Biological Opinion for the Proposed Mobile Communication Towers at Hanapēpē Armory on Kauaʻi

Photo Credit: Tracy Anderson, Save Our Shearwaters Program

September 17, 2023
(01EPIF00-2023-0085291-S7)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaii 96850

In Reply Refer To:
2023-0085291-S7

September 18, 2023

Colonel Anthony Hammett
Army National Guard
ARNG-IEE-N
111 South George Mason Drive
Arlington, Virginia 22204

Subject: Biological Opinion for the Proposed Mobile Communication Towers at Hanapēpē Armory, Kauaʻi

Dear Colonel Hammett:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological opinion (BO) based on our review of the Army National Guard (ARNG) and Hawaiʻi Army National Guard (HIARNG) proposed placement and operation of two mobile high frequency communication towers on Hanapēpē Armory in southern Kauaʻi, and its effects on the federally threatened Newell's shearwater or ʻaʻo (*Puffinus newelli*), the federally endangered Hawaiian petrel or ʻuaʻu (*Pterodroma sandwichensis*), and the federally endangered Hawaiʻi distinct population segment (DPS) of the band-rumped storm-petrel or ʻakēʻakē (*Hydrobates castro*) in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

This biological opinion is based on information provided in your biological evaluation and other pertinent data. A complete administrative record of this consultation is on file at our Pacific Islands Fish and Wildlife Office (PIFWO).

The biological evaluation also included a request for Service concurrence with a "not likely to adversely affect" determination for the federally endangered Hawaiian hoary bat or ʻōpeʻapeʻa (*Lasiurus cinereus semotus*) and the federally threatened Hawaiian goose or nēnē (*Branta sandvicensis*). Please see Appendix A for our concurrence on those species. The remainder of this BO covers the impacts of the project to the listed Newell's shearwater, Hawaiian petrel, and band-rumped storm-petrel (collectively referred to hereafter as Hawaiian seabirds).

CONSULTATION HISTORY

May 12, 2023: The ARNG submitted their final biological evaluation to the Service that included all information related to the proposed mobile communication towers and conservation actions.

August 7, 2023: The Service emailed Craig Blaisdell of HIARNG clarifying if any new barbed wire fencing is being installed with the proposed project. Mr. Blaisdell confirmed no new barbed wire fencing will be installed, so the Service did not consider barbed wire impacts to the Hawaiian hoary bat as a part of this project.

BIOLOGICAL OPINION

Description of Proposed Action

The HIARNG is proposing to deploy (raise) two mobile, telescoping high frequency (HF) communication towers at the Hanapēpē Armory during significant weather events, emergencies and/or for training/maintenance purposes. The purpose of the two HF communication towers is to provide emergency communications for all-hazard domestic emergencies and disasters; provide non-commercial communications; provide inter-island emergency communication; and communicate with the National Guard Bureau and inter-agency partners for all-hazard domestic preparedness, response, and recovery.

The towers deploy straight upwards in a telescoping manner and retract in the same fashion. Each tower foundation will be 80 feet (ft) tall with an antenna that will increase the height to 85 to 90 ft. The two towers will be on mobile platforms that have a footprint of 18.5 ft by 8 ft (Figure 1). The towers are constructed of structural aluminum (silver-gray color) and will each require three guy wires for stabilization. When deployed, the guy wires will be affixed to the tower at approximately 65 ft up and stretch out to jersey barriers approximately 70 ft from the base. No construction or land disturbance is required for placement of the jersey barriers. When not in use, the two tower structures will remain in the location where the HIARNG deploys them on the armory (Figure 2).

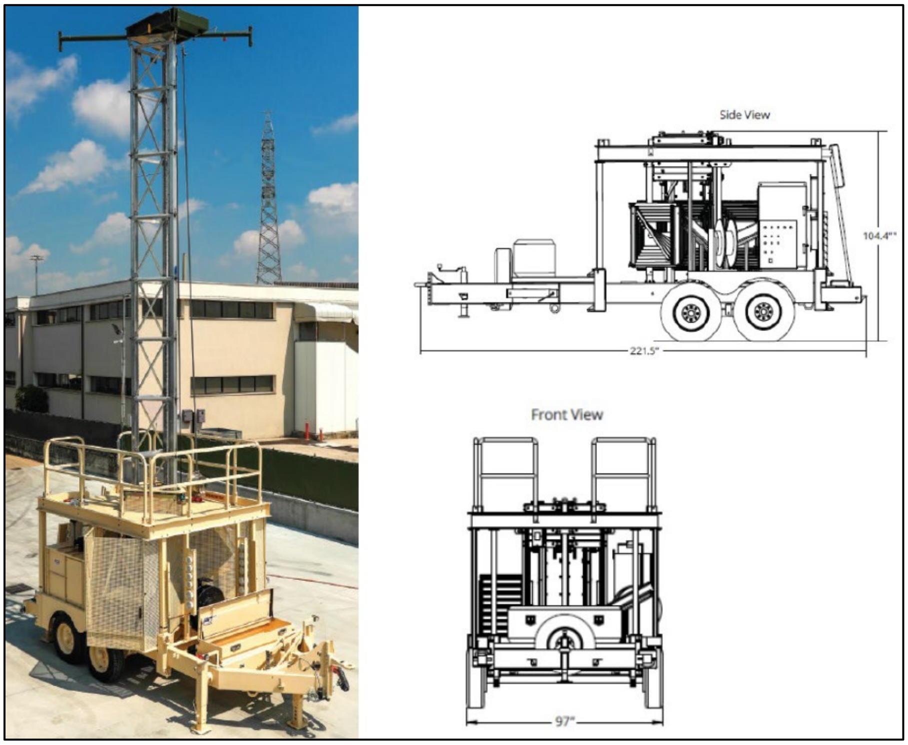

Figure 1. Manufacturer photo of a single tower and tower dimensions.

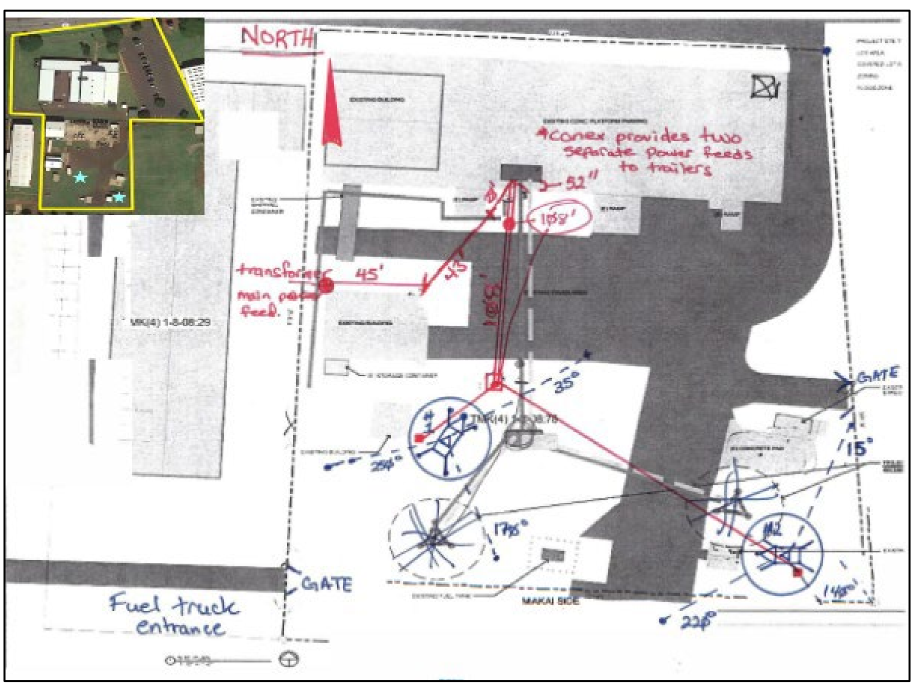

Figure 2. Mobile tower positions #1 and #2. Blue hashed lines from tower center are guy wires attached to Jersey barriers approximately 70 ft away. Red lines are underground power and antenna cables.

Full deployment of the mobile towers takes only five minutes once the towers are in position. Based on the height of the tower and proximity for aviation navigation, the towers will not require any lights (Federal Aviation Administration 2020). Deployment of the towers for testing purposes will occur during daylight hours. Deployment for their intended purpose may occur at any time and could stay in place for an undetermined period for each deployment, which may include part of or throughout the evening hours. Although the mobile towers will not be deployed permanently, the frequency and duration of their deployment is contingent upon unpredictable weather events. Additionally, the term of this proposed project is 20 years.

The following conservation measures will be implemented to avoid or minimize adverse effects to Hawaiian seabirds:

- All lights on Hanapēpē Armory will be shielded and contain the lowest intensity lighting that will allow for full safety and security concerns of the facility. Parking lot lights will be set at 10% at night and go to 100% if activated by motion.
- The ARNG will apply special reflective tape and/or bird diverters along each of the tower guy wires when deployed.
- The ARNG will explore the need and use of bird diverters for the onsite power lines to reduce potential collisions.

The ARNG, through the HIARNG, will also provide annual funding of $20,000 to the National Fish and Wildlife Foundation (NFWF) Impact-Directed Environmental Account for Hawaiian Seabirds for seabird conservation efforts as a measure to compensate for affects associated with deployment of the mobile towers. This funding will be provided annually for the 20-year term of the proposed project.

Action Area

The action area is defined at (50 CFR 402.02) as "all areas to be affected directly or indirectly by the federal action and not merely the immediate area involved in the action. The Service has determined that the action area for this project is the Hanapēpē Armory.

The Hanapēpē Armory (Armory) is an approximately 4.92 acre State-owned facility located at 1-3460 Kaumualiʻi Hwy, Hanapēpē, Hawaiʻi 96716, in southwestern Kauaʻi (Figure 3). The Armory is a developed area in lowland dry habitat that is sparsely vegetated with a few non-native tree species and manicured lawn. The action area (Figure 4) for this consultation incorporates the boundaries of the Armory.

Figure 3. Location of the Hanapēpē Armory.

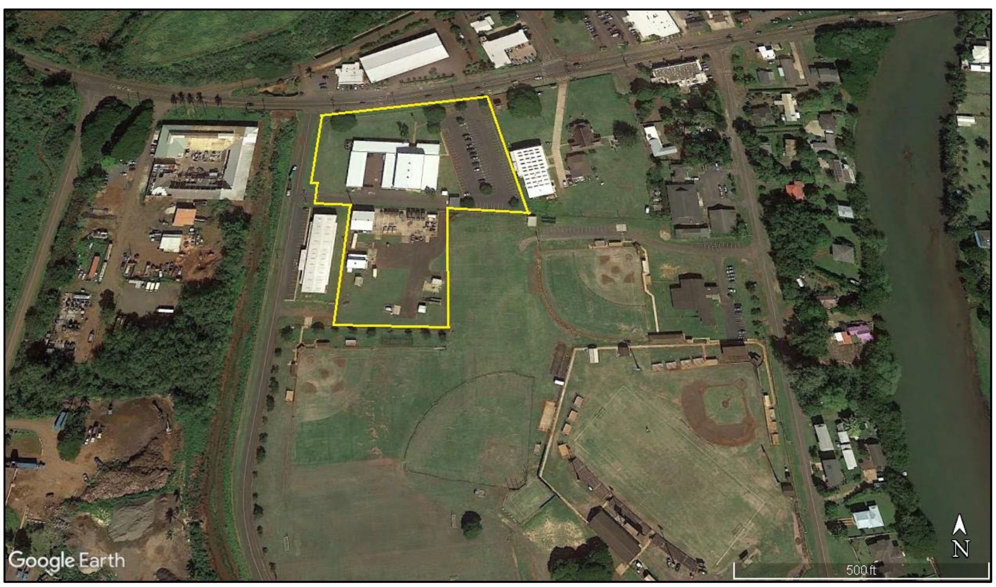

Figure 4. Location and boundary of the action area.

