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Chapter 2. Management Alternatives

2.1 Alternatives Development

During development of the alternatives for the draft CCP/EA, the Service reviewed and considered a variety of resource, social, economic, and organizational aspects important for managing the Refuge. These biological, physical, and socio-economic conditions are described more fully in Chapters 3, 4, and 5. As is appropriate for a national wildlife refuge, resource considerations were fundamental in designing alternatives. House Report 105-106 accompanying the Improvement Act states “...the fundamental mission of our System is wildlife conservation: wildlife and wildlife conservation must come first.” Toward this end, the planning team reviewed relevant plans, studies, and past and current research to better understand ecosystem trends and the latest scientific recommendations for species and habitats.

Public involvement is an important part of the planning process. Local, State, and Federal agencies, community groups, Refuge users, nonprofit organizations, and others were contacted by Refuge staff to ascertain priorities and issues. Public scoping meetings and workshops were held during 2009–2010 and involved more than 80 people. We also provided planning updates throughout the development of this draft CCP/EA, which allowed for comment opportunities to assist with alternatives development. Further details of public involvement and participation can be found in Appendix I.

2.2 Actions Considered but not Developed

During development of the alternatives, the planning team considered the actions detailed below. All of these actions were ultimately eliminated from further consideration for the reasons provided.

Recreational hunting. Part of the Improvement Act identifies compatible hunting as a priority public use for consideration on national wildlife refuge lands. Though hunting has been discussed in the past, due to the endangered species present on the Refuge, recreational hunting is not a use that would align with the purposes of this Refuge and therefore is not compatible. Kīlauea Point NWR is not open to recreational hunting because our main management focus is providing habitat for endangered species. Hunting would cause unacceptable disturbance and potential take of these endangered animals and plants. Additionally, a Refuge hunt program would create public safety concerns due to an insufficient buffer acreage. Recreational hunting opportunities are allowed on other parts of the island such as State forest reserves.

Sunset viewing opportunities. In past discussions as well as during public scoping, residents expressed interest in having more opportunities to view the sunset from the Refuge. Suggestions included building a parking lot or providing more access via Crater Hill for sunset trail hikes. However, providing sunset viewing opportunities via the Refuge does not align with the mission of the Refuge System nor would it contribute to the fulfillment of Refuge purposes. Additionally, people are currently allowed to access Crater Hill during daytime hours via the Seacliff Plantation entrance gate. Sunset viewing opportunities are also provided elsewhere on the island and in areas that would not adversely impact wildlife or their habitat.

Co-locating a visitor welcome and orientation center at the proposed new Hanalei NWR overlook site. In 2004, the Service expanded the refuge acquisition boundary of Hanalei NWR by 6 acres (USFWS 2004a and 2004b) to accommodate parking and facilities for a new Hanalei Valley scenic overlook. The site, facility design, and operations were described in the final EA and Finding of No Significant Impact (FONSI) for the Hanalei Valley/Hanalei National Wildlife Refuge Scenic Stop developed by the State of Hawai‘i Department of Transportation (HDOT) and Federal Highway Administration (FHWA) (HDOT and FHWA 2003). Currently, the Service is continuing to work with willing landowners to acquire interests (fee title, conservation easements, or cooperative agreements) within the proposed new overlook site. Should land acquisition occur, the Service would work with other agencies, partners, the local community, and others on the design, construction, and management of any visitor-support facilities at this site.

The new Hanalei NWR overlook site is located approximately 7 miles, or 15 minutes driving time without traffic, west of Kīlauea Point NWR. Thus, visitors traveling from the east along Kūhiō Highway (State Route 56) would have to overshoot the Refuge to get to the visitor welcome and orientation center and then double back in order to get to the Refuge. In order to ensure that visitor access to the Refuge remains convenient and tied to a sense of place (e.g., proximal to the wildlife and habitats occurring on the Refuge), co-locating a visitor welcome and orientation center with opportunities at the new Hanalei overlook site was considered but not developed.

2.3 Alternatives Descriptions

2.3.1 Features Common to All Alternatives

All alternatives contain some common features. These are presented below to reduce the length and redundancy of the individual alternative descriptions.

Acquisition of Inholdings and Cooperative Agreements. Each refuge must be managed to fulfill the Refuge System mission as well as the specific purpose(s) for which the refuge was established. In order to protect high quality coastal and lowland areas (wetlands, coastal strand, aquatic habitats, and their associated uplands), contribute to the recovery of endangered or threatened species, support other native plants and animals, and enhance opportunities for compatible wildlife-dependent public use, the Service will continue to work with willing sellers and other partners to acquire interests (fee title, conservation easements, and /or cooperative agreements) in inholding lands within the approved Refuge boundary.

Under all alternatives, the Service will explore the possibility of working with the State to cooperatively manage the tidelands adjoining Kāhili Quarry through interagency cooperative agreement or other mechanisms. Cooperative management of this area would contribute to achieving the Service’s mission, the Refuge’s purposes, and would help meet several of our goals by allowing us to protect wildlife resources through oversight of public use activities and Refuge law enforcement.

Adaptive Management. Based on 522 Departmental Manual (DM) 1 (Adaptive Management Implementation), Refuge staff shall utilize adaptive management for conserving, protecting, and, where appropriate, restoring lands and resources. Within Title 43 of the Code of Federal Regulations (CFR) 46.30, adaptive management is defined as a system of management practices based upon

clearly identified outcomes, where monitoring evaluates whether management actions are achieving desired results (objectives). Adaptive management accounts for the fact that complete knowledge about fish, wildlife, plants, habitats, and the ecological processes supporting them may be lacking. Adaptive management emphasizes learning while doing based upon available scientific information and best professional judgment, considering site-specific biotic and abiotic factors on Refuge lands and waters. In the presence of accelerated climate change, adaptive management is an increasingly important management decision process. The Refuge will employ adaptive management as a standard operating procedure under all alternatives. Part of measuring the success of and adaptively managing the Refuge includes 5-year reviews and a 15-year revision of the CCP, which will be initiated by the Service and involve many of the same steps and engagement with partners and the public as the original CCP.

Appropriateness and Compatibility. Consistent with relevant laws, regulations, and policies, prior to allowing any public use of the Refuge (including commercial use), each use will first need to be found appropriate and determined compatible (16 U.S.C. 668dd-668ee, 50 CFR 25, 26, and 29; and 603 FW 1 and 2). The Service will make preliminary findings and determinations regarding the appropriateness and compatibility of each use included in each alternative. Prior to a signature on the decision document for the CCP and associated NEPA document, appropriateness findings and compatibility determinations will be finalized for each use included in the Service’s proposed action. Appropriateness and compatibility are further discussed in Appendices A and B.

Climate Change. The Refuge will participate in and contribute to climate change assessment efforts, including those underway at a landscape scale. These efforts may include collaboration with the Pacific Islands Climate Change Cooperative (PICCC), which is a landscape conservation cooperative (LCC). The LCCs are formal science-management partnerships between the Service, Federal agencies, states, tribes, NGOs, universities, and other entities to address climate change and other biological stressors in an integrated fashion. LCCs provide science support, biological planning, conservation design, research, and design of inventory and monitoring programs. As needed, objectives and strategies will be adjusted to assist in enhancing Refuge resources’ resiliency to climate change. The Refuge will also continue to pursue and engage in mechanisms to conserve energy in Refuge operations, including the use of fuel-efficient vehicles.

Cultural and Historic Resource Protection and Section 106 Compliance. Cultural and historic resources on refuges receive protection and consideration in accordance with Federal cultural resources laws, Executive orders, regulations, and policies and procedures established by the Department of the Interior (DOI) and the Service. Actions with the potential to affect cultural and historic resources will undergo a thorough review before being implemented, as is consistent with the requirements of cultural resource laws. Refuge management actions will support the State of Hawai‘i’s vision statement “to promote the use and conservation of historic and cultural resources for the education, inspiration, pleasure and enrichment of the public in a spirit of stewardship and trusteeship for future generations” (DLNR HPD 2009). All ground-disturbing projects will undergo a review (including, but not limited to, archaeological and cultural surveys) under Section 106 of the National Historic Preservation Act (NHPA).

The Service will provide our Regional Historic Preservation Officer (RHPO) a description and location of projects and activities that affect ground and structures, including project requests from third parties. Information will also include any alternatives being considered. We would also

coordinate and consult with the State Historic Preservation Office (SHPO) and seek assistance from Native Hawaiians on issues related to cultural resources education and interpretation, special programs, and NHPA. Examples of projects identified in this CCP include, but are not limited to, fencing and building new maintenance and visitor services (VS) facilities, and acquisition of inholdings.

Native Hawaiians believe that the mana, or spiritual essence and power of a person, resides in the bones, their iwi. Unmarked Native Hawaiian burial sites have been exposed in the coastal strand/dunes area of the approved Refuge boundary but can be encountered almost anywhere. Care of inadvertently discovered iwi is an important issue for Native Hawaiians and the entire community in Hawai'i. The Service has the responsibility to care for the iwi with utmost respect for Hawaiian protocol, the laws of the state of Hawai'i, and all of the recognized cultural descendants. Strict protocols come into force whenever human skeletal remains are encountered inadvertently, through maintenance activities or through natural erosion.

When human remains are encountered, all work in the immediate area is stopped and the police are notified, as well as the DLNR. A qualified archaeologist then examines the burial context to assist in determining jurisdiction. If the remains appear to have been in place for less than 50 years, or appear to be a possible homicide victim or missing person, the local police secure the scene and investigate. If the remains appear to have been in place and interment for more than 50 years, they may be a burial. The DLNR, in consultation with the Service, the island burial council, and any identified descendants, determines whether the burial can safely remain in place where discovered or whether relocation may be needed.

Fishing. Fishing is one of six wildlife-dependent public uses that receives priority consideration in refuge planning when compatible with Refuge purposes and the Refuge System mission. Under all alternatives, Kīlauea Point NWR will remain open for recreational fishing per refuge-specific regulations for hunting and fishing, Hawai'i, 50 CFR 32.30. Fishing on the Refuge occurs in the ocean at Kāhili Quarry and in the estuary of Kīlauea River. Fishing will be allowed on a 24-hour basis in accordance with State regulations and include harvest via hook and line, throw net, spear, or shellfish gathering. Currently, fishing is not limited to any designated location, nor are related facilities provided. The Service proposes no major improvements (e.g., no asphalt or permanent paving) to Kāhili Quarry Road or Kāhili Quarry. See also Objective 4.6 for information on proposed new stipulations under the action alternatives regarding temporary shelters, portable camp stoves or barbeques, and dogs.

Traditional native Hawaiian fishing at Kīlauea (East) Cove will also remain open under all alternatives. See Appendix B for compatibility determinations.

Implementation Subject to Funding Availability. After the CCP is completed, actions will be implemented over a period of 15 years as funding becomes available. Draft project priorities and projected staffing/funding needs are in Appendix C, although special funding initiatives, unforeseeable management issues, and other budget issues will likely require adjustments to the implementation schedule in the future. The CCP will be reviewed at least every 5 years and updated as necessary.

Integrated Pest Management (IPM). In accordance with DOI and Service policies 517 DM 1 and 569 Fish and Wildlife (FW) 1 respectively, an IPM approach would be utilized, where practicable, to eradicate, control, or contain pest and invasive species (herein collectively referred to as pests) on the Refuge. IPM would involve using methods based upon effectiveness, cost, and minimal ecological disruption, which considers minimum potential effects to nontarget species and the Refuge environment. Pesticides may be used where physical, cultural, and biological methods, or combinations thereof, are impractical or incapable of providing adequate control, eradication, or containment. If a pesticide would be needed on Refuge lands or waters, the most specific (selective) chemical available for the target species would be used unless considerations of persistence or other environmental and/or biotic hazards would preclude it. In accordance with 517 DM 1, pesticide usage would be further restricted because only pesticides registered with the U.S. Environmental Protection Agency (EPA) in full compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and as provided in regulations, orders, or permits issued by EPA may be applied on lands and waters under Refuge jurisdiction.

Environmental harm by pest species would refer to a biologically substantial decrease in environmental quality as indicated by a variety of potential factors including declines in native species populations or communities, degraded habitat quality or long-term habitat loss, and/or altered ecological processes. Environmental harm may be a result of direct effects of pests on native species including preying and feeding on them; causing or vectoring diseases; preventing them from reproducing or killing their young; out-competing them for food, nutrients, light, nest sites, or other vital resources; or hybridizing with them so frequently that within a few generations few, if any, truly native individuals remain. Environmental harm also can be the result of an indirect effect of pest species. For example, decreased seabird use may result from pest plant infestations reducing the availability and/or abundance of suitable habitat for breeding.

Environmental harm may involve detrimental changes in ecological processes. For example, Guinea grass infestations can alter fire return intervals by displacing native species and communities of bunch grasses, forbs, and shrubs. Environmental harm may also cause or be associated with economic losses and damage to human, plant, and animal health. For example, invasions by fire-promoting grasses that alter entire plant and animal communities by eliminating or sharply reducing populations of many native plant and animal species can also greatly increase fire-fighting costs.

Predator control is aimed at minimizing entry of introduced predators to the Refuge using exclusion (e.g., hog wire fences), habitat modification (e.g., removal of trees used by cattle egrets for roosting), and control/eradication (eradicating or reducing and maintaining low numbers of rats, mice, cats, dogs, pigs, and mongooses if they are detected). Live trapping and use of bait stations (e.g., 0.005% diphacinone) will continue to be used to control rats and mice. These species are euthanized when live-trapped. Live traps are used to capture cats, dogs, and pigs on the Refuge.

When other methods are impractical, use of firearms and pellet guns are employed to humanely dispatch introduced predators and other pests such as pigs, chickens, and cattle egrets. Given the need to minimize stress on animals, gunshot at times is the most practical and logical method for wild or free-ranging animals. Personnel and public safety override any dispatching of animals by gunshot.

Shooting follows protocols for humane dispatch (AVMA 2007) and is only performed by highly skilled personnel trained and federally certified in the use of firearms. Predator and pest control will be conducted by Service personnel or contractors.

See Appendix G for the Refuge's IPM program documentation to manage pests for this CCP. Along with a more detailed discussion of IPM techniques, this documentation describes the selective use of pesticides for pest management on refuges, where necessary. Throughout the life of the CCP, most proposed pesticide uses on the Refuge would be evaluated for potential effects to biological resources and environmental quality. These potential effects would be documented in "Chemical Profiles" (see Appendix G). Pesticide uses with appropriate and practical best management practices (BMP) for habitat management as well as nursery/facilities maintenance would be approved for use on the Refuge where there likely would be only minor, temporary, and localized effects to species and environmental quality based upon non-exceedance of threshold values in Chemical Profiles. However, pesticides may be used on the Refuge where substantial effects to species and the environment are possible (exceed threshold values) in order to protect human health and safety (e.g., mosquito-borne disease).

Migratory Bird Protection and Conservation. Statute and policy at several levels mandate the protection and management of migratory bird populations at the Refuge. The primary Federal protective measure for these species is the Migratory Bird Treaty Act of 1918 (MBTA), which prohibits hunting, taking, capturing, killing, or selling of migratory bird species, and also fully protects eggs, nests, and feathers from collection or destruction. Additional directives from international treaties, domestic legislation, Executive orders, State law, and Service policy require the protection, monitoring, and assessment of migratory nongame birds, determination of the effects of environmental changes and human activities on migratory birds, and active protection of colonies, roosts, and adjacent waters for seabirds. At least 35 species of migratory birds, primarily seabirds, occur on or adjacent to the Refuge.

Participation in Planning and Review of Regional Development Activities. The Service will actively participate in planning and studies pertaining to future agricultural, industrial, and urban development, transportation, recreation, contamination, and other potential concerns that may affect Refuge resources. The Service will continue to cultivate working relationships with County, State, and Federal agencies, nongovernmental organizations, and community groups to stay abreast of current and potential developments. We will utilize outreach and education as needed to raise awareness of Refuge resources and dependence on the local environment.

Implementation of transportation strategies, in particular, will require coordination with Kaua'i County, Kaua'i Bus, Hawai'i Department of Transportation, Federal Highways Administration, and other stakeholders (e.g., Kīlauea Neighborhood Association and the public). The transportation elements of the CCP should be compatible with the Kīlauea Town Plan, the Kaua'i North Shore Development Plan, the County of Kaua'i General Plan, the State Transportation Improvement Plan and Long-Range Transportation Plan (LRTP), the USFWS Region 1 LRTP, and other plans.

Partnerships. Partnerships are critical components in maintaining and continuing efforts to implement resource management improvements, such as restoring habitat for threatened and endangered species, or enhance recreational opportunities. These partnerships typically involve

joining forces with Federal, State, and local agencies, organizations, schools, and Refuge Friends groups.

Reevaluation of public use visitation days at the Kīlauea Point. Due to flat and declining budgets, starting in February 2014, the Service reduced the days that Kīlauea Point proper (hereafter referred to as the Point) is open to the general public from 7 to 5 days a week. The Refuge is closed each Sunday and Monday. After a trial period of 1 year, the visitation days will be reassessed to see if it would be possible to reopen on a 6- or 7-day a week schedule. However, closures will continue to be a management option depending upon the availability of staff and resources.

Refuge Revenue Sharing. Annual payments to local governments under the Refuge Revenue Sharing Act (16 U.S.C. 715s) would continue according to the established formula and subject to congressional appropriations.

Regulatory compliance. This draft CCP/EA provides descriptions of the affected environments and resources, potential environmental consequences of certain types of activities, and general themes for management alternatives. Consequently, this draft CCP/EA can be incorporated by reference into future proposals to avoid lengthy recital and repetitive information. However, since this draft CCP/EA is programmatic in many issue areas, it may not contain the necessary detail on every future action outlined to adequately present and evaluate all physical, biological, and socioeconomic impacts. Some of these details are dependent on funding and implementation schedules. Therefore, prior to implementation, all activities will undergo appropriate reviews and consultations, and permits and clearances will be secured, as necessary, to comply with legal and policy requirements. This includes appropriate evaluations and documentation under the National Environmental Policy Act (NEPA), evaluation and consultation required by Section 7 of the Endangered Species Act (ESA), and review and consultation required by Section 106 of the National Historic Preservation Act.

State Coordination. KNWRC will continue to coordinate with Hawai‘i State agencies regarding areas of mutual interest.

Step-down Management Plans (SDMP). The CCP provides guidance in the form of goals, objectives, and strategies for several Refuge program areas, but may lack some of the specifics needed for implementation. Regardless of the alternative selected as the final management plan for the Refuge, several subsequent, or step-down, plans will be developed. For example, the CCP may note that signage is needed to accomplish a certain management objective. However, it will take a Refuge Sign Plan to specifically define design standards.

All step-down plans require appropriate NEPA compliance and implementation may require additional County, State, and Federal permits. Project-specific plans, with appropriate NEPA compliance, may be prepared outside of these step-down plans. The following SDMPs have been identified for the Refuge (implementation schedule can be found in Appendix C):

- Refuge Sign Plan;
- Facilities, Equipment, and Vehicle Maintenance Plan;
- Safety Plan;
- Visitor Services Plan (for entire KNWRC);
- Inventory and Monitoring Plan;

- Cultural/Historic Resource Management Plan;
- Master Site Plan;
- Wildland Fire Management Plan;
- Habitat Management Plan; and
- Plant Restoration Strategy.

Sustainability. For any projects that identify either new building or enhancements to existing structures or the transportation system, the Service will use, to the extent possible, sustainability measures such as alternative transportation options, reusing materials, utilizing renewable technology such as solar power, and acquiring goods and services in the most environmentally friendly way possible in order to minimize our footprint and effects to climate change as outlined in Executive Order 13514.

Threatened and Endangered Species Protection and Recovery. Protection of threatened and endangered species is common across all alternatives. The protection of federally listed species is mandated through the ESA, which provided establishment authority and was one of the purposes for this Refuge. It is also Service policy to give priority consideration to the protection, enhancement, and recovery of these species on national wildlife refuges. To ensure adequate protection, Section 7 of the ESA requires the Service to review all activities, programs, and projects occurring on lands and waters of refuges to determine if they may affect listed species or modify their designated critical habitat; this is known as an informal consultation. If the determination is that an action may affect and is likely to adversely affect a listed species or modify designated critical habitat, then we conduct a formal consultation and prepare a biological opinion, to identify those negative effects and the means to offset those effects.

Transportation Implementation Study. The Refuge has received funding from the Federal Transit Administration's Paul S. Sarbanes Transit in Parks Program to assist in planning for the implementation of the transportation components that emerge from the CCP. The study will provide recommendations on how to implement components, such as data collection, coordination with other entities, and as necessary, service planning for any proposed shuttle services.

