United States Department of the Interior

FISH AND WILDLIFE SERVICE

Pacific Islands Fish and Wildlife Office
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Honolulu, Hawai'i 96850

In Reply Refer To:
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Memorandum

To: Chief, Division of Consultation and Conservation Planning
Region 1, Portland, Oregon

From: Field Supervisor, Pacific Islands Fish and Wildlife Office
Honolulu, Hawaii

Subject: Section 7 Consultation for the Lanai Meteorological Tower Habitat Conservation Plan and Incidental Take Permit Application, TE-194350-0

This represents the biological opinion of the U.S. Fish and Wildlife Service (Service) in accordance with section 7 of the Endangered Species Act of 1973, as amended (Act), for the potential effects to the endangered Hawaiian petrel, Uau (*Pterodroma sandwichensis*); Hawaiian stilt, Aeo (*Himantopus mexicanus knudseni*), and Hawaiian hoary bat, Ope apea (*Lasiurus cinereus semotus*); and the threatened Newell's (Townsend's) shearwater, Ao (*Puffinus auricularis newelli*) hereafter, collectively called "covered species", from the proposed construction and operation of seven meteorological (met) towers through March 1, 2010, on the island of Lanai, from the issuance of incidental take permit TE-194350-0, and implementation of the Habitat Conservation Plan (HCP) for the construction and operation of the met towers.

This biological opinion is based upon: 1) Draft Habitat Conservation Plan for the Construction and Operation of the Lanai Meteorological Towers, Lanai, Hawaii (TTEC 2008); 2) Draft Environmental Assessment for the Issuance of an Endangered Species Act Section 10 (a)(1)(B) Permit for the Incidental Take of Listed Species for the Lanai Meteorological Towers Project (USFWS 2008); 3) Hawaiian Dark-rumped Petrel and Newell's Manx Shearwater Recovery Plan (USFWS 1983); 4) Recovery Plan for the Hawaiian Hoary Bat (*Lasiurus cinereus semotus*) (USFWS 1998); 5) Draft Revised Recovery Plan for Hawaiian Waterbirds (USFWS 2005a); 6) other biological literature (see Literature Cited at the end of the document); and, 7) information contained in our files. Our log number for this consultation is 2008-F-0320. Copies of pertinent materials and documentation are maintained in an administrative record in the U.S. Fish and Wildlife Service (USFWS) Pacific Islands Fish and Wildlife Office in Honolulu, Hawaii.

Consultation History

On June 6, 2007, USFWS Pacific Islands Fish and Wildlife Office staff met with representatives of Castle & Cooke Resorts, LLC, to discuss the potential impacts of the construction and operation of met towers on listed species and recommend developing a Habitat Conservation Plan as part of an application for an incidental take permit for the take of Hawaiian petrels that could collide with the met towers.

On November 9, 2007, the USFWS Pacific Islands Fish and Wildlife received the first draft of Castle & Cooke Resorts, LLC's HCP for review.

On March 7, 2008, the Hawaii Department of Land and Natural Resources (DLNR) Endangered Species Recovery Committee reviewed a revised draft HCP and recommended the Board of Land and Natural Resources release the document for public review.

Between March 8 and May 7, 2008, DLNR conducted a 60-day public review period.

On April 11, 2008, DLNR and held a public hearing on Lanai to accept input on the draft HCP.

On June 23, 2008, the USFWS Portland Regional Office received the permit application and associated fee from Castle & Cooke Resorts, LLC.

On July 8, 2008, USFWS published a notice of availability for 30-day public review of Castle & Cooke, LLC's application for an incidental take permit, including a revised draft HCP and Environmental Assessment in the Federal Register.

On August 8, 2008, the USFWS Portland Regional Office initiated the request for intra-Service consultation with the Pacific Islands Fish and Wildlife Office.

On August 12, 2008, the DLNR Endangered Species Recovery Committee reviewed a revised draft HCP and recommended the Board of Land and Natural Resources approve the HCP and issue a state incidental take license.

DESCRIPTION OF THE PROPOSED ACTION

The Service proposes to issue an incidental take permit (ITP) under section 10(a)(1)(B) of the Act, to Castle & Cooke Resorts, LLC (Castle & Cooke), for covered activities associated with construction and operation of seven met towers through March 1, 2010, and to accept a proposed HCP for incidental take of four federally listed species that are known or believed to occur in the project area: the endangered Hawaiian petrel, Hawaiian stilt and the Hawaiian hoary bat, and the threatened Newell's (Townsend's) shearwater. As provided for under the Act, the applicant has developed and proposes to fund and implement the HCP to minimize and mitigate the effects of the incidental take. The following project description is a summary of the construction and

operation of the met towers, the monitoring for carcasses at the met tower sites, and the mitigation activities to be implemented elsewhere on the island as described in the HCP and Environmental Assessment (EA).

Overview and Action Area

Castle & Cooke proposed to install and operate seven 50-m-tall (165 ft) met towers on the island of Lanai, Maui County, Hawaii (Figure 1-1 in the HCP). The met tower footprints are bounded by open lands currently owned and managed by Castle & Cooke. The met towers and their associated monitoring plots are located within a combined footprint area of approximately 4.6 ha (11.4 ac). Six met towers have been erected and the installation of the seventh is pending; this consultation only covers the continued operation of the seven towers through March 1, 2010. The towers are collecting data on wind speeds and patterns throughout the northern portion of the island. This data will be used to determine the suitability of the wind regime, over the proposed lands described above, to sustain a commercially viable wind energy facility. Met tower locations were selected based on several factors including (1) adequate vertical and horizontal distribution throughout the wind resource area, (2) suitable erection areas (*e.g.*, area, grade, soils, close proximity to existing access roads), and (3) avoidance of sensitive biological and archaeological resources. Specific site descriptions are included within the HCP.

The met towers are a standard design and made specifically for wind energy resource measurements. These lightweight towers are made of galvanized steel tubing. The tubes slide together without bolts or clamps, and are made from a combination of 1.5-meter (5-foot) and 3-meter (10-foot) sections. The sections are assembled horizontally on the ground and then tilted up using a ginpole and winch; the solar panel and communications equipment would then be installed. The towers rest on a steel base plate approximately 0.8 sq. m (9 sq. ft) in size and are supported with aircraft cable guy wires in four directions at each guy level. The guy wire radius is 30.5 to 33.5 m (100 to 110 ft). The guy wires are anchored with standard dead-man type anchors to a depth of 1.5 to 2.4 m (5 to 8 ft). A figure illustrating a typical meteorological tower structure with associated guy wire locations is included in Appendix 2 of the HCP.

Installation of the towers requires minimal ground disturbance. No cranes or concrete foundations are required for the installation of these met towers. No new access roads are created as part of the proposed action. Only minimal excavation is required with a small backhoe to install the anchor points. A small trench approximately 0.61 m (2 ft) wide by 1.8 m (6 ft) long by 1.2 to 1.8 m (4 to 6 ft) deep is excavated so the guy wire steel rod anchors can be inserted into the ground at each site. Tower installation personnel access each tower site via existing roads, existing four-wheel-drive trails, and by foot. A pickup-sized flatbed truck with a trailer is used, although some locations may require manual transport of materials. At each tower site, low-lying brush is removed by hand and the backhoe as required within the guy wire area to allow for safe erection of the towers. Brush is also removed within the temporary tower assembly areas outside of the guy wire areas. The width of these temporary tower assembly areas is approximately 3 m (10 ft) wide to accommodate assembly of the tower sections. No

fencing is proposed for the tower sites, although some non-native vegetation may be cleared after installation to improve the ability to locate carcasses. Installation of each tower requires approximately 3 to 5 days once the anchors are installed. Following erection of the towers, all installation equipment is removed from the site.

In order to reduce the potential for listed species to collide with a tower and associated guy wires, Castle & Cooke is implementing measures to make the towers more visible to flying wildlife. White, 2.5-cm (1-in) poly tape is fitted to the guy wires to increase visibility and subsequently increase the likelihood of avoidance. This tape has proven effective in minimizing petrel collisions with fencing and other structures at the Lanai colony when wrapped along the length of the fencing (Penniman, pers. comm. 2007). The poly-vinyl tape is cut into approximately 1.2-m (4-ft) segments, folded in half over the wire, and attached using ultra-violet light resistant zip ties, leaving at least 1.8-m (6-ft) gaps above and below the anemometer. Bird diverters are added between the taped sections. Additionally, two one-meter sections of yellow polyvinyl chloride (PVC) tubing are placed on each guy wire, starting at the anchor points. This is the maximum amount of PVC tubing that can be applied to the guy wires without causing excessive loading and drag.

The action area also includes any area where mitigation for any of the covered species may occur. As part of the mitigation actions to be implemented (detailed in Appendix 7 of the HCP), Castle & Cooke is funding habitat restoration efforts within habitat that, once restored, will provide improved habitat for three of the covered species (Hawaiian petrel, Hawaii hoary bat and Newell's shearwater). The habitat restoration will occur within the central summit of the island known as the "Lanaihale". The final size of the restoration area will depend on the number of Hawaiian petrel carcasses found during monitoring at the tower sites, but the maximum size to be restored is 2.4 ha (6 ac). In addition, Castle & Cooke is funding a predator control program at the Lanai Wastewater Treatment Plant (WWTP) where Hawaiian stilts are known to nest, and expanding the predator control program already being implemented by DOFAW within the active Hawaiian petrel colony on the island, and these areas are considered part of the action area.