Analytical Framework for the Jeopardy/Adverse Modification Analysis

Jeopardy Analysis Framework

In accordance with regulation (see 84 FR 44976), the jeopardy determination in this Biological Opinion relies on the following four components:

1. The *Status of the Species*, which evaluates the species' current range-wide condition relative to its reproduction, numbers, and distribution; the factors responsible for that condition; its survival and recovery needs; and explains if the species' current range-wide population is likely to persist while retaining the potential for recovery or is not viable;

2. The *Environmental Baseline*, which evaluates the current condition of the species in the action area relative to its reproduction, numbers, and distribution absent the consequences of the proposed action; the factors responsible for that condition; and the relationship of the action area to the survival and recovery of the species;

3. The *Effects of the Action*, which evaluates all future consequences to the species that are reasonably certain to be caused by the proposed action, including the consequences of other activities that are caused by the proposed action, and how those impacts are likely to influence the survival and recovery role of the action area for the species; and

4. *Cumulative Effects*, which evaluates the consequences of future, non-Federal activities reasonably certain to occur in the action area on the species, and how those impacts are likely to influence the survival and recovery role of the action area for the species.

In accordance with policy and regulation, the jeopardy determination is made by evaluating the consequences of the proposed Federal action in the context of the species' current range-wide status, taking into account any cumulative effects, to determine if implementation of the proposed action is likely to cause an appreciable reduction in the likelihood of both the survival and recovery of the species in the wild. The key to making this finding is clearly establishing the role of the action area in the conservation of the species as a whole, and how the effects of the proposed action, taken together with cumulative effects, are likely to alter that role and the continued existence (i.e., survival) of the species.

Status of the Species

Newell's shearwater or ʻaʻo (*Puffins newelli*)

Listing Status, Taxonomy, and Species Description
The Newell's shearwater was listed as a threatened species in 1975 (USFWS 1983), pursuant to the Endangered Species Preservation Act of 1966. *The Hawaiian Dark-rumped Petrel and Newell's Manx Shearwater Recovery Plan* was published in 1983 (USFWS 1983). A species five-year review was completed in 2017. The review recommended up-listing the Newell's shearwater to endangered status due to precipitous declines in the global population over the last two decades. Critical habitat has not been designated for the Newell's shearwater (USFWS 1983).

The Newell's shearwater taxonomically belongs to the *Puffinus* genus, in the *Procellariidae* family and *Procellariiformes* order, along with 20 other extant shearwaters ranging throughout the Indian, Atlantic, and Pacific oceans (Gill and Donsker 2016). Shearwaters are characterized by exhibiting a "shearing" flight pattern, dipping from side to side on stiff, straight wings with few wing beats. Genetic analyses conducted by Martínez-Gómez *et al.* (2015) confirmed the taxonomic status of Newell's shearwaters (*P. auricularis newelli*) as a subspecies alongside the Townsend's shearwater (*P. auricularis auricularis*). These two subspecies comprise *P. auricularis*. The two subspecies exhibit minor differences in plumage patterns and breeding chronology (Martínez-Gómez *et al.* 2015).

The Newell's shearwater is approximately 12 to 14 inches long, with a wingspan of 30 to 35 inches (Berger 1972), and weighs approximately 14 ounces (Ainley *et al.* 1997a).
Its plumage is glossy black above, and white below (Ainley *et al.* 1997a). Newell's shearwaters have low maneuverability characterized by a fast, directional, and low to water flight pattern, due to high wing-loading. A Newell's shearwater wing-loading averages about 60 N [newtons]/m2 (± 5.3 SD) with a low aspect ratio (10.3 ± 0.45 SD); significantly different from other shearwaters or petrels (Spear *et al.* 1995; Warham 1977). Observations of Newell's shearwaters transiting over land show a distinct flight pattern characterized by an almost frantic flapping style with the wings held straight (KESRP 2017a). It has a dark gray to brown bill that is sharply hooked at the tip (Ainley *et al.* 1997a). Its claws are well adapted for burrow excavation and climbing.

Historic and Current Distribution
The Newell's Shearwater's historical range is thought to include the island of Hawaiʻi, Maui, Molokaʻi, Oʻahu, and Kauaʻi (Pyle and Pyle 2009); however, recent surveys suggest birds may still be extant throughout its historical range, although in low numbers. Newell's shearwaters were thought to be extinct after 1908, due largely to habitat loss and predation, but in 1954 a specimen was collected on the island of Oʻahu (King and Gould 1967) and in 1967 a breeding colony was found on Kauaʻi (Sincock and Swedberg 1969). Although no Newell's shearwater breeding colonies have been identified on Oʻahu, downed Newell's shearwaters have been

recovered throughout the island since the 1950s (Pyle and Pyle 2009). On the island of Hawaiʻi, Deringer and VanZandt (2011) detected birds calling in Waipiʻo and Pololū in the Kohala mountains. Then in 2016, Young and VanderWerf used song meters and detected Newellʻs Shearwater calls in Waimanu Valley. On Maui, Newellʻs Shearwater ground calling reported at Haleakalā National Park witin Kīpahulu Valley and along the northern slope of Mount Haleakalā near Koʻolau Gap, indicating a breeding site (NPS 2012). However, due to sensitive natural resources in the area and difficult terrain, no ground surveys have been conducted in this location (NPS 2012). In 2016, Young and VanderWerf deployed song meters at 20 sites in the western Maui mountains, and detected Newell's Shearwaters at 2 sites, but with low calling rates. Although no Newell's Shearwater breeding colonies have been identified on Oʻahu, downed Newell's Shearwaters have been recovered on Oʻahu since the 1950s (Pyle and Pyle 2009), and Young and VanderWerf (2016) documented a total of four calls at two sites in the Waiʻanae mountains using song meters. On Molokaʻi, surveys using song meters at three sites resulted in one detection of a Newell's Shearwater (Young and VanderWerf 2016) with no breeding populations detected (L. Young, pers. comm. 2017).

An estimated 90 percent of Newell's Shearwater global population and known extant breeding colonies with documented burrows are located on Kauaʻi (Ainley *et al.* 1997a; Griesemer and Holmes 2011; Figure 5).

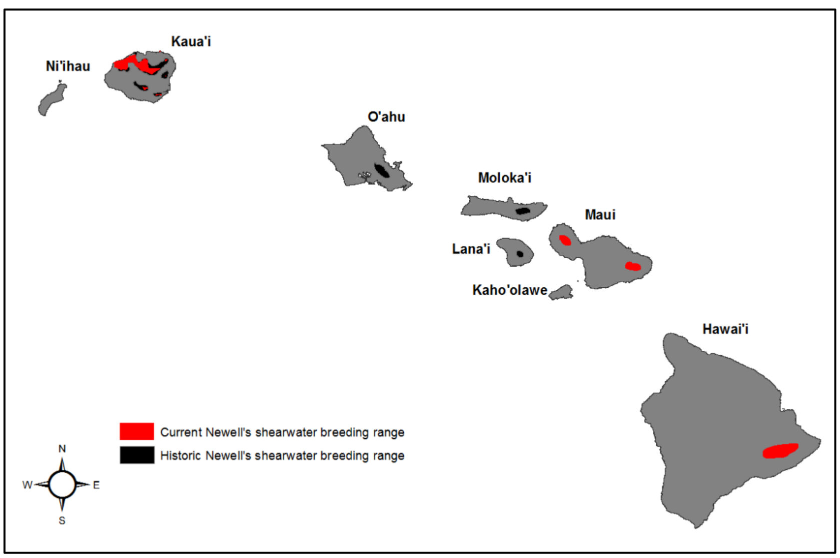

Figure 5. A comparison of the historic and current breeding range for the Newell's shearwater within the Hawaiian Archipelago. While the Newell's shearwater may breed on the island of Hawaiʻi and Maui, the only known breeding colonies of Newell's are located on the Kauaʻi.

Since 1993, ornithological radar surveys have been conducted at 13 sites across Kauaʻi, providing documentation of the population trend for Newell's Shearwaters. Ornithological radar has been used to monitor the summer movement patterns and provides accurate and comparable estimates of numbers of birds as they transit through the detection area (Day and Cooper 1995; Raine *et al.* 2017b). However, studies show a significant reduction in the number of Newell's

Shearwaters transiting to and from montane breeding colonies between 1993 and 2013 (Day and Cooper 1995; Raine *et al.* 2017b). Using the radar data as a proxy for the breeding population, the Newell's Shearwater population on Kauaʻi declined at a mean annual rate of 13 percent over the 20-year period (Raine *et al.* 2017b). Additionally, Day *et al.* (2003) study showed a similar trend, with a population mean annual decline of 11.2 percent for Newell's Shearwater from 1993 to 2001.

Based on historic and current distribution of breeding sites, Newell's shearwaters prefer breeding habitat in montane wet (e.g., Hono o Nā Pali colony) to lowland wet and wet cliff (e.g., Upper Limahuli colony) habitat of 200 to 1,000 meters (m) in elevation, steep to moderate slopes with thick native understory of uluhe fern (*Dicranopteris linearis*) and open canopy of dispersed ʻōhiʻa trees (*Metrosideros polymorpha*) (Troy *et al.* 2014). The preference for montane forested habitat beneath dense uluhe fern helps to conceal shearwater burrows from predators while dispersed ʻōhiʻa trees may provide a take-off point for shearwaters to regain flight (Troy *et al.* 2014). The Newell's substrate preference includes rocky volcanic soils with a moderate amount of fine soil particles and suitable drainage to prevent burrow flooding (Troy *et al.* 2014). Recent seabird surveys have resulted in the first confirmed Newell's shearwater burrows (n=3) along the Nā Pali coast, in dry cliff habitat (Raine and Banfield 2015a).

Life History

Newell's shearwaters have a lifespan of up to 36 years, do not reproduce until 6 years of age, lay one egg per year, and offspring require significant parental investment (Ainley *et al.* 2001). The traits of a long lifespan and low reproduction at high energetic costs define the life strategy of a species that has evolved in a stable environment (i.e., more predictable); as with the succession of ecosystems in the Hawaiian Islands following a period of volcanic eruptions.

Newell's shearwater breeding season begins in late March/early April when adults and sub-adults arrive to inland breeding colonies, followed by a 2 to 4 week departure when breeding adults forage to build-up reserves (Raine and McFarland 2013; Raine and McFarland 2014; Raine and Banfield 2015a). The incubation period begins in May, continues through July, and the chick provisioning stage occurs in late July through September (Raine and McFarland 2013). Male and females equally incubate the egg (Ainley *et al.* 1997a). The fledging or late chick rearing stage, when young leave the nest for the first time occurs in September through December (DOFAW 2016; Raine and McFarland 2013). Adults travel from breeding to feeding areas and return to feed their chicks irregularly every one to three nights (Ainley *et al.* 1997a). Newell's shearwaters, similar to other birds in the Order Procellariiformes, exhibit strong natal philopatry, with breeding pairs returning to the same burrow to breed each year (Bried *et al.* 2003).

Newell's shearwaters on Kauaʻi begin returning to their breeding habitat as sub-adults at 2 to 3 years of age (Ainley *et al.* 1997b). The shearwater breeding season is March 1 to January 1 to cover the period when shearwaters may transit to and from the ocean and inland breeding sites (Travers *et al.* 2016). All transit over land occurs in darkness, with a peak over land passage during the year coinciding with the late incubation and chick rearing stages (Travers *et al*. 2013). Fledglings leaving the nest for the first time exhibit strong phototropic behavior and rely on ambient light from the moon to navigate to open ocean (Telfer *et al.* 1987).