Volunteer Opportunities. Volunteers are key components of successful management of public lands and are vital to refuge programs, plans, and projects, especially in times of static or declining budgets. Currently the Refuge makes extensive use of volunteers in habitat restoration and public use programs. In the future, successful implementation of native habitat restoration, survey and monitoring activities, and environmental education (EE) and interpretation programs will require the use of volunteers and partnerships.

Wilderness Review. The Service's CCP policy requires that a wilderness review be completed in all CCPs. If it is determined that the area meets the minimum requirements for wilderness, the process moves on to the wilderness study phase. The CCP planning team completed a wilderness inventory which can be found in Appendix D. This review concluded that the Refuge is not suitable for wilderness designation.

Wildlife and Habitat Management Review. The Improvement Act directs that each refuge shall be managed to fulfill the mission of the Refuge System and the specific purposes for which the refuge was established. Modifications are made to Refuge wildlife and habitat management programs based

on periodic informal or formal evaluations that ensure these programs are consistent with national, regional, ecoregional, and administrative policies and reflect consideration of current scientific knowledge. These evaluations provide feedback, determine if wildlife and habitat management goals and objectives are being met, and guide the Refuge in setting CCP priorities.

More formal evaluations, such as the wildlife and habitat management review, are conducted by Regional Office biological staff with refuge managers and biologists and a multi-disciplinary team of biologists and natural resources specialists. The Refuge conducted a habitat review in February 2013. In addition to a report summarizing the habitat review team's recommendations, the review will also inform development of the (1) Final Plant Restoration Strategy for KNWRC and (2) step-down Habitat Management Plan.

2.3.2 Summary of Alternatives

Each alternative describes a combination of management designed to achieve Refuge purposes, vision, and goals. These alternatives provide different ways to address and respond to management concerns, public and partner issues, and opportunities identified during the planning process. They also reflect the direction in the Refuge Administration Act, Service policies, and legal mandates outlined in Chapter 1. A summary of the key differences between the alternatives is presented in Table 2-1. A brief description as well as accompanying maps of each alternative follows.

Alternative A: No Action Alternative (Current Management)

Alternative A describes current management activities. This alternative assumes little to no change in current management programs (based on pre-existing initiatives at the Refuge) and is the baseline from which to compare the other alternatives.

Wildlife and Habitat. Management programs aimed at long-term protection and enhancement of migratory seabird populations and their habitats would continue. The Refuge currently supports six species of breeding seabirds including the threatened 'a'ō, and at least 30 species of non-breeding migratory birds on or adjacent to the Refuge. As sea levels rise over the next century, protected areas on high islands will become increasingly important to seabirds that currently nest primarily on the low islands and atolls of the Northwestern Hawaiian Islands. In addition, the Refuge is protecting and enhancing habitat for the endangered nēnē population and enhancing native plant communities.

Current management activities include weed control and outplanting native plants by volunteers, mowing and weeding grassland-shrubland habitat for nēnē, and controlling introduced predators. Biological programs also include construction of a 7-acre predator-proof fence, enhancing and monitoring the threatened 'a'ō population through social attraction and other devices, exploring with partners the feasibility of translocation techniques to support declining 'a'ō populations, and banding and monitoring reproductive success and survival of seabirds and nēnē.

Public Use and Access. With an estimated 500,000 people annually visiting the Refuge, public use of this Refuge is high (4th highest in the entire Refuge System). A 100-year-old lighthouse once used by the U.S. Coast Guard and currently on the National Register of Historic Places is the number one attraction at this Refuge. A majority of activities offered revolve around wildlife observation and photography (at Kilauea Road Overlook (hereafter referred to as the Overlook), viewing scopes,

binoculars) and interpretation and EE. Various events are offered throughout the year such as Lighthouse Day, and National Wildlife Refuge Week. Interpretive guides and hikes are offered on a very limited basis. There is a visitor center (VC) with limited interpretive displays that also houses a bookstore run by the Kīlauea Point Natural History Association (KPNHA).

Current Refuge infrastructure cannot adequately support this high level of public use. As a result, there is traffic congestion at the Refuge entrance and inadequate access, parking, and EE and VC infrastructure to provide a quality visitor experience. Strategies already underway to improve public use include implementing recommendations by the Transportation Assistance Group, such as improving signage, improving traffic flow at the Overlook and on the Refuge, and testing the use of intelligent transportation systems, transportation demand management strategies, and parking management strategies to better manage traffic coming to the Refuge. We are also partnering with the Federal Highway Administration to improve safety and traffic flow at the existing parking lot.

The Kāhili Quarry area is currently open to wildlife-dependent uses (fishing, wildlife observation and photography) and as a general public access to off-Refuge areas (Kīlauea River, Kīlauea Bay, and Kāhili Beach) for boating and other stream, beach, and ocean uses (e.g., snorkeling, sunbathing, surfing, swimming, and walking, including dog walking).

Cultural and Historic Resources. The Lighthouse was recently restored, rededicated, and renamed in the National Register of Historic Places as the Daniel K. Inouye Kīlauea Point Lighthouse. A historic structures report was also completed for the Lighthouse Station and maintenance to keep structures intact is ongoing. A cultural interpretive guided trail walk to Mōkōlea Point is offered during National Wildlife Refuge Week. Historic interpretive events are offered during the same event as well on Lighthouse Day.

Maintenance/Facilities and Law Enforcement. The Refuge has a VC, historic buildings, walkways and other historic structures, interpretive displays/signs, pedestrian walkways, parking area, fences, gates, roads, and signs to maintain. However, there is no covered building or parking for large Refuge equipment and vehicles (e.g., maintenance baseyard). The Refuge has only two small storage areas for equipment and a native plant nursery. Strategies already underway are examining relocating certain maintenance and facilities function off the Point as well as enhancing existing maintenance and storage areas. Administrative facilities and staff offices are housed in the historic buildings, as well as one staff residence. KNWRC law enforcement personnel patrol all three Refuges comprising KNWRC.

Alternative B: Restore native ecosystems; maintain visitor center on the Point

The chief distinction of this alternative from Alternative A is increased protection and management of biological resources and developing cultural resource programs and partnerships. For public use and access, primary differences involve reorganizing uses of existing buildings as well as improving public parking, traffic flow, and visitor activities; all focused visitor services would remain on the Point.

Wildlife and Habitat. Management programs aimed at long-term protection and enhancement of migratory seabird and endangered nēnē populations and their habitats would be expanded to larger areas on Crater Hill and Mōkōlea Point, including exploring the expansion of or additions to

predator-proof fenced units. As noted above, breeding habitat for seabirds, free of introduced predators and well above sea level, is a pressing need in the Hawaiian Islands. In addition, native plant communities would be restored to provide recovery habitat for threatened and endangered coastal plants.

Management programs on the Point would continue to support native bird populations but there would be no major habitat improvements in an effort to keep potential conflicts within high visitor use areas manageable (e.g., habituation, breeding bird disturbance). Current management activities such as weed control and outplanting native plants by volunteers, mowing and weeding grassland-shrubland habitat for nēnē, and controlling introduced predators would continue. Priority research, inventories, monitoring, and other scientific assessments would support management objectives.

Public Use and Access. Due to high visitation, limited land available for public use on the Refuge, and impacts to endangered species, public use and access would focus on reconfiguring use of existing buildings (e.g., Quarters #1 (current VS offices) to bookstore, VC for either an EE facility or interpretation) and traffic flow patterns to improve public use opportunities. Strategies include offering an optional shuttle, providing public/tour bus stop, and bike parking at the Overlook; increasing public parking at the Overlook and the existing parking areas; and expanding the volunteer program.

Public access to the Kāhili Quarry area would remain open; however, there would be new stipulations for anglers on temporary shelters and portable stoves or self-contained barbecues. Additionally, visitors accessing adjacent off-Refuge areas (Kāhili Beach, Kīlauea Bay, and the Kīlauea River) would be limited to daylight hours only (6 a.m. to 5 p.m.). All dogs brought into the quarry area would be required to be leashed on a short (8-foot maximum) leash or kept in a secure, enclosed pen or crate at all times and would not be allowed to run free.

Cultural and Historic Resources. The emphasis for cultural and historic resources in this alternative would be to develop relationships and better partnerships with Native Hawaiian organizations, historical institutions, and other preservation partners to identify and prioritize resources to protect and manage. We would share information on methods of resource protections and preservation. This alternative also integrates cultural and historic resources into outreach, interpretation, and planning with a specific focus on the Kīlauea Point Light Station.

Maintenance/Facilities and Law Enforcement. Maintenance facilities would be improved or rebuilt within the existing footprint, while at the same time exploring opportunities to move some maintenance and facility needs off the Point (e.g., storage). This alternative would also remodel and relocate administrative and VS offices between Quarters #2 (current staff residence) and #3 (current administrative offices). Law enforcement would develop an enforcement monitoring system and more partnering, workshops, outreach, and training on law enforcement would be conducted for Refuge staff and volunteers, partners, and the community.

Alternative C: Restore native ecosystems; build visitor center on Crater Hill

The chief distinction of this alternative from Alternative B is alternate transportation for public use, visitor access, and new facilities for visitation, orientation, and information dissemination. This alternative would also improve administrative and maintenance facilities.

The construction of a new visitor welcome and orientation center and maintenance facilities on Crater Hill would be associated with several actions that may need to occur prior to or in conjunction with the actual construction potentially including, but not limited to, the following: (1) completion of a transportation implementation study; (2) expansion of Refuge boundary to include Kīlauea Road; (3) acquiring land and easements; (4) redesigning Kīlauea Road for safe ingress–egress of pedestrians, cars, trucks, shuttle, and heavy equipment; (5) complete design of the new building and associated infrastructure; and (6) complete development of an associated transportation system. Within this draft CCP/EA, these actions are addressed at a conceptual level. Thus, more detailed planning, facility and transit design, and appropriate evaluation would be undertaken, including additional effects assessment in compliance with NEPA, evaluation and consultation under section 7 of ESA, and surveys and consultation under Section 106 of NHPA.

Wildlife and Habitat. Same as Alternative B. However, a welcome and orientation center and maintenance facilities would be constructed on the southwestern portion of Crater Hill. The approximately 3- to 4-acre footprint of the new facilities would fragment and reduce the quality and quantity of habitat for existing and future populations of endangered nēnē and seabirds.

Public Use and Access. The Service would focus on moving as much of the existing VS facilities off the Point to a new visitor welcome and orientation center on the Refuge (e.g., southwestern corner of Crater Hill). No private vehicles would be allowed past the current entrance gate. This alternative would also focus on using a shuttle system to provide public access to the Point and Overlook during open public hours, move the bookstore to the visitor welcome and orientation center, acquire and gate a portion of Kīlauea Road from the visitor welcome and orientation center, and provide guided interpretive hikes on Crater Hill.

Public use and access of Kāhili Quarry would be the same as Alternative B.

Cultural and Historic Resources. Same as Alternative B.

Maintenance/Facilities and Law Enforcement. A new maintenance baseyard (e.g., storage sheds, bays, pole barns, and nursery) would be built in the same area as the new visitor welcome and orientation center (e.g., southwestern corner of Crater Hill). KNRWC's main administrative offices would be co-located at the new visitor welcome and orientation center and Quarters #3 remodeled for basic administrative and volunteer offices. Law enforcement is the same as Alternative B.

Alternative D: Preferred – Restore native ecosystems; move visitor center off-Refuge (adjacent to or within 1 mile of approved Refuge boundary)

The chief distinction of this alternative from Alternative C is an off-Refuge visitor welcome and orientation center to facilitate public use, visitor access, information, and orientation. By being off the Refuge, it would open for potential habitat restoration the southwestern corner of Crater Hill not occupied by the visitor welcome and orientation center.

The construction of a new visitor welcome and orientation center and maintenance facilities within 1 mile of the Refuge boundary, under this preferred alternative, would be associated with several actions that would need to occur prior to or in conjunction with the actual construction. Those actions could include (1) completion of a transportation implementation study; (2) expansion of the Refuge

The construction of a new visitor welcome and orientation center and maintenance facilities within 1 mile of the Refuge boundary, under this preferred alternative, would be associated with several actions that would need to occur prior to or in conjunction with the actual construction. Those actions could include (1) completion of a transportation implementation study; (2) expansion of the Refuge boundary to encompass the new site; (3) land acquisition, easement, or interim lease; (4) complete design of the new building and associated infrastructure; and (5) complete development of an associated transportation system.

An alternative to off-Refuge land acquisition and construction of a new building would be to modify an existing facility or co-locate the Refuge welcome and orientation center with a partnering conservation organization located within 1 mile of the current Refuge boundary (e.g., in Kīlauea Town, near the proposed Kīlauea Town Bypass), as described in the site selection criteria listed under Objective 4.2, which would preclude several actions listed above.

Within this draft CCP/EA, these actions are addressed at a conceptual level. Thus, more detailed land acquisition planning, facility and transit design, and appropriate evaluation would be undertaken, including additional effects assessment in compliance with NEPA, evaluation and consultation under Section 7 of ESA, and surveys and consultation under Section 106 of NHPA.

Wildlife and Habitat. Same as Alternative B.

Public Use and Access. The Service would focus on moving as much of the VS off the Point to a new visitor welcome and orientation center off Refuge lands (adjacent to or within 1 mile). This offsite alternative could encompass many scenarios. The visitor welcome and orientation center could be located adjacent to the Refuge boundary or be within 1 mile of the Refuge (including in Kīlauea Town or on the main Kūhiō Highway). Depending on the location of the visitor welcome and orientation center, it could also connect to the bypass being considered by Kīlauea Town.

Similar to Alternative C, no private vehicles would be allowed past the current entrance gate. This alternative would also focus on using a shuttle system to provide public access to the Point and Overlook during open hours, move the bookstore to the new visitor welcome and orientation center, and provide more guided interpretive hikes on Crater Hill. If the visitor welcome and orientation center is adjacent to the Refuge, acquiring and gating a portion of Kīlauea Road from the visitor welcome and orientation center would only be considered if the center was adjacent to the Refuge boundary along that roadway.

Public use and access of Kāhili Quarry would be the same as Alternative B.

Cultural and Historic Resources. Same as Alternative B.

Maintenance/Facilities. The new maintenance baseyard (e.g., storage sheds, bays, pole barns, and nursery) would be off current Refuge lands. Depending on the location of the visitor welcome and orientation center (if adjacent to the Refuge), the new maintenance facilities would be co-located with it. However, if the visitor welcome and orientation center is on the outskirts of the 1-mile radius, the new maintenance baseyard may not be co-located with the visitor welcome and orientation center.

KNWRC's main administrative offices would be co-located at the visitor welcome and orientation center and Quarters #3 remodeled for basic administrative and volunteer offices. Law enforcement is the same as Alternative B.

Table 2-1 Summary of Alternatives by Issue.

Key Themes	Objectives	Alternative A (Current Management)	Alternative B (Restore Native Ecosystems; Visitor Center in Situ)	Alternative C (Restore Native Ecosystems; Build Visitor Center on Crater Hill)	Alternative D (Preferred – Restore Native Ecosystems; Move Visitor Center Off-Refuge Nearby)
<i>Coastal ecosystem</i>	1.1 Enhance coastal mixed woodland-grassland habitat for seabird breeding and roosting	40–50 ac	97 ac		
	1.2 Enhance coastal grasslands for nēnē foraging, breeding, and roosting	27 ac	32–34 ac		
	1.3 Protect sea cliff and beach strand habitat	59 ac	59 ac		
	2.1 Restore/enhance breeding populations of ‘a‘o and other seabirds	Manage suitable habitat; sustain/expand current distribution of seabirds (e.g., through the use of social attraction)	Re-establish populations (e.g., determine feasibility of potential ‘a‘o chick translocation)		
	2.2 Restore/enhance native coastal plant communities (including endangered plants)	3–5 ac	10–30 ac		
<i>Inventory and monitoring, research,</i>	3.1 Conduct high-priority inventory and monitoring	Monitor birds and conduct inventories as needed	Re-evaluate, develop, and implement a prioritized inventory and monitoring program within regional framework		

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<i>and assessment</i>	(survey) activities				
<i>Visitor Services</i>	<p>3.2 Conduct high-priority research projects and scientific assessments</p> <p>4.1 Improve visitor access</p> <p>4.2 Improve visitor information and orientation</p> <p>4.3 Enhance/expand environmental interpretation</p>	<p>Conduct research and scientific assessments on priority species or issues</p> <p>Improve traffic flow in the existing parking area and better delineate parking spaces</p> <p>Redesign and enhance Overlook to provide greater orientation and information; re-examine site layout and move some functions off the Point</p> <p>Continue to provide limited guided interpretive activities; expand opportunities to provide limited access to the interior of the Lighthouse;</p>	<p>Develop a collaborative research program for priority research projects and scientific assessments that directly support management objectives</p> <p>Same as Alt. A, <i>except</i> provide optional shuttle from the Overlook; increase public parking onsite; improve traffic flow at the Overlook (e.g., public/tour bus stop; shuttle stop; bike parking)</p> <p>Same as Alt. A, <i>except</i> remodel existing VC for either EE or new interpretive exhibits and displays while maintaining bookstore onsite</p> <p>In addition to Alt. A., remodel existing VC; explore converting current VS office (Quarters #1) to other functions; remodel</p>	<p>Institute mandatory shuttle (no private vehicles); acquire and gate portion of Kīlauea Road from new visitor welcome and orientation center; improve traffic flow at the Overlook (e.g., shuttle stop; bike parking)</p> <p>Establish new visitor welcome and orientation center on the Refuge at southwestern corner of Crater Hill</p> <p>Same as Alt B <i>except</i> increase number of guided interpretive activities; offer guided interpretive hikes on Crater Hill; move bookstore to new visitor welcome and orientation center; expand Contact Station to allow for more scenic viewing</p>	<p>Same as Alt. C <i>except</i> acquire and gate portion of Kīlauea Road from new visitor welcome and orientation center <i>only if</i> adjacent to Refuge</p> <p>Same as Alt. C <i>except</i> establish new visitor welcome and orientation center off the Refuge (adjacent or within 1 mile)</p>

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		enhance partnerships	Contact Station	
	4.4 Enhance/expand EE	Enhance partnerships; utilize interns and volunteers	In addition to Alt. A., develop Junior Ranger program; provide teacher workshops; convert an existing structure to designated EE facility/facilities	
	4.5 Enhance/expand wildlife observation and photography	Continue to provide viewing scopes and binoculars; work with partners; identify closed areas	In addition to Alt. A., expand citizen science opportunities	Same as Alt. B <i>except</i> offer guided interpretive hikes on Crater Hill; expand opportunities (e.g., workshops, activities)
	4.6 Reduce wildlife disturbance, habitat degradation, and user conflict potential while increasing public safety at Kāhili Quarry	Continue to allow 24-hour fishing and general access to off-Refuge nonwildlife-dependent uses; maintain passable road to beach and shoreline; post boundary; replace existing fence; explore possibility of cooperatively managing tidelands with State	In addition to Alt. A, implement new stipulations including: <ul style="list-style-type: none"> - Allowing anglers to erect temporary shelters (protections from the sun and/or rain) in the quarry area during daylight hours only - Allowing anglers to bring and use portable stoves or self-contained barbeques (e.g., off-the-ground portable enclosed fires), but not build ground fires or fires in fire rings or pits - Allowing access to Kāhili Beach, Kīlauea Bay and the Kīlauea River through the Kāhili Quarry area from 6 a.m. to 5 p.m. daily - Requiring all dogs brought into the quarry area to be to be leashed on a short (8-foot maximum) leash or kept in a secure, enclosed pen or crate at all times and would not be allowed to run free 	
	4.7 Enhance/expand outreach	Conduct outreach through more activities and engagements with target audiences	In addition to Alt. A., encourage staff training and engagement	
	4.8 Enhance/expand volunteer and Friends group opportunities	Continue coordination with KPNHA; improve volunteer materials	In addition to Alt. A, expand to at least 200 volunteers; develop program to focus on natural resource management; implement a training program; host at least two community work days per year	

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<i>Cultural and historic resources</i>	5.1 Implement a proactive cultural (including historic) resource management program	Prepare cultural resource overview and conduct archival research and communication with Native Hawaiian organizations, historical institutions, and other preservation partners			
	5.2 Create and implement with partners a program for Kīlauea Point Light Station	Prepare a historic treatment plan and consult with historical societies and other preservation partners to develop interpretive media	Same as Alt A., <i>except</i> develop an outreach program		
<i>Operations</i>	6.1 Replace, maintain, enhance visitor/administrative/maintenance facilities	Enhance existing maintenance/facility areas and provide protected area for machines/vehicles; pursue offsite parking for staff and volunteers	Same as Alt A, <i>except</i> remodel existing maintenance/facility areas; remodel and relocate administrative and VS offices to Quarters #2 and #3	Include administrative offices in new visitor welcome and orientation center; remodel Quarters #3 for basic administrative and volunteer offices; build new maintenance baseyard on the Refuge (e.g., southwestern corner of Crater Hill)	Same as Alt. C <i>except</i> build new maintenance baseyard off the Refuge
	6.2 Enhance law enforcement	Continue to work with partners and law enforcement to protect natural resources	Develop law enforcement monitoring system; develop outreach tools; provide workshops and training		

2.4 Goals, Objectives, and Strategies

Goals and objectives are the unifying elements of successful refuge management. They identify and focus management priorities, resolve issues, and link to refuge purposes, Service policy, and the Refuge System mission.