No other impacts to listed species are anticipated, but if new information indicates that any potential impacts to newly listed species or critical habitat not covered by this biological opinion will occur, they will be addressed through an amendment to the HCP as set forth in Section 6.8 of the HCP.

Project Duration

The proposed project duration is based on the length of time needed to gather sufficient meteorological data to evaluate the suitability of the site as a wind energy generating facility, which is a maximum of two years. Since Castle & Cooke has six of the seven met towers collecting wind data, the Service's incidental take permit will expire on March 1, 2010. The continuance of the operation of the met towers would be subject to a renewal of Castle &

Cooke's Conservation District Use Permit (CDUP) with the State Office of Conservation and Coastal Lands (OCCL), as well as a renewal of the HCP, if amended.

Habitat Conservation Plan

The incidental take of four listed species may occur as a result of the construction and operation of the seven met towers. Of the four, three are birds: the endangered Hawaiian petrel, the threatened Newell's (Townsend's) shearwater and the endangered Hawaiian stilt. The fourth species is a mammal, the endangered Hawaiian hoary bat. These species may potentially collide with the met towers, resulting in injury or mortality. These species also may collide with guy wires supporting the towers. All of these species are endemic and nest only on the Hawaiian Islands (American Ornithologists' Union 1998).

An HCP has been prepared for the construction and operation of the met towers in accordance with requirements of section 10(a)(1)(B) of the Act, as amended, and Hawaii Revised Statutes Chapter 195-D, for issuance of an Incidental Take Permit and Incidental Take License, respectively. Upon issuance of the permit and license, Castle & Cooke will be authorized for the incidental take of the covered species associated with the construction and operation of the seven met towers.

The purpose of the HCP is to assess the potential impacts posed by the met towers upon each listed species; discuss alternatives that may minimize anticipated potential impacts; propose appropriate measures to minimize, mitigate, monitor, and report potential impacts to the maximum extent practicable; ensure adequate funding for implementation of the mitigation measures; and provide for adaptive management and adjustment of the mitigation measures as determined by the resource agencies during implementation of the HCP.

Specific biological goals of the HCP are to:

- minimize and mitigate, to the maximum extent practicable, the effects of take caused by interaction of covered species with the seven met towers;
- adhere to goals of the existing recovery plans for the four covered species, considering the most recent updated information and goals;
- increase the knowledge and understanding of the four listed species' occurrence and behavior in the project vicinity and on Lanai; and
- provide a net conservation benefit to each of the four species.

By implementing the HCP and considering the project's other environmental benefits, Castle & Cooke proposes to offset the risks of project-related impacts and provide a net conservation benefit to the four affected species.

Minimization and Avoidance of Impacts

Castle & Cooke is minimizing the risk of collisions as much as practicable by

- siting the towers primarily on the western side of the Wind Resource Area to maximize the distance from the Hawaiian petrel colony;
- marking guy wires with high-visibility flagging, bird diverters, PVC tubing, or other suitable marking devices designed to reduce bird strikes;
- establishing take limits to minimize the impacts;
- monitoring beneath met towers in such a way as to ensure that any birds or bats that collide with the towers have a high probability of being detected; and
- account for undetected take by adjusting for searcher efficiency and carcass removal rates.

Anticipated Impacts in the HCP

The HCP assessed the potential of impacts to each of the four covered species separately.

Hawaiian Petrel
Based on data from both visual surveys and marine ornithological radar studies, the Hawaiian petrel is the species that is most likely to impact the met towers within the project term (survey results are presented in Appendices 3 and 4 of the HCP). Annual movement rates of Hawaiian petrels within 1.5 km (0.9 mi) of each of the seven met tower sites were estimated using marine radar and the exposure rates of the birds to a met tower were calculated from the two-dimensional area of the met towers relative to the two-dimensional area sampled by the radar screen. The probabilities of a Hawaiian petrel colliding with each met tower were estimated by adjusting the exposure rates by a collision avoidance factor ranging from 99 to 95 percent, resulting in an estimate that between 5 and 25 petrels could collide with a tower during the two year project term. While there are collision avoidance data available for other seabird species that support the use of an avoidance rate adjustment greater than 95 percent (Desholm *et al.* 2006), the ability of Hawaiian petrels to avoid collisions with objects such as met towers has not been documented. In his review of a model designed to estimate the number of collisions by Hawaiian petrel that could occur due to a wind energy facility on Maui, Podolsky (2005) recommended that detection and avoidance rates will be much higher than the 90 percent used as the worst case and would instead be closer to the 0.995 level. Castle & Cooke commissioned an avoidance behavior study at two smaller communication and weather towers near the Lanaihale colony and at one met tower site in order to document whether petrels are able to see and avoid collision with towers. Final results are not yet available, but during 25 nights of surveys, 20 Hawaiian petrels were observed approaching the communication towers and exhibiting avoidance behavior by changing their flight path or reversing their direction (Cooper, pers. comm. 2007).

It is anticipated that the met towers could result in the incidental direct take of up to seven Hawaiian petrels over the term of the HCP. Because of the uncertainty involved with estimating the anticipated take level of Hawaiian petrels, the HCP incorporates a tiered approach such that if the "Tier 1" take limit of seven petrels is reached before the incidental take permit expires, a higher, "Tier 2" take limit of 14 petrels would be authorized, along with additional mitigation requirements to account for greater than anticipated Tier1 take levels. If Tier 2 take limits are reached without an approved amendment to the HCP, the towers will be taken down.

The determination of incidental take will take into account observed direct take as adjusted for estimates of unobserved direct take. The following is a summary of the components that go into estimating the adjusted take:

1. Observed Direct Take. The fundamental approach for observing direct take will be to conduct regular searches of the project area during operation to quantify the number of individual birds that have been killed or injured. A detailed protocol for conducting regular searches is provided in Appendix 6 of the HCP.

2. Unobserved Direct Take. Downed wildlife may be overlooked by searchers, or scavenged by local predators such as cats (*Felis domesticus*) prior to being detected. The monitoring protocol presented in Appendix 6 of the HCP includes methods for estimating searcher efficiency and scavenging rates, which together provide a basis for estimating the number of individuals that are taken but that go undetected.

Newell's Shearwater, Hawaiian Stilt and Hawaiian Hoary Bat
The HCP establishes a take limit of two individuals of each species for Hawaiian stilt, Hawaiian hoary bat, and Newell's shearwater, but based on the frequency of individuals of these species within the vicinity of the met towers, the likelihood of any collisions is remote. If the take limits established for any of these species are reached without an approved amendment, the met towers will be taken down.

Monitoring and Reporting

The HCP includes monitoring and reporting to ensure compliance and biological effectiveness of HCP implementation as described in Appendix 6 of the HCP. Castle & Cooke will conduct monitoring to document fatalities of covered species as well as non-listed species, and to assess site-specific carcass removal (*i.e.*, scavenging) rates to provide a basis for determining the appropriate search frequency, according to protocols described in Appendix 6 of the HCP. Annual reports and other deliverables described above will be provided to DLNR and USFWS, allowing them to independently verify that Castle & Cooke performs all of the required activities and tasks on schedule.

Mitigation and Adaptive Management for Anticipated Impacts

The proposed mitigation and adaptive management measures included in the HCP are incorporated herein. The summary of the mitigation program listed below includes the full range of measures that have been identified to provide mitigation for any of the potential take scenarios (*i.e.*, Tiers 1 and 2). Castle & Cooke will fund a project-specific mitigation plan that will be integrated into the on-going interagency seabird conservation project and the watershed enhancement program on Lanai. This collaboration ensures that a coordinated and cost effective program will be implemented by the Hawaii Division of Forestry and Wildlife (DOFAW). The mitigation plan includes two primary components: predator control and habitat restoration. The combination of these two mitigation measures will provide immediate- and long-term benefits for each species by increasing adult and juvenile survival, nest success, and suitable nesting habitat required for the long-term productivity of these species.

Castle & Cooke does not anticipate reaching the maximum Tier 1 authorized take limits but will fund the mitigation measures proposed that compensate for the Tier 1 take limits established in the HCP. If Tier 2 mitigation is deemed necessary based on monitoring results, Castle & Cooke will fund the additional Tier 2 mitigation measures as outlined in the HCP. Castle & Cooke will also implement a wildlife education and observation program for all staff members who will be at the project area on a regular basis.

Predator Control

Predation of young and adults is considered one of the primary threats to all four species. Feral cats, barn owls (*Tyto alba*), and rats (*Rattus* spp.) are the predators known to occur on Lanai that may kill adult or young Hawaiian petrels or Newell's shearwaters. Although the total impact of cats on the colony is not known at this time, preliminary data indicates that cats are a threat to petrels and shearwaters. An active feral cat population has been documented in the vicinity of the petrel colony, and DOFAW has established traps in locations around the colony. Ungulates have created trails throughout Lanaihale that have increased access to the colony for cats. Increasing the trapping efforts for predators would have the potential to decrease the number of adult and juvenile petrels and Newell's shearwaters killed and have a net positive effect on both populations. Increases in survival and productivity at seabird colonies through predator control are well-documented in Hawaii and elsewhere (Winter and Wallace 2006; Hodges and Nagata. 2001).