Newell's shearwaters are pelagic, spending much of their time foraging over deep waters where 96 percent of their diet consists of cephalopods, primarily the Ommastrephidae family of flying squid with the remaining 4 percent consisting of flying fish (*Exocoetus* sp.) (Ainley *et al.* 2014). Newell's shearwaters likely specialize in feeding over yellowfin tuna (*Thunnus albacares*), as both flying squid and flying fish are important in the diet of yellowfin tuna.

Population Demographics

At-sea surveys conducted in the central and eastern tropical Pacific between 1980 and 1994 (Spear *et al.* 1995) estimated the total Newell's shearwater population at 84,000 (95% CI = 57,000-115,000) including juveniles and sub-adults. An updated assessment based on survey data collected by the National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NOAA-NMFS) Southwest and Pacific Islands Fisheries Science Centers from 1998 to 2011, estimated the total Newell's shearwater population at 27,011 (95% CI = 18,254-37,125) including juveniles and sub-adults (Joyce 2013). Given 90 percent of the global population resides on Kaua'i (Ainley *et al.* 1997a; Griesemer and Holmes 2011), the estimated population of Kaua'i is 24,310 individuals (USFWS 2017). The percentage of the population that is breeding age (6 years of age or older) is estimated at 0.637 (Ainley *et al.* 2001), equaling an adult population size of 15,485 (approximately 7,500 pairs).

Annual survivorship and juvenile/sub-adult survivorship of the Newell's shearwater have not been studied in the field (i.e., estimated from banding efforts and recapture). Population viability modeling estimates Newell's shearwater adult survivorship from 0.905 (Ainley *et al.* 2001) to 0.920 (Griesemer and Holmes 2011; USFWS 2017) and juvenile/sub-adult survivorship at 0.333 (Ainley *et al.* 2001) based on long-term survivorship data of related species. The likelihood of Newell's shearwater adults (≥ 6 years of age) to breed in any one year was estimated to vary between 0.60 and 0.50 (Ainley *et al.* 2001), which is markedly lower than the breeding probability (0.82) of other Procellariidae species. Based on a five-year monitoring study of a single Newell's shearwater colony on Kaua'i the annual reproductive success of shearwaters was estimated at 0.66 fledglings per breeding pair (Ainley *et al.* 2001). In comparison, the Manx shearwater, a closely related species with an extensive range and a stable global population has a reproductive success of 0.70 (Brooke 1990; and Ainley *et al.* 2001). Ainley *et al*. (2001) had documented 14 shearwater breeding colonies distributed across Kaua'i (Figure 6). Currently, several of these formerly large Newell's shearwater colonies in Kalāheo, Kaluahonu, and Makaleha on Kaua'i have declined dramatically in recent decades to near extirpation (Raine *et al*. 2017b). No population data exists for Newell's breeding on other islands.

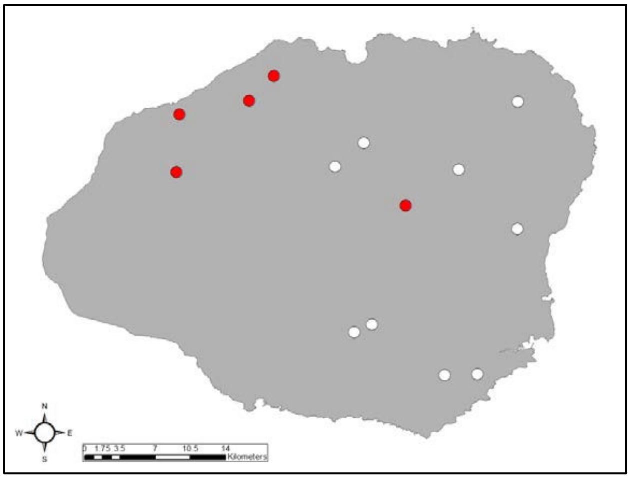

Figure 6. Map of Kaua'i depicting Newell's shearwater breeding colony locations (n=14), however the unfilled circles (n=9) represent colonies near extirpation (Ainley *et al*. 2001).

Since 2011, the breeding success of Newell's shearwater pairs within the Upper Limahuli Preserve on Kaua'i has increased by 27 percent, from 0.692 to 0.882 in 2011 and 2015, respectively (Raine *et al*. 2016). This increase is a direct result of the ungulate exclusion fence completed in 2010 and intensive predator control that began in 2011.

Threats
Primary threats to the Newell's shearwater include artificial nighttime lighting (Reed *et al*. 1985; Cooper and Day 1998); collisions with power lines, towers, and other structures (Cooper and Day 1998; Podolsky *et al*. 1998, Travers and Raine 2016); predation by introduced predators (Raine and Banfield 2015a,b), particularly cats (*Felis catus*), black rats (*Rattus rattus*), feral pigs (*Sus scrofa*), and barn owls (*Tyto alba*); changes to breeding habitat due to introduced invasive plants (Troy *et al*. 2014); and more recently, climate change. These threats to the Newell's shearwater have been steadily increasing.

Climate change has its effects on both seabird adult survivorship and recruitment (Sandvik *et al.* 2012) by generally affecting food distribution, abundance, and availability (Oro 2014). Research by Spear *et al.* (2007) and Ainley *et al.* (2014) also indicated that Newell's Shearwaters forage readily with yellowfin tuna and may be vulnerable to fishery interactions.

<u>Hawaiian petrel or 'ua'u (*Pterodroma sandwichensis*)</u>

Listing Status, Taxonomy, and Species Description
The Hawaiian petrel (*Pterodroma sandwichensis*) was listed as an endangered subspecies (Hawaiian dark-rumped petrel, *Pterodroma phaeopygia sandwichensis*) in 1967 (32 FR 4001; March 11, 1967), but was changed to full species status in 2010 (75 FR 9282; March 1, 2010). The *Hawaiian Dark-rumped Petrel and Newell's Manx Shearwater Recovery Plan* was published in 1983 (USFWS 1983). The *Amendment to the Hawaiian Dark-rumped Petrel and Newell's Manx Shearwater Recovery Plan* was published in 2019. This plan includes revisions of

the recovery criteria for the species (i.e., support representation by ensuring ecological, morphological, behavioral, and genetic diversity of the species throughout its range; resiliency through stable or increasing populations; and redundancy by recommending distribution throughout the historical rang). These recovery criteria were amended to include objective and measurable criteria based on the best available data. Critical habitat has not been designated for the Hawaiian petrel. A species five-year review was completed in 2022. The review recommended no change to the listing status.

The Hawaiian petrel is a medium-sized seabird in the family Procellariidae (shearwaters, petrels, and fulmars). The Hawaiian petrel is approximately 16 inches long (40 cm) and has a wingspan of about 3 ft (90 cm). It has a dark gray head, wings, and tail, and a white forehead and belly. The Hawaiian petrel has a stout grayish-black bill that is hooked at the tip, and feet that are pink and black. The Hawaiian petrel has a stout grayish-black bill that is hooked at the tip, and feet that are pink and black. The Hawaiian petrel and Galapagos petrel (*Pterodroma phaeopygia*; formerly referred to as *Pterodroma phaeopygia phaeopygia*) were commonly known as two subspecies of the dark-rumped petrel (*Pterodroma phaeopygia*) (USFWS 1983, p. 1). The Hawaiian petrel was reclassified as a full species in 1993 because of differences in morphology and vocalization (Sibley and Monroe 1993). In 1997, the evolutionary split was confirmed by genetic analyses (Browne et al 1997). The Hawaiian and Galapagos petrels are also geographically separated, and do not share at-sea foraging areas (Spear et al. 1995, p. 633; Adams et al. 2009). The Service published the listing change to full species status in 2010 as described above.

Historic and Current Distribution
The Hawaiian petrel was once abundant on all southern islands of the Hawaiian Archipelago including the island of Hawaiʻi, Maui, Lānaʻi, Kahoʻolawe, Molokaʻi, Oʻahu, and Kauaʻi (USFWS 1983, p. 3; Ainley *et al*. 1997a, p. 24; KIRC 2015, p. 19). By the 1980s, the Hawaiian petrel population had experienced a significant range contraction and today breeding colonies are found only in remote or high elevation areas on the island of Hawaiʻi, Maui, Lānaʻi, and Kauaʻi (Figure 7). The known breeding habitat varies by location: on East Maui (Haleakalā) and the island of Hawaiʻi (Mauna Loa), petrels breed in subalpine habitat at high elevation, while on Kauaʻi and Lānaʻi they breed in lowland wet or in wet cliff habitat with dense ferns (VanZandt *et al*. 2014). The current distribution of the Hawaiian petrel is believed to be an artifact of range contraction resulting from predation and habitat destruction rather than preference (Hu *et al*. 2001). Hawaiian petrel breeding colonies are known to exist at five locations on four different islands (Figure 7), although fragmented Hawaiian petrel breeding occurrences (<10 burrows) have been reported in other areas (Simons and Hodges 1998; Spencer 2010).

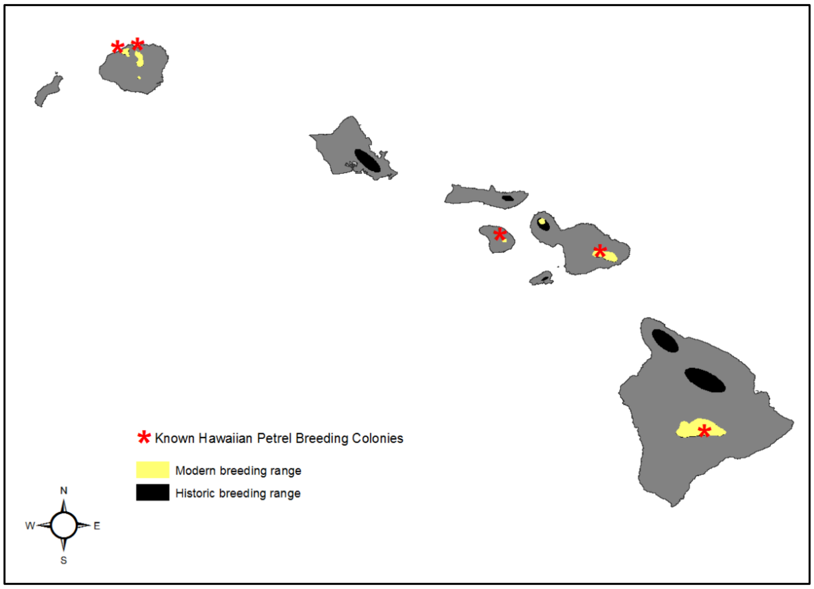

Figure 7. Map of the modern and historic breeding range of the Hawaiian petrel. Historic accounts from islands outside of Maui are limited and thus the historic breeding range is likely conservative. Currently Hawaiian petrel breeding colonies exist at five locations on four different islands.

Ainley et al. (1997b) and Spear et al. (1995) previously estimated a total 19,000 birds, including juveniles and subadults, on Kaua‘i. Croxall et al. (2012) estimated a global population of the Hawaiian petrel to be 9,000 to 16,000 mature individuals. Average breeding probability for Procellariformes is estimated at 0.82 (Griesemer and Holmes 2011, p. 17). Pelagic surveys developed by Joyce (2013) using data collected between 1998 and 2011 (Joyce pers. comm. As cited in Vorsino 2020) projected a 2006 estimate of the Hawaiian petrel population to be 52,186 birds, with the caveat that this estimate represented the global minimum for that sampling period (Vorsino 2020). The Hawai‘i Seabird Hui estimated that approximately 33 percent of the main Hawaiian islands population of the species resides on Kaua‘i (17,221 individuals) (Andre Raine pers. comm. as cited in Vorsino 2020). Vorsino (2020) estimated the Kaua‘i population to be comprised of 10,970 adults, 2,885 fledglings, and 3,366 juveniles.