A CCP describes management actions that help bring a refuge closer to its vision. A vision broadly reflects the refuge purpose(s), the Refuge System mission and goals, other statutory requirements, and larger-scale plans as appropriate. Goals then define general targets in support of the vision, followed by objectives that direct effort into incremental and measurable steps toward achieving those goals. Strategies identify specific tools and actions to accomplish objectives.

The draft goals for the Refuge for the 15 years following completion of the CCP are presented on the following pages. Each goal is followed by the objectives that pertain to it. All objectives are for the lifetime of the CCP unless otherwise specified. Some objectives pertain to multiple goals and have simply been placed in the most appropriate spot. Similarly, some strategies pertain to multiple objectives. The goal order does not imply any priority in this CCP. Priority actions are identified in the staffing and funding analysis (see Appendix C).

Readers, please note the following:

- The objective statements as written apply to the Service's Preferred Alternative; and
- The objective statement indicates specific items (i.e., acreages) that vary in the other alternatives. How those items vary is displayed in the short table under each objective statement; as applicable, each other alternative shows substitute text for the item or items in italics.

Below each objective statement are the strategies that could be employed in order to accomplish the objectives. Note the following:

- Check marks (✓) alongside each strategy show which alternatives include that strategy; and
- If a column for a particular alternative does not include a check mark for a listed strategy, it means that strategy will not be used in that alternative.

Other symbols used in the following tables include:

- ~ Approximately
- % Percent sign;
- > Greater than;
- < Less than;
- ≥ Greater than or equal to; and
- ≤ Less than or equal to.

2.4.1 Goal 1: Protect, enhance, and manage the coastal ecosystem to meet the life-history needs of migratory seabirds and threatened and endangered species.

Objective 1.1 Enhance and manage coastal mixed woodland-grassland habitat for seabird breeding and roosting.		
<p>Annually manage 97 acres and enhance 2–5 acres per year (within the 97 acres) mixed woodland-grassland habitat for seabird breeding and roosting with the following attributes:</p> <ul style="list-style-type: none"> • Safe flight corridors free of obstacles (e.g., pest trees, signs) and light hazards; • Broad habitat characteristics of seabirds currently breeding on Refuge: <ul style="list-style-type: none"> ○ Large grasslands (<6 inch vegetation height) or open-canopy, open-understory woodlands next to open windward runways for take-off and landing (mōlī); ○ Substrates with rock and root crevices or good soil/root structure or sub-canopy layer for burrowing (‘ua‘u kani); ○ Hala/naupaka woodlands with an open understory or dense subcanopy layer (e.g., hala leaf litter) for burrowing (‘a‘o); ○ Rocky ledges and crevices of steep cliffs (koa‘e kea); ○ Open-understory woodlands, rock and root crevices (koa‘e ‘ula); ○ Large patches of woodlands >3.0 feet tall (‘ā); availability of small woody debris (‘ā) • Minimal human disturbance in areas designated for seabird breeding (time varies by species); and • Predation by introduced predators (e.g., dogs, cats, rats) zero for threatened ‘a‘o; ≤20 adults per year for ‘ua‘u kani; ≤1 adult per year for all other species. 		
Alternatives:	Alt A (Current)	Alt B-D
<i>Total acreage annually managed</i>	40–50	97
Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B-D
a. Reduction in pest ironwood and other species by 2–5 acres/year in priority areas (e.g., obstacles to flight, limiting nesting)		✓
b. Mowing an additional 2–3 acres of grasslands per year to set back invasive shrub succession (<6 inch vegetation height)	✓	✓
c. Small-scale outplanting native plants (e.g., ‘āheahea, hala) that provide suitable habitat structure and function for seabirds		✓
d. Use IPM strategies including mechanical/physical (e.g., mowing, brush-cutting, excavation, prescribed fire), cultural, chemical (e.g., herbicides), biological, and other suitable techniques to control Christmasberry, lantana, ironwood, and other pest/undesirable plants (see Appendix G)	✓	✓
e. If insect threats (e.g., mosquitoes, ants, scale insects) to breeding seabirds are detected during monitoring, use IPM control techniques (e.g., removing potential breeding sites for mosquitoes, ant bait stations (e.g., Fipronil), approved biocontrols, hand removal of infected leaves, granular and spot-treating plants with insecticides (e.g., Sevin ®))	✓	✓
f. Ensure no obstacle or light hazards occur onsite; work with community (e.g., Town of Kīlauea, Department of Land and Natural Resources (DLNR)) to promote appropriate, bird-friendly lighting,	✓	✓

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lighting including downward shielding, seasonal reduction in outdoor lighting, and window shades		
g. Complete public use closure around threatened ‘a‘o burrows	✓	✓
h. Partial public use access in designated public use areas (parking lot and trail to Lighthouse on the Point) and on Crater Hill for a limited number of guided interpretive hikes; complete closure in all other parts of the Refuge	✓	✓
i. Maintain or replace 2.7 miles of existing hogwire fencing (same as in Objective 1.2 and also includes Objective 4.6, strategy c)	✓	✓
j. Live-trapping, shooting, and bait stations to reduce predation on migratory birds by introduced vertebrate pests	✓	✓
k. With partners, install and maintain predator-proof fence east of Crater Hill (Nihoku Ecosystem Restoration Project; USFWS 2014)	✓	✓
l. Explore the possibility of expansion of or separate additions to the Nihoku Ecosystem Restoration Project predator-proof fence (e.g., adding fence panels)		✓

Rationale: Safe habitats for breeding and foraging are essential for all migratory seabirds using the Refuge. While most seabirds exhibit some flexibility in their habitat requirements, features of the plant community (species and structural characteristics) favor or limit populations. Thus, control or eradication of pest plants would be focused mainly on areas where they have a negative effect on seabird survival and reproduction. The Refuge consists of degraded coastal grasslands and woodlands (scrub, shrub, and forest) dominated by pest plants which require annual maintenance. For example, rapid growth of ironwood trees at the base of Mōlī Hill, creates obstacles within primary mōlī flight corridors. In 2010, a mōlī fledgling taking its first flight crashed into an ironwood tree and was grounded cliff-side for a day, an annual occurrence if ironwoods are not removed. In addition, when wind direction shifts, mōlī land from the west (versus north) where there is a large pest oleander patch obstructing this secondary flight corridor.

The Refuge would prioritize problem areas for pest control based on bird habitat requirements, human safety, and plant species’ aggressiveness, and enhance approximately 2–5 acres each year. Pest insect species can affect survival and reproduction of migratory seabirds by causing mortality through predation or parasitism, or by modifying habitat to make it less suitable. Ants can attack seabird chicks or pipping eggs and have short-term but widespread detrimental effects (Plentovich et al. 2008, USFWS 2005). Urban lights can disorient seabirds, particularly ‘a‘o fledglings making their first flights to sea. Subsequently, birds crash into vegetation or obstacles and die, get crushed by vehicles, or get killed by predatory animals (Ainley et al. 2007).

The total acreage managed for seabirds is estimated to be 97 acres where additional management activities include control of introduced predators and other pest species such as ants around ‘a‘o burrows, minimizing human disturbance during breeding, removing debris from artificial ‘a‘o and ‘ua‘u kani burrows prior to breeding season, and ensuring safe onsite flight corridors free of obstacles and light hazards.

Opportunities for restoring native habitats for seabirds exist when there is a high likelihood of restoring native-dominated plant communities (e.g., human-caused factors contributing to the spread of pest species have ceased, invasive competitors have been eradicated, or there is a commitment for long-term pest control). Translocation, propagation, and outplanting appropriate native plants to improve habitat for migratory seabird nesting. For example, ‘ā are known to nest on the native shrub ‘āheahea and use its foliage to line nests. Restoring native plant communities may also provide more stability within the

plant community to suppress new weed invasions. Small-scale outplantings would be conducted following recommendations in the draft Plant Restoration Strategy for KNWRC. The Plant Restoration Strategy would be finalized within 2 years of CCP completion.

Studies show that even passive human activities like birdwatching or photography could be harmful to some birds by altering normal feeding and breeding patterns. Birds are particularly wary of large groups, loud noises, and rapid movements. When people are present, birds may spend less time tending their young and more time on the lookout for danger, or may leave the area expending time and energy that could have been spent successfully foraging and raising young. Human disturbance of breeding birds could result in increased desertion of nests, reduced hatching success, and decreased chick survival (Dahlgren and Korschgen 1992, Staine and Burger 1994). Although effects on chick survival were not examined, a Refuge pilot study comparing ‘ua‘u kani chick stress hormone levels near and far from the Lighthouse Trail, which receives high visitor usage, found smaller chicks and elevated stress hormones (up to 100 times higher) in trailside chicks (Kitaysky et al. unpublished). Thus, stress affects animals in different ways (physical, physiological) and may not be expressed outwardly by changes in their behavior. Studies such as these could assist in determining whether or not human activities at the Refuge are affecting bird survival and reproduction (see Objective 3.2).

On the other hand, seabird viewing provides an opportunity for people to gain first-hand experience, learn about wildlife, and take an active interest in wildlife conservation. The Refuge is required to consider compatible public uses, particularly those that may provide long-term benefits for wildlife. Thus, the Refuge would continue to allow wildlife viewing in designated public use areas (parking lot and trail to Lighthouse) but continue to limit visitation hours to limit negative effects on breeding birds (e.g., 10:00 a.m.–4:00 p.m.) and prohibit entry to other areas of the Point, including the breeding areas of listed species. The Refuge would allow a limited number of guided interpretive hikes on Crater Hill. Hikes would be conducted outside the breeding season for endangered nēnē. Interpretive and other activities on Crater Hill would be compatible with the Refuge System mission and Refuge purpose, and be continually monitored and adapted to minimize negative effects on native wildlife. At this time we do not have specific guidelines for other species because sensitivity varies by species, life stage, and many other factors. Specific guidelines for minimizing disturbance to native birds would be developed in a step-down Visitor Services Plan depending on the alternative chosen (see further discussion in Objective 4.5 Rationale).

Monitoring migratory seabird populations and habitats is necessary to detect changes in excess of natural variation that might be attributed to human activities. Refuge activities such as biological monitoring, maintenance, vegetation management, and predator control would be timed to minimize disturbance on breeding birds. Such techniques for natural resources management activities include limiting the number of visits to once per week, minimizing physical contact with birds, moving slowly in colonies, keeping voices and noise levels low, and approaching birds tangentially (Carney and Sydeman 1999). See Appendix B for Compatibility Determinations.

The foremost threat to adult seabirds on land is introduced predators including cats, rats, mongooses, dogs, and barn owls. In the Pacific Region, cats and rats have been responsible for colony extirpations and range-wide population declines of numerous species (USFWS 2005). Seabird eggs and chicks are easy prey for pigs, mice, and introduced cattle egrets and unattended (or abandoned) eggs can be eaten by common mynah (Byrd et al. 1984), chickens and red-crested cardinals. Cats, rats, mongooses, dogs, and barn owls regularly prey on adult seabirds. In 2010 at the Refuge, >75 adult ‘ua‘u kani were found preyed upon by owls (compared with 5 in 2009), and carcass recoveries subsided after removal of 4 introduced barn owls. Also in 2010, dogs entering the Refuge at the unfenced end of Mōkōlea Point killed at least nine adult ‘ua‘u kani on the Refuge. Even when this number is low, such losses could

affect local populations because adult survival is an important factor regulating seabird populations. Thus, it is critical to control predators to reduce seabird mortality and increase reproductive success and survival, which would also benefit migratory waterfowl and shorebirds and endangered nēnē, and is important to achieve Refuge purposes.

In collaboration with several partners, including the American Bird Conservancy, the Kaua‘i Endangered Seabird Recovery Project (a Hawai‘i Division of Forestry and Wildlife and Pacific Cooperative Studies Unit effort), the National Fish and Wildlife Foundation, and others, construction of an approximately 2,400 foot long predator-proof fence around 7 acres of the Refuge slightly east of Crater Hill (i.e., the Nihoku Ecosystem Restoration Project) was completed in September 2014 (USFWS 2014). Under the action alternatives (B–D), the Service would explore the possibility of expansion of or separate additions to the Nihoku Ecosystem Restoration Project fence. It is hoped that the creation of predator-free refugia would improve nesting success for nēnē and mōlī, facilitate natural re-colonization by other seabirds such as the ka‘upu or ‘ou and support future plans to potentially translocate the threatened ‘a‘o and reintroduce rare and endangered plants.

Objective 1.2 Enhance and manage coastal grasslands habitat for nēnē foraging, breeding, and roosting.

Within 2 years, annually manage 32–34 acres and enhance 5–7 acres (within the 32–34 acres) of coastal grassland habitat for nēnē foraging, breeding, and roosting at Crater Hill and Mōkōlea Point with the following attributes:

- Mosaic of grassland and native shrublands including large contiguous patches (>3 acres) of Kikuyu-Spanish clover grasslands;
- Kikuyu-Spanish clover grasslands managed <4–6 inches vegetation height;
- 15–20% native-dominated shrublands (canopy >75% cover; e.g., naupaka (*Scaevola*) coastal dry shrubland);
- <10% cover of pest woody vegetation (e.g., lantana, Christmasberry, ironwood);
- Minimal human disturbance during the peak breeding season (approximately October–March); and
- Predation levels by introduced predators (e.g., dogs, cats, rats) ≤2 adult nēnē per year.

Alternatives:	Alt A (Current)	Alt B–D
<i>Total acreage annually managed</i>	27	32–34
Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B–D
a. Mowing at a frequency to stimulate vigorous growth of grasses; maintain <4–6 inches tall	✓	✓
b. Rehabilitate and maintain irrigation system at Crater Hill for native plant establishment		✓
c. Enhance grasslands with native shrubland plant communities that provide suitable habitat structure and function for nēnē (e.g., naupaka, ‘akoko, nehe for nēnē food and cover)		✓
d. Use IPM strategies including mechanical/physical (e.g., mowing, brush-cutting, excavation, prescribed fire), cultural, chemical (e.g., herbicides), biological, and other suitable techniques to control lantana, Christmasberry, ironwood, and other pest/undesirable plants (see Appendix G)	✓	✓

e. Public use closures and Refuge activities would be timed to minimize disturbance on breeding birds	✓	✓
f. Maintain or replace 2.7 miles of existing hogwire fencing (same as in Objective 1.1 and also includes Objective 4.6, strategy c)	✓	✓
g. Live-trapping, shooting, and bait stations to reduce predation on migratory birds by introduced vertebrate pests	✓	✓

Rationale: Nēnē are browsing grazers of grasses, sedges, forbs, and shrubs and typically nest in edges of open-understory woodlands. No studies have been conducted on nēnē lowland foods or habitat use (see Objective 3.2). However, research conducted in mid-elevation Hawai‘i Island found nēnē fed mainly on cultivated grasses, and that legumes and grass leaves had more protein than berries and grass seeds; pasture grasses had more protein than shrubland grasses; mowed or livestock-grazed grasses had more protein than rank grasses; and breeding success was higher for nēnē with more grasses in their diet (Black et al. 1994). Birds selected forage with high water and protein content, which indicates high forage quality, such as the young shoots of a Kikuyu grass-Spanish clover grassland, and preferred sward-forming (turf-like growth) over bunch grasses, and short (2–4 inches) over tall grasses (Woog and Black 2001).

Currently, approximately 27 acres of Kikuyu grasslands are managed for nēnē at Crater Hill year-round. Kikuyu grass was introduced for cattle forage prior to acquisition by the Refuge. Removal of 5–7 acres of pest Christmasberry, lantana, and other aggressive weeds to open up existing historic Kikuyu grass-Spanish clover grasslands would increase habitat managed for nēnē to 32–34 acres total. Enhancement of these grasslands by planting patches of native shrublands to create a mosaic would provide additional food, cover, and close-proximity nesting, escape, and thermal cover. Although Kikuyu grass is considered an aggressive pest, the species originates in tropical Africa at elevations of 5,000–10,000 feet and appears to be less aggressive in the coastal zone. Currently, there are no known native grasslands that could be restored to provide the same nutrition as Kikuyu-Spanish clover grasslands.

In lieu of artificial water features for nēnē, the Refuge would improve mowing regimes to manage short grasslands with high moisture and enhance areas with native shrubs such as naupaka, which provide moisture in berries. Managed grasslands at Crater Hill also provide habitat for prospecting seabirds such as mōlī and stopover or wintering habitat for migratory waterfowl and shorebirds, including cackling goose, kōlea, and the candidate species kioea. Small-scale outplantings would be conducted following recommendations in the draft Plant Restoration Strategy for KNWRC. The Plant Restoration Strategy would be finalized within 2 years of CCP.

Nēnē eggs and goslings are vulnerable to introduced predators including rats, mongooses, dogs, cats, and pigs. Adult nēnē are vulnerable mainly to dogs and cats, especially during their synchronous molt of flight feathers, which renders birds flightless. It is critical to control predators to reduce mortality and increase reproductive success and survival. Controlling introduced predators would also benefit migratory seabirds, waterfowl, and shorebirds and is important to achieve the Refuge purpose (USFWS 2004c).

Objective 1.3 Protect sea cliff and beach strand habitat.

Protect approximately 59 acres of sea cliff and beach strand habitat for seabird breeding and roosting and ‘Īlio-holo-i-kauaua basking year-round, with the following attributes:

- No signs of accelerated human-caused erosion;
- Minimal or no human disturbance year-round; and
- Seabird populations stable or increasing.

Alternatives:	Alt A (Current)	Alt B–D
<i>Total acreage annually managed</i>	59	59
Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B–D
a. Conduct a road and trail assessment and analysis and identify problem areas (e.g., accelerated erosion, compaction) and solutions (e.g., water bars, erosion matting, re-vegetation) (Objective 3.2)	✓	✓
b. Stabilize areas of accelerated erosion identified in the road and trail assessment and analysis		✓
c. Design and implement a monitoring program for 1–2 indicator species (e.g., ‘ā) to detect natural or anthropogenic variation in habitat conditions (Objective 3.1)		✓
d. Continue to support the National Oceanic and Atmospheric Administration and Department of Land and Natural Resources (DLNR)’s Marine Mammal Response Network	✓	✓
e. Public use closure	✓	✓
f. Implement additional stipulations to reduce wildlife disturbance and habitat degradation due to public use at Kāhili Quarry (Objective 4.6)		✓
<p>Rationale: Sea cliff habitat is characterized by nearly-vertical or vertical cliff faces (>45% slope) with highly-erodible soils exposed to wind and sea. Given the vertical topography and unstable substrates of these areas, access is very difficult to hazardous. This area is important breeding habitat for ‘ua ‘u kani, koa‘e ‘ula, koa‘e kea, and ‘ā and roosting habitat for ‘iwa, ‘ā (brown boobies and red-footed boobies) and endangered nēnē. The beach strand habitat, consisting of small areas totaling approximately 8 acres of sand or gravel within or just above the tidal zone, provides protected basking habitat for the critically endangered ‘īlio-holo-i-kauaia and potentially the threatened honu and foraging habitat for migratory shorebirds such as ‘ūlili, akekeke, kōlea, and marine fauna.</p> <p>Trespassing is a regular occurrence in several areas including unleashed pet dogs and the illegal harvest of firewood to build fires during fishing or illegal camping. Unleashed dogs impact endangered and migratory wildlife in both public and remote areas. In addition, trespassers have been caught scaling steep cliffsides to access remote surfing areas. The areas are closed to the general public and management would be limited to protection from the potentially devastating effects of human (e.g., crushing birds in underground burrows) and predator (e.g., dogs preying upon endangered nēnē goslings or ground-nesting seabirds) intrusion, conducting public education, and population and habitat monitoring.</p>		

2.4.2 Goal 2: Restore and/or enhance and manage populations of migratory seabirds and threatened and endangered species.

Objective 2.1 Restore and enhance breeding populations of ‘a‘o and other seabirds.
<p>Restore and enhance breeding populations of ‘a‘o and other seabirds on Crater Hill and Mōkōlea Point, with the following attributes:</p> <ul style="list-style-type: none"> • Viable breeding populations; trends suggest stable or increasing population sizes and distributions; and • High genetic diversity.

Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B–D
a. Continue to maintain ‘a‘o colony on the Point (NESH Hill), while increasingly putting emphasis for ‘a‘o recovery on Crater Hill/Mōkōlea Point areas (including the Nihoku Ecosystem Restoration Project area)	✓	✓
b. Manage suitable habitat for seabirds including a control of vertebrate and invertebrate pests and habitat-modifying plants, minimal human activity, and no flight or light hazards (Objective 1.1)	✓	✓
c. Re-establish populations of extirpated seabird species		✓
d. Provide a high-island refugium for seabird populations potentially displaced by climate change or other stressors		✓
e. Use social attraction techniques to enhance the ‘a‘o and other seabird populations; monitor for bird and predator responses to stimuli	✓	✓
f. With partners, determine feasibility of the Refuge as a potential ‘a‘o chick translocation site (Objective 3.2)		✓
<p>Rationale: As habitat components are managed and threats are controlled, the Refuge could take on the role of passive or assisted restoration and enhancement of seabird populations. Many examples of successful conservation programs are based on the principle that populations can be restored to an area if limiting threats are removed (e.g., human disturbance, introduced predators). Re-colonization rates may be improved with chick translocation (Miskelly et al. 2009) or social attraction techniques which use sound or visual stimuli to modify behavior (Gummer 2003). However, there is evidence that colony establishment can occur faster at a considerably cheaper rate using fencing and social attraction versus fencing and chick translocations, and that chick translocations may be required at some locations but not others (Courtot et al. 2014, Sawyer 2014). Since 2007, two loudspeakers project ‘a‘o colony calls to attract prospecting birds to Kīlauea Point where they may have a higher chance of successful reproduction and long-term survival. Between 1978 and 1980, 65 and 25 ‘a‘o eggs were translocated from mountain habitats to the Refuge and Moku‘ae‘ae Island, respectively, and cross-fostered by ‘ua‘u kani (Byrd et al. 1984).</p> <p>Currently, the Refuge supports at least 11 prospecting or breeding ‘a‘o pairs, some presumably the fledglings of the translocated eggs or their progeny. In partnership with the Kaua‘i Endangered Seabird Recovery Project, the ‘a‘o social attraction program would be expanded to select areas on Crater Hill and Mōkōlea Point. With partners, the Service would explore the feasibility of the Refuge as a potential ‘a‘o chick translocation site for mountain colonies in severe decline (USFWS 2011).</p> <p>As discussed in Objective 1.1, seabird breeding habitat, free of introduced predators, is a pressing need in the Hawaiian Islands. ‘A‘o translocations may also increase genetic diversity at the Refuge. These techniques would be considered for other species of high conservation concern such as ka‘upu (black-footed albatross) (Arata et al. 2009).</p> <p>Today’s bird distributions may be uninformative about their pre-human distributions. Of 40–43 native bird species found at a Māhā‘ulepū, Kaua‘i, fossil site, only about one-fourth occur in the vicinity today, one-fourth have been extirpated from Kaua‘i or its lowlands including ‘a‘o, and ‘ua‘u, and half are extinct (Burney et al. 2001). The Refuge currently supports six species of breeding seabirds. Lehua Islet, located just 19 miles west of Kaua‘i, is a 271-acre State seabird sanctuary comparable in size, elevation, and aspect to the Refuge. Lehua supports over 25,000 pairs of 8–12 breeding seabird species including ka‘upu, ‘ā (brown booby), the candidate species ‘ake‘ake (band-rumped storm petrel), Bulwer’s petrel, and noio (Hawaiian noddy) (Vanderwerf et al. 2007), which are not known to breed at the Refuge. In addition, an estimated 90,000 pairs of 18 breeding seabird species, including Christmas</p>		

shearwater, endangered ‘ua‘u (Hawaiian petrel), noio kōhā (brown noddy), ‘ewa‘ewa (sooty tern), and pākakalala (grey-backed tern) breed on Ka‘ula Rock, a 158-acre State seabird sanctuary located 54 miles southwest of Kaua‘i (Harrison 1990, Vanderwerf et al. 2007). Breeding populations of many of these species, now absent or rare on Kaua‘i, could be established or re-established using passive and assisted restoration techniques.

Climate change is one of the most serious threats to wildlife today. Scientists are already documenting the effects of global warming on low-lying islands through accelerated coastal erosion. Models predict an increase in the frequency and severity of droughts and storms. Rising sea levels are expected to disrupt habitat functions and eliminate terrestrial habitat on important seabird breeding areas such as Midway Atoll and Laysan Island, where elevations peak at 13 and 50 feet, respectively (Baker et al. 2006). As sea levels rise over the next century, protected areas on high islands including the Refuge will become increasingly important for seabirds that currently nest primarily on low islands and atolls of the Northwestern Hawaiian Islands (Arata et al. 2009, Young 2010).

Objective 2.2 Restore and/or enhance and manage native coastal plant communities including habitat for endangered plants.

Restore and/or enhance and manage 10–30 acres of native coastal plant communities (e.g., naupaka (*Scaevola*) coastal dry shrubland and/or ‘ilima (*Sida*) coastal dry mixed shrub and grassland) on Crater Hill and Mōkōlea Point, with the following attributes:

- 15–20% native-dominated plant communities (canopy >75% cover; e.g., naupaka-dominated canopy with pohuehue locally dominant along seaward edges (naupaka shrubland); ‘ilima-dominated dense canopy with ‘āheahea and pōpolo co-dominants (‘ilima shrubland));
- <10% cover of pest plants (e.g., lantana, koa haole, Christmasberry);
- Endangered plants (3–8 species) interplanted into existing matrix (e.g., dwarf naupaka, ‘ohai, ‘awiwi); and
- Restoration enhances and has negligible negative effects on breeding bird populations.

Alternatives:	Alt A (Current)	Alt B–D
<i>Total acreage annually managed</i>	3–5	10–30
Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B–D
a. Maintain the current onsite greenhouse while exploring options for creating an offsite greenhouse and/or partnerships to support outplanting of native plants that are from local seed sources and conditioned to the local environment		✓
b. Within 2 years, develop a Restoration Working Group (RWG) and finalize draft Plant Restoration Strategy for KNRWC		✓
c. Expand involvement of both volunteers and native plant organizations		✓
d. Work with RWG and others to implement Final Plant Restoration Strategy (e.g., plant propagation, restoration ecologist, site preparation, restoration and repatriation, site maintenance, monitoring, evaluation, adaptive management)		✓

e. Use IPM strategies including mechanical/physical (e.g., mowing, brush-cutting, excavation, prescribed fire), cultural, chemical (e.g., herbicides), biological, and other suitable techniques to control Christmasberry, lantana, ironwood, and other pest/undesirable plants (see Appendix G)		✓
f. IPM techniques to control pest insects (approved biocontrols, hand removal of infected leaves, granular and spot-treating plants with insecticides (e.g., Sevin ®))		✓
g. Restoration activities are timed and conducted to minimize disturbance to breeding birds	✓	✓
<p>Rationale: The Refuge consists of degraded coastal and lowland, dry and mesic woodlands, grasslands, and mixed woodland-grassland plant communities. Over 30 native coastal and lowland plant species are appropriate for re-establishment. Of these species, approximately one-third would be established as dominant members of the communities, while the remaining two-thirds will be integrated as sub-dominants and associated species. Populations of eight species of endangered plants could be established within these restored habitats, thereby contributing to their Statewide recovery. Beginning in 1980, approximately 13 acres on the Point and portions of Crater Hill’s west slope were restored with hala, ‘akoko, ‘ilima, naupaka kahakai, ‘āheahea, and pohinahina. The Refuge has a small native plant nursery that is staffed largely by volunteers (Bruegmann and Castillo 1999).</p> <p>With nearly 300 species of plants listed as threatened or endangered, nearly one-third of Hawai‘i’s remaining native flora is threatened with extinction. Over 100 species of plants now listed as threatened or endangered occur, or historically occurred, on the Island of Kaua‘i; 49 species are found only on Kaua‘i. Plants that grow in coastal shrublands and low elevation forests are particularly rare due to the long-term presence of humans and the negative effects of their actions, specifically, development, agriculture, fire, and the introduction of pest species. Only 11 percent of lowland mesic and dry native plant communities remain intact on Kaua‘i, compared to 22 percent for all of the Hawaiian Islands combined (The Nature Conservancy 1998). Thus, the Refuge could play a key role in recovery of listed plant species.</p> <p>Finalization of the draft Plant Restoration Strategy for KNRWC would be completed within the first 2 years of CCP implementation. The scope of the draft Plant Restoration Strategy includes 50 acres restored (fully functioning, stable plant communities) over 50 years (plant community restoration is a slow process). For the CCP, this translates to approximately 10 acres (in highly degraded sites) or 30 acres (in sites with native-dominant upper canopy) of restoration over 10–12 years. The term “restoration” is used in the context of rebuilding an ecological community comprised of predominantly native species including its form, function, and processes, while “enhancement” is used in the context of increasing or improving but not attempting to fully restore a former ecological state, based on our limited historical knowledge of the coastal and lowland plant communities of Kaua‘i. As stated in the draft Plant Restoration Strategy, achieving this level of restoration would require dedicated full-time staff and funding. Thus, implementation would be dependent on a Final Plant Restoration Strategy and partnerships to acquire and leverage restoration and maintenance funding (Bruegmann and Castillo 1999). Plant restoration activities would be timed to have minimal negative effects on breeding birds and be compatible with migratory seabird management and endangered wildlife recovery priorities.</p>		

2.4.3 Goal 3: Gather scientific information (surveys, research, and assessments) to support adaptive management decisions.

Objective 3.1 Conduct high-priority inventory and monitoring activities.		
<p>Conduct high-priority inventory and monitoring activities that evaluate resource management and public use activities to facilitate adaptive management. These activities contribute to the enhancement, protection, use, preservation, and management of wildlife populations and their habitats on and off Refuge lands. Specifically, they can be used to evaluate achievement of resource management objectives identified under Goals 1–2. These surveys have the following attributes:</p> <ul style="list-style-type: none"> • Data collection techniques would likely have minimal animal mortality or disturbance, minimal habitat destruction, and minimal long-term or cumulative impacts on resources of concern; • Proper cleaning of investigator equipment and clothing as well as quarantine methods, where necessary, would minimize the potential spread or introduction of pest species and pathogens; and • Projects will adhere to scientifically defensible protocols for data collection (e.g., sample size), where available and applicable. 		
The following is a list of priority activities to support resource management decisions on the Refuge:	Alt A (Current)	Alt B–D
a. Within 1 year, map type and status of all fences and gates		✓
b. Within first 2–3 years, re-evaluate, develop, or initiate Refuge-specific monitoring plans (protocols, sample designs, and databases) for high-priority taxa (e.g., listed, highly invasive, or indicator species, species/species groups of regional concern) within the regional Inventory and Monitoring (I&M) framework; work with U.S. Geological Survey (USGS) Biological Resources Discipline, universities, and other partners to develop efficient systems for synthesis, analysis, and reporting of Refuge monitoring data		✓
c. Within first 2 years, design and conduct a vegetation monitoring program that would allow for assessment in reaching habitat management objectives		✓
d. Within first 5 years, conduct a comprehensive inventory of plants, invertebrates, and vertebrates occurring at the Refuge. Use initial inventories as baseline data to assess past and future changes in plant and animal communities		✓
e. Monitor population size of all native breeding birds at least each decade and species of high conservation concern annually (e.g., ‘a‘o, mōlī, nēnē)		✓
f. Map soils, vegetation, and bird distributions	✓	✓
g. Conduct early detection and rapid response pest plant species and assessment; rank species to target for control		✓
h. Develop GIS layers to support biological goals and objectives and I&M program		✓
i. Monitor effects of visitor activities on wildlife and re-evaluate the program every 5 years		✓
j. Monitor seabird and nēnē populations and mortality and morbidity	✓	✓
k. Continue to partner with DLNR to conduct nēnē banding	✓	✓

l. Monitor response of pest species and habitat to management actions within an adaptive management framework		✓
m. With partners (e.g., Kaua‘i Endangered Seabird Recovery Project): <ul style="list-style-type: none"> - Conduct yearly auditory and visual surveys to detect new ‘a‘o breeding burrow or prospecting locations; - Monitor response of ‘a‘o and non-target species (e.g., owls) to social attractions; - Monitor burrow activity of two ‘a‘o pairs using PIT monitoring system; and - Band and monitor reproductive success and survival 	✓	✓
n. In partnership with the Migratory Bird Program, DLNR, private landowners, and volunteers, conduct banding and monitoring reproductive success and survival of mōlī within regional demographic monitoring framework; formalize this partnership	✓	✓
o. Monitor sex structure and demography of the mōlī population using molecular or other techniques	✓	✓
p. With partners, such as the Pacific Islands Climate Change Cooperative, design and implement a climate change monitoring program compatible with, and complimentary to, other state and regional climate change monitoring programs, which would allow for detection of climate change impacts on Refuge resources (e.g., shifts in breeding phenology of target seabird species that may inform management)		✓
<p>Rationale: The Administration Act requires us to “... monitor the status and trends of fish, wildlife, and plants in each refuge.” Surveys would be used primarily to evaluate resource response to assess progress toward achieving refuge management objectives (under Goals 1–2 in this CCP) derived from the Refuge System mission, refuge purpose(s), and maintenance of biological integrity, diversity, and environmental health (601 FW 3). Determining resource status and evaluating progress toward achieving objectives is essential to implementing adaptive management on Department of the Interior lands as required by policy (522 DM 1). Specifically, results of surveys would be used to refine management strategies, where necessary, over time in order to achieve resource objectives. Surveys would provide the best available scientific information to promote transparent decision-making processes for resource management over time on Refuge lands.</p>		

Objective 3.2 Conduct and facilitate high-priority research projects and scientific assessments at the Refuge to directly support management objectives and guide management decisions.

Conduct high-priority research projects that provide the best science for habitat and wildlife management on and off Refuge. Scientific findings gained through these projects would expand knowledge regarding life-history needs of species and species groups as well as identify or refine habitat and wildlife management actions. Research also will reduce uncertainty regarding wildlife and habitat responses to Refuge management actions in order to achieve desired outcomes reflected in resource management objectives and to facilitate adaptive management (e.g., developing thresholds to better define “minimal human disturbance in areas designated for seabird breeding” in Obj. 1.1). These research projects have the following attributes:

- Focus wildlife population research on assessments of species-habitat relationships. Develop models that predict wildlife response to management;
- Design and conduct issue-driven research unlikely to be reliably addressed using long-term monitoring. Develop models that predict wildlife response to management;
- Promote Refuge research and science priorities within the broader scientific community.

Ensure that cooperative research focuses on meeting information needs identified in biological goals and objectives;

- Adhere to scientifically defensible protocols for data collection (e.g., sample size), where available and applicable, in order to develop the best science for resource management;
- Data collection techniques would have minimal animal mortality or disturbance, minimal habitat destruction, and minimal long-term or cumulative impacts on resources of concern;
- Use proper cleaning of investigator equipment and clothing as well as quarantine methods, where necessary, to minimize the potential spread or introduction of pest species and pathogens; and
- Present results in peer reviewed articles in scientific journals and publications or symposia.

Conduct scientific assessments to provide baseline information to expand knowledge regarding the status of Refuge resources to better inform resource management decisions. These scientific assessments will contribute to the development of Refuge resource objectives and they would also be used to facilitate habitat restoration through selection of appropriate habitat management strategies based upon site-specific conditions. These assessments have the following attributes:

- Use accepted standards, where available, for completion of assessment; and
- Scale and accuracy of assessments would be appropriate for development and implementation of Refuge habitat and wildlife management actions.

The following is a list of priority research to support resource management decisions on the Refuge:	Alt A (Current)	Alt B–D
a. Identify primary predators for each life stage of seabirds		✓
b. Identify effective control methods for primary predators (e.g., cats)		✓
c. With partners, determine feasibility of the Refuge as a potential ‘a‘o chick translocation site	✓	✓
d. With partners, evaluate effectiveness of the Pacific Missile Range Facility Bird-Aircraft Strike Hazard Program and Egg Swap Program including feasibility of alternate release sites for mōlī		✓
e. Investigate effects of visitor activities on survival and reproduction of priority bird species		✓
f. Develop survey methods to reliably estimate population size for species of high conservation concern		✓
g. Investigate the relative importance of causes of mortality (e.g., predators, disease, vehicle strikes) for nēnē and seabirds of concern		✓
h. With partners, conduct pollen core studies to reconstruct prehistoric vegetation composition		✓
i. Investigate status and distribution of ‘ōpe‘ape‘a; identify management priorities	✓	✓
j. Investigate status and distribution of endemic insects, particularly species of concern		✓
k. With partners, investigate breeding and foraging ecology of nēnē in lowlands		✓
l. Investigate daily and seasonal movements of nēnē		✓
m. Establish partnerships with other agencies, universities, and organizations to pursue collaborative research projects	✓	✓
n. Work with DLNR and other partners to conduct habitat assessments for Makapili Rock and Moku‘ae‘ae Island (both owned by State of Hawai‘i) which are located within 300 feet offshore of the Refuge		✓

o. Conduct a road and trail assessment and analysis and identify problem areas (e.g., excessive erosion, compaction) and solutions (e.g., water bars, erosion matting, re-vegetation)	✓	✓
<p>Rationale: Research projects on Refuge lands would address a wide range of natural and cultural resource as well as public use management issues. Examples of research projects include habitat use and life-history requirements for specific species/species groups, practical methods for habitat management and restoration, extent and severity of environmental contaminants, techniques to control or eradicate pest species, effects of climate change on environmental conditions and associated habitat/wildlife response, identification and analyses of paleontological specimens, modeling of wildlife populations, and assessing response of habitat/wildlife to disturbance from public uses.</p> <p>Projects may be species-specific, Refuge-specific, or evaluate the relative contribution of the Refuge to larger landscape (ecoregion, region, flyway, national, international) issues and trends. Like monitoring, results of research projects would expand the best available scientific information and potentially reduce uncertainties to promote transparent decision-making processes for resource management over time on the Refuge. In combination with results of surveys, research would promote adaptive management on the Refuge. Scientific publications resulting from research on the Refuge will help increase the visibility of the Refuge System as a leader in the development of the best science for resource conservation and management.</p> <p>In accordance to the policy for implementing adaptive management on refuge lands (522 DM 1), appropriate and applicable environmental assessments are necessary to determine resource status, promote learning, and evaluate progress toward achieving objectives whenever using adaptive management. These assessments would provide fundamental information about biotic (e.g., vegetation data layer) as well as abiotic processes and conditions (e.g., soils, topography) that are necessary to ensure that implementation of on-the-ground resource management achieve resource management objectives identified under Goals 1–2.</p>		

2.4.4 Goal 4: Ensure that visitors and kama‘āina of all ages and abilities feel welcome, enjoy a safe visit, and are provided high-quality opportunities for wildlife-dependent recreation which allows them to connect with, while having limited impacts to, the wildlife, habitats, and cultural and historic richness of the Refuge.