Therefore, in addition to habitat restoration within the Lanaihale, Castle & Cooke will provide funding to augment DOFAW's current predator-control program at the petrel colony. Tier 1 funding provides for materials and for the hire of two DOFAW staff members to set and monitor 20 additional traps throughout the Lanaihale for the 2-year period; locations will be determined by DOFAW. Care will be taken to locate traps in previously disturbed areas; creating new trails through the colony would only provide increased access for the cats to the birds and burrows. In addition to funding for personnel to set and monitor traps, Castle & Cooke will provide DOFAW

with the full-time use of a vehicle on Lanai during the 2-year period to implement the predator control program.

Cats are known to be present and have been trapped in the vicinity of the Lanai WWTP, which is the only location on the island where Hawaiian stilts are known to nest. Therefore, predation of stilts by cats likely occurs and has an adverse effect on the resident stilt population. DOFAW does not currently have the staff or resources to implement a regular predator control program at the WWTP to protect the Hawaiian stilt. Castle & Cooke will provide DOFAW 12 traps to be placed around the perimeter of the WWTP. DOFAW staff implementing the petrel colony predator control and habitat restoration program will maintain these traps at the WWTP. This program will be implemented with the Tier 1 funds and is anticipated to provide a net benefit to the stilts by reducing predation of eggs, chicks, and adults.

If Tier 2 mitigation is required, the efforts of the predator control program will be increased at the colony. An additional 15 traps will be set in the vicinity of the colony for a total of additional 35 traps. More traps would increase the potential to remove more predators preying on the colony and provide a net benefit to the seabirds by further reducing predation on eggs, chicks and adults.

Habitat Restoration

At Lanaihale, much of the potential nesting habitat for Hawaiian petrels and Newell's shearwaters has been degraded by the introduction of ungulates and subsequent establishment of invasive species such as strawberry guava (*Psidium cattleianum*). Restoration of degraded habitat through the removal of invasive species and reintroduction of uluhe fern (*Dicranopteris linearis* and *Diplopterygium pinnatum*) and other native species should ultimately increase the size of the breeding population. Appropriate areas of degraded habitat for restoration have been selected as shown in the scope of work provided in Appendix 7 of the HCP. The restoration area is within the area being protected from further ungulate damage by fencing and ungulate control through the efforts of the Lanai Forest and Watershed Partnership. DOFAW may consider installing artificial burrows to encourage colonization, thus reducing the time needed to recognize a net benefit to the species. The areas to be restored were chosen based on the following criteria: 1) reliable records of former Hawaiian petrel nesting behavior (Jeffrey, pers. comm. 2007); 2) accessibility; 3) uluhe fern present in isolated patches; and 4) provides a connection between two gulches with known petrel nesting. The size of the restoration area for each tier was based on a number of variables (see Section 5.3.4 of the HCP), including the take limits established and associated loss of eggs/chicks due to take of breeding adults, density of burrows that has been documented within the few accessible areas of the Lanai colony, age distribution of the population, and fledging success rates. The habitat restoration program would also benefit the Hawaiian hoary bat by increasing foraging and roosting habitat.

A Memorandum of Agreement (MOA) was developed between Castle & Cooke and DOFAW that outlines the responsibilities for each party associated with the mitigation plan. Should the Tier 1 take level for petrels be reached, Tier 2 mitigation would be implemented. Tier 2

mitigation would double the size of Tier 1 habitat restoration from 1.2 ha (3 ac) to 2.4 ha (6 ac). Additional funds would be provided to DOFAW/MISC to clear the additional acreage of invasive vegetation. DOFAW has the option to restore the entire 2.4 ha in 2009 with the Tier 1 funds. Tier 2 funds would be provided to DOFAW only if the petrel Tier 1 take limit is reached. The 1.2- or 2.4 ha restoration area(s) will be maintained by the DOFAW employees hired under the Tier 1 mitigation plan. DOFAW may choose to supplement the Castle & Cooke funds to conduct and maintain the entire 2.4-ha restoration parcel for the project period if Tier 2 is not initiated. In the event there is one or more incidental take of Hawaiian petrel at the met towers, then DOFAW shall have rights to continue to maintain and monitor the restoration area for eight more years (through February 28, 2018), or at the time nesting and fledging success in the restoration area is achieved, whichever occurs first. All post-completion activities shall be conducted by DOFAW at its own cost and expense.

The following provides a summary of the restoration measures to be implemented by DOFAW and the Maui Invasive Species Committee (MISC).

- Invasive species such as strawberry guava will be cleared from the identified area. This includes manual labor to remove the plants and treat stumps with herbicide.
- If the natural seed bank does not facilitate regeneration of native uluhe fern and other native species such as *Metrosideros*, *Rubiaceae* or *Tetraplasandra*, uluhe fern, and other native plants may need to be planted in select locations after invasive plant removal.
- The restoration area will require maintenance for the 2-year period to control weeds and other invasive species and protect the native plant species. Tier 1 funding also will support DOFAW staff to maintain and monitor habitat restoration activities.
- DOFAW may consider installing artificial burrows to encourage colonization if the birds do not start using the restored habitat on their own.
- Restoration activities will be conducted so as to minimize any disturbance to the petrel colony during the breeding season and potentially to Hawaiian hoary bats if indeed bats breed on Lanai. Clearing activities will not occur in the vicinity of active petrel burrows during the breeding season. The sensitive period for bats is July 1 through September 30. During that time period, five consecutive days of negative bat detections must occur for DOFAW to be able to cut trees greater than three m (10 ft) in height.

Adaptive Management

In the event an injured or dead petrel, shearwater, stilt, or bat is documented, Castle & Cooke would immediately assess the impact and adapt the program accordingly. Should monitoring reveal that authorized take of petrels is higher at one of the tower locations as a result of collision with a met tower, Castle & Cooke would closely evaluate the data and consider removing the

tower in question rather than waiting until a take limit is reached and be required to remove all of the towers.

Some of the met tower sites are densely vegetated with shrub/scrub habitat while other areas are open grasslands or are barren of vegetation. Castle & Cooke will assess searcher efficiency by vegetation type and will consider various methods of vegetation management and search protocol in order to maximize the likelihood that any collisions that do occur get detected.

Brief, quarterly reports will be submitted to DOFAW and USFWS. These reports will summarize the results of the post-construction monitoring surveys, document take, if any, of each species, and identify any recommended changes to the monitoring protocols. Any incidental take of one of these covered species will be reported within 24 hours and the cumulative adjusted take reported within two weeks. Castle & Cooke will also conduct semiannual meetings with DOFAW and USFWS to discuss the monitoring program, compare the monitoring results to estimated take levels, discuss the progress of the mitigation measures, and develop any recommendations for revising on-going activities.

Funding

An estimate of the costs of funding the proposed mitigation plan is provided in Section 6.7 of the HCP. Castle & Cooke will enter into an agreement with and provide monies to DOFAW to fund the predator control and habitat restoration program. A minimum non-refundable endowment of $252,203 for the Tier 1 mitigation will be disbursed by Castle & Cooke in two payments according to the MOA. The first payment ($143,138) was provided to DOFAW in February, 2008, for Year 1 of Tier 1 and the remainder of Tier 1 costs ($109,065) will be paid within 10 working days of Castle & Cooke's receipt of the approved incidental take license. DOFAW will provide a letter to Castle & Cooke and the USFWS acknowledging the receipt of the funding and committing its use for seabird and bat habitat restoration and predator control.

If Tier 2 mitigation is deemed necessary based on monitoring results, additional funds, as outlined in the HCP, will be provided. Castle & Cooke will provide financial assurances for the Tier 2 funds and the estimated costs for post-construction monitoring at the towers over the 2-year period ($150,000). These funds will be assured through a financial instrument such as a bond, letter of credit or other similar mechanism as approved by DLNR and USFWS. This financial assurance for the mitigation and monitoring costs, not delegated to DOFAW via check, will be approximately $203,135 and will be in place prior to the effective date of the ITL/ITP. Tier 2 mitigation funds will be released 20 days after reaching the Tier 1 take limit for the Hawaiian petrel.

Progress to Date

Under the terms of the State of Hawaii's Conservation District Use Permit, as amended, (LA-3419) Castle & Cooke was able to install and operate the met towers prior to the approval of the HCP. As a result, Castle & Cooke provided funding to DOFAW to initiate the Tier 1 level of

mitigation in advance of issuance of the state license and federal permit for incidental take. As of August 31, 2008, the following mitigation and monitoring measures have been implemented:

- Hired on-site staff to implement monitoring protocol prescribed under the HCP (no carcasses found);

- The first payment ($143,138) for DOFAW's implementation of the predator control and habitat restoration work was provided to DOFAW in February 2008. Twelve cat traps were deployed in the WWTP area for the protection of Hawaiian stilt and other native water birds, and an additional 20 cat traps have been added to DOFAW's predator control program within the Lanaihale, bringing the total to 60. MISC conducted two weeks of staff time to begin the habitat restoration and DOFAW has hired additional staff to continue the work. Approximately 0.5 ha (1.2 ac) has now been cleared.;

- Instituted on-going training of on-site construction personnel as prescribed under the Wildlife Education and Observation Program (WEOP) (Section 5.4 of the HCP);

STATUS OF THE SPECIES

Hawaiian Petrel

Taxonomy and Species Description

The Hawaiian petrel is a large petrel, approximately 40.6 cm (16 in) long with a wing span of 91.4 cm (three ft). Previously known as the Dark-rumped petrel, the Hawaiian petrel, has a dark gray head, wings, and tail, and a white forehead and belly. It has a stout grayish-black bill that is hooked at the tip, and pink and black feet. It has a distinctive call during the breeding season that sounds like "oo ah oo." They also have calls that sound like the yapping of a small dog.