Most of the Hawaiian petrel global population breeds on the island of Maui within Haleakalā National Park, a location that has had the longest consistent and intensive predator control in place since the 1970s. At Haleakalā National Park, the overall total number of burrows found as of May 2022 was 2,798, which is an increase from 700 known nests documented by Simons (1984). The primary reason for the relatively large numbers of petrels and their successful breeding around Haleakalā summit today is the fencing and intensive predator control maintained by Haleakalā National Park since about 1982. 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 Hawaiian petrel population residing on the island of Kauaʻi is estimated at 1,200 to 1,600 pairs (Ainley et al. 1997b, Pyle and Pyle 2009). On Kauaʻi, there are ten conservation sites identified for Hawaiian petrel management, however, not all currently have breeding populations. Since 2021, Archipelago Research and Conservation (ARC) based on Kauaʻi has been contracted by the Kauaʻi Island Utility Cooperative (KIUC) as part of the KIUC Short-Term Habitat Conservation Plan. ARC is tasked with surveying for additional seabird burrows and monitoring breeding success within the five managed colonies of the Hono O Nā Pali Natural Area Reserve (Pihea, North Bog, Hanakapīʻai, Hanakoa, Pōhākea) and managing the colonies in Upper Limahuli Valley and Upper Mānoa Valley. As of 2021, ARC has located 987 Hawaiian petrel burrows across all managed sites (Raine et al. 2022). While fledgling success in the last few years has improved, the overall population has declined 78 percent since 1993 (Raine et al 2017d). The population decline has since flatlined at a very low level, with no change in the last decade (Raine et al. 2020).

No breeding colonies are known to occur on Oʻahu, however, a study by Young and VanderWerf (2016) detected the presence of Hawaiian petrels on the windward slope of Mt. Kaʻala at 3,600 ft elevation. Pacific Rim Conservation continues to conduct surveys and burrow searching in the northern Koʻolau mountains and near the summit of Mount Kaʻala on Oʻahu (Young in litt. 2022). No burrows have been located yet but Hawaiian petrel calls continue to be detected on acoustic monitors at both sites (Gustafson 2022).

Monitoring efforts on Lānaʻi using song meters, auditory, and visual observation have noted high densities of birds (Raine et al. 2020). The four key colonies on this island exist on the high-elevation mountain ridge of Lānaʻihale located on private land owned and managed by Pūlama Lānaʻi. Efforts to monitor burrows in 2017 resulted in very low fledging success, due primarily to predation by cats and black rats (Raine et al. 2020). Over a four year period from 2017 to 2021, the number of known burrows within Lānaʻi's managed areas went from 196 to 580 (Sprague in litt. 2022). In 2021, 169 of the 180 monitored burrows showed signs of activity with 136 burrows having confirmed breeding. From 2017 to 2021, the reproductive success of the sites managed by Pūlama Lānaʻi increased from 72% to 81%. This increase in reproductive success was due in part to significant predator control implemented after 2016 (Sprague et al. 2021).

Life History

Hawaiian petrels are a *K*-selected species with a reproductive strategy most suited to a stable environment (Stearns 1977). Hawaiian petrels have a long lifespan (up to 35 years), do not reproduce until 6 years of age, lay one egg per year, and require significant parental investment for offspring (Simons and Hodges 1998). Hawaiian petrel breeding season is typically characterized into four consecutive periods: (1) prospecting or pre-laying stage begins in late February, followed by a 2 to 4 week exodus when breeding adults forage to build-up reserves; (2) the egg laying stage begins at the end of April with incubation through early July; (3) the nestling and chick-provisioning stage continues through early October; and (4) fledging occurs in October through mid-November (NPS 2012, p. 80; Adams 2013). This breeding chronology begins approximately 2 to 3 weeks later for Hawaiian petrel colonies on Kaua‘i (Judge *et al*. 2014, p. 83; KESRP 2017b). Petrel offspring require up to five months of care from both parents in order to survive. Hawaiian petrels, similar to other birds in the Order Procellariiformes, exhibit strong natal philopatry, with breeding pairs returning to the same burrow to breed each year (Bried *et al*. 2003, p. 242).

Hawaiian petrels are exclusively pelagic, spending much of their time at-sea resting or foraging for squid, small fish, and crustaceans displaced to the surface by schools of tuna (Simons 1985). Satellite telemetry studies in 2006 to 2008 indicate the majority of Hawaiian petrels (n=20) forage in the North Pacific with few reported south of 10°N (USGS unpublished). During the chick-provisioning stage, each adult foraged an average distance of up to 11,000 km during a 2 to 3 week period before returning to the nesting site (n=9; Adams *et al*. 2009). Non-breeding adults were documented traveling an average distance of 23,000 km over a six month period (n=3; Adams *et al*. 2009). All transit over land occurs in darkness, with a peak over land passage during the year coinciding with the late incubation and chick rearing stages (Travers *et al*. 2015, p. 18). Fledglings leaving the nest for the first time exhibit strong phototropic behavior and rely on ambient light from the moon and stars to navigate to open ocean (Telfer *et al*. 1987, p. 410).

Current Population Demographics

Pelagic surveys estimate the total Hawaiian petrel population at 19,000 (95% CI = 11,000-34,000) including juveniles and subadults, and an estimate of 4,500 to 5,000 breeding pairs (Ainley *et al*. 1997a; Spear *et al*. 1995). Croxall *et al*. (2012) estimated a global population of the Hawaiian petrel to be 9,000 to 16,000 mature individuals. Simons (1984, p. 1067) found an 89% breeding frequency of adult Hawaiian petrels (percentage of adults that attempt to breed each year) in a study of 15 accessible, undisturbed, unpredated burrows of established breeding adults. Average breeding probability for Procellariformes is estimated at 0.82 (Griesemer and Holmes 2011, p. 17). Demographic studies of long-lived seabirds have shown that breeding probability increases with age (Ainley and DeMaster 1980) and is a function of individual fitness and habitat quality (Lescroël *et al*. 2009).

Colonial breeding populations of long-lived seabird species rely on a high rate of adult survivorship. Simons (1984, p. 1067) estimated Hawaiian petrel adult survivorship to be 0.93 in the absence of predation and dropped to 0.80 or lower in years of high predation events. Average sub-adult or juvenile survivorship for Procellariformes is 0.65 to 0.93 (Simons 1984, p.1067).

The majority of the Hawaiian petrel global population breeds on Maui within Haleakalā National Park, a location that has had the longest consistent and intensive predator control in place since the 1970s. While fledgling success in the last few years has improved for the Kaua‘i colonies, overall current trend for the Kaua‘i colonies is decreasing. Due largely to natal and breeding philopatry as well as foraging segregation, limited gene flow occurs within seabird species populations (Friesen *et al*. 2007). Welch *et al*. (2012, p. 23) examined nuclear sequences from 164 Hawaiian petrels representing all extant island colonies and estimated the average migration rate was 0.467 to 10 migrants per generation for petrel populations breeding on different islands.

Wiley *et al*. (2012, p. 124) sampled 80 Hawaiian petrels from contemporary Hawai‘i and Kaua‘i subpopulations and found high levels of genetic differentiation between petrels nesting on Kaua‘i and Hawai‘i islands (F_{ST}=0.50). Research conducted by Stiebens *et al*. (2013) highlights the conservation value of the Kaua‘i petrel population by demonstrating that philopatry is an evolutionary strategy to conserve a high adaptive potential at the margins of a species' distribution, while asymmetric gene flow maintains genetic connectivity with the rest of the population.

Threats

The primary threat to the Hawaiian petrel includes predation by introduced predators (Hodges and Nagata 2001; Raine and Banfield 2015a, 2015b); particularly cats, rats, mongoose, feral pigs, and barn owls. Fifty-four percent of all known Hawaiian petrel deaths at Haleakalā National Park, from 1991 to 2011 (n=532) have been due to introduced predators (NPS 2012). Additional threats include collisions with power lines, towers, and other structures (Cooper and Day 1998; Podolsky et al. 1998; Simons and Hodges 1998); light attraction, although at a lower rate than Newell's shearwaters (Reed et al 1985; Cooper and Day 1998); and changes to breeding habitat due to introduced invasive plants (Troy et al 2014). Other studies suggest another threat to seabirds is climate change and its affects to both seabird adult survivorship and recruitment (Sandvik *et al*. 2012) by generally affecting food availability (Oro 2014). However, other anthropogenic impacts such as oil-spills and interactions with fisheries, as well as previously described land-based threats may confound the association between climate and seabird demography.

Band-rumped storm-petrel or ‘akē‘akē (*Hydrobates castro*)

Listing Status, Taxonomy, and Species Description

The Hawai‘i distinct population segment of the band-rumped storm-petrel (*Hydrobates castro*) (band-rumped storm-petrel) was listed as endangered effective in 2016 (81 FR 67786). For a population to be listed under the Act as a distinct vertebrate population segment, three elements are considered: (1) the discreteness of the population segment in relation to the remainder of the species to which it belongs; (2) the significance of the population segment to the species to which it belongs; and (3) the population segment's conservation status in relation to the Act's standards for listing (61 FR 4722). The Hawai‘i population of the band-rumped storm-petrel may be distinct based on geographic and distributional isolation from other band-rumped storm-petrel populations elsewhere in the Pacific and Atlantic oceans. A population also can be considered "discrete" if it is delimited by international boundaries across which exist differences in management control of the species. The Hawaiian Islands population of the band-rumped storm-petrel is the only population within U.S. borders or under U.S. jurisdiction. Critical habitat has not been designated for the band-rumped storm-petrel. The *Recovery Plan for 50 Hawaiian Archipelago Species*, which included the band-rumped storm-petrel, was published in 2022 (USFWS 2022).

The band-rumped storm-petrel is a seabird in the family Hydrobatidae (order Procellariiformes) and a member of the Northern Hemisphere subfamily Hydrobatinae (Slotterback 2002, p. 2), with some taxonomic questions unresolved. Prior to 1900, this species had been described as an unnamed petrel in the genus *Thalassidroma* (Dole 1869, 1879 *in* Stejneger 1887, p. 78), as *Cymochorea cryptoleucura* (Ridgeway 1882, pp. 337– 338), and as *Oceanodroma cryptoleucura* (Stejneger 1887, p. 78). After Henshaw's 1902 publication, the Hawaiian population was known as *O. castro cryptoleucura*, the Hawaiian storm-petrel (Harrison *et al*. 1990, p. 47). Austin (1952, pp. 395-396) examined eleven museum skins from the Hawaiʻi population and studied the taxonomy of the band-rumped storm-petrel and concluded that, although the various populations exhibited minor size differences, these differences were not significant and the populations were best considered as belonging to a single species with no separable subspecies. Since then taxonomists have typically combined the Pacific populations (Galapagos Islands, Japan, and Hawaiʻi) of the band-rumped storm-petrel into a single taxon, and currently the American Ornithologist's Union (AOU) regards the species as monotypic with no recognized subspecies (Slotterback 2002). However, some authors designate *Oceanodroma castro* as referring solely to the Madeiran storm-petrel, breeding in the Azores Archipelago and which may belong to two distinct, albeit sympatric, populations with separate breeding seasons, as well as distinctive morphologies, vocalizations and moult cycles (Monteiro and Furness 1998; Bolton *et al*. 2008). As such, del Hoyo et al (2014) have re-classified the band-rumped storm petrel as *Hydrobates castro*, with breeding populations in the eastern Atlantic from the Berlengas Islands and the Azores (Portugal), down to Ascension Island and Saint Helena (St. Helena to UK), and in the Pacific Ocean off eastern Japan, on Kauaʻi, Hawaiʻi (USA) and in the Galapagos Islands (Ecuador) (del Hoyo *et al*. 1992). Moreover, Pyle *et al*. (2016, p. 59) has reported regular sightings of the Leach's storm-petrel (*Hydrobates leucorhous*) and the band-rumped storm-petrel (*Hydrobates castro*) overlapping in range and plumage coloration around Hawaiian waters, further questioning the taxonomic status of the species. Recent genetic studies of historical and modern samples of the band-rumped storm-petrel (n=24) from Kauaʻi, Oʻahu, Maui and the island of Hawaiʻi found little differentiation between the Kauaʻi and island of Hawaiʻi presumed breeding colonies (Antaky et al. 2020, pp. 9, 10). However, the Maui and Oʻahu recovered individuals from these samples did not assign to either of the breeding colonies on Kauaʻi or the island of Hawaiʻi, therefore, suggesting the presence of another distinct population in the region (Antaky et al. 2020, pp. 9-10).