Objective 4.1 Improve visitor access.				
<p>Improve visitor access associated with the Refuge with the following attributes:</p> <ul style="list-style-type: none"> • Enhance visitor safety and experiences to improve their connection to wildlife and habitats; • Integrate with other transportation plans and initiatives that share Refuge purposes and goals; • Promote sustainable transportation practices; and • Minimize human disturbance to biological resources. 				
Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B	Alt C	Alt D
<i>Strategies specific to the overall Refuge</i>				
a. Coordinate transportation network with existing public transport options (e.g., work	✓			

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with the County for a bus stop closer to the Refuge)				
b. Continue to integrate Refuge planning efforts with Kīlauea Town planning efforts, including the bypass road and multi-use trail connecting the Refuge to town		✓		
c. Develop a data collection plan (e.g., better traffic and parking count, documenting “overage”, accident and incident data,) that is updated and reviewed annually to continue to evaluate transportation network efficacy		✓		
Strategies specific to the Overlook and current entrance				
d. Within the first 5–10 years, implement recommendation from the Transportation Assistance Group (TAG), suggesting testing operational changes to determine their effectiveness in reducing congestion (e.g., change operating hours, charge differential fees, test parking reservation system, test variations of the “one-in, one-out” protocol, arrange transit demonstration service, implement “intelligent technologies” to better inform and manage congestion, work with the County on road easement/acquisition/cooperative agreement)		✓		
e. Improve parking safety and efficiency (e.g., better delineate onsite public parking)		✓		
f. Increase parking capacity at Overlook		✓		
g. Continue to provide private vehicle access into Refuge	✓	✓		
h. Provide bicycle parking at Overlook		✓	✓	✓
i. Create area for public/tour bus drop-off and optional shuttle pick-up		✓		
j. Provide an <i>optional shuttle</i> into the Refuge from the scenic Overlook at the current Refuge entrance. Shuttle would be <i>mandatory when Refuge parking at capacity</i>		✓		
k. Institute a <i>mandatory shuttle which would prohibit private vehicles</i> from traveling into the Refuge and would require all visitors to use a shuttle system from a visitor welcome and orientation center			✓	✓
l. Acquire and gate the portion of Kīlauea Road (a County road) from the new visitor welcome and orientation center to its terminus at the current Refuge entrance gate. Vehicular traffic beyond the new visitor welcome and orientation center would be limited to administrative,			✓	✓ (only if property adjacent to road)

emergency, and residential access when Refuge is open. When Refuge is closed, the road to the scenic Overlook is open				
Strategies specific to the Point				
m. Enhance public parking currently on Refuge (e.g., paving of gravel areas, restriping). Improve pedestrian and vehicle circulation.	✓	✓		
n. Remove parking currently on Refuge and renovate area for shuttle stop from the visitor welcome and orientation center. Improve pedestrian circulation			✓	✓
<p>Rationale: The popularity of the Refuge generates operational, access, and safety issues, both at the Refuge and in the nearby Kīlauea Town. Most visitors drive to the Overlook and Point in a rental car, the main mode of transportation for all visitors on the island. During the peak winter season, visitors arriving during hours of high visitation may find the parking lot full and space limited in the temporary overflow parking area. The capacity of the Refuge’s parking lots is the Refuge’s limiting factor for visitation. If all parking is full, visitors are turned away.</p> <p>There are two paved parking areas as well as two unpaved/unmarked gravel areas at the Point; these facilities can accommodate 51 vehicles total. The two paved parking areas are dead-ends and do not allow for through traffic. The parking in the gravel areas is also unmarked. Large tour buses (25 passenger or larger) are restricted from entering the Refuge. Due to the poor configuration and layout of the parking area, as well as the limited amount of space, Refuge rangers regularly spend a large portion of the peak visitation time of day directing traffic, parking cars, and moving traffic control signage. Intensive staff effort is needed to park and direct traffic in these situations.</p> <p>Separate areas of grassland habitat are used for parking in overflow conditions and can accommodate approximately 20 vehicles. Refuge staff prefers not to use this area, particularly during the winter rainy season when it becomes very soft and muddy. When visitation exceeds parking capacity, including reasonable overflow limits, Refuge staff institutes a “one in, one out” system which generally requires two staff members. Alternately staff place a sign at the entrance gate to indicate that public entry into the Refuge is temporarily closed, but cannot let them know when they can return.</p> <p>The current parking situation within the Refuge not only prevents Refuge staff from conducting other key duties (Refuge staff currently spend 2–3 hours a day addressing traffic issues), but also degrades the quality of wildlife habitat by periodically excluding endangered nēnē families from foraging, roosting, and brood-rearing resulting in movements of goslings to neighboring private properties were they are unprotected and at times unwelcome, contributing to human-wildlife conflicts. The situation also negatively impacts the visitor experience, and undermines the Service’s ability to provide interpretation and EE (see rationale for Objectives 4.3 and 4.4). For additional discussion of transportation-related management challenges, see Chapter 5, Sections 5.3.3 and 5.3.4.</p> <p>Several studies have been conducted regarding Refuge-related transportation issues including the Alternative Transportation Systems (ATS) study in 2006 (Parsons Brinkerhoff Quade and Douglas, Inc. 2006) and interagency TAG study in 2009 (TAG 2009). The ATS study evaluated the feasibility of five conceptual alternatives for dealing with transportation issues and the anticipated rise in island visitor numbers:</p> <ul style="list-style-type: none"> • No build, which would keep current status; • Minor improvements, transportation system management, and transportation demand 				

management, which would include some physical or operational changes to increase effective capacity through improved management of parking resources or would redistribute demand to less busy times;

- Moderate improvements to increase capacity, which would include physical improvements such as additional paring and/or widening roads;
- Voluntary shuttle service with private vehicle access, which would institute a shuttle system from a new offsite welcome and orientation facility while continuing to allow private vehicles onto the Refuge; and
- Mandatory shuttle service, which would prohibit public parking beyond the entry gate at Kīlauea Point NWR and require all visitors to use a shuttle system from an offsite welcome and orientation facility.

The TAG study considered the recommendations of the 2006 ATS study and additionally provided a series of non-binding recommendations for the Refuge to consider. Common to all alternatives, in the near term, the Refuge would adopt an incremental approach and experiment with small-scale operational and infrastructure improvements based on TAG recommendations. Over the mid- to long-term, the mandatory shuttle service component of the Preferred Alternative would be further analyzed in conjunction with other proposals (e.g., new visitor welcome and orientation center) via SDMPs and/or other planning.

Objective 4.2 Improve visitor information and orientation.

Improve visitor information and orientation associated with the Refuge with the following attributes:

- Visitors are welcomed and are provided a safe experience;
- 75% of visitors can identify Kīlauea Point as a National Wildlife Refuge;
- Visitors are educated about access options while core staff functions are maintained; and
- Minimize human disturbance to biological resources.

Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B	Alt C	Alt D
<i>Strategies specific to the overall Refuge</i>				
a. Develop a Refuge Sign Plan to better direct individuals, enhance orientation, and reduce impacts to wildlife within 3 years			✓	
b. Continue working with the Hawai‘i Department of Transportation and County of Kaua‘i on Refuge directional signage for Kūhiō Highway and through Kīlauea Town, and signage to reduce impacts to wildlife (e.g., nēnē crossing)			✓	
c. Identify and develop methods to provide greater information to visitors prior to entering the Refuge (e.g., volunteers at Overlook, cell phone audio tour at Overlook, AM radio station, rangers onboard shuttles to the Refuge, operating hours on highway signage)			✓	

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d. Every 5 years, evaluate Refuge fees and conduct a visitor survey to evaluate existing programs as well as new programs under development, analyze current and potential Refuge visitor profiles, and explore visitation trends	✓			
e. Ensure public use facilities, interpretive materials, and programs are accessible to and usable by persons with various disabilities	✓			
Strategies specific to the Overlook and current entrance				
f. Redesign and enhance the scenic Overlook at the entrance to the Refuge to provide greater orientation and information, increased interpretation.	✓			
g. Establish a <i>new onsite visitor welcome and orientation center on Crater Hill (~3–4 acres)</i> which would include visitor contact, orientation and information, fee collection, restrooms, bookstore/retail, multipurpose room, outdoor spaces, administrative offices, private vehicle and tour bus parking, public bus stop, shuttle pick up/drop off and pedestrian trail to the Overlook			✓	
h. Establish a <i>new offsite visitor welcome and orientation center on lands adjacent to or within 1 mile of the Refuge (~3–4 acres), including within Kīlauea Town</i> , which would include the following: visitor contact, orientation and information, fee collection, restrooms, bookstore/retail, multipurpose room, outdoor spaces, administrative offices, private vehicle and tour bus parking, public bus stop, and shuttle pick up/drop off				✓
Strategies specific to the Point				
i. Continue to provide on an on-call basis golf carts to transport visitors who may need assistance getting to the VC or Lighthouse	✓			
j. Provide for greater site orientation	✓			
k. Re-examine the site layout at Kīlauea Point and evaluate non-site-dependent functions currently located there and <i>move a limited number off the Point</i> (e.g., maintenance functions, some administrative and equipment storage) to improve the visitor experience	✓	✓		
l. Remodel the existing VC, for either EE or new interpretive exhibits and displays. Continue to maintain bookstore operations on the Point (e.g., Quarters #1)		✓		

<p>m. Re-examine the site layout at Kīlauea Point and evaluate non-site-dependent functions currently located there and <i>move as many as is feasible and possible off the Point</i> (e.g., bookstore, administrative and maintenance functions, equipment storage, fee collection, parking) to improve the visitor experience</p>			✓	✓
<p>n. Remodel the existing VC for either EE or new interpretive exhibits and displays. Maintain bookstore operations at the new visitor welcome and orientation center</p>			✓	✓
<p>Rationale: Directional signage on Kīlauea and Kolo Roads (both County roads) leading to the Refuge is limited with visitors regularly becoming lost in Kīlauea Town. The sign design also varies with green, brown, and even homemade signs directing the way. This signage also directs travelers to the Kīlauea Lighthouse and makes no reference to the Refuge on which the Lighthouse stands. For a majority of visitors, the trip to the Refuge is their first visit to a national wildlife refuge, and their first introduction to the Refuge System. Many visitors incorrectly believe the Refuge to be a National Park. Also, while many who live on the island are aware of the Kīlauea Lighthouse, they are not aware of the Refuge.</p> <p>The configuration of the Overlook at the entrance to the Refuge at the end of Kīlauea Road, together with its constraints, poses challenges to orienting, informing, and guiding visitors clearly down to the Point. The current entrance experience is confusing and potentially unsafe for visitors. There is limited advance directional or orientation/information signs to help visitors understand how to access the Point and see the Lighthouse. Visitors who arrive by car typically park to see the view at the Overlook but are confused about whether or not they are supposed to drive or walk past the gate down into the Refuge. There are signs, however, they are not readily noticed by the visitor. It is also unclear to bicyclists whether or not they are allowed to ride their bicycles past the entrance gate.</p> <p>After visitors exit their vehicle, there is a lack of information and signage to let them know where they can and cannot go. There are several buildings adjacent to the parking areas; however, the Lighthouse, restrooms, and VC are not visible from the parking lot. Therefore, visitors are often confused about how to get to these facilities, as well as the existing buildings and where they should go.</p> <p>A new off-Refuge visitor welcome and orientation center would resolve many of these issues. It would serve as the gateway to the Refuge where visitors would park, be provided an orientation to the Refuge, and board their shuttles and/or start their interpretive, guided tours and hikes.</p> <p>Since the siting and construction of a new visitor welcome and orientation center under alternatives C and D are conceptual and not site-specific, implementation would require additional compliance, involving site-specific effects analysis.</p> <p>The location of the new visitor welcome and orientation center, as well as other facilities to support Refuge management (see Objectives 4.1 and 6.1), would likely be guided by a number of site selection criteria which may include, but would not be limited to the following:</p> <ul style="list-style-type: none"> • Reasonable cost. • Availability at the time when the Refuge had adequate funds to move forward on such a large project. • Within 1 mile of the existing established Refuge boundary. 				

- Consistency with local land use plans.
- Sufficient in size (at least three to four acres) to accommodate all needed facilities, including parking, shuttle access, and possibly maintenance building/yard.
- Existing facilities that could be modified to satisfy needs or a readily developable site.
- Good access to existing or planned roads (Kīlauea Road, Kūhiō Highway, or Kīlauea Town Bypass).
- Accessible by bus, bicycle, and walking.
- Existing parking area (including one that could accommodate shuttle buses) that could be shared with others or a site where such parking could be readily developed.
- Existing utilities (e.g., electricity, potable water, high-speed internet, and sewer).
- A relatively level site that would require minimal recontouring to accommodate the proposed facilities.
- A site that was or could readily be made secure.
- Building site would be located in an already developed or disturbed area.
- Co-location with another conservation organization (e.g., the U.S. National Oceanic and Atmospheric Administration’s marine sanctuary discovery center on Kaua‘i [NOAA 2011]) or another Federal, Hawai‘i, or local public agency.
- Views of the Kīlauea Point Lighthouse, ocean, or mountains.
- Construction and management would have negligible negative effects on trust resources (e.g., Federally-listed species, migratory birds)
- Construction and management would not be anticipated to reduce the quality or quantity or fragment habitat for trust resources.

Through a subsequent planning effort, the Service would explore the benefits, costs, and impacts of each potential site, and work with the community to determine the ideal location, considering the needs of the Refuge and the intent of the Kīlauea Town Plan and other plans.

Objective 4.3 Enhance and expand environmental interpretation.

Improve interpretive opportunities associated with the Refuge. The program shall include the following attributes:

- Hawai‘i’s unique cultural heritage is woven throughout the interpretive experience;
- Visitors are exposed to at least one of the three interpretive themes:
 - *The National Wildlife Refuge System*: The Refuge, part of a legacy of lands, reserved by the people of the United States, where wildlife comes first.
 - *Seabirds & Native Coastal Plants*: The Refuge abounds with seabirds passing through the cycles of life and balancing on the edge of survival, while plant communities thrive in the harsh coastal environment.
 - *Kīlauea Point Light Station*: The Kīlauea Point Light Station has marked the passage of Kaua‘i’s history . . . it was once a beacon calling to those crossing the vast expanses of the Pacific; now it calls upon all of us to protect the Native Hawaiian ecosystem.
- 90% of visitors understand that Kīlauea Point is part of a system of lands administered and managed by the Service for wildlife and plant conservation;
- 80% of visitors can name at least two seabird species that uses the Refuge during some part of their life history and at least one native plant;
- 70% of visitors understand that the Kīlauea Lighthouse played a prominent role in trans-Pacific navigation; and
- Minimize human disturbance to biological resources.

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Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B	Alt C	Alt D
a. Within 5 years, prepare an interpretive chapter of the KNWRC Visitor Service Plan			✓	
b. Develop orientation materials and/or train Service staff, volunteers, partners and tour operators to ensure understanding of the significant resources and messages that the interpretive program should be addressing			✓	
c. Develop exhibit themes, including interpretive exhibits and associated media at the VC and other visitor contact points, and/or observation viewpoints			✓	
d. Explore options to provide greater flexibility in interpretive exhibits and signage to allow for seasonal depictions (e.g., detachable interpretive panels.)			✓	
e. Expand opportunities to provide limited access to the interior of the Lighthouse			✓	
f. Explore possibilities for increasing the frequency of lighting of the Lighthouse (currently once per year)			✓	
g. Expand current and new partnerships to maximize effectiveness and efficiency of interpretive programs			✓	
h. Continue to evaluate items sold in the bookstore to ensure they reinforce key messages and the mission and goals of the Service. Include interpretive messaging whenever possible			✓	
i. Regularly evaluate visitor perceptions of resources and interpretive programming (e.g., informal discussion, observations by staff)			✓	
j. Develop methodologies that will be used for future evaluation of existing interpretive programs and new ones under development			✓	
k. Every 5–10 years, conduct an analysis of visitation trends and their implications for interpretation			✓	
l. Continue to provide guided interpretive activities as staff is available			✓	
m. Remodel the VC for interpretative displays (or EE facility, see Objective 4.4)			✓	✓
n. Increase the number of guided interpretive activities to at least 1 per day			✓	

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o. Remodel the Contact Station (radio beacon building) to provide expanded interpretation and/or scenic view		✓	✓ (expand scenic view)	✓ (expand scenic view)
p. Explore the restoration and conversion of one of the former lighthouse keeper’s homes (Quarters #1) to house other functions		✓ (bookstore)	✓ (living history site; bookstore offsite)	✓ (living history site; bookstore offsite)
q. Offer a limited number (2 times/week) of guided interpretive hikes to Crater Hill designed (location of trail, timing, group size) to have negligible negative effects on breeding birds yet provide a quality experience for visitors (see Objective 4.5)			✓	✓

Rationale: As one of the Service’s priority public uses, environmental interpretation is an important management activity for the Refuge. Interpretation is a communication process that forges emotional and intellectual connections, by providing opportunities for visitors to make their own connection to the resources. Messages and stories are often delivered through guided interpreters, self-guided interpretive panels, interpretive exhibits, printed materials, interpretive art, and electronic media.

The visitor is first welcomed to the Refuge at the fee collection booth. The ranger on duty assists in orienting visitors, answering their questions, informing them about wildlife activity that day, and advising the visitor of Refuge services offered at the VC and Contact Station, such as free binoculars for loan while on Refuge, and docent interpretive services. Volunteers are the primary means of personal interpretation on the Refuge. Between 2010 and 2013, the number of volunteers ranged from 103–115 annually, providing between 6,410 and 8,523 hours of service per year (USFWS 2014). The majority of these hours were dedicated to the VS program. Volunteers help visitors use the viewing scopes and binoculars, identify species, point out and provide information about wildlife behavior, and provide interpretation about the Lighthouse, the Refuge, and its resources. Under optimum conditions, there are at least two volunteers on duty, with one volunteer operating an on-call golf cart to help visitors who may need assistance getting from the parking lot to the VC or Lighthouse. The Point, as well as the area surrounding the Lighthouse, is almost entirely staffed by volunteers.

The Refuge has a number of interpretive panels around the Point highlighting native and nonnative plants and wildlife. Some of the panels were done at different times, using different styles, approaches and materials. These panels are appealing, of a good size, and are well-placed to be visible but not obtrusive. The most recent panels were completed in 1999. The panels are permanent and are in place year-round. Wildlife at the Refuge is seasonal. For example, whales and albatross are found in the winter months. Thus, this can cause some confusion for the visitor.

In 1987, Congressional funding provided for the design and construction of an EE Center. Today, the main floor of this facility serves as the VC and houses interpretive exhibits as well as a bookstore operated by KPNHA. When entering the Center, people are often expecting to see exhibits relating to the Kīlauea Point Light Station or the wildlife at the Refuge. However, some of the exhibits are only tangentially related or fully irrelevant to the site. This may prove disorienting to the visitor who may have expectations of finding information regarding the Refuge. In addition, the exhibits are badly worn. They are out of date and interpretive messaging for children is lacking.

Over the years the interpretive exhibits have been expanded upon by the KPNHA bookstore operations and the building has moved away from its primary intended function of education. In a survey conducted by the U.S. Geological Survey, it was noted that visitors did not expect to see a bookstore where they had anticipated interpretive exhibits (Sexton et al. 2011). The VC has become cluttered and is often very crowded. The design of the VC building itself is also out of context with the historic nature of the Kīlauea Point Light Station. The building requires a high level of routine maintenance.

The Contact Station is located at the tip of the Kīlauea Point Peninsula. Currently, the building contains an interpretive display on the history of Kīlauea Lighthouse, a desk staffed by volunteer docents, binoculars for loan, as well as an area to sit and watch a video about the Refuge. It also provides a place for visitors to escape from the rain, wind, or warm tropical sun. The building was originally designed to house radio equipment associated with the Lighthouse so it has a small number of windows, not allowing one to take in the expansive coastal views.

One of the most popular and notable features of the Refuge is the historic Kīlauea Lighthouse, which was list on the National Register of Historic Places in 1979. Since restoration, visits into the Lighthouse are only possible on a guided tour. Since Lighthouse Day (the first Saturday in May) in 2014, the Refuge started offering guided tours weekly, dependent upon staff and volunteers availability. Guided tours require temporary modifications of the interior and an intensive staff and volunteer effort. Overall, the frequency of opportunities for the public to experience the interior of the Lighthouse on guided tours is variable; tours may in the future occur more frequently or less frequently than once per week depending upon the availability of staff and volunteers.

As a primary host to visitors of Hawai‘i, the Refuge has the responsibility to learn about and interpret Hawai‘i’s unique culture as well as its evolution into modern society. Sharing the ancient beliefs and practices, cultural histories, traditional stories, chants, place names, and geographic divisions, as well as relaying the fact that the Refuge Complex continues to support the perpetuation of traditional cultural practices such as taro farming at Hanalei NWR and access for fishing at Kīlauea (East) Cove are a few ways that Kīlauea Point NWR is incorporating Hawai‘i’s culture into our environmental interpretation.

Objective 4.4 Enhance and expand environmental education.

Provide a high-quality EE program associated with the Refuge for at least 2,000 students annually. This program should emphasize the natural and cultural history of the Refuge, as well as the role and importance of national wildlife refuges. The EE program should include the following attributes:

- Focus on students in the pre-kindergarten and elementary grades on the Island of Kaua‘i;
- Tier to (or achieves) formal education standards (State, national);
- Incorporate measurable learning objectives and utilizes audience-appropriate curricula;
- Support and complements the Service mission, as well as the Refuge’s purposes and goals;
- Support the Service’s “Connecting People with Nature” emphasis; and
- Minimize human disturbance to biological resources.

Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B	Alt C	Alt D
a. Utilize interns and volunteers to assist in facilitating the EE program (schedule school groups, develop curriculum, make presentations, conducts visits)		✓		
b. Continue to partner with KPNHA to provide		✓		

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support for the Refuge’s EE program, including school bus funding				
c. Enhance current partnerships and explore new partnerships to maximize the effectiveness and efficiency of the EE program by working with groups of similar interest or with shared goals		✓		
d. Increase or enhance the partnerships with local, State and national EE organizations (e.g., Hawai‘i Environmental Education Alliance (HEEA), North American Association for Environmental Education (NAAEE). Continue participation in Statewide natural resource interpretation and EE initiatives		✓		
e. Annually disseminate current EE program guidelines and activities offered to all educators within the target audience			✓	
f. Ensure EE programs are accessible to and usable by children of various abilities. Utilize special teaching approaches, equipment, or care as necessary		✓		
g. On a yearly basis, define and measure results of all EE programs and modify current programs as needed to maximize the effectiveness of future efforts		✓		
h. Review the Refuge’s EE programs on a regular basis with a focus group of those involved with education at the pre-K and elementary level to ensure programs are addressing the identified environmental, educational, and community needs		✓	✓	✓
i. Update curricula and materials as necessary to ensure that programs support and complement the Service’s mission and current initiatives, as well as the Refuge’s purposes and goals		✓	✓	✓
j. Develop a multifaceted Junior Ranger program to reach all ages of young visitors to the Refuge		✓	✓	✓
k. Design and implement a training program that provides regular training for staff, volunteers, and other presenters or educators to ensure a highly qualified and trained cadre		✓	✓	✓
l. Work with partners to provide teacher training workshops, and explore opportunities to introduce the KNWRC’s EE program in pre-service (teacher certification) training at Kaua‘i Community College		✓	✓	✓

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m. Maintain the KNWRC’s Website to promote current educational opportunities, post curricula, and other learning resources		✓	✓	✓
n. Re-examine the site layout of Kīlauea Point to improve the facilitation of EE. Convert an existing structure to a designated facility/facilities for EE		✓	✓	✓ (not Quarters #2)

Rationale: As one of the Service’s priority public uses, EE is an important management activity for the Refuge. EE plays a key role in encouraging current and future generations to engage in environmentally responsible behavior like supporting the protection of habitat for wildlife through the National Wildlife Refuge System. With the assistance of interns and volunteers, the Refuge conducts EE programs throughout the year with the greatest number of students visiting January–May. Between 2010 and 2013, education participants involved in on- and offsite EE programs ranged from 7,200 to 12,032 (USFWS 2014). Due to the wide variety of age groups which the EE program currently serves (toddlers through college students) and the wide variety of subjects which the Refuge staff is asked to teach, the staff is often responding to individual requests and scrambling to create a new program for each one. By partnering with others to develop and implement a standards-compliant Refuge-based curriculum for all ages and abilities, the Refuge would be able to reach more students and community groups with a goal of developing an aware and environmentally literate citizenry. The Refuge would also conduct trainings and outreach (e.g., through the website) for staff, volunteers, teachers, and other educators in order to promote the EE program. KPNHA provides funding for bus transportation for schools that visit the Refuge, which is a significant contribution to the EE program and would continue into future.

The winding, narrow, and steep Refuge entrance road causes complications for EE programming, as the road cannot safely accommodate a school bus and regular visitor traffic at the same time. Because of this, school groups participating in EE programs generally arrive at the Refuge at 8:30 a.m., before the Refuge opens, which requires accommodation from staff. This way they can easily maneuver the roadway and have adequate room to park. The children also have the Point to themselves and are not distracted by the large number of visitors. However, the grassy areas where buses park is nēnē habitat and when the Refuge receives a heavy rain, these parking areas become muddy and soft. Although most school groups try to leave before 10:00 a.m., they often leave after the Refuge has opened, which then requires a minimum of two staff to assist in safely getting the children through the busy parking lot to their bus, as well as to stop traffic to allow the bus to exit the Refuge. By departing at 10:00 a.m., this leaves only 1 hour for the EE program given loading, unloading, restroom breaks, etc., which does not lend itself to a high-quality EE program.

Given the small time window during which EE is offered (8:30 a.m. to 10:00 a.m.) many schools on the west, south, and even east side of the island are unable to make it to the Refuge during this timeframe given the time it takes to travel to the Refuge. Only 7% of Kaua’i’s public and charter school students (K-12) are within a 20-minute drive of the Refuge. For a majority, 68%, it is at least a 40-minute drive to get to the Refuge and for nearly 30% it takes more than an hour. Consequently, the strategies under Objective 4.1 would facilitate EE programming by improving access and logistics.

In 1987, Congressional funding provided for the design and construction of an EE Center. Today, the main floor of this facility serves as the VC and houses the bookstore operated by KPNHA. The bottom floor of the VC has a multi-purpose room. This multi-purpose room also serves as the Refuge’s meeting room, volunteer meetings and trainings, as well as KPNHA staff and board meetings. It is also

frequently utilized by KPNHA to receive, sort, tag, and organize their merchandise. The limited amount of large indoor space on the Refuge leads to room conflicts. Also, the size of the multi-purpose room is often insufficient for EE programs. As such, the Contact Station adjacent to the Lighthouse is frequently used for EE, but staff often find they are racing to pack up their EE supplies and reorganize the room as visitors begin arriving at the Refuge. From 1997 to 2007, a portion of the bottom floor also provided office space for the Refuge’s EE Specialist. It currently provides office space for three KPNHA staff members, and storage for KPNHA supplies and merchandise. Converting an existing structure to a designated facility/facilities for EE would alleviate the room conflicts and space issues.

Objective 4.5 Enhance and expand wildlife observation and photography.

Visitors are provided compatible opportunities to participate in wildlife photography and observation with the following attributes:

- Minimum of 75% of visitors identify the Refuge as a place for premier wildlife viewing and photography on Kaua’i;
- High diversity of native wildlife species (seabirds, nēnē, marine mammals, turtles); and
- Minimize human disturbance to biological resources.

Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B	Alt C	Alt D
a. Continue to provide free viewing scopes as well as binoculars for loan, and expand the program to include quality field identification guides for loan			✓	
b. Continue to work with KPNHA to provide wildlife viewing tools and books for purchase			✓	
c. Continue to work with existing partners and explore new partnership opportunities to provide a variety of quality opportunities for wildlife observation and photography (e.g., photography and wildlife art workshops)			✓	
d. Provide current and accurate information online and onsite including wildlife checklists for both avid and casual wildlife watchers, Refuge maps, seasonal highlights, sightings, migration information, and wildlife counts			✓	
e. Promote wildlife observation and photography opportunities through brochures, news releases, displays, and special events. Include messages on good wildlife observation and photography practices to minimize disturbance			✓	
f. Clearly identify closed areas and direct visitors to comparable alternative sites both on- or off-Refuge			✓	

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g. Promote the Refuge’s designation as an Important Bird Area (IBA) by the Audubon Society and explore further designation of the Refuge as an IBA by the American Bird Conservancy	✓			
h. Work with the Hawai‘i Department of Transportation and the County of Kaua‘i to incorporate the international binocular symbol on direction signs to identify the Refuge as a watchable wildlife location	✓			
i. Expand program offerings, workshops, activities, and exhibits used to teach and enhance wildlife viewing skills and ethics		✓	✓	✓
j. Increase compatible opportunities for up-close and personal viewing of wildlife (e.g., remote cameras, observation/photo blinds, guided ranger and/or volunteer led hikes)		✓	✓	✓
k. Expand citizen science opportunities (e.g., Christmas Bird Count)		✓	✓	✓
l. Increase staff visibility among wildlife clubs/organizations (e.g., engage at meetings, conferences, and/or events, participate in listservs, host field trips or other events)		✓	✓	✓
m. Offer guided interpretive hikes 2 times/week to Crater Hill designed (location of trail, timing, group size) to have negligible negative effects on breeding birds yet provide a quality experience for visitors			✓	✓
<p>Rationale: Observation and photography of wildlife and nature promote public understanding and appreciation for the Refuge’s natural resources. The Refuge is one of the best accessible locations in the main Hawaiian Islands for viewing and photographing wildlife as it has a high diversity of breeding birds at one location. Six to eight species of seabirds, as well as Hawai‘i’s State bird, the nēnē, can readily be seen by the majority of visitors. The sheer number of birds, as well as their proximity, makes for an extremely high-quality viewing and photography experience. The National Oceanic Atmospheric Administration (NOAA) also administers the Hawaiian Islands Humpback Whale National Marine Sanctuary (HIHWNMS) in the waters surrounding the Refuge, and endangered koholā (humpback whales) are readily seen offshore and photographed from December to April. Groups of nai‘a (spinner dolphins), ‘īlio-holo-i-ka-uaua (Hawaiian monk seal), and honu (green sea turtle) can also be seen from the Point.</p> <p>While the best viewing opportunities are on the Kīlauea Point Peninsula, additional opportunities are provided at the Overlook at the entrance to the Refuge, as well as on Crater Hill and Kāhili Quarry. They also provide a different perspective than is provided from the peninsula. As discussed previously, the current configuration of the Overlook together with the site’s constraints pose challenges to orienting and informing visitors.</p> <p>The Refuge receives regular inquiries about the reinstatement of Crater Hill hikes from both visitors and the community. Refuge staff recognize the value of Crater Hill for wildlife observation and photography and the unique experience it provides. However, these hikes were suspended in 2003 due</p>				

to concerns over disturbance to active burrows of breeding ‘ua‘u kani and a colony of nesting ‘ā at levels that likely affected bird survival and reproduction. In addition, the lack of personnel to adequately maintain trails and maintain a state of preparedness for emergency situations was a liability issue for the Refuge. Consequently, the use was at that time deemed incompatible with the Refuge System mission and Refuge purposes.

In the CCP’s draft Compatibility Determination for wildlife observation and photography (Appendix B), access to trails at Crater Hill for wildlife observation and photography was determined to be compatible when performed under certain stipulations, including a required Refuge staff or trained volunteer guide, minimum age, maximum group size, and limited frequency. With the exception of special, free hikes during National Wildlife Refuge Week, reservations would be required and adults (16 years or older) would be charged a moderate fee to join these hikes. The Service would assess erosion and compaction on trails, and wildlife effects of visitation (e.g., disturbance and crushing of burrows) on Crater Hill and elsewhere, and develop solutions to any problems. If monitoring reveals that levels of use or associated impacts exceed those envisioned in the Compatibility Determination, the use will be re-evaluated and modified to ensure it remains compatible or terminated if found not compatible.

In the future, in addition to enhancing and expanding opportunities for wildlife observation and photography, the Refuge would seek to better promote the opportunities. Currently, general information about the wildlife is provided on the Refuge’s Website; however, it does not include information such as current highlights, sightings, or wildlife counts. A wildlife checklist is offered onsite, but is directed at avid wildlife watchers. Viewing scopes are set up in multiple locations around the Point and binoculars are provided for loan in order to enhance wildlife viewing; however, other options such as remote cameras, observation/photo blinds, guided ranger and/or volunteer led hikes would be explored to broaden the types of offerings available.

Objective 4.6 Reduce wildlife disturbance, habitat degradation, and user conflict potential while increasing public safety for visitors to Kāhili Quarry.

Visitors at Kāhili Quarry are provided opportunities to participate in wildlife-dependent uses (fishing, wildlife photography and observation) and have access to adjacent off-Refuge areas (Kāhili Beach, Kīlauea Bay, and the Kīlauea River) for boating, and other stream, beach, and ocean uses such as snorkeling, sun bathing, surfing, swimming, and walking, including dog walking, with the following attributes:

- Minimize human disturbance to biological resources and
- Enhance visitor safety.

Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B	Alt C	Alt D
a. Work with Kīlauea community to maintain a passable road to the beach and shoreline			✓	
b. Post jurisdictional boundary, as appropriate, within the quarry area			✓	
c. Explore the possibility of cooperatively managing tidelands with the State			✓	

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d. Replace the existing fence with a predator-resistant fence in a modified alignment for approximately 600 feet, following the base of vegetation growing down the cliffs defining Mōkōlea Point	✓
e. Anglers would be allowed to erect temporary shelters (protections from the sun and rain) in the quarry area during daylight hours only	✓
f. Anglers would be allowed to bring and use portable stoves or self-contained barbecues (e.g., off-the-ground portable enclosed fires), but not build ground fires or fires in fire rings or pits	✓
g. General public access to Kāhili Beach, Kīlauea Bay, and the Kīlauea River through the Kāhili Quarry area would be allowing from 6 a.m. to 5 p.m. daily	✓
h. All dogs brought into the quarry area would be required to be to be leashed on a short (8-foot maximum) leash or kept in a secure, enclosed pen or crate at all times and would not be allowed to run free	✓
<p>Rationale: The Kāhili Quarry area, located on the south side of Mōkōlea Point, shows signs of many years of heavy public use, including vehicle use. The area has several fire pits, trash, and abandoned motor vehicles. At the south end of the area, between the unimproved dirt and gravel road and the Kīlauea River, there are cleared areas that have been used for camping and a small boat slide. The area has also been occasionally used by squatters.</p> <p>Access to the Kāhili Quarry area is either by motor vehicle, foot, horse, or bicycle down Kāhili Quarry Road, a rough, unimproved dirt and gravel road; by boat from the ocean or across Kīlauea River; or by wading or swimming across Kīlauea River. The Refuge owns a small portion of Kāhili Quarry Road from the Refuge boundary to the end of a parking area near the estuary of Kīlauea River. Under all alternatives, the Service would continue to work with the Kīlauea community to maintain a passable road to the beach and shoreline; however, no major improvements (e.g., no asphalt or permanent paving) to Kāhili Quarry Road or Kāhili Quarry are proposed. The Service would post its jurisdictional boundary, as appropriate, within the quarry area. The Service would also explore the possibility of working with the State to cooperatively manage the tidelands adjoining Kāhili Quarry through interagency cooperative agreement or other mechanisms. Cooperative management of this area would contribute to achieving the Service’s mission, Refuge’s purposes, and would help meet several of our goals by allowing us to protect wildlife resources through oversight of public use activities and Refuge law enforcement.</p> <p>A predator-resistant fence would be constructed to replace the existing fence would be in a modified alignment for approximately 600 feet, following the base of vegetation growing down the cliffs defining Mōkōlea Point. It is hoped that the new fence would reduce the potential for wildlife and habitat impacts from both trespassing humans and nonnative predators, such as free-roaming dogs.</p> <p>Under all alternatives, fishing on the Refuge occurring in the ocean at Kāhili Quarry and in the estuary of Kīlauea River would continue to be allowed on a 24-hour basis in accordance with State regulations</p>	

(see also Section 2.3.1). However, to discourage illegal camping or squatting, anglers would be allowed to erect temporary shelters (protections from the sun and rain) in the quarry area during daylight hours only. Also, to prevent adverse impacts to habitat due to open fires, only portable, self-contained camp stoves or barbeques would be allowed for preparing food.

Public access to off-Refuge areas (Kīlauea River, Kīlauea Bay, and Kāhili Beach) through the Kāhili Quarry area of the Refuge for fishing, boating, and other stream, beach, and ocean uses (e.g., snorkeling, sunbathing, surfing, swimming, and walking, including dog walking) would continue to be allowed under all alternatives. However, to reduce potential impacts to nocturnal seabirds such as ‘ua‘u kani and the threatened ‘a‘o, general public access (for nonwildlife-dependent uses) would be limited to 6 a.m. to 5 p.m. daily. These limited hours would reduce the number of night-time visitors to the Kāhili Quarry area, lowering the likelihood for illegal activities at night, which present threats to natural resources and public safety.

Dogs would be allowed at Kāhili Quarry in association with fishing or access to off-Refuge areas (Kīlauea River, Kīlauea Bay, and Kāhili Beach); however, all dogs must be on a short leash (8 feet or less) or in a secure, enclosed pen or crate at all times. Free-roaming dogs can harass, injure, or kill wildlife. On Kaua‘i, free-roaming dogs have killed shearwaters and mōlī at nesting colonies, sometimes in large numbers in a single incident (Hawaii Department of Land and Natural Resources 2013a and 2013b).

Other stipulations required to ensure the compatibility of uses at Kāhili Quarry are enumerated in Appendix B, Compatibility Determinations.

There is also a separate, but overlapping, nonexclusive access easement in favor of Seacliff Plantation (formerly the Pali Moana Corporation) for beach access, parking, and emergency and maintenance operations over and across Kāhili Quarry Road. This access, intended solely for use by the named party in the easement, is subject to reasonable rules and regulations for the protection of wildlife, including those mentioned above.

Objective 4.7 Enhance and expand outreach.

Enhance and expand outreach associated with the Refuge with the following attributes:

- Support the Refuge’s goals and fosters public awareness of the Service and its mission;
- Convey and reinforce the following message across all Refuge programs:
“The Service helps Americans conserve and enjoy the outdoors”;
- Incorporate outreach goals, designates target audiences and identifies key messages;
- Provide consistent and timely information to decision makers, community leaders and the public; and
- Focus on improving and building long-term relationships with our partners and the community.

Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B	Alt C	Alt D
a. Identify key themes and messages that support Refuge goals and related local, regional, and national conservation priorities (e.g., ‘a‘o conservation, avian disease, predator threats)			✓	
b. Identify target audiences, including community, political, economic and social			✓	

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leaders, conservation groups, resource users, the news media, and other Federal, State, and local agencies	
c. Explore various outreach tools, including new media technology, and strategies to reach each of the individual target audiences	✓
d. Invite elected officials and their staff to an annual site visit and face-to-face meeting at the Refuge	✓
e. Provide the news media with accurate and current information which meets their deadline needs	✓
f. Provide media with at least one Refuge related story a year	✓
g. Partner with offsite opportunities (e.g., organizations, initiatives, programs, special events) to maximize outreach effectiveness and efficiency. Incorporate Refuge messages when there is a high potential of reaching target audiences. Meet regularly to discuss common challenges and collaborative opportunities	✓
h. Review current and potential onsite special events. Determine at least two annual events with goals that best reach the target audience, deliver key messages, and strengthen our connection with the community	✓
i. Increase visibility in the community via various outreach tools (e.g., Kīlauea Neighborhood Association established communications efforts, radio segments, evening lectures, workshops, presentations at meetings)	✓
j. Ensure outreach and information programs are accessible to and usable by persons with various disabilities	✓
k. Review all existing and potential publications to determine whether they meet the Service's and the Refuge's communication needs, are effectively distributed, and meet graphic standards. Revise or eliminate as necessary	✓
l. Monitor and evaluate results of outreach by obtaining feedback from the targeted audience to determine whether they comprehend the outreach message. Modify current programs as needed to maximize the effectiveness of future efforts	✓
m. Engage all staff in regular face-to-face visits with organizational opinion leaders and decision-makers	✓

n. Encourage employees to join professional organizations and community organizations to enhance Service professionalism and support		✓
o. On a regular basis, evaluate all outreach products. Keep a detailed list of what products are produced, how many are distributed, and document when and where they are used		✓
p. Provide staff with opportunities for outreach training (e.g., outreach basics, building community support, working with news media, congressional operations)		✓

Rationale: The mission of the Service is, “working with others to conserve, protect, and enhance fish, wildlife, and plants and their habitats for the continuing benefit of the American people.” As reflected in the first three words, the Service acknowledges that it cannot effectively carry out its enormous natural resource management mission single-handedly. Thus, outreach is needed to enlist the support of a wide range of publics by improving communications with them. The fundamental purpose of Service outreach is to build understanding, trust, and support from a variety of groups by helping the various publics understand who the Service is, what we do, and why we do it.

Most of the Refuge’s current outreach efforts have been conducted on an ad hoc basis to meet the needs of an individual event or program. While this has resulted in favorable results in some individual instances, its overall effect has been a “scattershot” approach to communications. Existing resources dedicated to outreach are limited. Refuge staff often notes that the public confuses the Service with State wildlife agencies and the National Park Service. Anecdotal evidence suggests that most are not aware of who the Service is, while an even greater number are not aware of what the Service does or why it does this work. Messages describing how the Service is different from other government agencies, how national wildlife refuges are different from other public lands and why the Service’s work is important to people are currently absent.

Studies show that people believe information received from peers and community authority figures (kūpuna, teachers, ministers, etc.) more than they do newspapers and sources outside the community (Rogers 2003). Therefore, as part of improving relations with the community, connections with these individuals need to be maintained. In addition to the community, there are several other key publics, and there are a variety of reasons why they are important to include in outreach. All of the Service publics are constituents of elected officials and good communication with elected officials is essential for the Service to be effective and responsive to the American public.

Conservation groups have a great interest in resource management, and their support or lack of it influences other publics. Businesses, both small and large, can be a source of funding or support through partnerships. Other Federal agencies, as well as State and local governments, can help give momentum to Service initiatives, and their support can enhance a project’s likelihood of success. Finally, the news media can directly influence virtually all other publics. Each of these different publics can have a significant bearing on how or whether the Service accomplishes its mission and the Refuge achieve its goals.

Objective 4.8 Enhance and expand volunteer and Friends group opportunities.