Historic and Current Distribution

The species was once abundant on all main Hawaiian islands except Niihau. Today, Hawaiian petrels breed in high-elevation colonies, primarily on East Maui and, to a lesser extent, on Hawaii, Kauai and Lanai, and probably Molokai, Lehua, and sea stacks off Kahoolawe.

Based on pelagic observations, the total population including juveniles and subadults was estimated at 20,000 with a breeding population of 4,500 to 5,000 pairs (Spear *et al.* 1995, Ainley *et al.* 1997). Approximately, 1,000 pairs nest in Haleakala National Park, Maui. Numbers breeding on Maui appear to be stable (Simons and Hodges 1998) and have increased in areas of Haleakala National Park with active predator management (Hodges and Nagata 2001). The breeding colony of the Hawaiian petrel on Lanai was rediscovered in 2006, near the summit of Lanaihale. Although the petrel colony was historically known to occur, its status was unknown and thought to have dramatically declined until surveys were conducted in 2006 (Penniman,

pers. comm. 2007). While the population size has not been estimated with statistical confidence, it is estimated that at least a thousand Hawaiian petrels are using the habitat within the Lanaihale (Penniman, pers. comm. 2008). There is also a small colony on Mauna Loa, on the Big Island of Hawaii. Kauai populations are difficult to assess, but potentially a large portion of the population nest on that island.

Life History

The Hawaiian petrel is primarily nocturnal flying over land, and active in their nest colony for about nine months each year (activity at the nesting colony is diurnal and nocturnal). The long-lived adults (ca. 30 years) return to the same nesting burrows each year between March and April. Females lay only one egg, which is incubated alternately by both parents for approximately 55 days. Eggs hatch in July or August, after which both adults spend their time flying to sea to feed and bring food home for the nestling. The fledged young depart in October and November at Haleakala, although unpublished information from Hawaii Island suggests that birds may be found as late as December (Cathleen Bailey, Haleakala National Park, pers. comm., 2004). Adult birds do not breed until age six and may not breed every year. However, pre-breeding and non-breeding birds return to the colony each year to socialize. It is estimated that 89 percent of the adult population breed each year (Simons 1984).

Habitat Description

Hawaiian petrels are colonial and nest in burrows, crevices in lava, or under ferns. The burrows are generally 1 to 2 m (3 to 6 ft) long (from entrance to nest chamber), although some may be as long as 9 m (30 ft) (Simons and Hodges 1998). On Hawaii and Maui nest in the cold, xeric environment above 2,500 m (8,200 ft) primarily in national parks. On Kauai, there is evidence that Hawaiian petrel nest at lower elevations in densely vegetated rainy environments (Ainley *et al.* 1997). On Lanai, Hawaiian petrels nest in burrows under dense uluhe ferns.

Threats, Recovery Strategies, and Ongoing Conservation Measures

The most serious threat to the species at their nesting colonies, based on studies at Haleakala, is depredation of eggs and young in the breeding colonies by introduced mammalian predators such as feral cats and mongoose. According to population modeling, this species could face extinction in a few decades if predation is not controlled (Simons 1984). Removal and exclusion of feral ungulates, which can damage native vegetation and facilitate the spread of invasive plants, together with intensive control of non-native predators have improved survival of the species (Hodges and Nagata 2001). Other threats include avian malaria, which was found in blood samples of Hawaiian petrels in the 1960s and may have killed off low-elevation breeders, and occasional mortality from collisions with powerlines and fences near breeding sites. For example, 31 adult birds were killed at Haleakala National Park from 1976 to 1993 as a result of collisions with a fence erected to exclude predators from the nesting colony (Hodges 1994). Methods such as placing white flagging on fences have been found to reduce the potential for

Hawaiian petrels to collide with fences (Swift 2004). In addition, fledgling birds are sometimes grounded when they become disoriented by lights on their nocturnal first flight from inland breeding sites to the ocean. A few, mostly juvenile, Hawaiian petrels land in brightly lit areas at scattered locations on Maui in most years (referred to as "fallout"). The problem is much smaller than the one involving Newell's shearwaters (see following section), and currently is not anticipated to pose a threat to remaining populations (Simons and Hodges 1998). Predator control in key habitat areas, the establishment of Bird Salvage-Aid Stations, and light attraction studies have been initiated to help conserve the Hawaiian petrel. The USFWS, DOFAW and the National Park Service work cooperatively to protect their breeding habitats and control predators within Haleakala National Park.

The USFWS' "Recovery Plan for the Hawaiian Dark-rumped Petrel *(Pterodroma sandwichensis)* and Newell's Townsend's Shearwater *(Puffinus auricularis newelli)*" includes three objectives: (1) reduce annual fallout, (2) provide long-term protection for the known nesting colonies, and (3) develop efficient predator control methods for use in and around isolated nesting sites (USFWS 1983).

The Pacific Region Seabird Conservation Plan (USFWS 2005b) also recommends the USFWS: (1) Work with the National Park Service, the state of Hawaii and other land managers to control introduced predators in the area of important colonies; (2) Work with utility companies to develop solutions to reduce mortality caused by powerlines (*e.g.,* different spatial array, strategic tree planting, visual deterrents); (3) Survey Lanai and Kahoolawe to determine if the Hawaiian petrel are nesting, locate and determine the size of Kauai colonies, and outline and implement a population monitoring program; (4) Maintain a program to shield lights to reduce their effects on petrels and continue recovery efforts for grounded fledglings; (5) Determine status of offshore islands such as Lehua, that could be made predator-free.

The Service, DOFAW, and other partners have a number of conservation efforts underway to benefit Hawaiian petrels statewide. The Kauai Endangered Seabird Recovery Project was recently initiated with the purpose of identifying the breeding locations of rare and endangered seabirds living on Kauai, monitor their populations, identify threats, and initiate conservation efforts to alleviate threats. On Maui, the Hawaiian petrel colony within Haleakala National Park has been fenced for protection from feral ungulate damage and Park Service staff conduct predator control within the colony. Surveys of the Lanai Hawaiian petrel colony have been conducted by DOFAW staff since it was rediscovered in 2006. The Lanai Hawaiian petrel colony is located within the boundaries of the Lanai Forest and Watershed Partnership, which is a partnership formed among Castle & Cooke, DOFAW, and the Service (and others) to protect and restore the native forest ecosystem of the Lanaihale and to benefit endangered, threatened or candidate species. This restoration effort revolves around the installation of an exclosure fence that will restrict feral ungulates from accessing the forest above 609 m (2,000 ft) in elevation.

Newell's Shearwater

Taxonomy and Species Description

The Newell's shearwater is a bird of the open tropical seas and offshore waters near breeding grounds. A medium-sized shearwater, the Newell's is approximately 30.4 – 35.6 cm (12-14 in) long, with a wingspan of 76.2 – 88.9 cm (30-35 in). It has a glossy black top, a white bottom, and a black bill that is sharply hooked at the tip. Its claws are well adapted for burrow excavation and climbing.

Historic and Current Distribution

The Newell's shearwater was once abundant on all main Hawaiian islands. From at-sea counts conducted in 1994, the total population of the Newell's shearwater was estimated at roughly 84,000 birds (Ainley *et al.* 1997). Recent radar target data (Day *et al.* 2003), however, from 1993 to 1999-2001 indicate the population may have declined approximately 60 percent from those estimates (Day *et al.* 2003; Nick Holmes pers. comm. 2008). The current breeding population size is estimated to be 14,600 pairs (DOFAW 2005) with approximately 75 percent occurring on the island of Kauai (Ainley *et al.* 1997).

Newell's shearwater breeds on several of the main Hawaiian islands, with the largest numbers clearly occurring on Kauai, where they nest in mountainous terrain between elevations of 152 and 701 m (500 and 2,300 ft). These birds also nest on Hawaii, almost certainly nest on Molokai, and may still nest on Oahu. The occurrence on Maui of injured, dead, or grounded adults in summer, low numbers of radar targets exhibiting Newell's-like timing of movement, and of juveniles in autumn suggest that the species also may nest on Maui; however, the exact status of this species on Maui is unclear at this time. The strictly nocturnal behavior of this species makes determination of its status and distribution more difficult than that of the more crepuscular Hawaiian petrel. Newell's shearwaters are not known to nest on Lanai.

Population models incorporating best estimates of breeding effort and success yielded a population decreasing at a rate of 3.2 percent annually (Ainley *et al.* 2001). When variables describing the anthropogenic mortality suffered by Newell's shearwater (predation, light attraction and collision) were included, these models predicted a population decline of 30 to 60 percent over 10 years (Ainley *et al.* 2001). As noted by DOFAW (2005), it is evident that an attraction to lights and collision with power lines and other structures exacts a significant mortality on fledglings and breeding adults.

Life History

Most of the life history information for this species is based on studies of the Kauai population; life histories of birds in a Lanai population, if one exists, may differ slightly. During their nine-month breeding season from April through November, Newell's shearwaters live colonially in

burrows under ferns on forested mountain slopes. These burrows are used year after year and usually by the same pair of birds. A single egg is laid probably in June. Incubation by both sexes lasts 45 days, and young fledge in October-November. The Newell's shearwater needs an open downhill flight path through which it can become airborne.