The band-rumped storm-petrel is a small seabird about 8 inches long with a wingspan of about 19 in (47 cm), and about 2 ounces (50 grams) in weight. The tail is only slightly notched and may appear almost square. Plumage is an overall blackish-brown with a white band across the "rump" (above the tail). This species typically flies with a relatively shallow wing-beat, and glides on slightly bowed wings as a regular part of flight (Slotterback 2002, p. 2). Sexes are alike in size and appearance. Vocalizations at breeding colonies can be used to further distinguish this species from other Procellariiformes seabirds (Allan 1962, p. 279; James and Robertson 1985, pp. 391–392).

Historic and Current Distribution
The band-rumped storm-petrel probably was common on all of the main Hawaiian Islands prior to Polynesians arrival about 1,600 years ago (Berger 1972, pp. 25-26; Harrison *et al*. 1990, p. 47). As evidenced by abundant storm-petrel bones found in middens on the island of Hawaiʻi (Harrison *et al*. 1990, p. 47) and in excavation sites on Oʻahu and Molokaʻi (Olson and James 1982b, p. 33), band-rumped storm-petrels once were numerous and nested in sufficiently accessible sites, including coastal areas, to be used as a source of food and possibly feathers (Harrison *et a1*. 1990, p. 48). They were also known from French Frigate Shoals in the Northwestern Hawaiian Islands (Henshaw 1902, p. 118).

In Hawaiʻi, band-rumped storm-petrels are known to nest in remote cliff locations on Kauaʻi and Lehua Island, in steep open to vegetated cliffs, and in little vegetated, high-elevation lava fields on Hawaii Island (Wood et al. 2002, p. 17–18; VanderWerf et al. 2007, pp. 1, 5; Joyce and Holmes 2010, p. 3; Banko 2015 in litt.; Raine 2015, in litt.; Galase 2019). Vocalizations were heard in Haleakalā Crater on Maui in 1992 (Johnston 1992, in Wood et al. 2002, p. 2), on Lānaʻi (Penniman 2015, in litt.; Raine et al. 2020), and in Hawaiʻi Volcanoes National Park (Orlando 2015, in litt.). Based on the scarcity of known breeding colonies in Hawaiʻi and their remote, inaccessible locations today compared to prehistoric population levels and distribution, the band-rumped storm-petrel appears to be significantly reduced in numbers and range following human occupation of the Hawaiian Islands, likely as a result of predation by nonnative mammals and habitat loss.

Band-rumped storm-petrels are regularly observed in coastal waters around Kauaʻi, Niʻihau, and the island of Hawaiʻi (Harrison et al. 1990, p. 49; Holmes and Joyce 2009, 4 pp.), and in ‘‘rafts’’ (regular concentrations) of a few birds to as many as 100, possibly awaiting nightfall before coming ashore to breeding colonies. Kauaʻi likely has the largest population, with an estimated 221 nesting pairs in cliffs along the north shore of the island in 2002, and additional observations on the north and south side of the island in 2010 (Harrison et al. 1990, p. 49; Wood et al. 2002, pp. 2–3; Holmes and Joyce 2009, 4 pp.; Joyce and Holmes 2010, pp. 1–3).

Raine et al. (2017a) conducted auditory surveys, automated acoustic surveys and mist netting data to create a predictive distribution model based on key habitat variables. Based on these and previous survey data, breeding is occurring primarily in the steep, remote cliffs areas of the Nā Pali coast in the northwest region of the island, Waimea Canyon, Hanapēpē Valley, rocky cliff faces of the vegetated valleys of Wainiha and Lumahaʻi, and Lehua Islet (Wood et al. 2002; VanderWerf et al. 2007, p.1; Raine et al. 2017a). KESRP has captured multiple birds along the Na Pali coast and Waimea Canyon in recent years with brood patches, strongly suggesting multiple breeding colonies on Kauaʻi. Additionally, retrieval of downed fledglings on Kauaʻi in the fall further points to local nesting locations (VanderWerf et al. 2007, Holmes and Joyce 2009). Auditory surveys also conducted on Lānaʻi in Hauola Canyon, documented high call rates of the band-rumped storm-petrel, suggesting breeding is also currently occurring there (Raine et al. 2020). Birds are also known from Maui (Mitchell et al. 2005), Kahoʻolawe (Olson 1992, pp. 38, 112), and the island of Hawaiʻi (Mitchell et al. 2005; Orlando 2015, in litt.). Galase (2019),

p. 26, 27) documented the first confirmed breeding colony on the northern slope of Mauna Loa within the US Army's Pōhakuloa Training Area (PTA) on the island of Hawaiʻi. The species likely once nested in coastal Maui, where the remains of a chick were found in 1999, and islands such as Niʻihau and Kaʻula, where surveys have not been conducted, likely have suitable nesting habitat and may harbor the species (Penniman 2015, in litt.).

Life History
The band-rumped storm-petrel is long-lived (15 to 20 years) and probably does not breed until its third year (Harrison *et al*. 1990, p. 48). The band-rumped storm-petrel breeding biology in Hawaiʻi is poorly known. Like most seabirds a single egg is laid per season. Breeding birds return to nest sites in late May and complete egg laying by mid-June and incubate until the beginning of August (Raine et al. 2017c). The incubation period averages 42 days and fledging occurs 70 to 78 days after hatching (Harris 1969). Fledglings depart the nest site between October and late November, with peak fledging in October (Raine et al. 2017a).

Nesting sites are in burrows and in crevices, holes, and on protected ledges along cliff faces, where a single egg is laid (Allan 1962, p. 274–275; Harris 1969, pp. 104–105; Slotterback 2002, p. 11). Plant communities in the vicinities of possible nesting areas include shrubs and grasses, common herbs, randomly distributed tree species, and dry mesic cliff species (Wood et al. 2001a, Wood et al. 2001b). Raine et al. (2017a) predicts highest occurrence of breeding in areas with low rainfall, little to no vegetation and greater than 40-degree slopes.

When not at nesting sites, adults spend their time foraging on the open ocean for small fish, squid, and crustaceans. They have been observed feeding during the day, but it is likely that they also feed at night (KESRP 2017c). During the non-breeding season, some birds apparently remain near their breeding islands, while others undertake long-distance movements of unknown extent. The band-rumped storm-petrel has been detected west of the Galapagos Islands during spring but not during autumn counts; >620 miles north of Hawaiian Islands during summer surveys; and >990 miles south of Hawaiʻi in the Phoenix Islands, as well as the entire distance from the Hawaiian Islands to Japan (Slotterback 2002, Mitchell et al. 2005).

Current Population Demographics
Brooke (2004) estimated the global population of band-rumped storm-petrels to number around 150,000 individuals. However, due to unresolved taxonomic questions and similarity in plumage coloration with other species, population estimates may be widely challenged. Wood *et al*. (2002) estimated 171 to 221 breeding pairs of band-rumped storm-petrels on Kauaʻi, based on surveys conducted in 2002 and recordings of storm-petrel ground calls. The SOS program has also documented the retrieval of fledglings. Kauaʻi likely has the largest population of band-rumped storm-petrels in the Hawaiian Islands (Harrison *et al*. 1990). During the breeding season, band-rumped storm-petrels have been heard calling in flight over the broad slopes of Mauna Loa on Hawaiʻi, the summit of Haleakalā on Maui, and have been heard ground calling from very steep, rocky cliffs along the Nā Pali coast and Waimea Canyon on the island of Kauaʻi (Banfield *et al*. 2013; Raine and Banfield 2015b). Concentrated calling activity on Kauaʻi, Maui, and the

island of Hawaiʻi suggests breeding occurs on these islands and there is a small possibility that a remnant colony may exist on Lehua Islet (KESRP 2017c). No data exists on the population demographics of band-rumped storm-petrels in the Hawaiian Archipelago.

Threats

Depredation by nonnative animals on nests and adults during the breeding season is the greatest threat to the Hawaiian population of the band-rumped storm-petrel. These predators include feral cats, barn owls, small Indian mongoose, black rats, Norway rats, and Polynesian rats (Scott et al. 1986, pp. 1, 363–364; Tomich 1986, pp. 37–45; Harrison et al. 1990, pp. 47–48; Slotterback 2002, p. 19; Raine 2015, in litt.). The band-rumped storm-petrel lacks effective predator defenses, and has a lengthy incubation and fledgling period, making adults, eggs, and young highly vulnerable to depredation by introduced vertebrates. Wood et al. (2002) observed introduced barn owls flying along basalt cliff faces where the band-rumped storm-petrels nest in Pōhakuao, Kauaʻi.

Another impact to the band-rumped storm-petrel results from the effects of artificial lights on fledgling young and, to a lesser degree, adults. Artificial lighting along roadways, resorts, ballparks, residences, and other developed areas both attracts and confuses night-flying bandrumped storm-petrel fledglings, resulting in fallout (Harrison *et al*. 1990) and collisions with buildings and other objects (Banko *et al*. 1991). Since 1979, a total of 40 band-rumped storm petrels have been processed by the SOS program (Anderson 2015, p. 4-13), where carcasses have been documented or live birds rehabilitated and released. The majority of these birds landed on cruise ships enroute and these ships subsequently docked at Nāwiliwili Harbor, Kauaʻi and submitted injured birds to the SOS for care (Anderson 2015, p. 4-13). In 2014, a record number of three band-rumped storm petrel individuals were processed by the SOS program. The first was a subadult after hatch year (AHY) bird picked up in September from Kapaʻa. The second band-rumped storm-petrel was a hatch-year (HY) bird attracted to the lights from a research boat offshore from the Nā Pali coast and was subsequently unable to regain flight. The third band-rumped storm-petrel was also a HY bird found at the Kauaʻi Sheraton Hotel in Kōloa, Kauaʻi in November 2014. All three band-rumped storm-petrel individuals were successfully released after rehabilitation by the SOS program.

Environmental Baseline

Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the past and present impacts of all federal, state, or private actions and other human activities in the action area. Also included in the environmental baseline are the anticipated and/or ongoing impacts of all proposed federal projects in the action area that have undergone Section 7 consultation, and the impacts of state and private actions which are contemporaneous with the consultation in progress.