Improve volunteer and Friends group opportunities associated with the Refuge with the following attributes:

- Provide effective training and program management;

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<ul style="list-style-type: none"> • Support and complement the Service mission and current initiatives; • Increase visibility and foster conservation; • Support a variety of Refuge programs/activities and increase their effectiveness; and • Encourage community involvement and strengthen relationships. 				
Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B	Alt C	Alt D
a. Develop a general orientation packet and orientation checklist that provides new volunteers, interns, KPNHA staff, and board members with general information on the Service and the Refuge			✓	
b. Regularly review and update handbooks and training materials to ensure they are current, and support and complement the Service's current initiatives, as well as the Refuge's purposes and goals			✓	
c. Expand efforts and explore various tools and strategies to provide effective, up-to-date and accurate communication to volunteers, interns and KPNHA staff			✓	
d. Regularly recognize volunteers, interns, as well as KPNHA for their contributions			✓	
e. Continue coordination with KPNHA through consistent and regular communication and regular attendance at meetings and events			✓	
f. Review and amend, as necessary, the KPNHA Cooperative Agreement/Memorandum of Understanding			✓	
g. Enhance and expand existing volunteer/intern program (complete needs assessment and create new position descriptions for volunteers and interns, recruit, and train) to a corps of at least 200 volunteers and interns in order to support a greater variety of Refuge programs			✓	
h. Develop a volunteer program that combines resource management (e.g., pest control, plant restoration) with interpretation (e.g., guided hike and birding on Crater Hill)			✓	
i. Expand current and new partnerships to maximize volunteer/intern recruitment and training efforts, as well as the effectiveness and efficiency of the program			✓	

j. Design and implement a training program, including a training manual, that provides regularly scheduled training for volunteers, interns, and KPNHA staff for all Refuge program areas, not just VS		✓
k. Every 5 years, obtain feedback and suggestions from volunteers and interns through a feedback form, survey, or other instrument		✓
l. Provide an orientation for Refuge staff on how to effectively work with volunteers and interns		✓
m. Host at least 2 community work days per year (e.g., National Public Lands Day, Martin Luther King Day of Service, National Volunteer Week) that reach at least 100 people annually		✓
n. Strengthen coordination with KPNHA through an annual whole-day planning meeting to develop an action plan for the upcoming year which includes goals, benchmarks, roles, timelines, implementation strategies, and evaluation needs		✓
o. Strengthen coordination with KPNHA to implement relevant CCP-related goals, objectives, and strategies to ensure a clear, shared vision which meets the Refuge's purpose		✓
<p>Rationale: Staff recognize that the volunteer program is a critical part of the Refuge workforce, and that it benefits all programs and goals and strengthens community relations. This is especially true in times of static or declining budgets. Due to the limited number of staff, the Refuge relies on assistance from Refuge volunteers and its partnership with KPNHA, a Refuge Friends Group, to provide visitor services such as interpretation and environmental education and habitat management (e.g., native plant restoration, banding birds, controlling introduced predators, and monitoring). Annually, volunteers contribute as many hours as more than 4.5 full-time employees. For more information on the volunteer program, see Chapter 5, Section 5.3.2. In the future, successful implementation of Refuge programs will require the use of partnerships, including expanding work with KPNHA and recruiting, training, and retaining more volunteers.</p>		

2.4.5 Goal 5: Identify, protect, evaluate, and interpret the cultural (including historic) resources and heritage of the Refuge while consulting with Native Hawaiian organizations and preservation partners, and complying with historic preservation legislation.

<p>Objective 5.1 Implement a proactive cultural resource management program that focuses on meeting the requirements of the National Historic Preservation Act and related legislation, including consultation, identification, inventory, evaluation, and protection of cultural resources.</p>		
Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B–D
a. Comply with Section 106 of the NHPA when conducting ground-disturbing activities. Identify cultural resources that coincide with	✓	✓

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existing and planned roads, facilities, public use areas, and habitat projects. Consult with Native Hawaiian organizations and interested parties. Evaluate cultural resources for eligibility to the National Register of Historic Places. Avoid or mitigate impacts as necessary		
b. Develop and maintain liaison with Native Hawaiian organizations, historical institutions, and other preservation partners for research, interpretation, and protection of cultural resources	✓	✓
c. Conduct archival research and communication with Native Hawaiian organizations, kūpuna, communities, and institutions to document the stories, occupation, and land use history of the Refuge	✓	✓
d. Prepare a cultural resource overview of the Refuge and step-down management plan by compiling a library of pertinent cultural resource sites, surveys, historical documents, maps, GIS files and prepare a report that presents this information within 4 years of CCP completion	✓	✓
e. Conduct a field inventory and evaluation of cultural resources identified and predicted by the archival research and communication program described above in concert with the information provided by the cultural resources overview	✓	✓
f. Establish a Refuge-specific protocol for handling discoveries of human remains, burial objects, sacred objects, and objects of cultural patrimony in accordance with the Native American Graves Protection and Repatriation Act of 1990, and in partnership with Native Hawaiian organizations within 1 year of CCP completion	✓	✓
g. Orient and train staff to recognize and be sensitive to cultural resources	✓	✓
h. Investigate and evaluate nomination of the Refuge as a Traditional Cultural Property (TCP)		✓
<p>Rationale: Cultural resources are irreplaceable and essential elements of Hawai‘i’s heritage. The National Historic Protection Act of 1966, Archaeological Resource Protection Act of 1979, and the Native American Graves Protection and Repatriation Act of 1990, and related legislation, require the Service to implement the kind of program described under this objective.</p> <p>The National Register of Historic Places contains a wide range of historic property types, reflecting the diversity of the Nation’s history and culture. Traditional Cultural Properties provide a "historic property" framework in order to consider intangible resources (places) of a culture, typically without structured or stated boundaries. A TCP can be defined generally as one that is eligible for inclusion in the National Register because of its association with cultural practices or beliefs of a living community that are rooted in that community’s history, and are important in maintaining the continuing cultural identity of the community (Parker 1998).</p>		

Objective 5.2 Create and implement, in cooperation with preservation partners, a program to maintain, restore, reuse, and interpret the Kīlauea Point Light Station.		
Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B–D
a. Prepare or update historic structure reports for each element of the Kīlauea Point Light Station (within 3 years of CCP completion)	✓	✓

b. Prepare a historic structure treatment plan that addresses the needs, priorities, costs, and schedule for maintenance, restoration, and reuse of each element of the Kīlauea Point Light Station (within 5 years of CCP completion)	✓	✓
c. Consult with historical societies, and other preservation partners to identify and prepare interpretive media (e.g., pamphlets, signs, exhibits) that relates the story of the Kīlauea Point Light Station for visitors	✓	✓
d. Develop an outreach program and materials so that cultural resource messages become part of events in the area, including the State’s Archaeology Month, National Wildlife Refuge Week, and appropriate local festivals		✓
<p>Rationale: The Kīlauea Point Light Station is nationally significant for its associations with maritime history and U.S. military history as well as for its unique architectural characteristics. The Kīlauea Point Light Station lens is one of only seven second-order classical Fresnel lenses still remaining in its original position in the United States. In addition to the Lighthouse, the station’s compound maintains excellent integrity with the three lava rock bungalow-style keepers’ cottages, an oil storage building, a landing, and other support facilities such as the derrick at Kīlauea Point.</p> <p>The Lighthouse station is open to the public and is one of the most visited sites on Kaua‘i, drawing more than an estimated 500,000 visitors a year. The Station is compromised by the corrosive effects of salt water decaying metals, crumbling concrete, and trapped moisture. Current restoration efforts were completed in 2013. The Refuge offers cultural and historic activities related to the Kīlauea Point Light Station.</p>		

2.4.6 Goal 6: Ensure that all visitors enjoy safe and well-maintained operations that contribute to a positive visitor experience.

Objective 6.1 Maintain, enhance, and replace visitor, administrative, and maintenance facilities.				
<p>To fulfill Executive Order 13514 to reduce greenhouse gas emissions and meet agency reduction targets by 2020, relocate, modify, and replace infrastructure to become energy neutral through (1) utilization of alternative energy sources for vehicles and structures; (2) conserving water; and (3) reducing waste, with the following attributes:</p> <ul style="list-style-type: none"> • Through its facilities, the Refuge would promote visitor and employee safety, health and well-being and provide a range of choices to experience the Refuge and its wildlife; and • The design and placement of Refuge facilities would be responsive to Kaua‘i’s setting. They would blend with and be fully integrated into these unique natural and cultural settings. Refuge facilities would be environmentally responsible and should protect wildlife, topographical features, scenic viewsheds, hydrologic systems, and the night sky. 				
Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B	Alt C	Alt D
a. Enhance/rebuild existing maintenance/facility areas on the Point to expand storage and provide covered, protected area for machines/vehicles	✓	✓ (rebuild)		
b. Remodel and relocate main Administrative and VS offices to Quarters #2 and #3		✓		
c. Pursue offsite parking for identified staff and volunteers	✓	✓		

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d. Include main administrative offices with new onsite or offsite visitor welcome and orientation center			✓	✓
e. Develop new maintenance baseyard (storage sheds, bays, pole barns, nursery)			✓ (on the Refuge, same area as visitor welcome and orientation center)	✓ (off the Refuge)
f. Remodel Quarters #3 for basic administrative and volunteer offices			✓	✓
<p>Rationale: Currently the Refuge has two storage sheds, about 17 by 25 feet, and a native plant nursery, approximately 24 by 30 feet with a perforated and mesh style roof. There is no covered maintenance facility for equipment and vehicles at the Refuge (maintenance baseyard). Due to the coastal marine environment, high humidity, and heavy winds that carry up salt spray from the surf below, degradation of equipment, vehicles, and facilities is accelerated and consistently exceeds normally acceptable mainland standards for maintenance costs and schedules. Vehicle maintenance, in particular, needs constant attention with rust and deterioration occurring within just a few years. In addition, the distance needed to transport supplies and equipment between Refuges often substantially adds to the cost of conducting Refuge management activities (heavy equipment used for the Refuge is transported from Hanalei NWR due to lack of covered storage at the Refuge). The historical designation of several buildings prevents modification to the extent needed to serve as office, maintenance, equipment and vehicle storage spaces. Additionally, given the nesting nēnē and ‘a‘o, acres to build such new structures on the Point are unavailable.</p> <p>In the future, Refuge facilities would demonstrate models of sustainability in the built environment through cohesive integration of building, site, and landscape. Facilities should be as resistant as possible to hurricanes and salt spray, employ highly efficient electrical and mechanical systems, use environmentally responsible materials, alternative energy sources, and other materials to fit within the community, reduce environmental effects, and reduce long-term-maintenance costs.</p> <p>Public facility improvements would be designed to connect visitors to the natural habitats and wildlife of the Refuge. Visitor needs would be identified and facilities would follow universal design standards serving a range of cultures, ages, and abilities. Refuge facilities would exhibit lasting value, including a consideration for life-cycle costs to achieve a cost effective, quality built environment. Whole life costing would be applied during the design process considering maintenance, operational, and disposal costs.</p> <p>Facility design would display a visual character that is recognizable as those of the Service and the Refuge System. Display of wildlife images, the Service shield, and Refuge System’s Blue Goose, and repetition of materials, colors, and design elements would contribute to branding and strengthening the Service’s image.</p> <p>Construction would also follow designated building guidelines (as identified in the North Shore development plan and Kīlauea Town Plan) such as height requirements (less than 25 feet in height).</p>				

Objective 6.2 Enhance law enforcement.

Enhance law enforcement for operational capabilities and public safety with the following attributes:

- Compliance on Special Use Permits (SUPs) achieved;
- Refuge laws enforced; and
- Minimize human disturbance to biological resources.

Strategies Applied to Achieve Objective:	Alt A (Current)	Alt B–D
a. Continue to work with partners and other law enforcement agencies to protect natural resources, eliminate criminal activity (including trespassing, access by dogs), and disturbance to sensitive areas	✓	✓
b. Explore concurrent jurisdiction with the State of Hawai‘i		✓
c. Ensure the Refuge Sign Plan developed integrates law enforcement signage (boundary/fence markings, public safety, Refuge regulations)		✓
d. Develop a law enforcement monitoring system (including SUPs) that is reviewed and updated, at a minimum, annually		✓
e. Develop outreach tools (e.g., brochures, Website) specifically for Refuge protection and safety issues and identify methods for circulation		✓
f. Provide law enforcement expertise at workshops, community/partner meetings, and public talk opportunities		✓
g. Provide annual training to non-law enforcement Refuge staff and volunteers on law enforcement incident reporting, monitoring, and procedures		✓

Rationale: Most law enforcement issues at the Refuge revolve around improved education of Refuge users and visitors to reduce impacts on biological resources. Examples include vehicle and nēnē impacts, loose dogs on Refuge lands, proximity to wildlife which can lead to distress or habituation, and trespass.

Fish and wildlife law enforcement issues on lands and waters of the Refuge are under the jurisdiction of the Service law enforcement officers. Their roles are to conduct and document law enforcement incidents and coordinate and meet with Refuge staff as well as law enforcement partners. Primary laws and regulations enforced include, but are not limited to:

- Administration Act;
- Lacey Act;
- Archaeological Resource Protection Act;
- Endangered Species Act;
- Migratory Bird Treaty Act;
- Marine Mammal Protection Act; and
- Code of Federal Regulations.

Zone and Refuge officers are also empowered to enforce laws as authorized. Activities could include issuing traffic citations and warrants for arrest as they relate to drugs, trespass, hunting, fishing, and the taking of wildlife on Federal lands and, in some instances, boating safety related to refuges.

The Refuge would establish a program to monitor compliance with the stipulations enumerated within compatibility determinations (Appendix B). Violation of any of these stipulations could result in temporary or permanent withdrawal of official permission to continue this use on the Refuge by

appropriate Refuge personnel. Special Use Permits (SUPs) could be revoked by the Refuge Manager with 30-days written notice of noncompliance with these stipulations.

Service officers often partner with other law enforcement agencies such as the Division of Conservation and Resources Enforcement-DLNR and other law enforcement agencies.

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Figure 2-1. Biological Management Alternative A, Kilauea Point NWR.

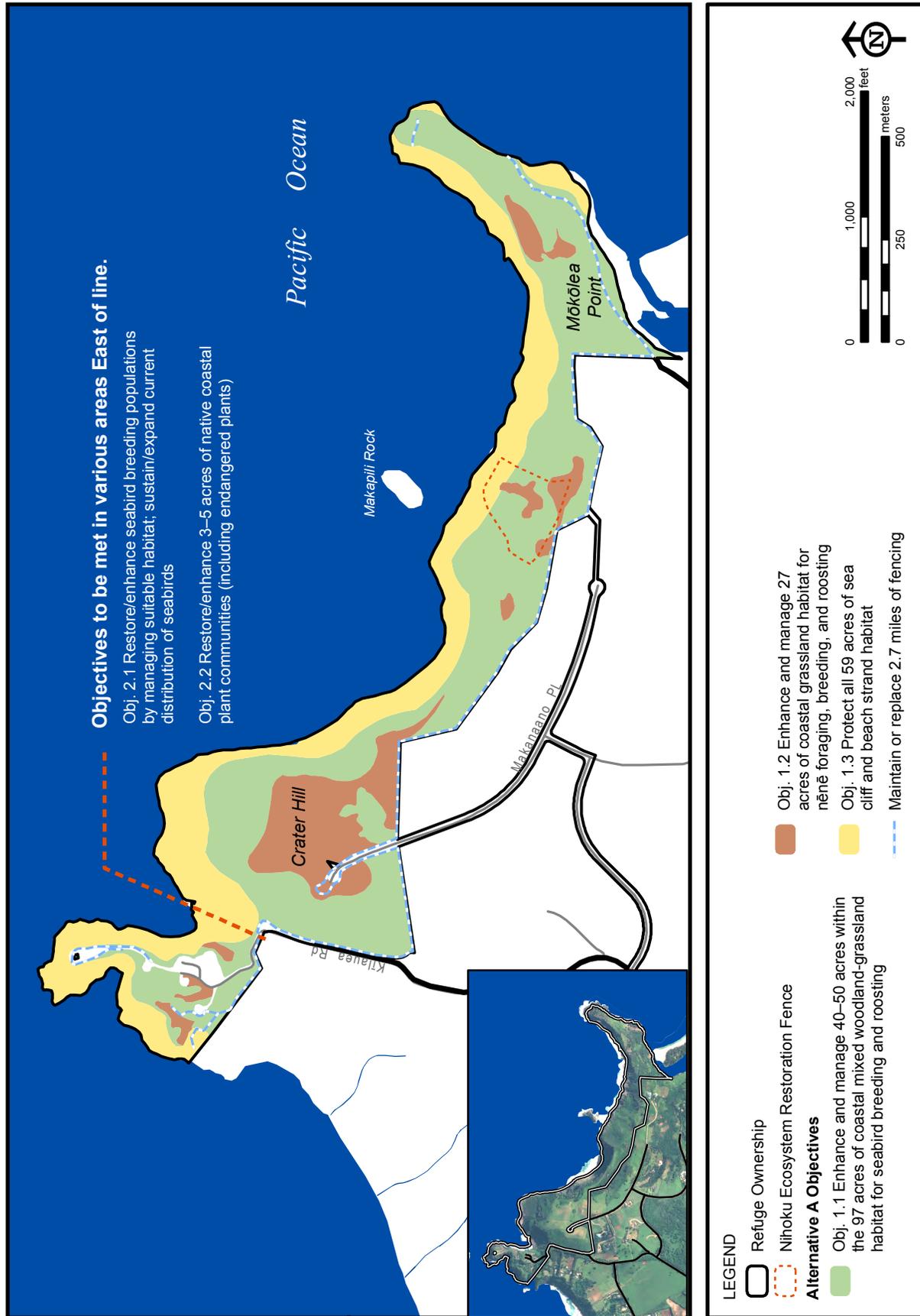


Figure 2-2. Biological Management Alternatives B–D, Kilauea Point NWR.