Daily flight to and from colonies occurs only at night. On, Kauai, Newell's shearwaters begin to arrive at colonies well after sunset and just before the sky becomes completely dark (*i.e.,* light meter reads 0 lux) (Cooper and Day 1995). After 30 minutes past sunset, markedly fewer birds arrive, although some continue to arrive throughout the night. In the morning, departure is even more synchronous and centered about 15 minutes on either side of a completely dark sky. Flight speed over land in Hawaii, without correction for wind direction and speed, has been estimated at 16.8 m/s ± 1.9 (38 miles per hour ± 4 SD; Reynolds *et al.* 1997, measured by radar).

Three age classes of Newell's shearwaters were developed based on the following demographic factors and assumptions (from Ainley *et al.* 1997 and as otherwise noted): (1) young-of-year (YoY), (2) pre-breeding immature/adult (if recognizable), or (3) breeding adults. For Newell's shearwater on Kauai, incidence of non-breeding is high: only 46 percent of pairs that actively use a burrow actually breed in a given year (range 30–62 percent, n = 5 yr, 36–47 burrows monitored/yr)(Telfer 1986). First breeding occurs at approximately six years of age (Ainley *et al.* 1997).

Study of reproductive success in one Newell's shearwater colony on Kauai documented an average annual production of 0.66 young per pair (Ainley *et al.* 2001). This fledging rate is similar to that of stable Manx shearwater populations (Brooke 1990). Based an allometric equation relating survivorship to body mass in procellariiforms, annual adult survivorship of Newell's shearwater was estimated to be 0.904 ± 0.017 SE. This figure is close to that estimated for Manx shearwater by more conventional means (Brooke 1990). No specific data exist on the longevity for this species, but other shearwaters may reach 30 years of age or more (Bradley *et al.* 1989, del Hoyo *et al.* 1992).

Habitat Description

On Kauai, Newell's shearwater breed between 160 and 1,200 m (528 to 3,960 ft) and at elevations between 189 to 330 m (623 to 1089 ft) near Puna, Hawaii (Ainley *et al.* 1997). Newell's shearwater usually nest where terrain is vegetated by open canopy of trees and understory of densely matted uluhe ferns. Some exceptions to these conditions exist, as on walls of Waimea Canyon, Kauai, where forest canopy is absent. Burrows are most commonly placed at the base of trees, where the substrate may be easier for the birds to excavate.

Threats, Recovery Strategy, and Ongoing Conservation Measures

The Newell's shearwater was listed as a threatened species by the USFWS in 1975. The Hawaiian Dark-rumped petrel and Newell's shearwater Recovery Plan was published in 1983.

During the last 150 years, 75 percent of the forests on the main islands of the Hawaiian archipelago have been converted to agricultural, military, commercial or residential land uses, leading to a depletion of available nesting habitat for this species. The introductions of the mongoose (*Herpestes auropunctatus*), black rat (*Rattus rattus*), and Norway rat (*Rattus norvegicus*) have also played a primary role in the reduction of ground-nesting seabirds. Predation by feral cats and barn owls has been observed. In addition, feral pigs (*Sus scrofa) are* known to collapse burrows as well as prey upon shearwater. Another major threat is the species' attraction to light. Increasing urbanization and the accompanying manmade lighting have resulted in substantial problems for fledgling shearwaters during their first flight to the ocean from their nesting grounds. When attracted to manmade lights, fledglings become confused, circle the light until they fall to the ground exhausted, or fly into utility wires, poles, trees, and buildings and fall to the ground. Between 1979 and 2007, more than 30,000 Newell's shearwaters fell on Kauai's highways, athletic fields, and hotel grounds (DOFAW 2007).

The USFWS' "Hawaiian Dark-rumped Petrel and Newell's Manx Shearwater Recovery Plan" includes three objectives: (1) reduce annual fallout, (2) provide long-term protection for the known nesting colonies, and (3) develop efficient predator control methods for use in and around isolated nesting sites (USFWS 1983). In order to meet these goals, DOFAW (2005) recommends the following short-term goals be accomplished first:

1. Increase reproductive success at a minimum of two Newell's shearwater colonies.
2. Increase fledging success by decreasing fallout at a specified location such as the north shore of Kauai.
3. Assess the effects of predators on Newell's shearwater reproduction.
4. Monitor overall population trends on Kauai and improve knowledge of Newell's shearwater breeding distribution throughout Hawaii, especially on Oahu, Lanai, Molokai, and Maui.
5. Monitor results of restoration/conservation activities at specific sites.

Predator control in key habitat areas, the establishment of Bird Salvage-Aid Stations, nest translocation, and light attraction studies have been initiated to help save the Newell's shearwater. DOFAW has operated a "Save Our Shearwaters" (SOS) program on Kauai since 1979 and has recovered and released over 30,000 Newell's shearwaters. Efforts to shade resort lighting appear to have been successful and beginning in the early 1980s the island's electric utility company began installing hoods on streetlights in areas of heavy fallout; recently all lights on the island have been shielded.

Hawaiian Stilt

The Hawaiian stilt was listed as an endangered species on October 13, 1970 (USFWS 1970). The original recovery plan was approved in 1978 and revised in 1985. The first draft of the second revision was released on May 1999 followed by the second draft of the second revision in

May 2005. A five year review has not yet been initiated. Critical habitat has not been designated for the Hawaiian stilt (USFWS 2005a).

Taxonomy and Species Description

The Hawaiian stilt is a slender wading bird, black above (except for the forehead), white below and with distinctive long, pink legs. Sexes are distinguished by the color of the back feathers (brownish female, black male) as well as by sound (females having a lower vocalization tone). Downy chicks are well camouflaged, tan with black speckling. Immature birds have a brownish back, and white patches on their cheeks (Pratt *et al.* 1987). A comprehensive summary of the knowledge of stilts in North America was published by The Birds of North America (Robinson *et al.* 1999).

Historic and Current Distribution

Hawaiian stilts were historically known from all of the major Hawaiian Islands, except Lanai and Kahoolawe (Paton and Scott 1985). The first stilts on Lanai were documented in 1989, at the Lanai City WWTP ponds and the number counted during bi-annual surveys has been as high as 135 (DOFAW 1976 to 2007). Stilts are now found on all of the main Hawaiian Islands except Kahoolawe.

By the early 1940s, statewide Hawaiian stilt numbers were estimated to be between 200 and 1,000 birds (Munro 1960, Schwartz and Schwartz 1949). However, these estimates did not account for the Hawaiian stilts present on Niihau and are therefore considered underestimates. Although Hawaiian stilt census data show high year-to-year variability in the number of stilts observed (Engilis and Pratt 1993), long-term census data indicate that statewide populations have been relatively stable or slightly increasing (Reed and Oring 1993, USFWS 2005a), estimated at 1,200 to 1,600 birds (Griffin *et al.* 1989; Engilis and Pratt 1993). Hawaiian stilts readily disperse between islands and constitute a homogenous metapopulation (Reed *et al.* 1994; Reed *et al.* 1998).

Life History

Hawaiian stilts nest on low relief islands (natural and man-made) in fresh or brackish ponds, man-made floating nest structures, and floating wooden platforms (Shallenberger 1977; Morin 1994). The nest itself is a simple scrape on the ground. They have also been observed using grass stems and rocks for nesting material (Coleman 1981; Nadig pers. comm. 2008). Stilts defend an area of approximately 20 to 30 m (66 to 99 ft) around the nest and are semi-colonial. The nesting season normally extends from mid-February through August (Robinson *et al.* 1999). Peak nesting varies among years and renesting can occur after a loss of a clutch (Robinson *et al.* 1999). Stilts usually lay 3 to 4 eggs that are incubated for approximately 24 days (Coleman 1981; Chang 1990). Chicks are precocial, leaving the nest within 24 hours of hatching. Adults with three-day old chicks have been observed to move 0.5 km (0.3 mi) from the nest site (Reed

and Oring 1993). Young may remain with both parents for several months after hatching (Coleman 1981).

Stilts are opportunistic feeders. They eat a wide variety of invertebrates and other aquatic organisms available in shallow water and mudflats. Specific organisms taken include water boatmen (*Corixidae*), beetles (*Coleoptera*), possibly brine fly (*Ephydra riparia*) larvae, polychaete worms, small crabs, Mozambique tilapia (*Tilapia mossambica*), western mosquitofish (*Gambusia affinis*), and tadpoles (*Bufo* spp.) (Robinson *et al.* 1999; Shallenberger 1977).

Habitat Description

Hawaiian stilts use a variety of aquatic habitats but are limited by water depth and vegetation cover. Hawaiian stilts are known to use ephemeral lakes, anchaline ponds, prawn farm ponds, marshlands and tidal flats. Stilts need early successional marshlands or other aquatic habitat with water depth less than 24 cm (9 in), with perennial vegetation that is limited and low growing for foraging areas. Native low-growing wetland plants associated with stilt nesting areas include water hyssop (*Bacopa monnieri*), sea purslane (*Sesuvium portulacastrum*), and the sedges makaloa (*Cyperus laevigatus*) and kaluha (*Bolboschoenus maritimus*) (Robinson *et al.* 1999). They may also use taro (*Araceae*) ponds where the full-grown vegetation forms a protective canopy.