<u>Status of the species within the action area</u>

Adult Newell's shearwaters, Hawaiian petrels, and band-rumped storm-petrels do not nest at Hanapēpē Armory but do use the area to commute and pass through from the ocean to their high elevation nest sites in the mountains. The Hawai'i Department of Land and Natural Resources (DLNR) Kaua'i Endangered Species Recovery Project (KESRP) has been conducting a radar monitoring program on Kaua'i since 1993. One of the bird monitoring stations is located at 'Ele'ele, which is within a few kilometers of the Hanapēpē Armory. The Newell's shearwater has been recorded at that site since 1993 but mean movement rates (targets/hour) have dropped drastically from 1993 (116.4) to 2020 (39.3). Similarly, the Hawaiian petrel has been recorded there since 1993 with mean movement rates decreasing from 326.4 in 1993 to 175.2 in 2020.

The nearest Newell's shearwater breeding colony is located approximately 7 miles away, along the Kāhili mountain to the northeast (Figure 8) of the proposed project area (Day and Cooper 1995; USFWS 2020). The Hawaiian petrel is also suspected of breeding in the interior Kāhili mountains (Day and Cooper 1995; USFWS 2020); although a very small colony (Dr. Andre Raine pers. comm. 2020). Additionally, the band-rumped storm-petrel has been recorded on Kāhili mountain (Raine et al. 2017a) and it is possible there may be a small population there, though it is not confirmed (Dr. Andre Raine pers. comm. 2020).

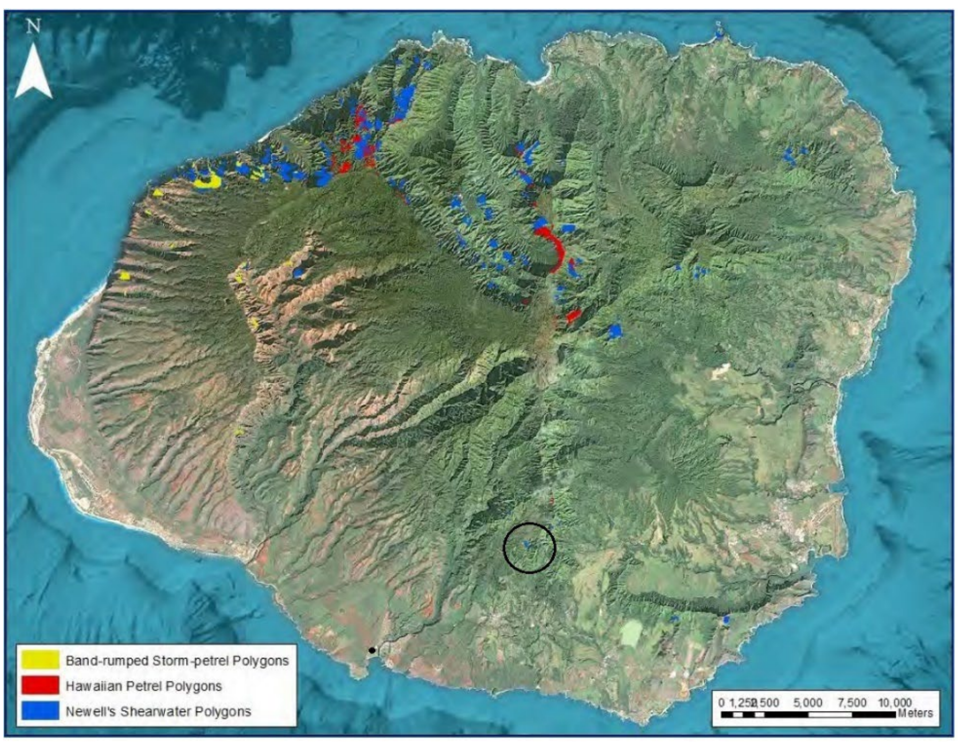

Figure 8. Map of calling hotspots from the Kaua'i Endangered Species Recovery Project (KESRP). The black dot is the proposed action area at Hanapēpē Armory. The black circled area is the Kāhili mountain to the northeast.

The Save Our Shearwaters (SOS) program is an organization initiated in 1979 to respond to the annual fall out of seabirds (attraction of seabirds to light, causing disorientation and grounding away from the ocean), and rescues and rehabilitates seabirds that are victims of fallout. According to SOS data from 2015 to 2020 (Kaua'i County 2021), there were 139 fallout records of Newell's shearwaters within one mile of the Hanapēpē Stadium which is a mile from the Hanapēpē Armory (Figure 9). Of the 139 recorded, 118 were hatch year (HY), 8 after hatch year (AHY), and 13 unknown. Additionally, from 2015 to 2020, the SOS program recorded three Hawaiian petrel within a mile of the Hanapēpē Stadium. Two were HY, and the other AHY. However, the SOS program during the timeframe of 2015 to 2020 did not record any band-rumped storm petrel within a mile of the Hanapēpē Stadium.

Figure 9. SOS collection records within one mile of the Hanapēpē Stadium. Black dot is Hanapēpē Stadium and the yellow square is the Hanapēpē Armory (action area).

Effects of the Action

The likely effects to Hawaiian seabirds are collisions with the communication towers and their associated guy wires. Additionally, the annual funding of $20,000 to NFWF will provide benefits to Hawaiian seabirds. Each stressor and benefit caused by the proposed action may have consequences to Hawaiian seabirds. The consequences of the proposed action on Hawaiian seabirds are discussed below.

Consequences of the Proposed Action on Hawaiian Seabirds

Effects Associated with the Communication Towers

Collisions with narrow-profile structures such as transmission lines and towers are well-documented for Hawaiian seabirds, particularly on Kauaʻi. Hawaiian seabirds are nocturnal and fly over 30 miles per hour, making it difficult for them to detect and avoid wires and antennas (Cooper and Day 2003, p. 64). Towers and their associated guy wires can be a stressor to Hawaiian seabirds by obstructing their flyway corridors to and from montane breeding areas. Surveys conducted by KESRP in 2013 using vertical radar and visual observation to estimate seabird flight altitude showed site-specific variation in altitude. In low elevation non-mountainous areas seabird flight height averaged 162 $\pm$ 85 ft above ground (Travers *et al.* 2014, p. 22). In contrast, at a high elevation mountainous area, a total of 323 Newell's shearwaters and Hawaiian petrels were observed with 43.2% flying through or colliding with a powerline segment at a height of approximately 88 meters above ground (Travers *et al.* 2013, p. 73; Travers *et al.* 2014, p. 26).

In 2008, the Navy's Pacific Missile Range Facility (PMRF) implemented search protocols for downed seabirds to estimate the number of avian fatalities attributable to collisions with communication towers at Barking Sands. In 2010, the survey protocols were expanded to include two communication towers at Kōkeʻe while still including the Barking Sands site. In 2015, the surveys were repeated for towers at both sites. The towers at Barking sands are located near sea level and approximately 10 miles from the nearest known Newell's shearwater breeding colony. These towers are exposed approximately 140 to 170 ft in height above the vegetation level. The Kōkeʻe site is located at an elevation of 3,700 ft, with the nearest Newell's shearwater breeding colony less than 1 mile away. The two communication towers at Kōkeʻe are 110 ft in height (approximately 100 ft above the vegetation level) with one tower having 28 guy wires.

At Barking Sands, no mortality of Hawaiian seabirds due to collision with communication towers was observed during surveys. At Kōkeʻe, two adult Newell's shearwaters were found grounded and dead under a communication tower; one from the 2015 survey and one during a Navy site visit in 2017. Additionally, the dense vegetation and topography surrounding the towers at Kōkeʻe reduces the effectiveness of discovering seabirds that collide with the tower or guy wires following the search protocols. This suggests that carcass recovery alone is not a good predictor of seabird collisions with communication towers at this site, and the two seabirds found are likely an underestimate of its true impact.

The site of the proposed communication towers at Hanapēpē Armory is located near sea level and approximately 7 miles from Kāhili mountain; the nearest known Newell's shearwater and Hawaiian petrel breeding colony, and potential band-rumped storm-petrel breeding colony (Figure 8). The towers will be 90 ft in height and will each have 3 guy wires. Under the proposed action, the communication towers and associated guy wires create a potential for Hawaiian seabird collision while flying between their nesting grounds in the mountains and feeding grounds at sea. The timing of this threat extends from late March/early April when Hawaiian seabirds occupy their nesting grounds, just prior to breeding, until early December when the last chicks of the season fledge and fly to sea. During the non-breeding season, Hawaiian seabirds remain at sea the entire time, therefore, they are not likely to collide with a communication tower or any other structure on land during this time. Although the communication towers will not be deployed permanently, the frequency and duration of their deployment is contingent upon unpredictable weather events. Therefore, we are considering the deployment of the communication towers as permanent standing structures to analyze the impacts to Hawaiian seabirds throughout all life stages of these species.

To estimate the impacts on Hawaiian seabirds associated with the communication towers, we used a collision model (Table 1) that was developed to estimate Newell's shearwater fatalities at the aforementioned PMRF Kōke‘e site (USFWS 2018). The collision model is based on a template modified from Sanzenbacher and Cooper (2013) and incorporates updated seabird movement rates near the action area and the proposed communication towers characteristics. Movement rates (targets/hour) for Newell's shearwater and Hawaiian petrel came from a radar monitoring station located at ‘Ele‘ele (Raine and Rossiter 2020). Movement rates (calls/hour) for band-rumped storm-petrel were taken from auditory surveys at Kāhili mountain (Raine *et al.* 2017a). Tower characteristics were updated based on the provided information for the proposed communication towers. The formula for "area occupied by guy wires" (Table 1, Line M) was slightly altered from the original used in the collision model at the PMRF Kōke‘e site. The original formula was divided by 7 due to the Kōke‘e site towers having 28 guy wires compared to 3 guy wires at the Hanapēpē Armory (28 divided by 3 equals 7). The "proportion of birds below tower height" (Table 1, Line Q) came from Travers *et al.* (2014), whose study showed that 9.1% of total seabirds observed (n = 884) were observed flying at or below powerlines (n = 80) with similar height or higher than the proposed communication towers. Information on collision-avoidance behavior exhibited by Newell's shearwaters suggests that avoidance responses are high based on observations of seabird interactions with powerlines on Kaua‘i (Travers *et al.* 2014, Travers *et al.* 2015, Cooper and Day 1998). Based on this information, for the purposes of the model, we considered 99% of seabirds flying through the airspace near communication towers avoid a collision fatality (i.e., 99% avoidance for annual fatality probability). The annual fatality probability was also multiplied by 2 to represent the total probability for the two communication towers being assessed (towers have the same characteristics).

Table 1. Collision model estimating annual fatality rates of Hawaiian seabirds for communication towers at Hanapēpē Armory, Kauaʻi.