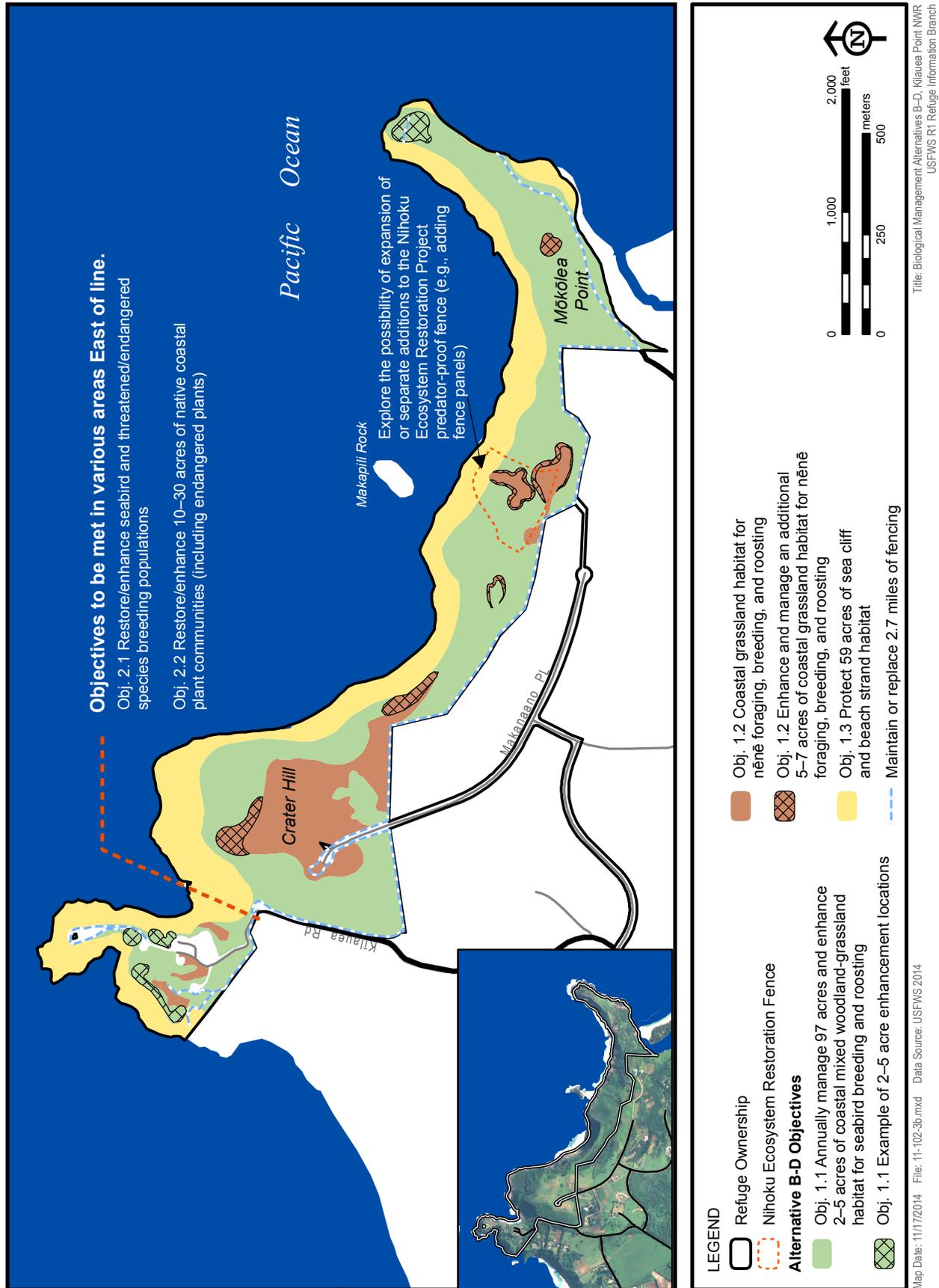
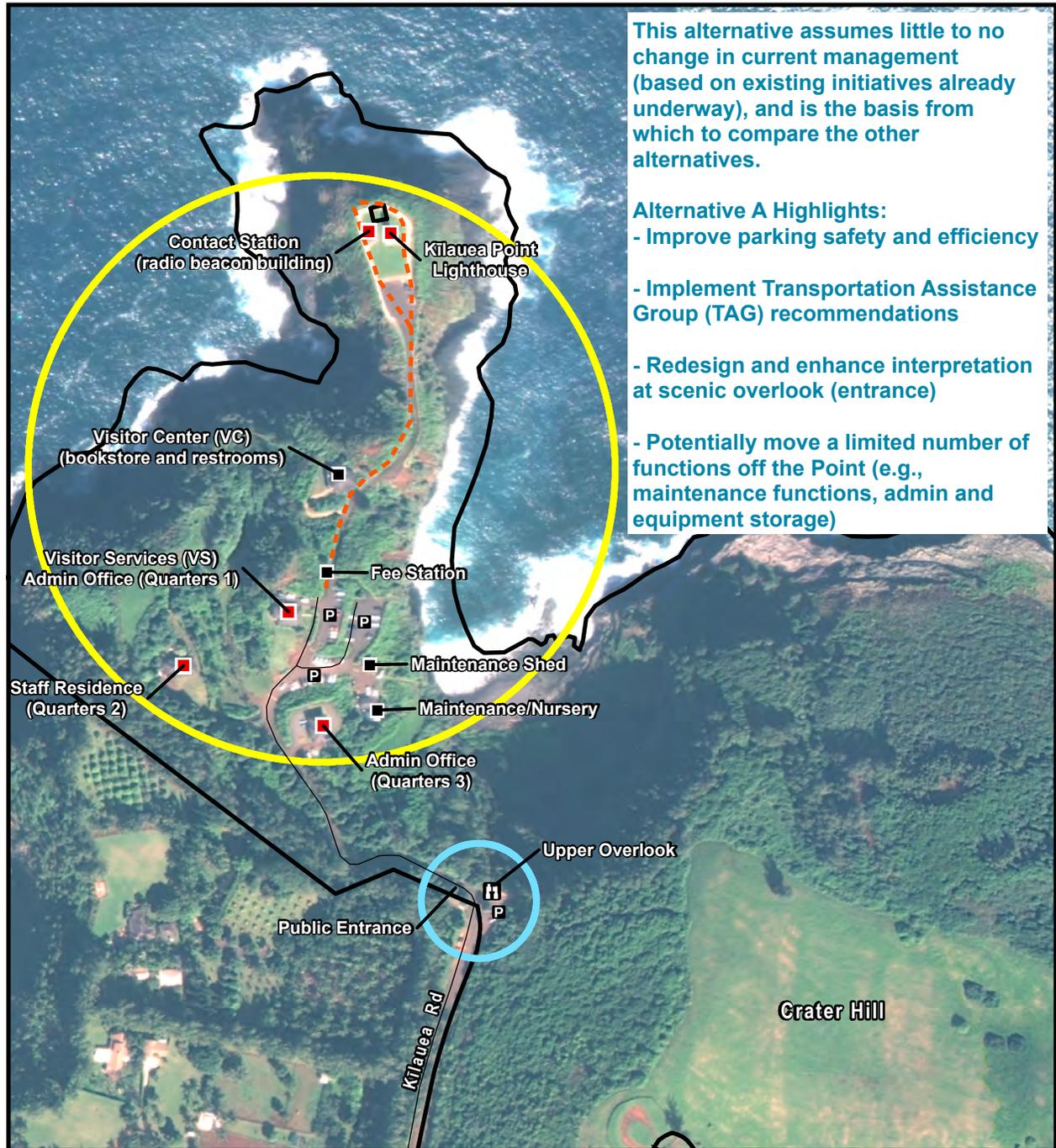


Figure 2-3. Public Use and Maintenance/Facilities Alternative A, Kilauea Point NWR.



This alternative assumes little to no change in current management (based on existing initiatives already underway), and is the basis from which to compare the other alternatives.

- Alternative A Highlights:**
- Improve parking safety and efficiency
 - Implement Transportation Assistance Group (TAG) recommendations
 - Redesign and enhance interpretation at scenic overlook (entrance)
 - Potentially move a limited number of functions off the Point (e.g., maintenance functions, admin and equipment storage)

LEGEND

Key Areas (general vicinity circled)	Refuge Ownership Boundary	Lighthouse Path
Scenic Overlook	Historic Refuge Buildings	Roads
The Point	Refuge Buildings	
	Parking Lot	
	Overlook	

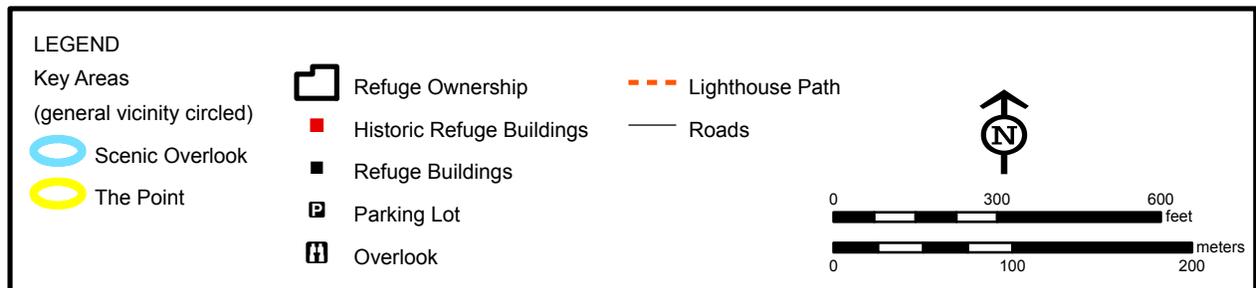
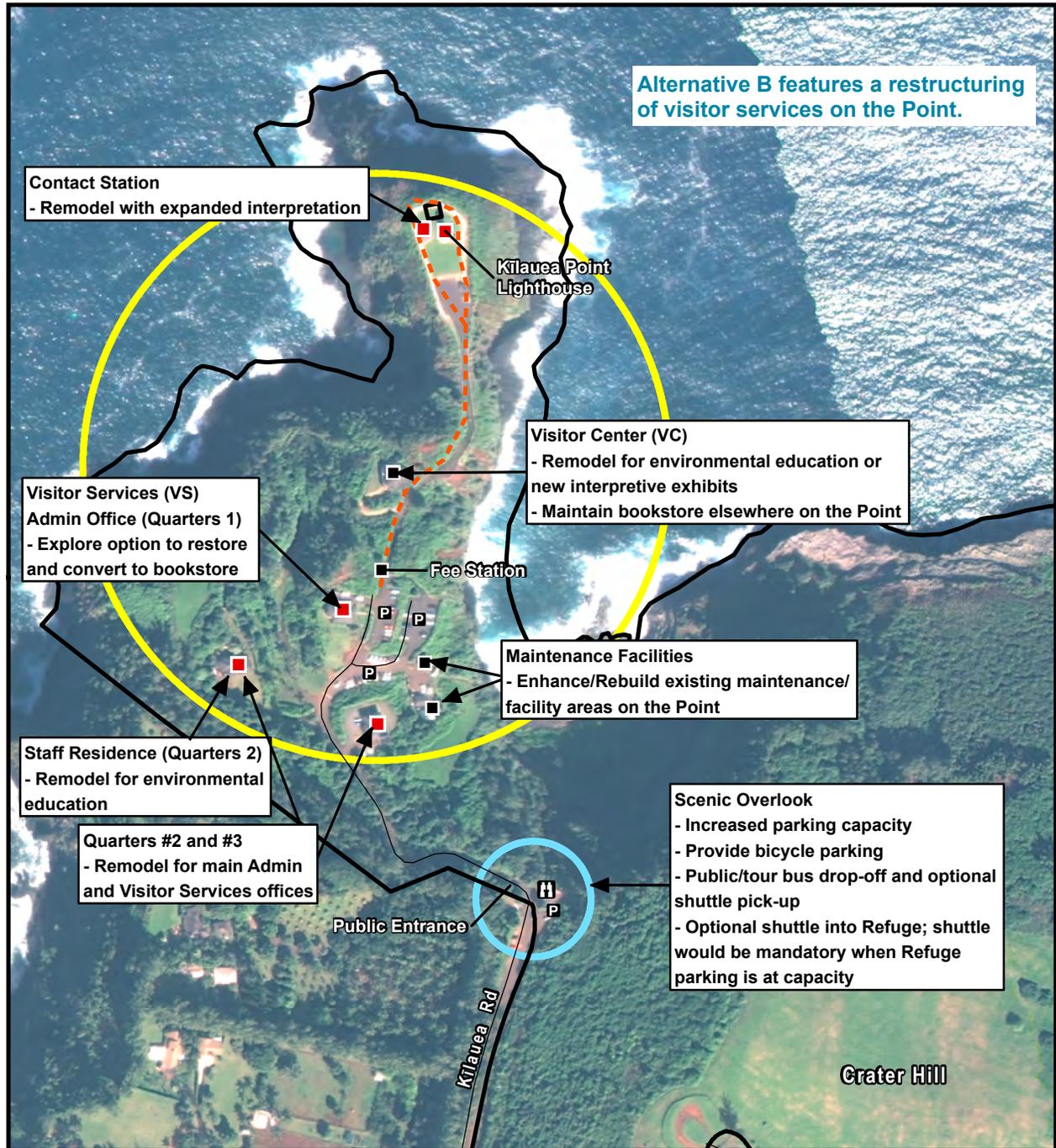
0 300 600 feet

0 100 200 meters

Map Date: 11/17/2014 File: 11-106-3a.mxd
 Data: USFWS 2014, DigitalGlobe 2010

Title: Public Use and Maintenance/Facilities Alternative A
 USFWS R1 Refuge Information Branch

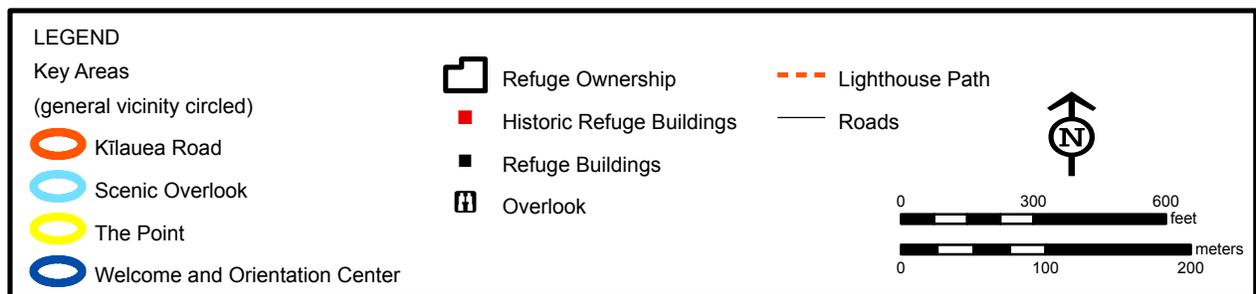
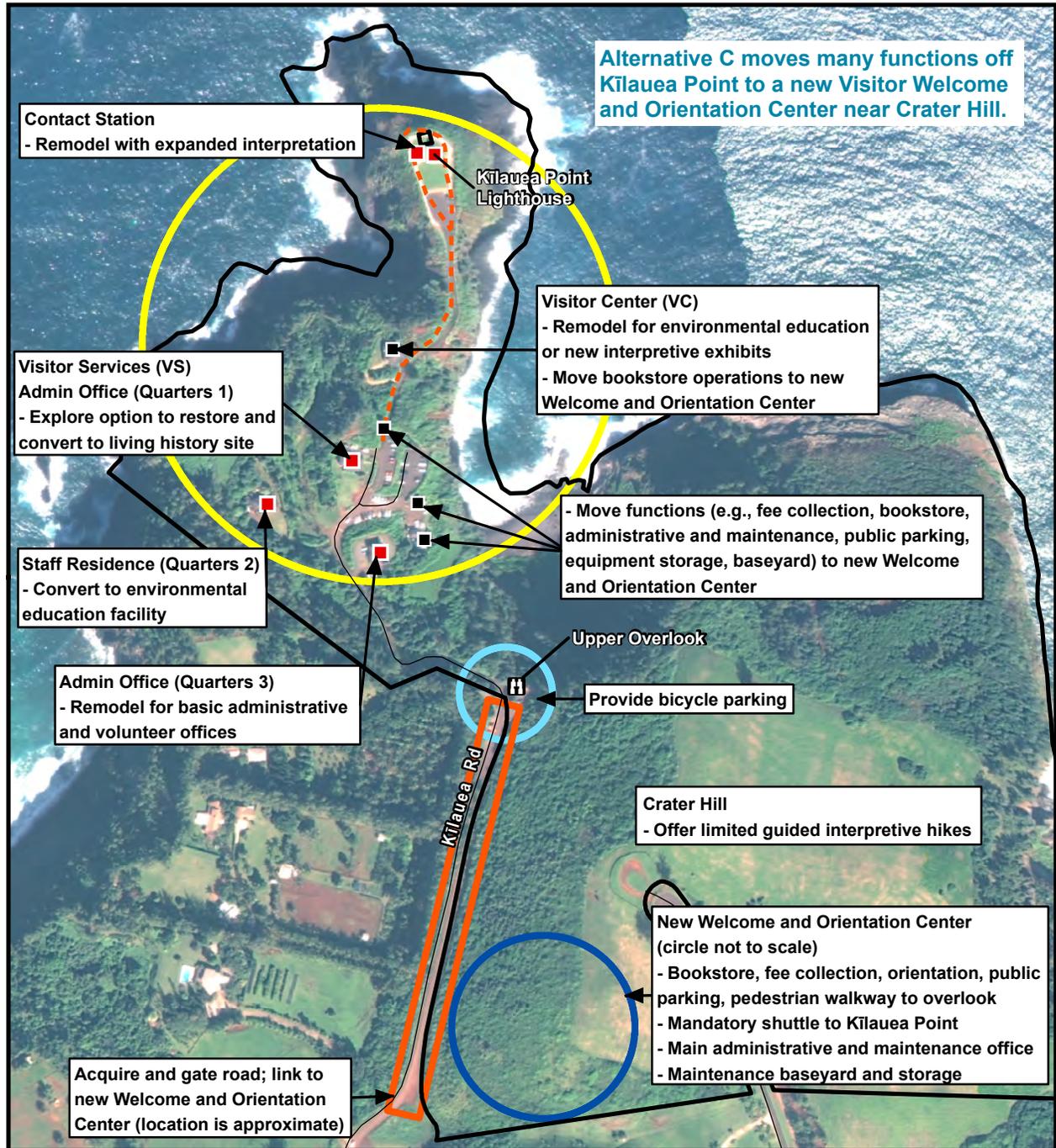
Figure 2-4. Public Use and Maintenance/Facilities Alternative B, Kilauea Point NWR.



Map Date: 11/17/2014 File: 11-106-3b.mxd
 Data: USFWS 2014, DigitalGlobe 2010

Title: Public Use and Maintenance/Facilities Alternative B
 USFWS R1 Refuge Information Branch

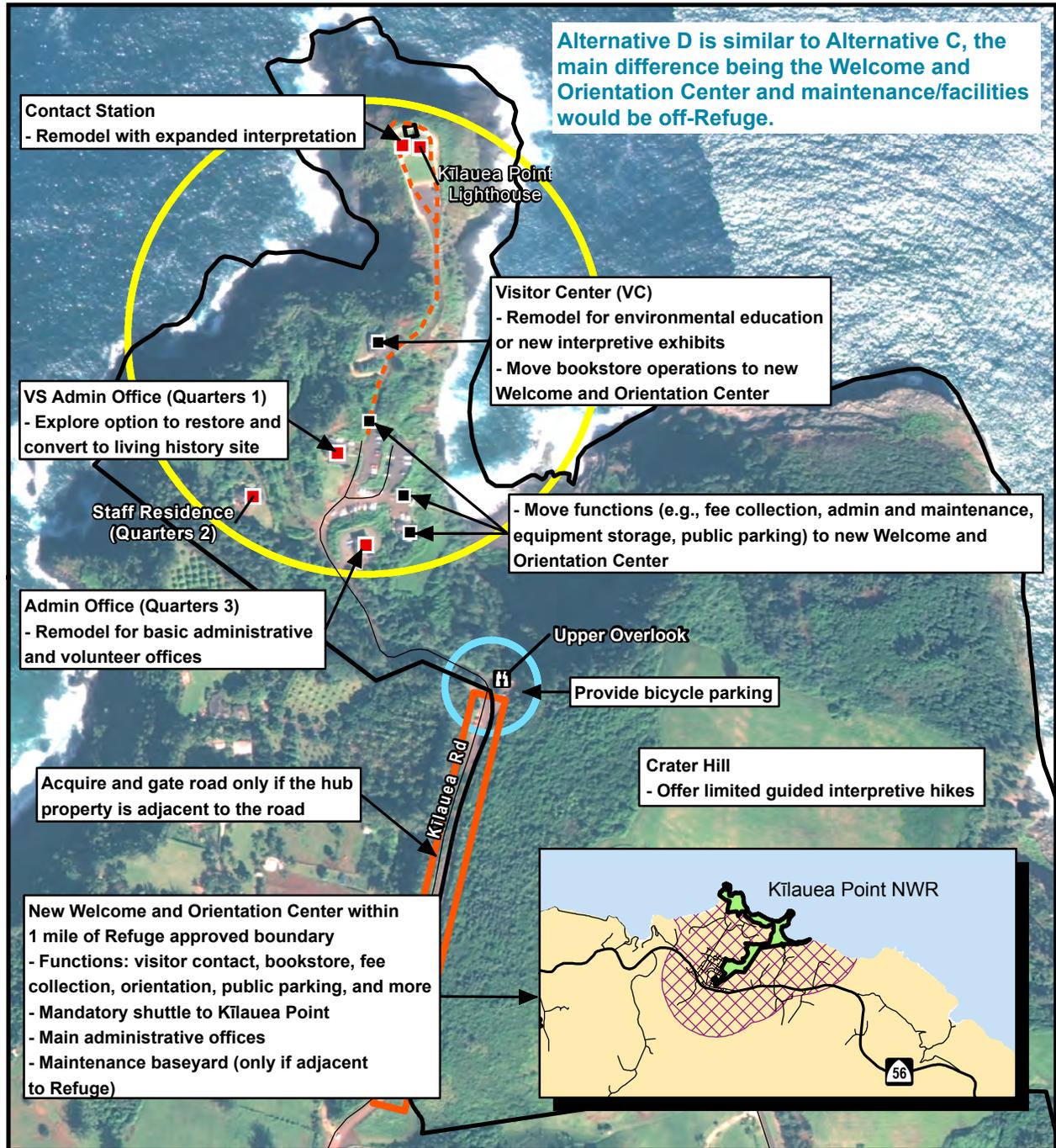
Figure 2-5. Public Use and Maintenance/Facilities Alternative C, Kīlauea Point NWR.



Map Date: 11/17/2014 File: 11-106-3c.mxd
 Data: USFWS 2014, DigitalGlobe 2010

Title: Public Use and Maintenance/Facilities Alternative C
 USFWS R1 Refuge Information Branch

Figure 2-6. Public Use and Maintenance/Facilities Alternative D, Kīlauea Point NWR.



Map Date: 11/17/2014 File: 11-106-3d.mxd
 Data: USFWS 2014, DigitalGlobe 2010

Title: Public Use and Maintenance/Facilities Alternative D
 USFWS R1 Refuge Information Branch