Threats, Recovery Strategies, and Ongoing Conservation Measures

Threats to the Hawaiian stilt include the loss of wetland habitat, predation by introduced mammals, invasion of wetlands by alien plants and fish, disease, and environmental contaminants (USFWS 2005a), and global climate change. Predation by introduced mammals and other native and non-native species is currently the most important factor limiting recovery for the Hawaiian stilt (USFWS 2005a, Robinson *et al.* 1999). Recovery of endangered Hawaiian waterbirds, including the Hawaiian stilt, focuses on the following objectives: 1) increase population numbers to a statewide baseline level; 2) establish multiple, viable breeding populations throughout each species' historical range; and 3) establish a network of wetlands on the main islands that are protected and managed for waterbirds (USFWS 2005a).

The Service, DOFAW, and other partners are conducting predator control programs at a number of wetland sites across the state in order to decrease mortality and increase reproductive success of Hawaiian stilt, including Chevron's implementation of a Safe Harbor Agreement to maintain stilt habitat at the Chevron Refinery on Oahu (USFWS 2005c).

Hawaiian Hoary Bat

Taxonomy and Species Description

The Hawaiian hoary bat is the only native terrestrial mammal from the Hawaiian archipelago (USFWS 1998). The Hawaiian hoary bat is a medium-sized (14 to 22 gm; 0.5 to 0.8 oz), nocturnal, insectivorous bat with short, thick, rounded ears, a wingspan measuring 26.9 to 34.6 cm (10.5 to 13.5 in), and a furry tail. "Hoary" refers to the white-tinged, frosty appearance of the bat's grayish brown or reddish brown fur. Although females are slightly larger than males, forearm lengths are similar in both genders. These bats are not colonial, and roost solitarily in tree foliage.

The Hawaiian hoary bat is classified under the Family Vespertilionidae of the Suborder Microchiroptera, and is one of three recognized hoary bat subspecies. The other two subspecies are *Lasiurus cinereus cinereus*, one of the most common and widespread bats in North America, and *Lasiurus cinereus vilosissimus*, which occurs in South America and the Galapagos.

Morphologically, the Hawaiian hoary bat may have diverged significantly from the North American form, as Hawaiian hoary bats are about 45 percent smaller. Nonetheless, preliminary genetic analysis indicates the Hawaiian hoary bat may be derived from the North American hoary bat. The low degree of genetic divergence, however, suggests subspecies classification may be appropriate (USFWS 1998).

Historic and Current Distribution

The Hawaiian hoary bat is endemic to the state of Hawaii and has been documented historically on the islands of Hawaii, Maui, Molokai, Oahu, and Kauai. This bat is now resident only on Hawaii, Maui, and Kauai, with the largest populations probably on Hawaii and Kauai; no evidence of a breeding population (*e.g.*, pregnant or lactating females) has been documented on Maui (USFWS 1998). Occasional observations of bats on Oahu, Molokai and Lanai are considered to be migrant or vagrant individuals from other islands.

There are no population estimates for the Hawaiian hoary bat and few historical records. Unsubstantiated population estimates across the state have ranged from hundreds to a few thousand (USFWS 1998). Data are limited because no feasible method currently exists for surveying the abundance and distribution of solitary, tree-roosting bats but efforts are underway to develop such methods using automated ultrasound detectors (Gorresen *et al.* 2008). The Hawaiian hoary bat's distribution may be broader than indicated by the current limited information resulting from localized search efforts (USFWS 1998).

The Hawaiian hoary bat occurs primarily below 1,219 m (4,000 ft) elevation, although it commonly is seen at 2,133 to 2,438 m (7,000 to 8,000 ft) on Hawaii and at 3,048 m (10,000 ft) on Haleakala, Maui. The highest altitude record of this species is of one bat at 3,354 m (11,004

ft) on Mauna Loa, Hawaii. This species was recorded between 0 and approximately 2,758 m (9,050 ft) in elevation on Maui, with most records occurring at approximately 630 m (2,060 ft).

Hawaiian hoary bats are thought to be present in low numbers on Maui and most numerous on the island of Hawaii, where they are uncommon but fairly widespread (Jacobs 1994). Bats have been detected in both wet and dry areas of Hawaii but seem to be more abundant on the drier leeward side (Jacobs 1994) and generally less abundant in wet areas (Kepler and Scott 1990). Bat occurrence on Hawaii has been found to be very low in the windward lowlands during winter with a dramatic increase in activity from late spring through autumn (Bonaccorso *et al.* 2008). Sites above 1600 m (5,249 ft) had highest occupancy during the winter months.

Life History

Hawaiian hoary bats are generally considered to be tree-roosting bats of primarily forested areas, similar to the North American hoary bat. Hawaiian hoary bats roost in a variety of tree species during the day and forage in a wide range of habitat types during the night. There is no information on the Hawaiian hoary bat's average life span, age at first reproduction, survivorship, how age and reproductive condition affect its food habits, habitat selection, home range size, and movement patterns.

Breeding has been documented on Hawaii and Kauai, but is not known on the other islands (Baldwin 1950, Kepler and Scott 1990). Breeding probably occurs most frequently between September and December, with birth of two young occurring in May or June. Hawaiian hoary bat activity apparently varies seasonally, but the nature and timing of this variation is unclear. Although seasonal inter-island and elevational migration has been suggested, migration on the scale of the mainland North American Hoary Bat is unknown in the Hawaiian hoary bat (Kepler and Scott 1990, Tomich 1986). Bonaccorso *et al.* (2008) found that Hawaiian hoary bat occurrence was very low in the windward lowlands of Hawaii during winter with a dramatic increase in activity from late spring through autumn. Sites above 1600 m (5,249 ft) had highest occupancy during the winter months.

Population estimates for all islands have ranged from hundreds to a few thousand. However, these estimates are based on limited and incomplete data and the status of the population is unknown (USFWS 1998). Observation and specimen records do suggest, however, that these bats are now absent or no longer breeding in historically occupied ranges.

Habitat Description

Hawaiian hoary bats have been observed foraging in a variety of both open and more vegetatively cluttered habitats, including open fields near native or non-native vegetation, over the open ocean (in bays near shore), over lava flows, and at streams and ponds, and have been documented foraging from 1 m to over 150 m (3 ft to over 483 ft) above the ground or water (Baldwin 1950, Fujioka and Gon 1988, Kepler and Scott 1990, Jacobs 1993 and 1994, and

Reynolds *et al.* 1997). It is not known whether they prefer to roost in native or non-native vegetation cover, but they generally have multiple roost sites which are usually 5 m (16.4 ft) or higher (HBRC 2007).

On Maui, the Hawaiian hoary bat is believed to primarily occur in moist, forested areas, although little is known about its exact distribution and habitat use on the island, especially in the West Maui mountains. In spite of the species' probable preference for moist forested areas, it has been seen on West Maui in Lahaina and near Mopua, both of which are dry, and on the dry, treeless crest of Haleakala in East Maui. It also is recorded regularly on the drier side of Kauai and Hawaii, especially near the coast, indicating that such habitat does not exclude this species. These bats were found to be more common on the drier side of Hawaii, probably because the number of flying insects is higher and feeding is less disrupted by rain. During the day, these solitary bats roost in a variety of tree species and occasionally in rock crevices and buildings. Bats have rarely been recorded hanging from wire fences on Kauai and have once been seen leaving and entering caves and lava tubes on Hawaii.

Threats, Recovery Strategy, and Ongoing Conservation Measures

The Hawaiian hoary bat was listed as endangered on October 13, 1970, under the Endangered Species Conservation Act of 1969, and a recovery plan was prepared in 1998 (USFWS 1998). Critical habitat has not been designated for the Hawaiian hoary bat.

The major threats to Hawaiian hoary bats are assumed to be the same as those that threaten many bat species in general (USFWS 1998). Bats have the slowest reproductive rate and the longest life-span of all mammals of their size (Neuweiler 2000). Thus, any mortality of breeding-age adults, particularly females, would constrain the recovery of the subspecies. The primary factor limiting recovery may be habitat loss, primarily the availability of roosting sites. Suitable roosting habitat is particularly important to pregnant and lactating females and non-flying young. Other possible threats identified in the recovery plan that have not been investigated may include pesticides (directly or by impacts to prey), predation (by native hawks and non-native feral cats), alteration of prey availability due to introduction of nonnative insects, and roost disturbance. Occasional instances are documented of Hawaiian hoary bats killed by collisions with vehicles and structures (Belwood and Fullard 1984; Tomich 1986; Kepler and Scott 1990; Menard 2001), and North American hoary bats seem quite susceptible to such collisions (Erickson *et al.* 2002).

The overall recovery strategy for the Hawaiian hoary bat is for research that can provide information on the subspecies' abundance and distribution, life history, and habitat associations. The currently available information is so limited that even the most basic management actions cannot be undertaken with any certainty of benefit. Therefore, the primary recovery goal is to conduct research essential to the conservation of the Hawaiian hoary bat. Research should focus on developing standardized survey and monitoring protocols for determining abundance and distribution, roosting habitat associations, basic life history biology, and food habits. Other recovery goals are to protect and manage current populations by identifying and managing

threats, including protection of key roosting and foraging areas; conduct a public education program; evaluate progress towards recovery; and revise recovery criteria as necessary (USFWS 1998).