Movement Rates		Newell's Shearwater	Hawaiian Petrel	Band-rumped Storm-petrel	Notes/References
A	Movement rate during peak hours (targets/hr)	39.300	175.200	8.000[1]	Raine and Rossiter 2020; Raine et al. 2017a
B	Total movement rate during peak hours (targets/6 hrs)	235.800	1,051.200	48.000	(A x 6); 6.5 peak hours of movement
C	Daily movement rate (targets/day)	265.511	1,183.650	54.048	(B x 1.126); 1 (6.5 peak hours) + 0.126 (mean proportion of birds moving during off-peak hours of night)
D	Flock size (avg birds/target)	1.020	1.020	1.020	
E	Daily movement rate (birds/day)	270.821	1,207.323	55.129	(C x D)
F	Mortality domain (days/year)	231.000	231.000	231.000	Breeding phenology adults present week 14- 46 (33 weeks x 7 days)
G	Annual movement rate (birds/year)	62,559.655	278,891.613	12,734.790	(E x F)
Tower Characteristics					
H	Height of tower exposed (m)	27.432	27.432	27.432	Height of towers is 90 ft
I	Tower width at base (m)	5.639	5.639	5.639	Longest tower width at base is 18.5 ft
J	Exposed area of tower (m^2)	154.689	154.689	154.689	(I x H)
K	Height of highest guy wire (m)	19.812	19.812	19.812	Guy wires start at 65 ft
L	Guy wire distance from pole (m)	21.336	21.336	21.336	Guy wires stretch out 70 ft
M	Area occupied by guy wires (m^2) both sides	60.387	60.387	60.387	Area to the left and right of tower in profile (M = (((1/2)L x K) x 2)/7).[2]
Horizontal Interaction Probability					
N	Maximum cross-sectional of exposed area of tower (m^2)	215.076	215.076	215.076	(J + M)
O	Cross-sectional sampling area of radar below tower height (m^2)	82,296.000	82,296.000	82,296.000	(3,000m x H)
P	Probability of seabird intersecting tower	0.003	0.003	0.003	(N/O)
Vertical Interaction Probability					
Q	Proportion of birds below tower height	0.091	0.091	0.091	Travers et al. 2014[3]
Exposure Rate					
R	Maximum annual exposure rate	14.878	66.327	3.029	(G x P x Q)
Annual Fatality Probability					
S	90% Avoidance	2.976	13.265	0.606	(R x 0.10 x 2)[4]
T	95% Avoidance	1.488	6.633	0.303	(R x 0.05 x 2)[4]
U	**99% Avoidance**	**0.298**	**1.327**	**0.061**	(R x 0.01 x 2)[4]

[1]Band-rumped storm-petrel movement rate is call/hour as this was the best available data near the project site
[2]Original formula divided by 7 due to only 3 guy wires present compared to 28 guy wires in original formula (28/3 = 7)
[3]Study showed 9.1% of birds flew at or below powerline height similar to communication towers
[4]Multiplied by 2 to account for probability of two communication towers

Based on this information, the model estimated an annual fatality probability of 0.298 for Newell's shearwaters (Table 2). Rounding to the nearest tenth, we used 1 adult seabird divided by 0.3 annual fatality probability (birds/year) to equal 3.3 years. Therefore, we estimate that up to 1 adult Newell's shearwater every 3 years is likely to be killed or injured due to collisions with communication towers. For Hawaiian petrels, the model estimated an annual fatality probability of 1.327 (Table 2). Rounding to the nearest tenth, we used 1.3 annual fatality probability (birds/year) multiplied by 3 years to equal 3.9 adult seabirds. Therefore, we estimate that up to 4 adult Hawaiian petrels every 3 years and a maximum of up to 2 in one year (1.3 annual fatality probability rounded up) are likely to be injured or killed due to collisions with communication towers. For band-rumped storm-petrels, the model estimated an annual fatality probability of 0.061 (Table 2). Rounding to the nearest tenth, we used 1 adult seabird divided by 0.1 annual fatality probability (birds/year) to equal 10 years. Therefore, we estimate that up to 1 adult band-rumped storm-petrel every 10 years is likely to be injured or killed due to collisions with communication towers.

Table 2. Estimated annual fatality rates for Hawaiian seabirds based on 99% avoidance.

Annual Fatality Probability	Newell's Shearwater	Hawaiian Petrel	Band-rumped Storm-petrel
99% Avoidance	0.298	1.327	0.061

In addition, based on the above and best available information on population dynamics (USFWS 2018), we estimated the number of seabird chicks or eggs that are likely to be killed per year as a result of its parent colliding with communication towers. Information on population dynamics estimates that 60% of adults killed would have been breeding and 46% of breeding attempts would have resulted in a chick fledgling in the nest (i.e., breeding probability of 60% and reproductive success of 46%). For Newell's shearwaters, we used 0.3 adult annual fatality probability, multiplied by 0.6 breeding probability, multiplied by 0.46 reproductive success to equal 0.083 chicks/eggs lost per year. Therefore, we estimate that up to 1 Newell's shearwater chick or egg every 12 years is likely to be killed as a result of its parent colliding with communication towers. For Hawaiian petrels, we used 1.3 adult annual fatality probability, multiplied by 0.6 breeding probability, multiplied by 0.46 reproductive success to equal 0.360 chicks/eggs lost per year. Therefore, we estimate that up to 1 Hawaiian petrel chick or egg every 3 years is likely to be killed as a result of its parent colliding with communication towers. For band-rumped storm-petrels, we used 0.1 adult annual fatality probability, multiplied by 0.6 breeding probability, multiplied by 0.46 reproductive success to equal 0.028 chicks/eggs lost per year. Therefore, we estimate that up to 1 band-rumped storm-petrel chick or egg every 20 years is likely to be killed as a result of its parent colliding with communication towers.

Beneficial Effects of Conservation Funding to Hawaiian Seabird Conservation Account

The ARNG, through the HIARNG, will provide annual funding of $20,000 to the Hawaiian Seabird Impact-Directed Environmental Account, administered by the National Fish and Wildlife Foundation. This funding will provide support to Hawaiian seabird conservation efforts and act as a measure to compensate for effects associated with deployment of the communication towers. These funds will be used to support management activities as needed for Hawaiian seabirds, such as predator control and habitat restoration at existing colonies where current management does not exist or is insufficient to adequately enhance reproductive success. By enhancing reproductive success of Hawaiian seabirds, these contributions are anticipated to offset any potential loss of reproduction from breeding pairs as a result of effects from the communication towers.

Cumulative Effects

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action 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, tribal, local, or private actions that are reasonably certain to occur within the action area at this time; therefore, no cumulative effects are anticipated.

Conclusion

Hawaiian seabird collisions with structures such as communication towers have been well-documented on Kaua‘i. The site of the proposed communication towers is located near sea-level and approximately 7 miles from the nearest known or potential breeding colonies of Hawaiian seabirds. While the proposed communication towers associated with this project are anticipated to have impacts on Hawaiian seabirds, the impacts to the overall population of Hawaiian seabirds are anticipated to be low. The results of the collision model showed low annual fatality probability, perhaps due to the low movement rates of nearby Hawaiian seabirds (e.g., far from breeding colony) and communication tower characteristics (e.g., minimal guy wires, low percentage of birds flying below tower height). It is estimated that up to one adult Newell’s shearwater every three years, four adult Hawaiian petrels every three years, and one adult band-rumped storm petrel every ten years may be injured or killed due to collisions with the communication towers. The loss of these adult Hawaiian seabirds will also result in the loss of chicks or eggs. It is estimated that up to one Newell’s shearwater chick or egg every twelve years, one Hawaiian petrel chick or egg every three years, and one band-rumped storm-petrel every twenty years may be injured or killed due to its parents colliding with communication towers. While this loss will impact breeding and reproduction, the annual NFWF contribution will provide benefits to Hawaiian seabirds. These contributions will be used to enhance Hawaiian seabird reproductive success and are anticipated to offset any potential loss of reproduction from breeding pairs as a result of collisions with communication towers. Overall, taking all of these effects together, there will not be a significant change in the reproduction, numbers, or distribution of Hawaiian seabirds that will appreciably reduce the likelihood of both the survival and recovery of these species in the wild.

After reviewing the current status of Hawaiian seabirds, the environmental baseline for the action area, the effects of the proposed communication towers, and the cumulative effects, it is the

Service's biological opinion that the project action, as proposed, is not likely to jeopardize the continued existence of Hawaiian seabirds. No critical habitat has been designated for these species, therefore, none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by FWS 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, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the ARNG so that they become binding conditions of any grant or permit issued to the ARNG, as appropriate, for the exemption in section 7(o)(2) to apply. The ARNG has a continuing duty to regulate the activity covered by this incidental take statement. If the ARNG (1) fails to assume and implement the terms and conditions or (2) fails to require the HIARNG to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the ARNG or HIARNG must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

Amount or Extent of Take Anticipated

Based on the analysis presented in this BO, the Service anticipates the following incidental take of Hawaiian seabirds may occur in the form of injury or mortality as a result of this proposed action.

The Service anticipates the following take of Hawaiian seabirds:

- Up to one (1) adult Newell's shearwater every three years may be taken in the form of injury or mortality due to collisions with the communication towers associated with the project.

- Up to one (1) Newell's shearwater chick or egg every twelve years may be taken in the form of injury or mortality as a result of its parent colliding with communication towers associated with the project.

- Up to four (4) adult Hawaiian petrels every three years and a maximum of two (2) adult Hawaiian petrels in one year may be taken in the form of injury or mortality due to collisions with the communication towers associated with the project.

- Up to one (1) Hawaiian petrel chick or egg every three years may be taken in the form of injury or mortality as a result of its parent colliding with communication towers associated with the project.

- Up to one (1) adult band-rumped storm-petrel every ten years may be taken in the form of injury or mortality due to collisions with the communication tower associated with the project.

- Up to one (1) band-rumped storm-petrel chick or egg every twenty years may be taken in the form of injury or mortality as a result of its parent colliding with communication towers associated with the project.

Effect of Take

In the accompanying biological opinion, the Service determined that this level of anticipated take is not likely to result in jeopardy of Hawaiian seabirds or destruction or adverse modification of critical habitat.

Reasonable and Prudent Measures

The Service believes the following reasonable and prudent measure(s) are necessary and appropriate to minimize impacts of incidental take of Hawaiian seabirds:

1. The ARNG and HIARNG will implement a monitoring program.

The Service has determined that there is a biological need for a monitoring program, and it is reasonable to identify the impacts of the communication towers to Hawaiian seabirds.

Terms and Conditions

In order to be exempt from the prohibitions of section 9 of the Act, the ARNG and HIARNG must comply with the following terms and conditions, which implement the reasonable and prudent measure described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following terms and conditions implement the reasonable and prudent measure above:

1. The ARNG and HIARNG will implement a monitoring program for incidental take by conducting ground-based carcass searches after each deployment of the mobile communication towers (excluding deployment tests during daylight hours). Ground-based carcass searches will cover a search area of at least 135 ft (1.5 x tower height) from the base of each mobile communication tower. For deployments of less than 3 days (72 hours), monitoring will occur within 24 hours of the end of deployment. For deployments of greater than 3 days (72 hours), monitoring will occur at a minimum of twice a week during deployment to the extent feasible considering safety (e.g., significant weather event). If monitoring cannot occur during deployment due to safety concerns, monitoring will occur when safety allows or at minimum within 24 hours of the end of deployment.
2. The Service will be notified by telephone (808-792-9400) and email (pifwo_admin@fws.gov) within 24 hours upon the discovery of an injured or dead Hawaiian seabird at Hanapēpē Armory. The ARNG or HIARNG will provide the Service a written notification, summarizing the event, within 30 days, using the Avian Injury / Mortality Form in Appendix B.
3. Upon locating a dead or injured specimen, the ARNG or HIARNG will immediately notify PIFWO at 808-792-9400. Care must be taken in handling any dead or injured specimens of proposed or listed species to preserve biological material in the best possible state. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead or injured specimens does not imply enforcement proceedings pursuant to the ESA. This reporting requirement enables the Service to determine if take is reached or exceeded and to ensure that the terms and conditions are appropriate and effective.
4. The ARNG or HIARNG will submit annual reports to PIFWO Admin (pifwo_admin@fws.gov) summarizing incidents of take of Hawaiian seabirds expressed in terms of the information included in the Avian Injury/Mortality Form found in Appendix B. The first report will be submitted by January 30th, one and a half months after the end of the first full seabird season following the issuance of this biological opinion and continue annually throughout the life of the project.