The Service, DOFAW, and Bat Conservation International (BCI, a nonprofit conservation and education organization) jointly sponsor a public-private Hawaiian Hoary Bat Research Cooperative to collaboratively prioritize and fund management-oriented research on the Hawaiian hoary bat's abundance, distribution, and habitat requirements.

ENVIRONMENTAL BASELINE

The environmental baseline describes the status of the species and factors affecting the environment of the species or critical habitat in the proposed action area contemporaneous with the consultation in process. The baseline includes State, local, and private actions that affect a species within the action area at the time the consultation begins. Unrelated Federal actions that have already undergone formal or informal consultation are also a part of the environmental baseline. Federal actions within the action area that may benefit listed species or critical habitat are also included in the environmental baseline.

Status of the Species within the Action Area

Habitat

The areas surrounding the met tower sites range from barren eroded soils to shrub/scrub, interspersed with open grassland areas and provide no habitat for Hawaiian petrel, Newell's shearwater, and Hawaiian stilt other than air space where the species fly. Hawaiian hoary bats may use the areas surrounding the met towers as foraging habitat.

The Lanai City WWTP where cat trapping will be conducted consists of a number of sewage treatment ponds that attract Hawaiian stilts and provide a source of invertebrate food. The ponds are separated by gravel berms and areas dominated by non-native grasses. There are no wetland areas near any of the met tower sites so no suitable stilt habitat will be impacted by the project.

Hawaiian Petrel

Visual surveys conducted at the met tower sites during 2007 recorded 33 petrels and two unidentified petrels/shearwaters. The ornithological radar sampling conducted at the met tower sites recorded 170 petrel/shearwater targets and 427 probable petrel targets in spring and summer surveys, respectively. Movement rates showed that fewer targets flew over the western portion of the study area during both surveys. While the population size has not been estimated with statistical confidence, it is estimated that at least 1,000 Hawaiian petrels are using the habitat within the Lanaihale (Penniman, pers. comm. 2008).

Newell's Shearwater

Newell's shearwaters are not known to nest on Lanai, but have been heard during night time surveys at the Hawaiian petrel colony (Penniman, pers. comm. 2007). No Newell's shearwaters were observed during the 2007 audio-visual surveys or confirmed during the ornithological radar surveys on Lanai.

Hawaiian Stilt

Although Hawaiian stilts are known to occur at the Lanai City WWTP, they are believed to have a low potential for occurrence in the met tower sites (closest met tower to the WWTP is 8.0 km (5 mi). Only one stilt was recorded during 485 radar sampling sessions (0.005 stilts/hr) during 2007 (at 200 m [656 ft] above ground level), and no stilts were observed during spring and fall avian point count surveys. The number of stilts nesting at the WWTP has not been documented, but as many as 135 individuals have been counted during the semi-annual waterbird surveys (DOFAW 1976 to 2007).

Hawaiian Hoary Bat

Although Hawaiian hoary bat presence has been documented on Lanai, their breeding status is not known. Only one bat sighting was recorded during 485 ornithological radar sampling sessions (0.005 bats/hr), but other isolated sightings are known both near met tower sites and within the Lanaihale (Penniman, pers. comm. 2007). Hawaiian hoary bats forage for insects in open areas such as grasslands and shrublands at variable heights but tend to roost in tree foliage, which is absent from the met tower locations.

EFFECTS OF THE ACTION

Hawaiian petrel

Injury or Mortality from Collisions

In order to minimize the likelihood that any of the covered species will collide with met towers, Castle & Cooke has marked the guy wires on all of the met towers with a combination of bird diverters and white flagging, which are known to reduce the likelihood of bird or bat strikes in other situations (APLIC 2004, Swift 2004). While using these devices should increase the visibility of the met towers, the effectiveness at reducing collisions is unknown.

Cooper, Day and Plissner (Appenidx 3 of the HCP) used the passage rate data from the ornithological radar surveys, estimated passage rates during non-survey hours (Day and Cooper 1995), and flight altitude data to model the risk of Hawaiian petrels to collide with the met towers during their 270-day breeding period. The model used collision avoidance factors ranging from 99 to 95 percent to estimate that between 5 and 25 petrels could collide with a met

tower during the two year project term. However, the HCP establishes a maximum take limit of 14 petrels that will be authorized under the ITP, and the met towers will be removed if that limit is reached. As of August 31, 2008, Castle & Cooke has been operating six of the seven met towers for approximately five of the eight months that Hawaiian petrels are present on Lanai each year and no evidence of any collisions has been documented during the monitoring surveys conducted.

It is possible that birds could collide with towers yet not be detected during monitoring efforts. To address this, Castle & Cooke is conducting searcher efficiency and scavenging removal trials to provide information that will help reduce the risk that unobserved take is not included in the take estimation. A standard calculation will be used that incorporates the number of carcasses found, searcher efficiency, carcass removal rate by scavengers, and the interval between searches (Appendix 6 of the HCP) to estimate incidental take. The take estimate will be recalculated each time a carcass is found using the most recent searcher efficiency and carcass removal data so that the take estimates are up to date should they trigger either the second tier of mitigation or tower removal. Castle & Cooke will assess searcher efficiency by vegetation type and will consider various methods of vegetation management and search protocols in order to maximize the likelihood that any collisions that do occur get detected.

Mortality of Eggs or Nestlings from Injury or Mortality of Adults

The collision of an adult petrel or shearwater may involve an adult with an egg or chick, an adult without an egg or chick, or a newly fledged bird on its first flight to the sea. In the case of an adult with an egg or chick, potential indirect loss of an egg or a chick is likely. The potential for successful rearing of a chick to a fledging is expected to decrease upon loss of a parent, and would probably be zero during the period from egg-laying through the first several weeks after hatching (Ainley *et al.* 1997). Later in the chick-rearing period parental feeding and care may drop off dramatically, and the loss of an adult may or may not affect survival of the chick. For purposes of establishing mitigation that provides a net benefit to the covered species as is required by State law, Castle & Cooke assumed that half of the birds that could collide with a met tower will also result in the loss an egg or chick. While the indirect take of Hawaiian petrel eggs or chicks is not included in the take limits 14, the additional indirect loss of up to 7 eggs/chicks is included in our jeopardy analysis.

Mitigation

Castle & Cooke will fund a project-specific mitigation plan that will be integrated into the on-going interagency seabird conservation project and the watershed enhancement program on Lanai. This collaboration ensures that a coordinated and cost effective program will be implemented by DOFAW. The mitigation plan includes two components that address the primary threats identified in the recovery plan (USFWS 1983): predation and habitat destruction.

Predation of young and adults is considered one of the primary threats to all three bird species and a potential threat to Hawaiian hoary bats. Feral cats, barn owls (*Tyto alba*), and rats (*Rattus* spp.) are the predators known to occur on Lanai that may kill adult or young Hawaiian petrels. Although the total impact of cats on the colony is not known at this time, preliminary data indicates that cats are a threat to petrels. An active feral cat population has been documented in the vicinity of the petrel colony, and DOFAW has established traps in locations around the colony. Ungulates have created trails throughout Lanaihale that have increased access to the colony for cats. Increasing the trapping efforts for predators would have the potential to decrease the number of adult and juvenile petrels killed and have a net positive effect on the population. Cats previously trapped from the Lanaihale have been found to have Hawaiian petrel remains within their digestive tracts (Penniman, pers. comm. 2007) confirming they are preying on them. Increases in survival and productivity at seabird colonies through predator control are well-documented in Hawaii and elsewhere (Winter and Wallace 2006; Hodges and Nagata 2001). Hawaiian petrel nest activity and nest success have both been found to be as much as double in areas protected from predators relative to unprotected areas (Hodges and Nagata 2001). While the number of cats present within the Lanai Hawaiian petrel colony is unknown, cat predation on petrels within the colony has been documented and conducting a continuous trapping program for two years is expected to increase reproductive success and decrease adult mortality within the colony. The proportion of the 1,000+ Hawaiian petrels using the Lanaihale that nest each year has not been determined, but if the nest success of at least 100 breeding pairs can be increased by even 50 percent due to the increased predator control efforts, the increase in the number of chicks that fledge during those two years will compensate for the potential loss of birds at the met towers.

The breeding colony of the Hawaiian petrels appears to be limited by the approximate area of the uluhe ferns, so the restoration of a native forest habitat that includes the uluhe fern component is expected to expand the occupied area of the petrel colony. Based on the density of burrows documented within accessible areas of the currently active colony, each of the 1.2 ha (3-ac) restorations areas (Tier 1 and Tier 2) could provide habitat for as many as 30 nesting burrows (Penniman, pers. comm. 2007). The restoration areas will be available for nesting during each breeding season for at least the eight years of access DOFAW is granted to maintain and monitor the sites after the met towers have been removed. Because the restoration area is within the portion of the Lanaihale where the Lanai Forest and Watershed Partnership is working to protect and restore the native forest ecosystem by installing an exclosure fence that will restrict feral ungulates, the benefits of the restoration efforts are expected to continue for many years beyond the period when take may occur. Beyond the direct benefits to the species, the eight years of post-restoration maintenance and monitoring that DOFAW will conduct will provide an opportunity to evaluate the effectiveness of this approach both for recovering the species and mitigating project-related impacts from future projects.

Summary of Species Response to the Effects of the Action on Hawaiian Petrels

The potential for project-related take of Hawaiian petrel is considered low, although the ability of their local populations to sustain even a low level of take is unknown at this time. The impact to the population has been limited in the HCP by establishing take limits such that the met towers would be removed if the Tier 2 take level is reached. Monitoring and adaptive management procedures are in place to reduce the risk that take limits are exceeded. The loss of up to 14 adult or subadult petrels and associated indirect take of eggs and chicks represents a relatively small percentage of the 1,000+ petrels estimated to be on Lanai, and even if this is a 50 percent overestimate, the impacts to the population would be relatively small.

The combination of predator control and habitat restoration addresses two of the primary threats to the species as identified in the recovery plan (USFWS 1983) and will provide immediate- and mid-term benefits (two years) for Hawaiian petrel by increasing adult and juvenile survival, nest success, and suitable nesting habitat required for the long-term productivity of these species (minimum of eight years, potentially longer). Subsequent monitoring of the mitigation measures implemented will allow the agencies to assess the effectiveness of the mitigation methods. The monitoring results will be used to enhance the effectiveness of the management activities here and at other seabird colonies throughout Hawaii. This could result in a greater net benefit to bird and bat populations beyond the initial net benefit to the birds and bats on Lanai.

Effects of the Action on Newell's Shearwater

The potential for project impacts to Newell's shearwater is low based on the lack of detections during surveys at the met tower sites. It is not known whether there are any Newell's shearwater breeding on Lanai or not. Any impacts to the population on Lanai have been limited in the HCP by establishing a take limit such that the met towers would be removed if take of two shearwater is reached. Monitoring and adaptive management procedures are in place to reduce the risk that the take limit is exceeded. The potential benefits of improving at least 1.2 ha (3 ac) of habitat within the Lanaihale, which will increase the nesting habitat available for Newell's shearwater nesting, and increasing the level of predator control being conducted, which would increase the nest success and adult survival of any that do nest on Lanai, is expected to outweigh the take of up to two Newell's shearwater, should it occur.

Effects of the Action on Hawaiian Stilt

The potential for project impacts to Hawaiian stilt is low based on the lack of detections during surveys at the met tower sites. There are no wetland habitats near the met tower sites that could attract stilts, nor are there any flight paths known that indicate stilts would be flying near the towers. Any impacts to the Lanai stilt population have been limited in the HCP by establishing a take limit such that the met towers would be removed if the take of two stilts is reached. Monitoring and adaptive management procedures are in place to reduce the risk that the take limit is exceeded. Conducting predator control at the Lanai City WWPT addresses one of the

primary threats identified in the waterbird recovery plan (USFWS 2005a) and predator control efforts have been found to more than triple the reproductive success of Hawaiian stilts (Gassmann-Duvall 2004). The potential benefits of increased nest success and decreased adult mortality are expected to outweigh the take of up to two Hawaiian stilt, should it occur.

Effects of the Action on Hawaiian Hoary Bat

The potential for project impacts to Hawaiian hoary bats is low based on the lack of detections during surveys at the met tower sites indicating very few bats fly in the vicinity of the met towers. Any impacts to the Lanai Hawaiian hoary bat population have been limited in the HCP by establishing a take limit such that the met towers would be removed if take of two bats is reached. Monitoring and adaptive management procedures are in place to reduce the risk that the take limit is exceeded. The potential benefits of improving at least 1.2 ha of habitat within the Lanaihale and increasing the level of predator control being conducted within the Hawaiian petrel colony is expected to outweigh the take of up to two bats, should it occur. The restoration of native vegetation within the Lanaihale also has the potential to increase the availability of native insects which may be important to the bats.

Cumulative Effects

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. The Service is not aware of any future State, local, or private actions that are reasonably certain to occur within the met tower sites. Should the data obtained by the met towers indicate that a commericially-viable wind energy facility is feasible, and Castle & Cooke chooses to develop such a facility, it would require the development of an additional HCP which would be assessed under a separate consultation.

The area within the Lanaihale where predator control and habitat restoration are occurring under the HCP is located within the boundaries of the Lanai Forest and Watershed Partnership, which is a partnership formed among Castle & Cooke, DOFAW and the Service (and others) to protect and restore the native forest ecosystem of the Lanaihale and to benefit endangered, threatened or candidate species. This restoration effort revolves around the installation of an exclosure fence that will restrict feral ungulates from accessing the forest, with the eventual goal of having 1,441 ha (3,560 ac) of the Lanaihale protected from ungulates.

CONCLUSION

After reviewing the current status of the, Hawaiian petrel, Newell's shearwater, Hawaiian stilt and Hawaiian hoary bat, the environmental baseline of the species in the action area, the effects of the proposed HCP, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Hawaiian petrel, Newell's

shearwater, Hawaiian stilt, or Hawaiian hoary bat. Implementation of the HCP's conservation strategy is expected to adequately offset impacts and result in a net conservation benefit for each species. No critical habitat has been designated for the covered species, therefore, none will be affected.

The level of take authorized for Hawaiian petrels represents a small percentage of the species' total population, estimated at 20,000 with a breeding population of 4,500 to 5,000. The strategies identified in the recovery plan include colony protection and management to increase productivity and survival by addressing the primary threat of predation. Based on the proposed minimization, mitigation, and adaptive measures to offset take, and anticipated overall net conservation benefit to the Hawaiian petrel, it is the USFWS' biological opinion that permit issuance for the proposed met tower project is not likely to jeopardize the continued existence of the species.

The low detection rates of Newell's shearwater, Hawaiian stilt, Hawaiian hoary bats at the met tower sites prevents any modeling of the potential risk for impacts. However, the lack of observations indicates that the potential for collisions by any of these three species with the met towers over the two-year project duration is very low, and a limit of two has been established in the HCP such that the towers will be removed if that level is reached. The habitat restoration implemented in the Lanaihale will increase the abundance of native vegetation, and is expected to increase nesting habitat available to Newell's shearwater should they nest on Lanai, as well as increase the of availability native insects to bats. The increase in predator control within the Lanaihale will likely increase the reproductive success of any Newell's shearwater that may nest there and may it may benefit bats as well, although predation has not been identified as one of the species' primary threats. The implementation of a predator control program at the Lanai City WWTP is anticipated to both decrease mortality and increase the reproductive success of the stilts that forage and nest there.

The monitoring, reporting, and adaptive management built into the HCP will reduce the potential for any of the take limits established to be reached, and ensure that the predator control and habitat restoration efforts achieve the anticipated benefits to each of the covered species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations promulgated pursuant to section 4(d) of the Act prohibit the take of endangered or threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct. Harm is further defined by the USFWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. Harass is defined by the USFWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is

defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

AMOUNT OR EXTENT OF TAKE

Based on the proposed HCP and the analysis of the effects of the proposed action provided above, the USFWS anticipates the following take may occur as a result of the proposed action:

1. Up to fourteen (14) Hawaiian petrels (adults, subadults, or fledglings) over the permit term, may be incidentally taken in the form of direct harm (injury or mortality) as a result of collision with met towers. Up to seven (7) eggs and/or chicks may also be incidentally taken in the form of indirect take as a result of the injury or mortality of breeding adults.

2. Up to two (2) Newell's shearwater (adults, subadults, or fledglings) over the permit term, may be incidentally taken in the form of direct harm (injury or mortality) as a result of collision with met towers.

3. Up to two (2) Hawaiian stilt (adults, subadults, or fledglings) over the permit term, may be incidentally taken in the form of direct harm (injury or mortality) as a result of collision with met towers.

4. Up to two (2) Hawaiian hoary bat (adult or juvenile) over the permit term, may be incidentally taken in the form of direct harm (injury or mortality) as a result of collision with met towers.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) of 1918, as amended (16 USC 703-712), prohibits the take of migratory birds. The MBTA provides no process for authorizing incidental take of MBTA-protected birds. Hawaiian petrel, Newell's shearwater, and Hawaiian stilt are protected under the MBTA. The Service will not refer the incidental take of these species for prosecution under the MBTA, if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF TAKE

In the accompanying biological opinion, the Service determined that the maximum level of incidental take authorized under the proposed HCP and permit is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES

1. HCP permitees need to provide assurance that funding is available to implement all activities described in the HCP prior to the ITP taking effect.

TERMS AND CONDITIONS

1. The ITP will not be in effect until funding has for the second payment of Tier 1 funds and the full amount of Tier 2 funds have been assured according to Section 6.7 of the HCP.

CONSERVATION RECOMMENDATIONS

Sections 2(c) and 7(a) (1) of the Act direct Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are USFWS suggestions regarding discretionary agency activities to promote the recovery of listed species. However, the process of developing an HCP essentially necessitates the incorporation of this approach into the planning process.

1. The USFWS will coordinate with Castle & Cooke to maximize potentially mutually beneficial conservation actions with actions being undertaken by the Lanai Forest and Watershed Partnership within the Lanaihale.

RE-INITIATION NOTICE

This concludes formal consultation on the proposed issuance of the section 10(a)(1)(B) incidental take permit to Castle & Cooke, LLC. As required in 50 CFR §402.16, reinitiation of consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect listed species in a manner or to an extent not considered in this opinion; 3) the agency action is subsequently modified in a manner that causes an adverse affect to the listed species that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by this action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

If you have any questions regarding any of the information contained in this biological opinion, please contact Bill Standley of my staff (phone: 808/792-9400; fax: 808/792-9581).

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