The Service believes that no more than one (1) Newell's shearwater every three years, four (4) Hawaiian petrel every three years, and one (1) band-rumped storm-petrel every ten years will be incidentally taken as a result of the proposed action, resulting in the indirect loss of up to one Newell's shearwater chick or egg every twelve years, one Hawaiian petrel chick or egg every three years, and one band-rumped storm-petrel every twenty years. The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The Federal agency must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures.

Conservation Recommendations

Section 7(a)(1) of the Act directs 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 discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

The Service recommends that the ARNG and HIARNG undertake the following conservation recommendations:

- Assist with island- and State-wide efforts to assess and minimize the effects of communication towers, power transmission lines, lighting, and other threats to Hawaiian seabirds posed by infrastructure.
- Promote Hawaiian seabird conservation actions in other areas outside of the action area on Kaua‘i.

In order for the Service to be kept informed of actions minimizing or avoiding adverse effects or benefitting listed species or their habitats, the Service requests notification of the implementation of any conservation recommendations.

Reinitiation-Closing Statement

This concludes formal consultation on the action(s) outlined in this biological opinion. As provided in 50 CFR § 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained or is authorized by law and: (1) if the amount or extent of taking specified in the incidental take statement is exceeded; (2) if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered; (3) if the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the biological opinion; or (4) if a new species is listed or critical habitat designated that may be affected by the identified action.

We appreciate your cooperation and assistance in helping us prepare this biological opinion. If you have any questions about this consultation, please contact Ryan Pe‘a, Fish and Wildlife Biologist, at (808) 792-9400 or by email at ryan_pea@fws.gov. When referring to this project, please include this reference number: 2023-0085291-S7.

Sincerely,

MICHELLE BOGARDUS

Digitally signed by MICHELLE BOGARDUS
Date: 2023.09.18 09:04:34 -10'00'

Michelle Bogardus
Acting Field Supervisor

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Appendix A. Informal Consultation for the Hawaiian hoary bat and Hawaiian goose

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Pacific Islands Fish and Wildlife Office
300 Ala Moana Boulevard, Room 3-122
Honolulu, Hawaiʻi 96850

In Reply Refer To:
2023-0085291-S7

September 18, 2023

Colonel Anthony Hammett
Army National Guard
ARNG-IEE-N
111 South George Mason Drive
Arlington, Virginia 22204

Subject: Informal Consultation for the Proposed Mobile Communication Towers at Hanapēpē Armory, Kauaʻi

Dear Colonel Hammett:

The U.S. Fish and Wildlife Service (Service) received your May 12, 2023, biological evaluation (BE) and request for consultation on the Army National Guard (ARNG) and Hawaiʻi Army National Guard (HIARNG) proposed placement and operation of two mobile high frequency communication towers on Hanapēpē Armory in southern Kauaʻi. You requested our concurrence with your "may affect, but not likely to adversely affect" determination for the federally endangered Hawaiian hoary bat or ʻōpeʻapeʻa (*Lasiurus cinereus semotus*) and the federally threatened Hawaiian goose or nēnē (*Branta sandvicensis*). This response is in accordance with section 7 of the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531 *et seq*.).

Project Desciption
The HIARNG is proposing to deploy (raise) two mobile, telescoping high frequency (HF) communication towers at the Hanapēpē Armory during significant weather events, emergencies and/or for training/maintenance purposes. The towers deploy straight upwards in a telescoping manner and retract in the same fashion. Each tower foundation will be 80 feet (ft) tall with an antenna that will increase the height to 85 to 90 ft. The two towers will be on mobile platforms that have a footprint of 18.5 ft by 8 ft (Figure 1). The towers are constructed of structural aluminum (silver-gray color) and will each require three guy wires for stabilization. When deployed, the guy wires will be affixed to the tower at approximately 65 ft up and stretch out to jersey barriers approximately 70 ft from the base. No construction or land disturbance is required for placement of the jersey barriers. When not in use, the two tower structures will remain in the location where the HIARNG deploys them on the armory (Figure 2).

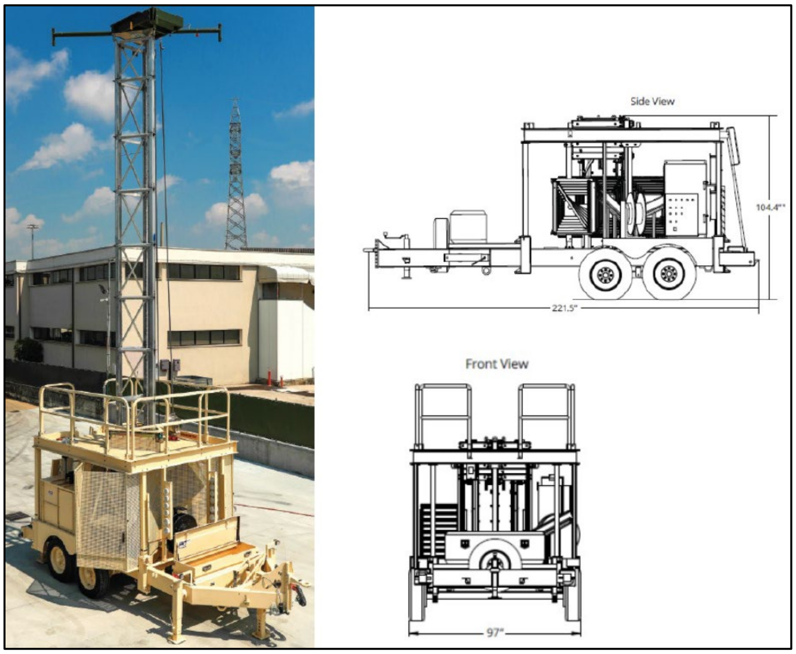

Figure 1. Manufacturer photo of a single tower and tower dimensions.

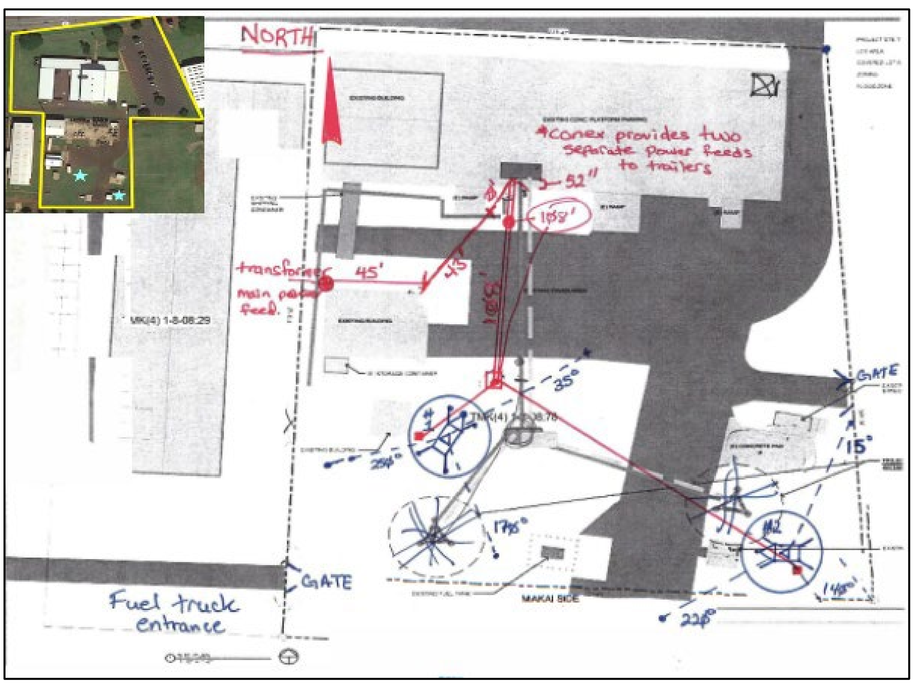

Figure 2. Mobile tower positions #1 and #2. Blue hashed lines from tower center are guy wires attached to Jersey barriers approximately 70 ft away. Red lines are underground power and antenna cables.

Full deployment of the mobile towers takes only five minutes once the towers are in position. Based on the height of the tower and proximity for aviation navigation, the towers will not require any lights (Federal Aviation Administration 2020). Deployment of the towers for testing purposes will occur during daylight hours. Deployment for their intended purpose may occur at any time and could stay in place for an undetermined period for each deployment, which may include part of or throughout the evening hours. Although the mobile towers will not be deployed permanently, the frequency and duration of their deployment is contingent upon unpredictable weather events.

The following conservation measures will be implemented to avoid or minimize effects to listed species:

Hawaiian hoary bat

- There will be no trimming or disturbing (to include pesticides) of trees greater than 15 ft tall on the Armory during the bat birthing and pup rearing season (June 1 through September 15).

Hawaiian goose

- Operations involving the towers (deploying the towers for testing or use, or affixing the guy wires) will stop if nēnē are seen within 100 ft of the construction area. Operations will resume once the bird(s) leave the area on their own or in accordance with the ESA Section 4(d) rule established for the nēnē.
- The ARNG will apply special reflective tape and/or bird diverters along each of the tower guy wires when deployed.

Analysis of Effects

Hawaiian Hoary Bat

The Hawaiian hoary bat roosts in woody vegetation across all islands and will leave their young unattended in trees and shrubs when they forage. If trees or shrubs 15 ft or taller are cleared during the pupping season, June 1 through September 15, there is a risk that young bats could inadvertently be harmed or killed, since they are too young to fly or move away from disturbance. By implementing the avoidance and minimization measure above, which states no trimming or disturbing of trees greater than 15 ft will occur during pupping season, adverse effects to the Hawaiian hoary bat are extremely unlikely to occur. Therefore, effects to the bats associated with this project are considered not probable and therefore discountable.

Hawaiian goose

The Hawaiian goose or nēnē are found on the islands of Hawaiʻi, Maui, Molokaʻi, and Kauaʻi. They are observed in a variety of habitats, but prefer open areas, such as pastures, golf courses, wetlands, natural grasslands and shrublands, and lava flows. While the project area is not within an established nēnē use area, nēnē utilize the surrounding Hanapēpē Bay area and could traverse the project site. By implementing the avoidance and minimization measures above, including stopping operations involving the towers if nēnē are within 100 ft and applying reflective tape or bird diverters along the tower guy wires, any adverse effects to nēnē are extremely unlikely to occur. Therefore, effects to the nēnē associated with this project are considered not probable and therefore discountable.

Summary
We have reviewed our data and conducted an effects analysis of your project. By incorporating the avoidance and minimization measures listed above, effects to the Hawaiian hoary bat and Hawaiian goose are extremely unlikely to occur. Therefore, effects are expected to be discountable. Because effects from the proposed action are discountable, we concur with your determination that the proposed action may affect, but is not likely to adversely affect the Hawaiian hoary bat and Hawaiian goose.

We appreciate your efforts to conserve endangered species. If you have any questions, please contact Ryan Pe‘a, Fish and Wildlife Biologist, at ryan_pea@fws.gov or 808-792-9400. When referring to this project, please include this reference number: 2023-0085291-S7.

Sincerely,

MICHELLE BOGARDUS
Digitally signed by MICHELLE BOGARDUS
Date: 2023.09.18 09:07:18 -10'00'

Michelle Bogardus
Acting Field Supervisor

APPENDIX B. Avian Injury / Mortality Form

Avian Injury / Mortality Form

Report Date:

Species (common name):

Date Found:

Time Found:

Age:

Bands:

Found by:

Documented by:

GPS Coordinates:

Location Found (including closest structure & distance to structure):

Condition of Specimen (include a description of general condition, as well as any visible injuries):

Probable Cause of Injury or Mortality and Supportive Evidence (attach photos and map, next page):

Action Taken (include notifications, reporting dates and times):

Additional Comments: