



# **2023 KSHCP ANNUAL REPORT**

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## EXECUTIVE SUMMARY

The three listed seabird species in Hawai'i: the Newell's Shearwater (NESH; *Puffinus auricularis newelli*, Hawaiian name: 'a'o), the Hawaiian Petrel (HAPE; *Pterodroma sandwichensis*, Hawaiian name: 'ua'u), and the Hawai'i distinct population segment (DPS) of the Band-rumped Storm-petrel (BANP; *Hydrobates castro*, Hawaiian name: 'akē'akē, hereafter Band-rumped Storm-petrel) are vulnerable to attraction to artificial lights, which has been observed and documented on Kaua'i for decades. The Kaua'i Seabird Habitat Conservation Plan (KSHCP) was developed and finalized in 2020 to address light attraction impacts to the listed seabirds on the island of Kaua'i. The KSHCP also addresses the impacts of lights on the Central North Pacific distinct population segment (DPS) of the green sea turtle (*Chelonia mydas*, Hawaiian name: Honu, hereafter Honu). This report documents and evaluates the activities conducted in the fourth year of the KSHCP (2023) by both the KSHCP participants, and their selected prime contractor (Pacific Rim Conservation), towards fulfilling the objectives of the KSHCP as approved by the Hawaii Department of Land and Natural Resources, Division of Forestry and Wildlife and the U.S. Fish and Wildlife Service (the regulatory agencies). The report focuses on the Kahuama'a seabird preserve management (the mitigation site), take, minimization measures and compliance effectiveness monitoring, and summarizes the financial status of the KSHCP.

The site which contains the Kahuama'a seabird preserve was selected during the KSHCP process to create a fenced, predator-free seabird preserve in the northwestern region of Kaua'i. Due to a large landslide that occurred at the originally proposed site, an alternative preserve site was selected 102 meters away from the original site resulting in changed circumstances being initiated almost immediately upon the adoption of the KSHCP. The new site selected provides comparable area and habitat to the originally proposed site. In 2021, construction was initiated and completed of the 9.2-acre seabird reserve. Biological monitoring of forest birds, seabirds, and their habitat at the preserve site were completed prior to construction in 2020 and has continued annually; all required surveys were completed prior to construction of the Kahuama'a seabird preserve to provide an inventory of the flora and fauna present in the area. In 2020, intensive burrow searching indicated that seabirds did not appear to be nesting in the immediate project area, but based on high rates of detection during auditory surveys they were clearly transiting the area during the breeding season. Predator control was continued along the Kalalau Rim with up to 22 live traps, and an additional 16 live traps along the Alakai Swamp Trail. Thirteen cats and 50 rats were removed through direct trapping methods in 2023 over 3,591 trap nights. Additionally, cats and rats were eradicated from within the seabird preserve using rodenticide contained in secure bait stations. For the first time since the project inception, listed seabirds were documented on the ground within the Kahuama'a preserve with seven visits from a Hawaiian Petrel near the social attraction system from June-August 2023.

In addition to the creation of the Kahuama'a seabird preserve and associated predator control activities implemented by the prime contractor, participants in the KSHCP ("Participants") were required to minimize and document seabird take at their facilities, vessels and properties ("Facilities").<sup>1</sup> Most participants ensured that lighting at their facilities was reduced and modified in compliance with the guidelines set forth in the KSHCP. In some cases, lights were completely turned off at the Participants' Facilities for the duration of the season. For tourism-based Facilities, lighting was significantly decreased as a result of closed facilities and/or greatly reduced occupancy due to the COVID 19 pandemic in 2020/2021. As of 2023, all tourism based Facilities had returned to normal operating conditions. Based on the reports and photos provided, all participants have made significant efforts towards reducing light attraction exposure risk to listed seabirds, at their Facilities. Each Participant also conducted annual outreach and training for workers at their Facilities that is specific to the Covered Seabirds in order to help workers spot downed seabirds and know how to

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<sup>1</sup> As used in this report, the term "Participants" refers to entities that are participants in the KSHCP by virtue of having been issued an incidental take permit and incidental take license. The Participants own a variety of properties, facilities and vessels covered by their incidental take permits and incidental take licenses which for simplicity in this report are simply referred to as "Facilities."

respond properly and in a timely manner. Overall, outreach at each participant property was adequate and professionally presented.

In addition to light reduction and training requirements, all covered Facilities were required to control non-native predators to protect any downed birds at their Facilities from depredation. Of the 191 Facilities included in the KSHCP as of 2023, 47 properties were required to do predator control. Only 25/47 of those properties conducted predator control across all Participants, resulting in significant gaps in coverage of predator control. Facilities that did not conduct predator control include 19 out of 32 covered Facilities owned by Kaua'i County. Of the remaining 25 Facilities that did conduct predator control, all but one were deemed to be effective based on the duration of trapping and trap placement which is a dramatic improvement from only 12 /25 Facilities in 2022. In total, 326 feral cats were removed from participant Facilities during the 2023 seabird fallout season- an increase of 19% over the 274 cats removed in 2022. Predator control efficacy has increased across all Facilities with each year of the KSHCP as each participant has refined their methods and made improvements.

Compliance monitoring evaluates whether the actions described above are being properly implemented and is used to ensure that each enrolled Participant meets its obligation under this KSHCP and the individual PIPs. In total, 53 NESH and two HAPE were found on participants' Facilities during the 2023 seabird fallout season which was the first documented HAPE take of the program, and more than double the NESH take from 2022. Both HAPE, and 49/53 of the downed NESH were released alive after being brought to the Save our Shearwaters (SOS) facility. No downed Band-rumped Storm-petrels or Honu nests were found during the 2023 season.

Overall, the objectives of the KSHCP were partially met in 2023, but deficiencies continue to improve over earlier years. Details and reasons for discrepancies are described in detail below.

## INTRODUCTION

Three listed seabird species breed seasonally in Hawai'i: the Newell's Shearwater (*Puffinus auricularis newelli* or NESH; Hawaiian name: 'a'o), the Hawaiian Petrel (*Pterodroma sandwichensis* or HAPE, Hawaiian name: 'ua'u), and the Hawai'i distinct population segment (DPS) of the band-rumped storm-petrel (*Hydrobates castro*, Hawaiian name: 'akē'akē, hereafter band-rumped storm-petrel), making the island's essential to the conservation of these species. These species are part of the unique natural and cultural heritage of Hawai'i, and the island of Kaua'i provides important breeding habitat for all three species. Protecting and managing that habitat to support viable populations of these species is critical for their long-term survival.

Among the threats known to impact the listed seabird species is the attraction to artificial lights, which has been observed and documented on Kaua'i for decades. The Kaua'i Seabird Habitat Conservation Plan (KSHCP) was developed and adopted in 2020 to address the light attraction impacts to the listed seabirds on the island of Kaua'i. The KSHCP also addresses the impacts of lights on the Central North Pacific distinct population segment (DPS) of the green sea turtle (*Chelonia mydas*, Hawaiian name: Honu, hereafter Honu). The proposed duration of the KSHCP is for 30 years and the geographic scope of the KSHCP coverage is the island of Kaua'i and Hawaiian waters.

Light attraction fallout on the island of Kaua'i is widespread, with certain geographic areas having concentrated, higher amount of observed fallout. The vast majority of fallout occurs in the autumn months, coinciding with the seabird fledgling season. Many different entities on Kaua'i (resorts, businesses, and governmental agencies) have documented seabird fallout on their Facilities and at their facilities resulting from the effects of light attraction. Light attraction on Kaua'i is an island-wide problem that negatively impacts the listed seabird species and is collectively attributable to many different entities.

The KSHCP relies on a unique structure to best meet the need for an effective and efficient response to the widespread nature of light attraction impacts on Kaua'i. The structure of the KSHCP enables multiple individual entities on Kaua'i to apply for incidental take authorization for light attraction impacts to the listed seabird species under one coordinated framework. This framework takes advantage of economies of scale and enables a pooling of resources to collectively achieve conservation goals. The requirements of the KSHCP, and the enrollment and approval process for listed species take authorization are defined in the KSHCP and consist of two parts: 1. the KSHCP document with associated appendices; and 2. material submitted by each applicant providing detailed descriptions of on-site minimization measures, covered activities, a monitoring plan and the amount of take authorization being requested, which are outlined in the individual Participant Inclusion Plans (PIPs).

In 2020, applicants to the KSHCP were each issued an approved Incidental Take Permit (ITP) from the U. S. Fish & Wildlife Service (USFWS) and Incidental Take Licenses (ITL) from the State of Hawai'i Department of Land and Natural Resources (DLNR). The mitigation and minimization measures contained in the KSHCP were developed to inform the preparation of individual applications for listed seabird incidental take authorization permits. The KSHCP defines a set of actions to minimize and mitigate the effects of light attraction on the listed seabirds and to meet conservation goals. The KSHCP provides a suite of minimization actions and requires that each Applicant to the KSHCP implement all the measures that are applicable to their facility and operational needs. Minimization measures emphasize reducing the amount of light that shines upward and reducing the amount of light output or intensity, which have been shown to reduce the effects of light attraction. Under the KSHCP, the minimization measures include:

- Deactivation of unnecessary lights.
- Use of full cut-off light fixtures (or their functional equivalent).
- Shielding existing light fixtures.
- Angling lights downward.
- Lowering the light output or intensity.

- Use of motion sensor light fixtures.
- Decreasing the visibility of interior lights.

Under the KSHCP, mitigation actions are designed to provide a net conservation benefit to the covered species as required by Hawaii law. Because some seabirds grounded by light attraction are found alive and deemed healthy, or are able to be rehabilitated, those birds are released back into the wild and are considered non-lethal take. For seabirds that are found dead, those not found but assumed to have been impacted by light attraction, and for those birds that could not be released back into the wild, these are considered lethal take. As mitigation for these unavoidable impacts to covered seabirds, approved mitigation consists of predator control and the creation of a fenced seabird preserve (known as the Kahuama'a Seabird Preserve) in the northwest region of Kaua'i. In this preserve, predators are being removed and seabirds are being lured to the site via social attraction, a well-established conservation technique for the creation of new seabird breeding colonies; details of the progress of this activity are documented below. The absence of predators will enable the seabirds to breed more successfully and with higher reproductive success rates than in areas outside the preserve, thereby providing a conservation benefit to the seabird populations. The preserve site is located in Kōke'e State Park along the rim of Kalalau Valley. Predator control will be conducted in the vicinity of the preserve to reduce the impacts of predation on seabirds breeding nearby.

The funding design of the KSHCP features a cost-sharing structure. Total costs of the KSHCP, including implementation, mitigation, monitoring, Adaptive Management as needed and reporting, are shared amongst the permit recipients according to the relative amounts of take authorized. Compliance and effectiveness monitoring has been conducted to ensure that authorized amounts of take are not exceeded and to enable the wildlife agencies to determine that mitigation actions are meeting conservation goals. The purpose of take monitoring is to determine when and where take of Covered Species occurs, and documents monitoring efforts. There are three types of monitoring addressed in the KSHCP: compliance, effectiveness, and take monitoring.

1. "Compliance monitoring" verifies implementation of the HCP terms and conditions by the individual Participants and the Prime Contractor. Annual reports and reporting requirements (as outlined in Section 6.6) were provided by each Participant and the Prime Contractor to document that the Participant has performed all of the required tasks and activities. (Actions on site to reduce/eliminate light attraction).
2. "Effectiveness monitoring" evaluates the success of the HCP to minimize and mitigate take of listed species to the maximum extent practicable; evaluating whether minimization measures are effective and sufficient; and the extent to which mitigation measures are successful.
3. "Take monitoring" determines when and where take of Covered Species occurs, and documents monitoring efforts.

The purpose of this report is to compile, document and evaluate the effectiveness of the activities conducted in Year 4 (2023) by the KSHCP participants, and their selected prime contractor towards fulfilling the objectives of the KSHCP as approved by the regulatory agencies. An additional purpose of this report is to describe compliance and effectiveness monitoring of mitigation at the Kahuama'a Seabird Preserve as required by KSHCP 6.6.2.4 and Table 6-1. The report is divided into six sections:

1. Kahuama'a seabird preserve management.
2. Summary of KSHCP participants' annual reports.
3. Mitigation effectiveness monitoring.
4. Take monitoring effectiveness.
5. Compliance monitoring and summary of changes.
6. Financial report.

The goal is to synthesize and summarize several hundred pages of information from lengthy reports into a succinct easy to read document that will allow the participants and agencies to evaluate the annual effectiveness of the KSHCP implementation. Thus, for the sake of readability, tables and figures are used frequently to present information in a clear and easy to understand format.



## SEABIRD PRESERVE MANAGEMENT

The KSHCP conservation program, described in detail in *Appendix A: Kahuama'a Seabird Preserve Management Plan*, is comprised of several mitigation activities include establishment of a seabird social attraction site (SAS) and construction of a predator-proof fence (PPF) enclosing approximately 2ha of suitable seabird breeding habitat.

The specific mitigation activities associated with this component of the KSHCP include:

1. Construction and long-term maintenance of the 2ha predator proof fence enclosure.
2. Installation and long-term maintenance of social attraction equipment (speakers, solar panels, artificial burrows) within the enclosure.
3. Eradication of predators from within the enclosure and implementation of long-term predator control at the site.
4. Monitoring for predator incursions within the enclosure.
5. Barn owl control around the preserve and in the surrounding Kalalau Valley area.
6. Feral cat control at ingress points to the SAS and neighboring source colonies in the Kalalau Valley.
7. Invasive plant control and vegetation control within the 2ha PPF enclosure and along a 50m 'predator defense zone' outside the fence.
8. Monitoring of the Covered Seabirds and their burrows/artificial nest boxes, including the physical handling and banding of birds by trained, federally permitted staff.
9. Monitoring of other listed species (plants, forest birds, etc.) within the 2ha PPF enclosure; and
10. Downed seabird recovery, evaluation, rehabilitation, and release to sea.

The Participants' Committee, on behalf of all the individual Applicants, procured and entered into an agreement with Prime Contractor to perform the mitigation and project management measures outlined in the KSHCP. The Prime Contractor has conservation biology and project management experience and holds recovery permits necessary to conduct its work under Section 10(a)(1)(A) of the Endangered Species Act and/or Sections 13-124-4 and 13-124-6 of the Hawaii Administrative Rules. The Prime Contractor also compiles data for the Annual Reports on mitigation progress. The following section reports on the efforts conducted in 2023 to execute the mitigation activities associated with the Kahuama'a Seabird Preserve

Table 1: Timeline of completed (2020-2021) and future (2022 onwards) activities for the Kahuama'a Seabird Preserve Management.

	2020					2021												2022-2025											
	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Infrastructure installation																													
Fence construction						x	x	x	x																				
Install sound system									x																				
Install artificial burrows								x																					
Restoration																													
Weeding								x		x		x			x		x	x			x		x			x		x	
Out planting									x																				
Botanical surveys			x			x				x		x			x		x	x			x		x			x		x	
Predator control																													
Rodent trapping inside the fence								x	x	x																			
Cat control inside fence								x	x	x																			
Cat control outside fence		x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Barn owl control outside fence							x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Seabird monitoring																													
Acoustic surveys	x	x	x	x				x	x	x	x	x	x	x	x	x				x	x	x	x	x	x	x	x	x	

## Administrative Summary

Pacific Rim Conservation (PRC) was selected as the prime contractor for the KSHCP and entered into contract with the Participants Committee on 12<sup>th</sup> June 2020. Pacific Rim Conservation's responsibilities include implementing the Management Plan for the Kahuama'a Seabird Preserve as well as other KSHCP duties, such as compiling data for the annual report. Pacific Rim Conservation is a 501(c)3 nonprofit organization whose mission is to maintain and restore native bird diversity, populations, and ecosystems in Hawaii and the Pacific Region and is a 'boots on the ground' conservation organization. With more than 15 years' experience, PRC is an expert in listed seabird monitoring, project management and predator exclusion fence construction and holds current state and federal permits to conduct the work required under the KSHCP.

Dr. Lindsay Young, the Executive Director of PRC is responsible for overall supervision of the project and serves as the point of contact between the participants group and PRC. Two long term staff members, Allene Henderson and David Hanna, were hired in 2021 and have been with the project for two years for the conservation implementation component. Allene left the project in the summer of 2023 to return to graduate school and PRC has since moved an existing staff member, Dylan Blanchard, into her position.

### *Fence maintenance*

Fence construction was completed on 28 June 2021 and in the 2.5 years since then, the focus has been on maintenance of the structure. Full fence inspections are done monthly, and intermittently between then using trail cameras and visual observations when working around the fence. Fence inspections include checking the fence hood and mesh integrity, clearing out outlying branches, removing obstructions, and covering exposed areas of the fence skirt. Sloped areas of the fence showed higher rates of erosion than the flat sections. The trail surrounding the outside of the fence experiences high levels of erosion due to high traffic from humans, pigs, goats, and deer. In addition to high foot traffic, the fence skirt experiences erosion from inclement weather and rain drainage. In January 2023, unusually heavy rain resulted in complete flooding of the fence which caused significant erosion on the skirt, and we believe allowed for the ingress of rats. The skirt was secured to the ground using metal landscaping pins, and sod was placed on top of the skirt (which was sourced from locations within 50 feet of the fence to avoid introducing pests) to secure the skirt against rodents (see figure 1). Unfortunately, as soon as the grass was laid down, ungulates proceeded to root into the new grass. A combination of techniques were trialed including cement, and temporary ungulate exclusion fences in order to secure the most vulnerable areas against both pigs and flooding (figure 2). In addition to sodding the skirt, the team responded by placing a pig trap as well as increasing fence monitoring. The combination of these techniques appeared to stabilize the skirt erosion issue for the remainder of the year.





*Figure 1: Images showing extensive flooding (left) followed by fence skirt re-attachment and sod placement (right)*



*Figure 2: Images showing before and after pictures of both cement installation and pig exclusion.*



## Social attraction and biological monitoring

### *Biological monitoring*

To facilitate effective, long-term monitoring at the site, a geo-referenced monitoring grid was installed to conduct bird, vegetation, and rodent surveys in 2020. The grid consists of stations inside the fenced area 25m apart marked with white PVC poles. The grid is maintained monthly and utilized for predator detection and control as well as biomonitoring.

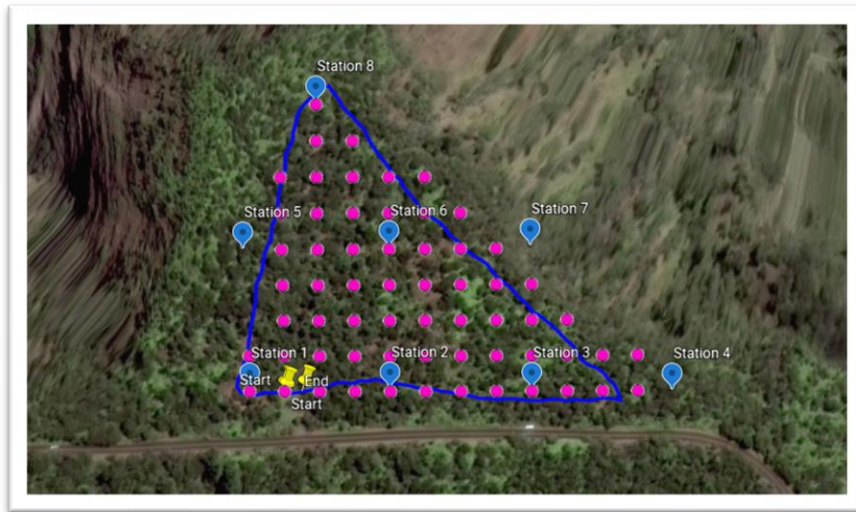


Figure 3: Biological monitoring grid installed at the Kahuama'a Seabird Preserve

### **Seabird surveys**

#### *Ground searching*

Auditory surveys, burrow searching, and monitoring of natural burrows was a critical part of pre-construction surveying at the Kahuama'a Seabird Preserve to document species present and ensure that construction activities did not impact any nesting seabirds. Diurnal "cold searching" was conducted to actively search vegetation for burrow cavities with signs of seabirds (e.g., scent, feathers, guano, eggshells), or active burrows. Active breeding can be distinguished from ground activity, if breeding attempts in natural burrows are observed (such as copulation, digging out a burrow, entering the burrow with nesting material, sitting in the burrow, or an egg is laid).

Survey areas were organized into three transects covering each side of the fence line: one covering the 80 m long section of old ungulate fence line facing east, one covering the 300 m long northeastern facing fence line, and one encompassing the 50 m section facing west. All transects were measured to match the length of the designated seabird habitat perimeter along the ungulate fence line. All three transects were further divided into perpendicular transects flagged 3 m apart, and staff walked these transects checking for seabird eggshells, guano, feathers, and scent. Participating staff were equipped with pink flagging tape to mark the burrow location in the event of a burrow being found, and location recorded on a shared GPS. Two transects were created for the seabird burrow surveys inside the ungulate fence, covering a total area of .39 acres. Transects were spaced 5 m apart, running parallel to the northeastern side of the fence line. Two staff equipped with GPS and pink flagging walked each transect from east to west, checking under tree roots for seabird eggshells, guano, feathers, and scent.

The total 2023 seabird survey area covered was 14,172.1m<sup>2</sup>, or 3.50 acres: a combined area of 10,614.88m<sup>2</sup> (2.62 acres) outside the fence, and 1583.48m<sup>2</sup>, or .39 acres inside the fence line. No Newell’s Shearwater or Hawaiian Petrel chicks, adults, or burrows were detected during sbsseabird burrow surveys.

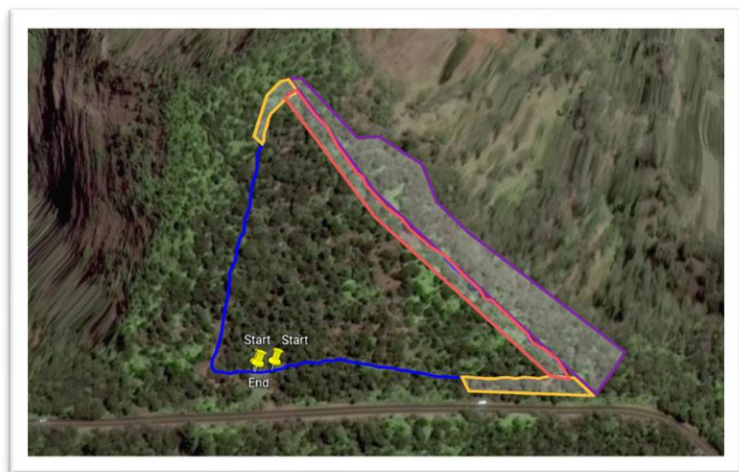


Figure 4: Seabird survey area at Kahuama’a. The original ungulate fence line in blue, with the final enclosure fence line shown in yellow, and the seabird habitat bounded by the red and purple lines.

### Auditory surveys

Auditory surveys began in mid-May 2023 and were conducted every two weeks with two surveys per survey day until August. Surveys were conducted 2 hours before sunrise and 2 hours after sunset, during the peak calling times for HAPE and NESH respectively. During auditory surveys, an observer listened and looked for seabirds. When seabirds were observed the following data were collected: species, time, number of individuals detected, number of calling bouts, a compass bearing, and estimated distance from observer. During auditory surveys, the sound system broadcasting NESH calls was turned off to ensure that it didn’t interfere with the survey. Distinctive behavior, such as concentrated calling, circling, ground calling, landings, and take-offs, were recorded separately with distance and direction from survey site noted specifically. These locations were then investigated whenever possible, to identify any birds that had landed. Due to the large number of other species in the immediate area, only HAPE, NESH and other listed bird species (Band-rumped Storm Petrel; BRSP and Hawaiian Goose; HAGO) were recorded.

A total of 12 Auditory surveys were done from May-September 2023, for a total of 24 hours of survey time per person (48 survey hours total). With the total number of detections and average call rate listed for each species in table 2 below:

Table 2: Total number of target bird species detections and average call rate during Auditory surveys at Kahuama’a in 2023

Species	Total # detections	Average call rates per hour
NESH	783	35
HAPE	12	12
BRSP	256	2-241/hr
Barn Owl	2	0

Newell’s Shearwaters were detected in relatively high frequency during every survey conducted and were regularly seen flying around and through the project area- there were 783 detections in 2023 which is comparable in terms of detections/survey effort observed in 2022. Call rates per hour ranged from 1 to 100.5 calls per hour, for an average of 35 calls per hour at the site depending on the date and time of day. This was lower than the 58 calls per hour in 2022. Hawaiian Petrel averaged 12 calls per hour during the one evening they were detected on auditory surveys which was aa

significant increase compared to 2022. Band-rumped Storm-petrels also increased dramatically in detection frequency from 9 total detections in 2022 to 256 detections in 2023. They were detected on five surveys with 241/256 sightings occurring on 08/24/2023 where their call rates approached 241 calls per hour and birds were seen circling the site. Barn owls were only detected on two surveys in 2023 compared to 19 in 2022 which correlated with fewer incidental observations in 2023.

While no seabirds were observed on the ground during auditory surveys, all three species were noted to be flying very closely overhead on several surveys and appeared to be circling the site. Despite the lack of birds observed on the ground during surveys, at least one and possibly two different HAPE were seen on the ground multiple times between June and August 2023. During every visit, the bird was seen below a speaker connected to our sound system that plays back bird calls to act like a colony is in the area, and sometimes visited each speaker (which are located 50m apart) on each night. This is the first documented visit of any of the covered seabirds into the project area and represents an important milestone for the project.



*Figure 5. Photographs of the first U'a`u attracted inside the fenced area caught on trail cameras on multiple days.*

### *Social attraction*

Once fence installation on the predator proof enclosure was complete, the social attraction component of the project was installed to encourage the target species to the project site to breed. Social attraction is a well-established conservation strategy to encourage seabirds to breed in a predator-free location by the simulation of colony activity through the playback of calls. When combined with the installation of artificial burrows, the technique can result in high productivity within a small and managed/protected area.

Speaker systems were ordered from the New Zealand Department of Conservation and were installed on 12 May 2021. The systems consist of a waterproof mp3 player and inverter system contained in a waterproof pelican case, a solar panel, and a 12V marine battery connected to omnidirectional waterproof speakers. Calls are projected towards the Northeastern facing slope to attract birds to the area that could be transiting from Kalalau Valley.

The system plays a mix of Newell's Shearwater calls from dusk until dawn to mimic natural attendance patterns at the colony during the seabird breeding season. Recordings were of multiple birds (simulating a large colony) and used a complete set of typical colony sounds to attract the most birds. The speakers turn on at sunset and continue to play species-specific calls until sunrise, drawing prospecting birds to the site to increase nesting probability within the predator free area. Broadcasting ran until October at the conclusion of the period of highest prospecting activity. During the period when acoustic surveys were being conducted, the sound system was turned off to assist in detecting live birds.



In addition to the acoustic attraction system, 100 artificial burrows suitable for both Hawaiian Petrels and Newell's Shearwater were constructed and installed at the site. An integral part of best management in a social attraction site is the provision of artificial burrows to optimize seabird habitat and expedite the process of establishing breeding at a new site - burrow excavation by a newly established breeding pair can take a year or more. Artificial burrows are used in almost all the successful social attraction sites documented in the literature. Not only does this increase the likelihood of earlier success at the social attraction site and increase the density of nesting pairs in an area, it also makes the monitoring of nests much easier and less likely to cause disturbance to burrows and birds. Since monitoring of nests and nesting success is an important part of mitigation for the KSHCP, artificial burrows are key in this project. Burrows were constructed by a local contractor using the specifications below and treated with Henry Tropicool Roofing sealant to reduce the chances of rot and reduce overall temperature. Burrows were installed along the North-eastern ridge along the steepest slopes within the reserve and within the area where the sound system was deployed. Burrows are monitored weekly during the breeding season.



*Figure 6: Photographs of completed artificial nest boxes installed at Kahuama'a Seabird Preserve.*

During the heavy rains in early 2023, 25 of the 100 burrows experienced minor flooding. These burrows were excavated, set higher up, and not dug in as deep to prevent standing water from accumulating. Since having larger portions of the burrow exposed could lead to increased temperatures in the burrows, the team conducted thermal monitoring on the burrows with the most sun exposure to determine average temperatures. In Hawaii, September and October are typically the warmest months, and also when seabird chicks are getting ready to fledge. We were reassured by the low average burrow temperatures obtained (FFigure 7) which were below ambient outside temperature and hope that this combination of partially exposed burrows will still maintain a good thermal environment for the birds while also reducing the chances of flooding.

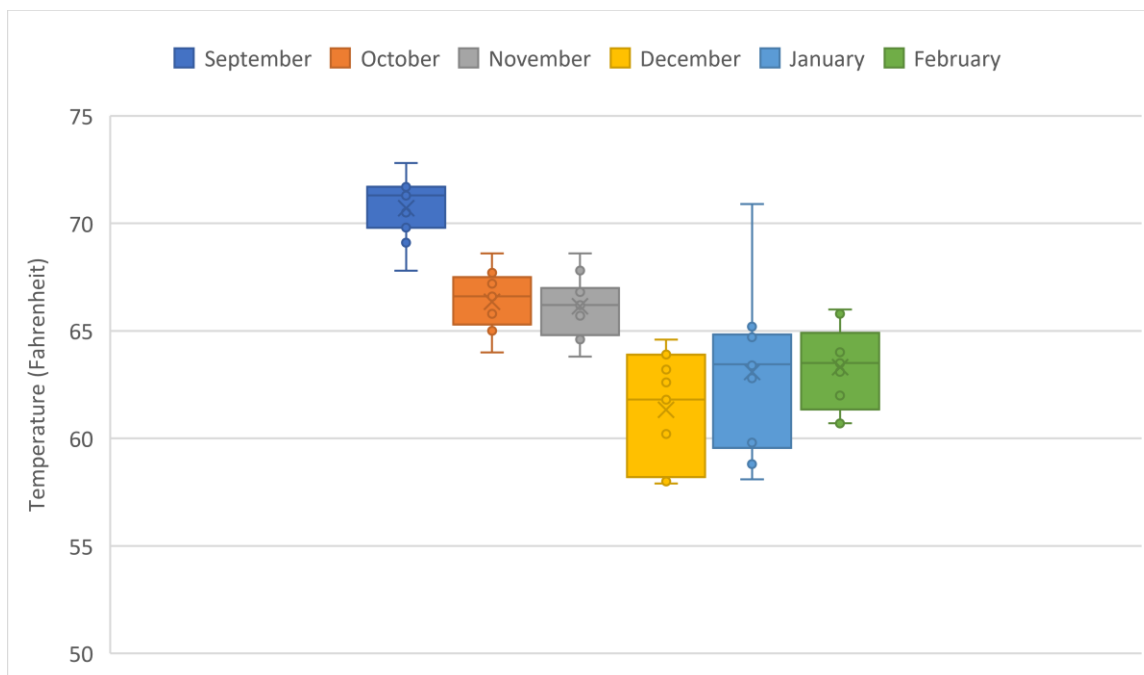


Figure 7: Average burrow temperatures by month at Kahuama`a Seabird Preserve.

### Habitat restoration

The Kahuama`a Seabird Preserve predator proof fence is expected to benefit native vegetation and rare plants currently being adversely affected by rats, pigs, goats, and deer, and more importantly, provide high-quality seabird nesting habitat. The habitat at the site is dominated by native vegetation, but certain invasive plants are proliferating, especially within the understory. Seabird habitat suitability mapping exercises consistently identify native vegetation as a critical component for successful nesting. Conversely, habitat modification by invasive plant species has been correlated with a reduction in seabird breeding. The suite of invasive plant species that have been identified as significant seabird habitat modifiers (Table 3) are present at the Kahuama`a Seabird Preserve and are currently being targeted for removal.

Table 3: Seabird habitat modifying plant species targeted for removal at Kahuama`a Seabird Preserve.

Common Name	Scientific Name	Priority
Strawberry guava	<i>Psidium cattleianum</i>	1
Himalayan (kahili) Ginger	<i>Hedychium gardnerianum</i>	1
Australian tree fern	<i>Sphaeropteris cooperi</i>	1
Blackberry	<i>Rubus argutus</i>	2
Banana poka	<i>Passiflora tarminiana</i>	2
Bush beard grass	<i>Schizachyrium condensatum</i> , <i>Andropogon spp.</i>	2
Koster's curse	<i>Clidemia hirta</i>	2
Daisy fleabane	<i>Erigeron karvinskianus</i>	3
Air plant	<i>Kalanchoe pinnata</i>	3



In 2023, the Kahuamaʻa team removed invasive species regularly throughout their field tasks. The dominant species addressed were Himalayan Ginger, Banana Poka and Blackberry. Primary areas in which the team weeded were through the main trafficked trails of the monitoring grid, the Social Attraction Site and the fence perimeter. The team focused on clearing weeds near the burrows so that the predominant plant present was the native uluhe, known to promote seabird breeding. In addition, the Kokee Resource Conservation Partnership group was brought in several times to conduct large scale control of Kahili Ginger and Blackberry around the burrows. In addition, the group also cut down several large invasive Karaka trees in the northeast side of the enclosure to reduce the chances of tree fall onto the fence line.

## Predator control and eradication

The breeding phenology and susceptibility of the Covered Seabirds to predation by barn owls and feral cats suggest that barn owl and feral cat control will result in an increase in the reproduction and numbers of seabirds breeding in Kalalau Valley outside of the 2ha Preserve site. Based on the above and the locations of breeding colonies within the Kalalau Valley (Section 5.4, Figure 5-1 and *Appendix A: Kahuamaʻa Seabird Preserve Management Plan*), efficacy estimates are conservative and assume that trapping along the rim of Kalalau Valley will achieve a 30% reduction in the number of shearwaters predated by feral cats. Thus, trapping locations were selected to follow the rim of Kalalau Valley in order to protect key seabird nesting populations in Kalalau Valley, and at a key ingress points into Kalalau Valley. Feral cats are using the roads and trails in the vicinity of the Kahuamaʻa Seabird Preserve as ingress points to prey upon nearby established colonies in the Kalalau Valley and Rim, Pihea (part of the Hono O Nā Pali NARS) and Honopū, expected source populations for the Kahuamaʻa Seabird Preserve.

### *Site Description*

#### Kalalau Rim

The Kalalau rim is an extremely high cliff area which falls over a thousand meters into the Kalalau Valley. Due to the steepness and inaccessibility of the cliff, there are many rare, endemic plants which have survived undisturbed by humans, giving the Kalalau rim unique characteristics. The vegetation at the site is a subtype of ʻŌhiʻa Lowland Mesic Forest, with ʻuluhe fern (*Dicranopteris linearis*) comprising much of the ground cover (Williams, 2016 unpublished report). Kokee road follows the Kalalau rim and was selected as a logical location for trap placement.

#### Pihea/Alakai swamp trail

Feral cats are observed on the road to Pihea by Hawaii DLNR staff on a near-weekly basis, and DLNR camera data reflects significantly higher numbers of cats moving along trails and fence lines than along densely vegetated areas. The Alakaʻi Swamp Trail was chosen in consultation with Hallux Ecosystem Restoration and the Hawaii DLNR, who do the majority of predator control in the Alakai region. This area covers critical ingress points into listed seabird colonies and is not currently being managed for cats and thus fills a critical need in protecting key listed seabird populations.

### *Methods*

#### Predator eradication

Due to the large size of the fenced area and multiple species of rodents detected during trapping work, the most feasible way to eradicate rodents from within the fenced area is using a rodenticide approved for conservation use. Diphacinone has been used to control rodents in Hawaiian coastal habitats and was used to successfully eradicate Pacific rats on Mokapu Islet off of Molokai (Dunlevy & Scarf 2007) and Black rats at Kaʻena Point and on other sites on Kauaʻi (Young et al. 2013, Young et al. 2018). Diphacinone also has been used to eradicate black rats in a variety of locations worldwide (see Donlan et al. 2003, Witmer et al 2007 for examples), though it appears to be less effective than brodifacoum, particularly for mice (Parkes et al. 2010). However, diphacinone is the only rodenticide approved for conservation purposes in Hawaiʻi, and thus was the only option available for this project.

Rodents were targeted for removal from within the fenced area with Ramik mini-bars® (HACCO Inc., Randolph, Wisconsin, USA) containing 0.005% diphacinone placed in tamper-resistant Protecta® plastic bait stations (Bell Laboratories, Madison, Wisconsin, USA) to shield them from rain and reduce the risk of poisoning to non-target species.

63 bait stations were placed in a 25-m grid pattern throughout the fenced area (see figure 4) and filled with up to 8 1-oz blocks per station. Bait stations were serviced twice per week during the first month. After that, the frequency was adjusted based on levels of take to ensure that an adequate supply of bait was available at all times. In addition to bait stations, 24 Goodnature A24 rat traps were deployed inside the fence the month before fence construction was completed in May. At every other grid point, rat tracking tunnels (N=31) were deployed as an additional metric to measure rodent presence and were run over a 24-hour period every 1-3 months.

#### Cat trapping

Detailed methods can be found in the appendix of the KSHCP, but in summary, live Tomahawk traps were used for the duration of 2023 to accomplish cat trapping objectives. Tomahawk traps are walk-in live-capture traps that can either be baited (single-door) or un-baited/blind-set (double-door), capturing animals as they pass through the trap. The traps used at both sites are a combination of single door (36"x10"x9") and double door (36"x9"x9") Tomahawk traps. All Tomahawk Traps are either baited or have lures inside of them to attract attention of predators. Baits used included sardines in olive oil, wet cat food, and dry cat food mixed with Wildlife Control Supplies Shellfish oil contained in an empty cat food can in the rear of the trap. Lures used along these traplines include cat toys, metal lids, and pieces of foil, compact discs as flashers, and liquid lures such as Booty Call, Triple Treat, Silent Stalker, Catnip Oil, Feline Exciter, Alley Cat, and Bobcat urine. Traps were generally open five days per week for two weeks of the month for a total of ten trap nights per trap every month. For traps that are not monitored by real-time transmitting cameras (described below), they were manually checked every 48 hours. For traps with cameras attached, they are generally opened on a Monday and closed on Friday and their transmitting cameras are checked daily. When Traps are not active, they are not baited and locked open to attract curiosity even when not in use.

Sixteen live tomahawk cage traps were placed every 100m alongside the Alakai Swamp trail along the last 1.4 km of the trail about 1km from the trailhead on Camp 10 road, and well away from the high traffic part of the trail. Care was taken to locate traps off the trail where they were not visible to the public by covering them with specifically designed trap covers and/or heavy foliage so that the only visible part of the trap was the open door. An additional 22 traps were deployed along the western side of the road along Kalalau Rim extending about half a kilometer along the road from Pu'u O Kila lookout and half a kilometer surrounding the Kahuama'a Enclosure. Traps were placed 5-10m off of the road, and camouflaged using the same protocols described above.

Fifteen out of sixteen traps along the Alakai Swamp Traill, and 18 out of the 22 Kalalau Rim traps were accompanied by a Cuddelink Cuddeback camera, which transmits pictures in real time via cellular service, and pictures sent to PRC predator technicians to alert them to possible captures. These cameras are used for both camera trapping and monitoring purposes. The Cuddelink "Home" camera was located at the other end of the trail, near Pihea Junction, which allowed for traps to be checked without physically visiting each trap.

*Table 4: Trap location, type and total number of trap nights for predator control in 2023. Trap nights indicates the number of nights that traps were open and active. Numbers reflect traps deployed from January 2023 through December 2023.*

Trap Line	Trap Type	Number Deployed	Total Trap Nights	# cats trapped
Alakai Swamp Trail	Tomahawks	16	1392	5
Kalalau Rim Trail	Tomahawks	22	2199	8

## Cameras

Game cameras were used to monitor common use trails along which the traps sit. Cuddeback Cuddelink cameras were deployed in a chain to transmit pictures to a “home” camera where all images can be quickly and easily viewed in the field or by retrieving and replacing a single SD card. Camera data was used to evaluate the level of interaction with each trap by any given predator. Images of predators are saved on an external hard drive and images of cats, specifically are saved in a shared Google drive to determine effectiveness. Although Cuddeback Cameras offer a cell version of their cameras to be used in areas skirting cell service availability, there is currently no cell service close enough to either trapline to warrant use of this type of camera.

## Rat control:

Fifteen out of 16 traps on the Alakai Swamp Trail, and 18 out of 22 cameras have Goodnatures deployed near them to reduce bait removal from the traps. There are also 10 Goodnatures set up inside of the Kahuama’a fence for rat control. The Goodnatures inside of the Kahuama’a fence were deployed in January of 2023.

## Barn Owl control

Barn Owl control was conducted before or after evening auditory surveys if Barn Owls were observed in the area. Night hunting operations were done with a 12 or 20-gauge shotgun (Non-lead shot) and a game caller playing Barn Owl territorial calls following standard procedures used for Barn Owl control approved by the State of Hawaii. Staff utilized night vision in order to prevent accidental Pueo take during all Barn Owl hunting operations. Control efforts were focused during the Barn Owl breeding season to maximize efficacy. In the 2023 season only 1 confirmed Barn Owl was seen in the area; a second owl was seen but it could not be identified to species.

## **Results**

### Eradication

No cats were detected within the fence upon fence construction and thus were considered to have been removed through passive methods since cats can escape from the inside of the fence, but not re-enter. While rats were thought to have been eradicated by the end of 2021, an irruption of Polynesian rats was documented in October 2022 either as a result of a small remnant population, or incursion into the area. Upon discovery of that population in 2022, the entire baiting grid was re-activated since Polynesian rats are not as responsive to mechanical removal (i.e. snap traps and A24’s). Unfortunately due to shortages in bait availability state wide, we were not able to maintain full bait stations at all times. While we thought we had re-eradicated rats by early 2023, the heavy rains that exposed much of the skirt along the fenceline made the fence porous to rodents for several weeks. This resulted in rats (this time both species) getting back into the reserve, albeit at much lower numbers than before. Baiting remains continuous, and based on all lines of detection, rats have not been observed at Kahuama’a since October 2023.

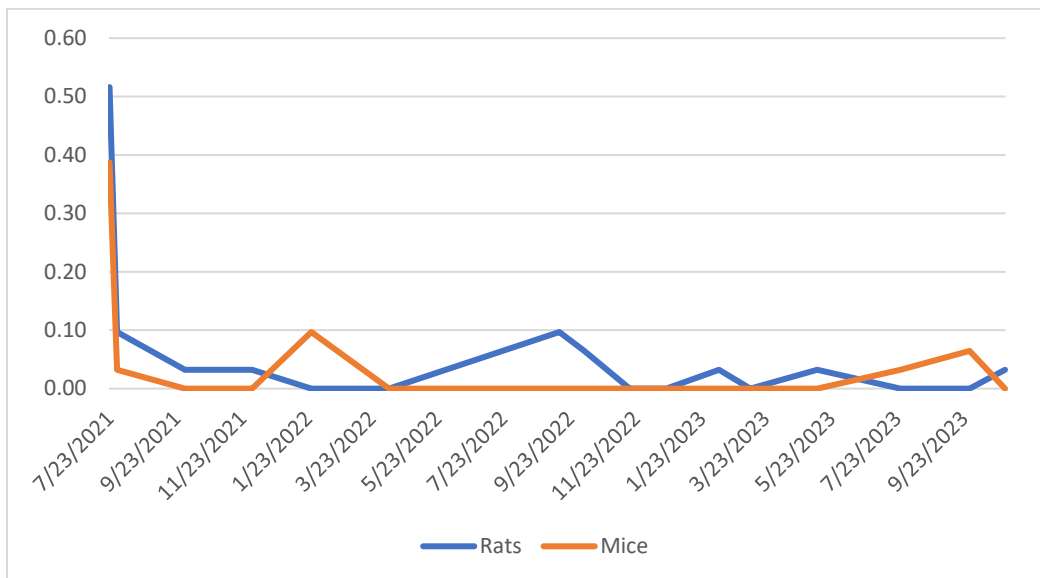


Figure 8: Proportion of tracking tunnels tracked by rodent species over time at Kahuama'a Seabird Preserve.

### Predator control:

A total of 3,591 cat trap nights were run in 2023 compared to 3,557 in 2022- 2,199 trap nights along the Kalalau Rim Trail and 1,392 trap nights along the Alakai Swamp Trail. Thirteen cats were captured in 2023- eight along KRT, and five on the Alakai Swamp Trail resulting in a total catch rate of 0.004 cats/trap night which is a large increase from the six cats captured in 2022. As required by the KSHCP, the cats were humanely dispatched.

A total of 51 rodents were incidentally removed via live traps between the two sites: 45 Black Rats (*Rattus rattus*), 5 Norway rats (*R. norvegicus*), and 1 Polynesian rat (*R. pacificus*) along with 2 mice; all rodents were humanely dispatched. The A24 rat traps on the Alakai Swamp and Kalalau Rim trail removed a minimum of 172 and 383 rats respectively throughout the year. This is a strong increase in catch rates compared to 83 and 212 rats removed from each site in 2022.

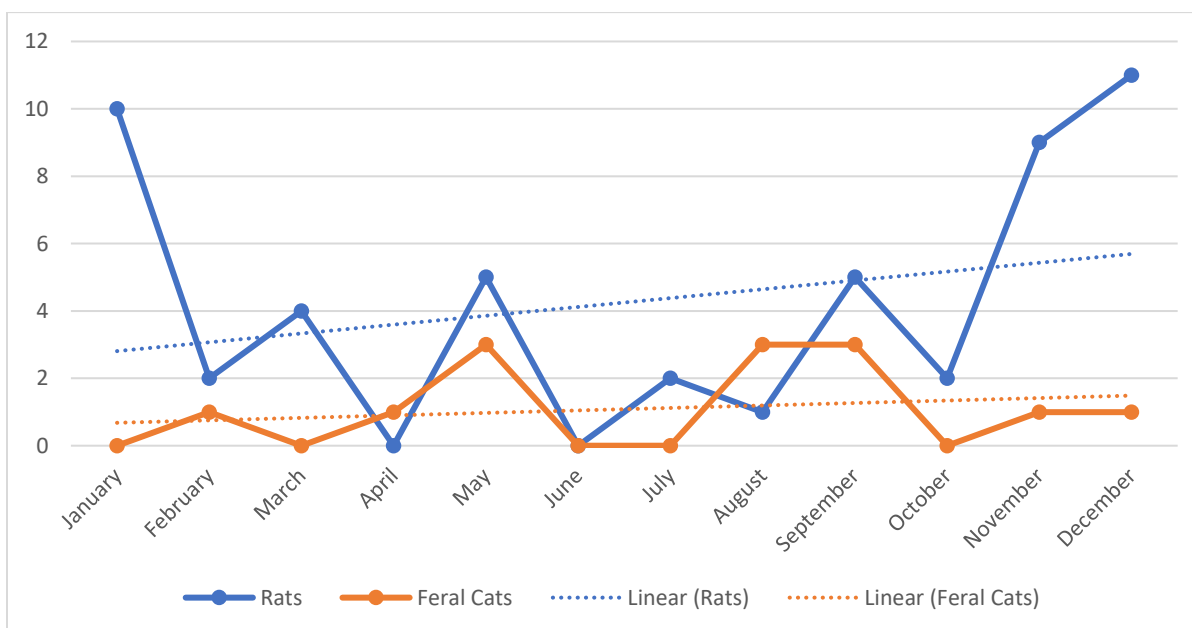


Figure 9: Total number of rodent and feral cat captures along traplines in 2023.

### Camera monitoring

Cameras have been used to monitor traps and corridors along both the Alakai Swamp Trail, and the Kalalau Rim Trail. Every trap on each trapline has camera, and there are 3 trail cameras along with fence corridor at the Kahuama'a site to track predators. Pinch point traps can be set up using Tomahawk traps if a feral cat is seen walking along the fence with evidence from the trail cameras. Three trail cameras were set up on the Alakai Swamp Trail, but were temporarily taken down after it was determined that they were too visible and accessible to the public and therefore potentially subject to vandalism or damage. The trail cameras specifically on the Alakai Swamp Trail were extremely important for tracking feral cats coming in and out of the Alakai Swamp Trail trailhead. The cameras will be put back in more discrete locations in 2023. Rats and mice have been observed on every game camera that is deployed on both Alakai Swamp Trail and Kalalau Rim. Black Rats made up the majority of game camera observations.

Cats were observed on game cameras on multiple occasions throughout the year. While most of the observations were on Alakai Swamp Trail, some were also on the Kalalau Rim Trail. Cat sightings decreased compared to 2021 which could be related to sustained cat control efforts in the area between this project, and other ongoing cat removal programs.



*Figure 10: Black kitten sighting along the fenceline. Many more cats were seen immediately on the fenceline in 2023 compared to previous years.*

Other animals such as pigs, dogs, and black-tail deer have been observed on game cameras frequently. Dogs are very commonly observed on game cameras at both Alakai Swamp Trail and Kalalau Rim. Dogs have been observed inspecting, crawling into, and sniffing traps that are baited. Black-tail deer have been observed at both sites on game cameras, specifically at the Kahuama'a site.

Similar to 2022, the project experienced two theft events in 2023 of two trail cameras and one goodnature trap on the Alakai Swamp Trail. Immediately following the theft events, the cameras and traps were relocated to new positions.

### Discussion

Protocols for effectiveness monitoring to evaluate progress and success are described in detail in *Appendix A: Kahuama'a Seabird Preserve Management Plan* for the KSHCP mitigation objectives. These objectives require three aspects of biological monitoring: monitoring of predator eradication/suppression, monitoring of vegetation (habitat)



management, and monitoring of Covered Seabird response to management.

Biological monitoring of forest birds, seabirds, and their habitat commenced on schedule in 2021 and all required surveys were completed during that time to provide an inventory of the flora and fauna present in the area. All listed seabird species are regularly flying by the site, with NESH in particularly high density based on call rates during the auditory surveys and HAPE now documented landing on the ground. The completion of the fence construction and subsequent predator eradication and deployment of social attraction equipment have the site ready for all future years to successfully attract listed seabirds to nest at the site.

The results of predator control on Alakai Swamp trail and Kalalau Rim should act as a baseline for trapping and game-camera observations moving forward and especially for use now that the fence construction is completed. Continuance of trapping via live traps along Kalalau Rim and directly adjacent to Kahuama'a should suffice in controlling cats that enter the area. Alakai Swamp Trail has proven to be a high-use trail for cats in Koke'e State Park. The number of trap nights was not only increased in 2023, but the catch rate and total number of cats removed dramatically increased. Rodent control, separate from cat control, was implemented along both traplines to prevent rodents from triggering the cat traps, and also increased significantly in 2023 in terms of the number of rats removed. Goodnature A24s and snap traps continue to be run outside the fence to enhance biosecurity at the site.

Interestingly, the data compiled from auditory and camera surveys at the site has proven to be almost contradictory to what has been expected. The species observed the most either in flight or on the ground, Hawaiian Petrel and Band-rumped Storm-petrel (i.e. visual observations during evening surveys and confirmed camera data) are not the species that are being broadcast on the sound system (Newell's are the calls playing from the sound system). The observations from many of the auditory surveys note that the observers can hear the ground calls from the large Newell's Shearwater colony that is nearby and was indeed one of the reasons that Kahuama'a was selected as an ideal social attraction location. Dense colonies of both Hawaiian Petrels and Band-rumped storm petrels are much further away and yet these species appear to be more attracted to the site. It is possible that having such a large, loud Newell's Shearwater colony just downslope from the project site is actually a deterrent to birds colonizing Kahuama'a as the social attraction calls being broadcast cannot compete in terms of call rates nor volume to the wild colony nearby. The nearby wild colony may be more attractive. While this is purely speculative at this time, our organization is conducting a larger study to look at the issue of whether there needs to be a minimum distance from seabird source colonies in order to optimize the chances of attraction to a new site.

Based on the activities to date, the activities of the Kahuama'a Seabird Preserve have met the objectives for predator control and suppression given the staffing and weather issues encountered in 2023.

*Table 5: Progress towards biological objectives stated in Table 7-4 of the KSHCP.*

Biological Objective	Status
2.A. Construct a predator-proof fence and install social attraction equipment (nest boxes, speakers) within the fenced area at mitigation site in Year 1 of KSHCP implementation.	Completed.
2.B. Remove predators from within the fenced enclosure with monitoring confirmation of their absence, and activation of social attraction equipment by Year 2; predator eradication within fenced enclosure maintained for the life of project.	Completed.
2.C. Ground activity by Covered Seabirds documented at the mitigation site by Year 4 of KSHCP implementation.	Partially complete- 'Ua'u have been documented inside the preserve.

2.D. Breeding activity by Covered Seabirds documented at the mitigation site by Years 5-7 of KSHCP implementation.	Not yet complete.
2.E. Cumulative upward trend in Covered Seabird breeding documented at the mitigation site by Year 10 of KSHCP implementation.	Not yet complete.
2.F. Continued cumulative upward trend in Covered Seabird breeding documented at the mitigation site by Year 20 of KSHCP implementation.	Not yet complete.
2.G. Maintain high quality seabird habitat at the mitigation site by removing habitat modifying invasive plants in Year 1 and annually throughout the 30-year duration of the KSHCP.	Underway
2.H. Protect nesting birds inside mitigation fence and in nearby source colonies by implementing predator control of 1) barn owls within the area surrounding the fenced enclosure and the Kalalau Valley, and 2) feral cats at ingress points to source colonies in the Kalalau Valley, beginning in year 1 and annually throughout the 30-year duration of the KSHCP.	Underway
2.I. Annual protection of any Honu nests adjacent to facilities via shielding or other measures to avoid light attraction take.	Completed

## SUMMARY OF KSHCP PARTICIPANTS' ANNUAL REPORTS

A consolidated summary of each Participant's annual report is provided below; reports are presented in alphabetical order. This includes sections on downed bird search effort, lighting and facilities, predator control, and training and outreach. For participants with multiple Facilities (Alexander & Baldwin, and the County of Kaua'i), they are grouped for the purpose of readability. The exceptions to this are State of Hawaii facilities which are presented individually.

### Alexander & Baldwin, Inc. (A&B)

Alexander & Baldwin facilities covered by the KSHCP include Hokulei Shopping Village, Waipouli Town Center, The Shops at Kukuiula (TSAK), and A&B's Port Allen commercial properties (five properties grouped together as one "facility" for reporting purposes). One of A&B's Port Allen commercial properties, formerly leased for operation of a fertilizer bulk storage facility, was sold to the tenant in February 2023 and is no longer covered by the A&B permits. The Kukuiula Development was sold during the 2021 season and is no longer covered by the A&B permits. The Port Allen Solar Facility was sold during 2020 and is also no longer covered by the A&B permits. The McBryde Resources facilities (Wainiha and Kalaheo Hydroelectric Plants and Pump 3) were sold in June 2022 and are no longer covered by the A&B permits.

#### *Take*

A total of seven NESH were found at A&B facilities by A&B search teams: five at Port Allen and two at Hokulei Village. Of the seven birds found, six were released alive, and one was found dead. Five additional NESH were found by A&B personnel near Port Allen, but not on A&B property; two were released alive and the rest were either found dead or euthanized upon intake at SOS. A Wedge-tailed shearwater was found in the Port Allen area; this bird was turned in to SOS by the A&B searchers and was reportedly released alive.

#### *Downed Bird search effort*

A&B's Downed Seabird Monitoring and Recovery Plan was updated in September 2023 and searchers were trained on the revised plan. Self-monitoring (downed seabird search and recovery) efforts were conducted in accordance with the plan by a science education non-profit in partnership with the predator control contractor at Port Allen, by landscaping staff (AM searches) and the predator control contractor (PM searches) at Waipouli and at The Shops at Kukuiula, and by the predator control contractor at Hokulei Village. Except for one search missed at Hokulei Village due to a traffic accident, all searches were completed and logged. Periodic internal monitoring of searchers by A&B Environmental Affairs was conducted throughout the season to help ensure effective searching, and additional training was provided as warranted.

At all A&B facilities, searches were conducted twice nightly every night during the seabird fallout season from September 15 to December 15. The first search was conducted three to four hours after sunset, and the second search was conducted one hour prior to sunrise. Heavy vegetation in some areas of the facility during the 2023 season was identified as a concern by searchers at Port Allen. Greater focus on vegetation management prior to and during the season is needed in order to help facilitate effective searching and to further discourage predators.

#### *Lighting and facilities*

Lighting at most A&B covered facilities had been previously modified in order to be in compliance with KSHCP guidelines. Plans for further lighting improvements are under development based on the most recent lighting audit. At Port Allen, semi-opaque panels on the roof and sides of the Steel Warehouse had been observed to transmit light from inside the building. This was addressed in 2023 through tenant control of interior lighting during the fledging season. Tenant performance will be monitored on an ongoing basis to assess the need for further action.



At Hokulei, a 14,820 square foot building pad (Pad 2) leased to Walgreens remains undeveloped. The pad will be developed at an unknown date in the future, either by Walgreens or another tenant, and such development will include additional lighting. When developed, lighting will be compliant with KSHCP requirements.

At Waipouli significant changes to the tenant makeup at this property are possible in the near future, which may alter the existing lighting. Additionally, a plan for installation of more energy efficient lighting facility-wide has been developed and is pending approval. New lighting will comply with KSHCP requirements.

Finally, at TSAK a lighting improvement program has been developed and is under internal review. Consideration is being given to adding an east-adjacent 3.13-acre parcel, currently partly used for employee parking, to the KSHCP.

### *Predator control*

At Port Allen, Hokulei Shopping Village, Waipouli Town Center, and The Shops at Kukuiula, animal control activities were contracted to a professional wildlife control firm. These efforts were executed well and appear to have been successful in reducing the number of predators on the landscape. Guidance for updating predator control plans was provided by DOFAW in 2021 and the Predator Control and Monitoring Plan for all A&B facilities was updated to comport with this guidance prior to the start of the 20222022 season. Out of a cumulative 1,252 trap nights across all properties, predator capture rates were 0.046. Below are the summaries presented from each of the properties describing the site-specific predator control efforts and challenges experienced.

Pre-season trapping at Port Allen Properties commenced on August 13 and daily trapping continued throughout the season. During the pre-season and throughout the season (with the exception of three days when only one or two traps were placed), three traps were placed at the Port Allen facilities resulting in a total of 370 trap nights. Tampering with/theft of traps appeared to be less of a problem than in the past. Traps were checked, baited, reset and maintained on a nightly basis. The presence of feral chickens in and around the property likely impacted the trapping program to an extent, due to chickens triggering traps and making them unavailable for predator control until checked and re-set. DDedicated chicken traps were placed during the pre-season trapping period in an effort to reduce the population, to the extent feasible.

Predator control "snapshot" surveys were conducted prior to the start of trapping and then before, during, and after the season, none of which indicated any significant predator presence on the property. This is consistent with results during previous years' surveys and contrasts sharply with the predator counts found at the start of the 2020 season. The continued low counts can be attributed to (1) highly effective control of predators during the preceding seasons, resulting in significant reduction in the predator population in the area; (2) discussions with nearby cat colony operators throughout the 2020 season, which encouraged them to re-locate their colonies off of the property; and (3) increased predator control efforts by neighboring property owners. Twice-nightly monitoring for the presence of predators on the properties in conjunction with seabird searches indicated that a reduction in the cat polulation of about 46 percent was achieved over the course of the season (the reduction in all predators spotted - including rats and dogs - was somewhat higher). No more than three cats were observed on the property during any search (this maximum occurring during the first three weeks of the season), and on average less than one cat was seen per night after the first two weeks of the season. The predator control contractor also monitors for the presence of predators on the property during their regular trap checks, and this information is used to help inform trap placement.

More than half of all predators caught at Port Allen were trapped during the month prior to the start of the season. Evidence of cat feeding on or near the property was observed only rarely. Loose dogs and rats were observed only a few times early in the season; one dog was trapped, while rodents appear to be under control as a result of the separate pest control program.

Predator control efforts at the Hokulei Shopping Village were contracted out to a wildlife control contractor and — as in prior years — appear to have been quite effective. Pre-season trapping commenced on August 13 and continued daily throughout the season. During the pre-season, three to four traps were placed at the facility nightly, while three traps were placed for the majority of the season for a total of 386 trap-nights. Traps were checked, baited, reset and maintained on a nightly basis. While tampering with traps was infrequent, one trap was vandalized and completely destroyed. This highlights the need for careful selection of trap sites both to ensure effective predator control and to limit trap visibility and susceptibility to tampering, theft, or destruction.

Predator control “snapshot” surveys were conducted prior to the start of trapping and then before, during, and after the season, none of which indicated any significant predator presence on the property. This is consistent with results during the 2022 surveys. Twice-nightly monitoring for the presence of predators on the properties indicated that a reduction in predator counts of nearly 90 percent was achieved over the course of the season, based upon average nightly predator counts observed during the last two weeks of the season as compared to those observed during the first two weeks of the season. The large grassy area immediately to the south of the property appears to provide a reservoir for cats entering the property, as many of the cats observed on-site were at the Safeway loading dock or other areas bordering the field. No more than four cats were observed on the property during any search. More than half of predator captures occurred during the month prior to September 15, demonstrating the value of pre-season trapping efforts. On average less than one cat was seen on the property per night after the first two weeks of the season. The predator control contractor also monitors for the presence of predators on the property during their regular trap checks, and this information is used to help inform trap placement. Evidence of cat feeding on the property was observed on a handful of occasions but does not appear as prevalent as it once was. No significant rat or dog activity was observed. Feral chickens, while occasionally found in traps, were not as prevalent as at Port Allen. Overall, the predator control program at Hokulei appears once again to have been highly effective.

Predator control efforts at Waipouli Town Center were contracted out to a wildlife control contractor. Pre-season trapping commenced on August 15 and continued on a daily basis throughout the season. For the reasons described below, the number of predator captures was low compared to prior years, with half occurring during the pre-season trapping effort. During the pre-season and throughout almost the entire season, one trap was placed at the facility for a total of 125 trap-nights. As noted in previous annual reports, tampering with, damage to and theft of traps has historically been more prevalent at this property than at other A&B facilities, possibly attributable to regular trespassers of various ilk. As such, there are only a limited number of available locations where traps can be effectively concealed. Since almost all predators on the property congregate in one area, however, a single well-placed trap has, in the past, nevertheless proven effective. Traps were checked, baited, reset and maintained on a nightly basis. The predator control contractor also monitors for the presence of predators on the property during their regular trap checks, and this information is used to help inform trap placement.

The long-standing active cat colony being operated on public land abutting the facility (i.e., Pouli Road right-of-way and the adjacent drainage canal parcel) makes effective predator control at this location extremely challenging. Not only does the nightly feeding that occurs just off-site attract a large influx of cats (often 20 or more cats) to the property, but it also renders any well-fed cats which remain on the property far less likely to be attracted to bait in a trap. Alternative means of predator control have been explored but are of limited utility in an urban environment. In 2023, approximately 90% of all predators observed at the facility during the season were observed in a limited area at the back of the property, in close proximity to the active colony feeding area. Moreover, a significant disparity exists between the number of cats sighted during morning searches and the number sighted during evening searches, due to the regular nighttime feeding time coinciding with the nightly search time. In 2023, this problem was exacerbated when an adjacent land parcel was cleared of vegetation, prompting cats frequenting that area to seek shelter on adjoining properties. As a result, even modest reductions in predator numbers (such as those that had been realized in past years) no longer appear achievable without actions to curtail the cat colony operation on public land. Unfortunately, prior interactions with this particular colony operator have been less than cordially received.

Predator control “snapshot” surveys were conducted prior to the start of trapping and then before, during, and after the season. The majority of predators observed during these surveys were located on or just off of the property in the immediate area of the normal feeding site (just off the property). These surveys indicated a relatively consistent predator count over the course of the season. Over the course of the day, predator numbers on the property are greatly influenced by feeding times at the colony. Twice-nightly monitoring for the presence of predators on the property indicated a significant increase in predator counts over the season, based upon average nightly predator counts observed during the last two weeks of the season as compared to those observed during the first two weeks of the season. This nightly monitoring (particularly the PM counts) is highly sensitive to colony activities, since colony feeding is generally done around the time of the nightly searches. Due to the cat colony, as many as 15 to 20 or more cats have been observed on or near the property during feeding events, and on average one to three cats were sighted on the property each night. Feeding was observed to be occurring on a regular basis.

In our 2020 report, we discussed the prevalence of trespassers entering the property to feed cats, free trapped cats, and generally interfere with our predator control program. While careful concealment of traps has reduced tampering and vandalism, these factors continue to limit the number of suitable locations for trap placement. Off-site feeding on the adjacent property continues to contribute to predator activity at this property. Since it became clear in 2023 that attempts at working with the belligerent cat colony operator were unlikely to be fruitful, continued vigilance and attention to this issue is particularly important at this facility to ensure that cat colony activities remain off the property. That said, even off-site feeding remains problematic for predator control efforts. A long-term solution to the off-site colony on public land needs to be developed. In 2023, we initiated outreach to a neighboring landowner who is also being negatively impacted by the cat colony to discuss the potential for placing traps off-site in an effort to improve future predator control.

Pre-season trapping at The Shops at Kukuiula commenced on August 15 and continued daily throughout the season. During the pre-season and throughout the season (except for two days when one trap was placed), three traps were placed at the facility (for a total of 371 trap-nights). Traps were checked, baited, reset and maintained on a nightly basis. The predator control contractor also monitors for the presence of predators on the property during their regular trap checks, and this information is used to help inform trap placement.

Predator control “snapshot” surveys were conducted prior to the start of trapping and then before, during, and after the season. While none of these surveys indicated significant predator presence on the property, the population as measured by the survey trended downward over the four surveys. Twice-nightly monitoring for the presence of predators on the property indicated that a reduction in predator counts of about 84 percent was achieved over the course of the season, based upon average nightly predator counts observed during the last two weeks of the season as compared to those observed during the first two weeks of the season. No more than four cats were observed on the property during any search. On average less than one cat was seen on the property per night during the latter half of the season (after a group of well-fed cats frequenting the ‘Long’s trash compactor building was finally captured). While direct evidence of cat feeding on the majority of the property was seldom observed, regular clandestine feeding was occurring in the area of the ‘Long’s trash compactor, and traps placed nearby appeared to have been tampered with on at least seven occasions. More forceful outreach to the tenant will be conducted prior to the 2024 season to discourage this activity. Fortunately, the cat population at the facility remains quite low despite these unauthorized activities. Rats were observed on a handful of occasions, but in general the separate pest control program appears to be keeping rats under control.

### *Training and outreach*

A total of 8 PowerPoint presentations were made for more than 48 staff members and contractors across all properties to educate staff members on the requirements of the KSHCP and on protocols related to searching, seabird biology and predator control. For the most part, these were developed and initiated by a contractor (HT Harvey Associates). In addition, printed outreach materials were developed and distributed, including a tenant outreach letter and a tri-fold

brochure to further educate tenants, employees, and visitors on the project at all facilities. Additionally, signs prohibiting the presence of loose predators and the feeding of predators were posted at all facilities.

#### *Changed circumstances and facility changes*

Changes at Port Allen include TMK No. (4) 2-1-3 parcel 029 was sold in February 2023 to Phoenix V, LLC and is no longer covered by the A&B permits. TMK No. (4) 2-1-3 parcels 025 and 026 (also at Port Allen) are unlighted and have experienced fallout in recent years that is clearly not attributable to lighting on these parcels. A request to withdraw these parcels from the KSHCP is among options being considered.

#### *Kauai Coffee*

Bronson Yadao will be the primary contact replacing Fred Cowell.

#### *Take*

No covered species were found on the property in 2023.

#### *Downed Bird Search effort*

Searching was conducted throughout the seabird season by harvest crew (10-12 people) in the orchard, where staff was present in this area 24 hours a day. Implementation of the dedicated search routine documentation was done during the seabird fallout season in the Factory area where 1-2 people searched the factory area for downed seabirds from 5-9am and again from 7-10 pm. Emphasis on ensuring that employees look under and around possible downed seabird locations.

#### *Lighting and facilities*

No new lighting changes were implemented in 2023. Landscape maintenance was conducted to provide easier visual access to possible downed bird locations as well as to decrease “‘hiding’ spots to improve searcher efficiency.

#### *Predator control*

Predator control was conducted for five days in September, but did not continue for the remainder of the seabird season. Two traps were deployed and three cats were caught during that time. Feeding of feral cats appears to have been discontinued at the property.

#### *Training and outreach*

All individuals who participated in searches were provided training on seabird awareness, the seabird monitoring protocol, downed seabird response protocol, and KSHCP reporting procedures. Training included a review of the fact sheet, KSHCP Downed Wildlife Protocol and Incident Documentation and Reporting Form

Printed outreach material included posters, leaflets, and coloring activity books that were distributed to visitors to the site. A poster was put on the information board in the main office by the breakroom and the digital presentation is saved in the central web portal for the employees to access at any time. Along with this, a seabird presentation is rotated through our digital information screens at random intervals.

#### *Kauai County*

#### *Take*

There was take of one listed seabird during 2023 across Kauai County properties- a single Newell’s Shearwater at Faye Park on 10/12/2023 which was ultimately released alive.

### *Downed Bird Search effort*

Searches were conducted once daily at all facilities at approximately 6:30am following the monitoring plan in the County's PIP. Searches were conducted by on-site staff.

### *Lighting and facilities*

There are 60 County facilities listed under the KSHCP that require monitoring due to their light classification:

- 37 Category 3 facilities.
- 11 Category 4 facilities
- 12 Category 5 facilities

Lights are off during fledgling season for category 4 and 5 sites with the exceptions of authorized night football games that elicit the support of the agencies to ensure the protection of endangered seabirds as well as ensure compliance with the KSHCP. There are eight fire stations island wide that are classified as aid stations and take in downed seabirds annually from organizations who do not participate in the KSHCP and community patrons who find downed birds. Of the 8 fire stations island wide, 4 are classified as category 3 facilities under the KSHCP:

1. Waimea Fire and Police Station
2. Kalaheo Fire Station
3. Hanapepe Fire Station
4. Hanalei Fire Station

The additional four seabird aid stations / fire stations not listed above are not listed in the KSHCP as category 3, 4, or 5 facilities but do take in downed seabirds also and assist SOS with efforts to revitalize the endangered seabird population. All fire fighter personnel participate in the annual seabird monitor trainings and perform regular searches of facilities as outlined in the KSHCP.

### *Predator control*

During the 2023 seabird season, a contractor conducted Predator Control and surveyed the target areas for predators. Category 3 facilities (sites with lights on at night during the fledgling season for safety) with known occurrences of predators were prioritized for predator control efforts. Of the 37 category 3 properties, 32 had lights on and thus require predator control per the KSHCP. As in past years, control was conducted at 13 of the 32 properties as described below. The contractor worked rotating time between Bryan J. Baptiste Sports Complex (AKA Kapa'a New Town Park), Hanapepe Transfer Station, Kukui Heiau, Lima Ola Housing Development, Lihue Police Station, Vidinha Stadium, Lihue Transfer Station, Lydgate Park, Spouting Horn Park and Hanapepe Veterans Cemetery. These sites were chosen based on previous predator sightings and known public feeding of nearby colonies.

A total of 64 traps and 17 cameras were used to remove cats and monitor predator presence at 13 County properties-the same total number of sites where trapping was conducted in 2022. While the total number of sites remained the same, one site was removed (Kukui Heiau), and replaced with the Kaua'i Economic Opportunity Center. Although 398 fewer trap nights were conducted in 2023 (958.25), the shift in trap placement strategy and use of novel baits and lures resulted in the increased number of cats removed (14 more in 2023 compared to 2022). The raw cat removal rate for 2022 was 0.14 cats/trap night and increased to 0.2 cats/trap night in 2023. Throughout 2023, the predator control staff documented multiple individuals feeding feral cats daily at Lydgate Park. Despite the new laws enacted banning feral cat feeding at County parks and recreation facilities, there has not been observed any change in cat feeding behavior, nor has enforcement of these laws by County staff been observed. Cat feeding activity and/or the presence of TNR'd cats was observed at almost every County site in 2023 and camera trapping at these same locations showed that cat feeding also attracted pigs. No permit was issued to the predator control contractor from County for feral pig control and so no pig control was conducted in 2023.

The goal of the project was to reduce the presence of predators on those County properties with lighting systems which pose higher risk of seabird fallout during seabird fledging season. Additionally, the Contractor was prepared to respond to reports of downed seabirds by conducting supplementary predator control after such events. No response work was required during the 2023 period of performance, and monitoring cameras did not detect any downed seabirds.

### *Training and outreach*

Kauai County had 42 personnel classified as assigned monitors and completed the annual seabird monitoring training for 2023. All assigned monitors are automatically, digitally assigned to watch the seabird informational/educational video, annually, online and must complete the task to receive credit through their Share Point Database. There were 168 new hires for 2023 and all new hires are automatically, digitally assigned to watch the seabird informational/educational video online and must complete the task to receive credit through our Share Point Database.

### **Lihue Airport**

Newly appointed Director of Hawaii Department of Transportation, Edward Sniffen, replaces the previous Director, Jade Butay. Jade Butay remains listed as Principal Officer on the ITP and the ITL was signed by Mr. Butay as the authorized licensee.

### *Take*

Three Newell's Shearwaters were found at Lihue airport; two were released alive and one was euthanized.

### *Downed Bird Search effort*

Systematic searches for downed seabirds were conducted twice each day at Lihue Airport as prescribed in the KSHCP and 'HDOT's Participant Inclusion Plan. Within the publicly accessible areas, H. T. Harvey & Associates trained searchers performed this surveillance each day between September 15 and December 15, within 3-4 hours after sundown and then again within 1 hour of sunrise. The public area consists of the terminals, parking areas, portions of the rental car facilities, several roadways and access corridors which interconnect the various parts of the airport facility, and the outer sections of the North Ramp along Ahukini Road. The Aircraft Operations Area (AOA), where active aviation activities take place, is a restricted area. The AOA is searched twice each day by USDA-Wildlife Services biologists in conjunction with the Lihue Airport Wildlife Hazard Management Program (WHMP). The WHMP entails even more frequent and regular wildlife surveillance, facility-wide, both during the fallout season and throughout the year. During the fallout season, USDA-Wildlife Services also frequently extend their searches into the public areas. As in past years, Airport Security and other trained personnel remained vigilant throughout the season and helped augment monitoring and surveillance capacity in 2023. The coordinated and repetitive on-the-ground surveillance and dedicated search effort by multiple staff and personnel provided an effective monitoring program at Lihue Airport in 2023.

In 2023, H. T. Harvey & Associates coordinated and performed the on the ground searches for covered seabirds utilizing a team of 4 field biologists who shared duties and conducted night and morning searches of the publicly accessible portions of Lihue Airport. HDOT coordinated closely with USDA-Wildlife Services, who manage searches for grounded seabirds in the AOA. H. T. Harvey & Associates search biologists received training and orientation to the search areas and procedures during the week leading up to the fallout season. Three of the search biologists have been with the program for multiple years and one was a new participant in 2023. This new individual received all of the same information and training exposure to how the searches are performed, including rescue, documentation, notification and reporting procedures. By the first of October, once the initial training proficiency period was complete, 3 of the 4 searchers shared 85% of the search effort at Lihue Airport. Training consisted of developing familiarity with the search areas, operational aspects of the facility, methods and approaches to ensure high detection capacity and thoroughness of coverage, conducting pre-season searches to enhance familiarity and aid in establishing search profiles, seabird species identification, ecology, and habits exhibited by grounded seabirds. Custom fabricated decoys of 'Newell's

shearwaters were used to enhance detection capacity of searchers via training, in addition to standard seabird awareness, rescue, and response training, this functioned to keep sensory sharp and is believed to be a successful tool. USDA-Wildlife Services staff biologists are highly trained professional wildlife biologists possessing intimate familiarity with seabirds and the annual fallout that occurs on Kaua'i. USDA-Wildlife Services biologists performed regular and routine wildlife surveillance inside the AOA and in public access areas with a heightened focus on detecting downed seabirds in all portions of the airport during the fallout season and coordinated closely throughout the season with the H. T. Harvey & Associates team. USDA-Wildlife Services found and reported training decoys on several occasions in 2023.

### *Lighting and facilities*

Lighting upgrades were implemented in 2020 as part of the Phase 3 lighting improvements for Lihue Airport. A total of 18 high-mast high-pressure sodium light fixtures in the Airside ramp area were replaced with LED full-cut-off heads. Lihue Airport also turns off portions of the high-mast ramp lighting during seabird fallout season on the following schedule: a.) Commercial terminal ramp lights are set to turn off at 12:30am – 3:30am, after last flight, and before Hawaiian Airlines crew begins early morning ramp operations in preparation of their morning flights, b.) Cargo, Commuter and Life Flight ramp lights remain on due to their activity, and c.) North ramp and T-hangar lights turn off at 12:00am – 5:30am. Combined, these measures are considered to advance the efficacy of seabird light attraction minimization and contribute to achieving biological goals and objectives. Beyond these already substantive achievements, there are no additional advancements to report for 2023.

### *Predator control*

A year-round animal control program is in place at Lihue Airport consistent with the provisions of the Wildlife Hazard Management Plan, which is implemented by USDA-Wildlife Services. This program covers the entire airport property inclusive of AOA and publicly accessible areas. In addition to avian wildlife the program addresses dogs, pigs, cats and any other free-roaming animals that might present a risk to aviation and public safety. Free-roaming cats present a threat to downed seabirds during the annual seabird fallout season, both within the AOA and publicly accessible portions of Lihue Airport. During the seabird fallout season, HDOT works in coordination with USDA-Wildlife Services to expand the trapping effort targeting the capture and removal of free-roaming cats at Lihue Airport, which includes increasing the number of traps for cats in the AOA and public access areas, prior to September 15<sup>th</sup>. Tomahawk-style live traps are baited with commercial cat food and checked daily. Trapping effort at Lihue Airport during the 2023 seabird fallout season consisted of 11 traps. In general, there were 2 traps located in the public area and 9 in the AOA for the entire monitoring period for a total of 1,012 trap nights and yielding a capture success rate of 0.008 cats/trap night. Three pre-season spot surveys were conducted to assess the abundance of cats in the public access areas of Lihue Airport. An average of 7.3 cats (range 7-8) was estimated as a baseline. The baseline can be used to assess the effectiveness of capture and removal measures. During the regular counts made during the fallout season we documented between 0-9 (average 2.1) cats, with animals seen on 71 of the 92 nighttime surveys (77%) conducted in the public access area. Removal effort was proportionally directed to focus efforts on the AOA, specifically areas known to be associated with fallout at Lihue Airport. Although our observations of cats are limited to the public access areas, cats were removed in both the AOA and the public area.

### *Training and outreach*

H. T. Harvey conducted training and outreach which consisted of developing familiarity with the search areas, operational aspects of the facility, methods and approaches to ensure high detection capacity and thoroughness of coverage, conducting pre-season searches to enhance familiarity and aid in establishing search profiles, seabird species identification, ecology, and habits exhibited by grounded seabirds, in addition to the standard seabird awareness, rescue, and response training that is extended to a broad range of facility personnel. Airport Security and other trained personnel also remained vigilant throughout the season and helped augment monitoring and surveillance capacity. USDA-Wildlife Services performed daily surveys consisting of early morning and evening searches of the entire AOA.

Outreach consisted of in-person visits to rental car company managers with overview of seabird light attraction and minimization tools, rescue and reporting procedures, and distribution of the Fact Sheet and five presentations were made to 86 staff in 2023. HDOT also provided a “walk-through” scenario-based orientation on site to familiarize what to watch for and how to handle a downed seabird; stressed importance of Fact Sheet distribution to lot staff and pointed out how and why lights can become an attraction risk for seabirds and encouraged shut offs when possible. Kaua’i Airports District Manager issued Airport Notice to All Concerned parties to alert airport personal and tenants regarding the seabird fallout season, procedures for rescue and reporting when seabirds are found (dead or alive), the role of USDA APHIS Wildlife Services, and to reiterate the airport policy of no cat feeding anywhere at the airport.

A seabird light attraction Fact Sheet containing written materials covering seabird light attraction issues, minimization tools, rescue and reporting procedures was widely distributed among the Lihue Airport workforce with an emphasis on reaching employees and contractors who are active in the AOA. As part of outreach efforts, the Fact Sheet was posted in worker common areas and bulletin boards where it is visible to staff.

### Nawiliwili Harbor

In his official capacity, Mr. Jade Butay executed both the ITP and the ITL on behalf of HDOT. Mr. Ed Sniffen should now be listed as the Principal Officer on the ITP and the ITL.

#### *Take*

Eight Newell’s Shearwaters were grounded and discovered at Nawiliwili Harbor in 2023; all were released alive.

#### *Downed Bird Search effort*

Searches were conducted twice each day at Nawiliwili Harbor in 2023 as outlined and prescribed in the KSHCP and HDOT’s Participant Inclusion Plan. These surveys were performed each night within 3-4 hours after sundown and then again within 1 hour of sunrise, on consecutive days beginning on September 15<sup>th</sup> and concluding on December 15<sup>th</sup>. Nawiliwili Harbor is a secure facility and requires personnel conducting work to possess valid Transportation Workers Identification Certification and Marine Security Clearance issued by the Department of Homeland Security. H. T. Harvey and Associates assigned trained field biologists to conduct searches of Nawiliwili Harbor each night and provided training that enabled harbor security personnel to properly conduct dedicated facility-wide seabird surveillance during the hour prior to sunrise (and throughout the night). Harbor security also conduct surveillance of the harbor on a routine, hourly basis, and because they have received awareness, response, and in some cases, search training, harbor security are a valued partner in ensuring the highest probability of detecting seabirds when they are grounded, and performing quick and efficient rescue and reporting. H. T. Harvey & Associates biologists conducted 92 searches of Nawiliwili Harbor on consecutive nights in 2023. Harbor security performed 92 consecutive searches within an hour of dawn during 2023 in addition to hourly surveillance of the entire facility. Harbor security were first to discover two of the eight Newell's Shearwaters discovered at Nawiliwili Harbor in 2023 and followed established procedures of coordination with H.T. Harvey on-site biologist, Harbors Division, and SOS.

Downed Seabird Monitoring personnel responsible for conducting searches for downed seabirds at Nawiliwili Harbor included one H. T. Harvey & Associates field biologist with extensive familiarity of Nawiliwili Harbor and 4 years of seabird search experience, as well as 3-4 harbor security officers who have received training and/or refreshers on search and surveillance procedures and reporting. In addition to the trained searchers, HDOT, Matson, and Young Brothers personnel in 2023, as in past years, provided incidental observational capacity that increased the probability that birds not detected during the dedicated nighttime and pre-dawn searches would be found by workers at the facility during the day. All of the individuals who participated in regular and routine searches of Nawiliwili Harbor facilities were presented with training and informational content on seabird awareness, response, rescue and KSHCP reporting procedures. Specific personnel responsible for conducting searches at Nawiliwili Harbor were Mitchell Craig (H. T.



Harvey & Associates field biologists) and several security personnel under the supervision of Ryan Campos (Allied Universal Security Services) and Robert Cecconi (HDOT Harbors Division).

### *Lighting and facilities*

Standard security and worker safety procedures at Nawiliwili Harbor require that high mast lights be turned on to full illuminance when active cargo operations are in progress and/or cruise ships are berthing, and only at the specific pier where those operations are occurring. The standard procedures in place during the seabird season are that when nighttime operations are completed, high mast lights are reduced to a lower security level setting (roughly 15% of illumination capacity). Prior to the completion and approval of the KSHCP, HDOT Harbors Division finished replacing the high-mast flood lights with new, full cut-off, downward-pointing LED fixtures. The new system upgrades provide more comprehensive system control features that enable programming and manual control capabilities that allow adjustments or corrections to be made quickly. Harbors Division personnel at Nawiliwili Harbor continue work closely with lighting engineers to ensure sufficient training of harbor security personnel and staff so that proper setting procedures are followed. Maintaining light minimization standards to reduce facility lighting during non-operational periods is in effect year-round at Nawiliwili Harbor and is considered progressive in terms of continuing to advance biological goals and objectives.

### *Predator control*

HDOT Harbors Division has posted signs regarding the no cat feeding policy in place at Nawiliwili Harbor since 2020. Predator control activities at Nawiliwili Harbor in 2023 consisted of initiating trapping efforts toward the end of the first week in September, in an effort to reduce the numbers of animals on site prior to the beginning of the fallout season. H. T. Harvey & Associates biologists performed three pre-season surveys to gain a baseline estimate of the general numbers of cats present. Trapping at Nawiliwili Harbor consisted of two Tomahawk-style live cage traps placed at various locations within the facility and moved regularly based on observations and reports delivered by search and monitoring personnel and harbor security. Traps were baited with commercial cat food and set Monday through Thursday, excluding weekends and state holidays, for a total 108 trap days. As in 2021 and 2022, Harbors Division retained the services of a licensed local animal controller to remove cats, same day, when cats were captured at Nawiliwili Harbor. The services provided enabled cats that were captured to be handed off to the service provider for efficient and humane evacuation from the facility. No dogs or pigs were reported inside the harbor. See Addendum Sheet 2 for additional summary information.

Cat observations at Nawiliwili Harbor were made by trained search biologists during the performance of nightly searches. Numbers of cats observed by the search biologist ranged from 0-6 and averaged 1.20 cats per survey. Cats were observed throughout Nawiliwili Harbor but were encountered most frequently along the property boundary adjacent to Nawiliwili Small Boat Harbor (DLNR-DOBOR). Trapping effort consisted of deploying 2 traps per day (excluding Friday, Saturday, and Sunday) for a total 108 trap days with an overall capture success rate of 0.07 cats/trap night, or roughly 0.62 cats/week. Although the pre-season survey duration was short (3 surveys, average count = 8), it did provide a baseline from which to evaluate the effectiveness of the current management program at reducing the number of cats on property and was especially valuable in understanding sources of cat ingress and movement into and out of Nawiliwili Harbor. This understanding was useful in anticipating where cats are likely to be encountered and what variables affect their retention within Nawiliwili Harbor and the surrounding area. In 2024, the services of the animal control contractor may be expanded to include managing the trapping effort, in addition to removing animals from the facility.

### *Training and outreach*

A total of two PowerPoint presentations were made to nine staff members working at Nawiliwili Harbor that included a review of the Fact Sheet, KSHCP Downed Wildlife Protocol, and Incident Documentation and Reporting Form. These

were developed and delivered by H. T. Harvey & Associates. Printed outreach material was posted in areas that are visible to harbor staff and tenants.

### Norwegian Cruise Lines (NCL)

In 2023, NCL had two vessels operational through parts of the seabird season (Pride of America and Norwegian Spirit) compared to three vessels in 2022. NCL retained Dr. Adrian Gall (ABR, Inc.) in July 2023 to serve as the company's seabird biologist. Dr. Gall visited the Pride of America with DOFAW and USFWS prior to seabird fallout season to inspect lighting and returned in September to provide training to the Environmental Officer. Dr. Gall and ABR staff supported the Environmental Officers with remote training and data management throughout the seabird season and assisted with the preparation of downed seabird reports and KSHCP annual reports.

#### *Take*

There was take of two listed seabirds during 2023 on Pride of America.

- On 08/22/2023 a Newell's Shearwater was found while the vessel was anchored off Kailua-Kona. It was transported to the Hawaii Wildlife Center where it was ultimately released alive.
- On 09/24/2023 a Hawaiian Petrel was found at 06:35 while enroute to Kahului Harbor and was transported to the Hawaii Wildlife Center where it was ultimately released alive.

#### *Downed Bird Search effort*

During operations within Hawaiian waters, seabird monitoring was continuous every day of the year on every vessel since each crew member was tasked with inspecting their own duty stations. The onboard Environmental Officer (one per vessel) was responsible for overseeing the seabird protocols, bird searches and recovery, record keeping, and reporting.

#### *Lighting and facilities*

No lighting changes were reported for either vessel in 2023.

#### *Predator control*

Biological Objective 1B relates to predator control and is not applicable on a seagoing vessel, thus NCL did not conduct predator control activities on any of its vessels.

#### *Training and outreach*

There were significant efforts made to conduct outreach and education to both crew and passengers. In total, 18 presentations were made to 1,247 staff across both vessels. During the seabird season, the Pride of America and the Norwegian Spirit provide information on seabirds, and seabird protocols to their passengers in the "Free Style Daily," L'NCL's onboard daily newspaper.

The ship's hotel staff closes cabin draperies each afternoon as part of the turn-down service and when cabins are cleaned. Passengers are requested to keep their draperies closed as part of the ship's green initiative and to conserve natural resources.

The Division of Forestry and Wildlife (DOFAW) has given instructions to NCL on protocols for downed birds recovered on Maui that contradict permit requirements. The federal permit and state license require NCL to comply with the KSHCP (see ITP Condition F, and ITL Condition B). Section 5.3.4.2 of the KSHCP requires that "KSHCP Participants must submit downed seabirds to an appropriately permitted rehabilitation facility." There are only two permitted rehabilitation

facilities in Hawai'i: Save our Shearwaters (SOS) and Hawaii Wildlife Center (HWC). When NCL vessels are in Nawiliwili, Kaua'i, all downed birds are submitted to SOS. When NCL vessels are in other Hawaiian ports, birds are submitted to HWC. In October 2023, DOFAW instructed NCL that when NCL vessels are in Kahului, Maui, birds should not be delivered to HWCHWC volunteers, and instead should be delivered to persons and entities who do not hold rehabilitation permits. Since this instruction contradicts the requirements of the ITP and ITL, a meeting between NCL representatives, DOFAW and USFWS was held on November 15, 2023. NCL requested during the meeting that the agencies agree upon a protocol for birds that need to be submitted in Kahului, Maui and, if that protocol changes the terms of the KSHCP, that the KSHCP be amended. This issue remains unresolved at the time of writing this report.

## 1 Hotel Hanalei Bay

After multiple years of renovation and remaining closed to guests, 1 Hotel Hanalei Bay opened in March 2023 and resumed normal operations. 1 Hotel Hanalei Bay retained Dr. Adrian Gall (ABR, Inc.) in July 2023 to serve as the resorts seabird biologist. Dr. Gall and ABR staff assisted with evaluating lighting and vegetation, updating training materials, and preparing downed seabird reports and the KSHCP annual report.

### *Take*

Searchers found 19 Newell's Shearwaters and one Hawaiian Petrel on the property in 2023. All birds were recovered alive, delivered to SOS, and subsequently released to the wild.

### *Downed Bird Search effort*

During seabird fallout season, dedicated seabird searchers conducted searches twice daily: once in the early morning prior to sunrise (04:00–08:30) and once in the evening after sunset (18:30–00:00). Each survey took approximately 2.5–4 hours to complete. Additionally, all resort staff search their respective work areas for downed seabirds while on duty.

1 Hotel Hanalei Bay's Director of Loss Prevention is responsible for overseeing the seabird protocols, bird searches and recovery, record keeping and submission of draft reports. 1 Hotel Hanalei Bay hired a team of 6 seabird searchers that received KSHCP-approved training. Searchers worked in shifts of two at a time to conduct daily searches during downed bird season. The sole responsibility of dedicated seabird searchers is to conduct seabird and Honu searches. All resort staff are responsible for searching their respective work areas for downed birds during work hours. Resort staff reported any found bird to the Loss Prevention Officer for retrieval. Downed birds were retrieved by the Loss Prevention Officer or trained seabird searchers.

As this was the first year that the property was fully operational since the enactment of the KSHCP in 2020, DOFAW conducted an efficacy trial to estimate searcher detection probabilities. Although 1 Hotel Hanalei Bay was notified via email that 35% of the decoys were found, the report from DOFAW has not yet been provided. Proposed adjustments to improve searcher detection include having the Loss Prevention staff deploy decoys for training purposes in the 3 weeks prior to the start of downed bird season 2024 and deploying decoys periodically throughout the seabird season to evaluate searcher detection.

The PIP for 1 Hotel Hanalei Bay also describes that for Honu searches, groundskeepers “rake the beach every morning shortly after daylight 365 days of the year. Lifeguards and pool attendants are in the area 365 days of the year as well and are trained to see sea turtles”. During seabird season, search personnel conducted searches twice daily in the early morning and after sundown along the search route, which includes Pu'u Pōa Beach. Search personnel were directed to survey the beach for Honu nests. No Honu nests or hatchlings were detected.

### *Lighting and facilities*

There was significantly more lighting in 2023 than previous years under the KSHCP as the hotel was open to guests for the first time since the implementation of the KSHCP. A lighting audit was done on 24 July 2023 by DoFAW, USFWS and consultants, and again on 21 September 2023 to ensure that lighting was seabird friendly.

Minimization efforts were implemented as described in a revised implementation plan submitted to the agencies in August 2023. This plan followed minimization measures described in the original PIP, taking into account the renovations of the facility completed in March 2023 that increased the search area to include the main reception of the resort that is now open to the sky.

#### *Predator control*

Predator control was conducted daily by a commercial contractor who moves traps around the property to the best locations to catch predators. The pest control contractor deployed and checked up to four traps daily during the seabird fallout season for a total of 364 trap nights and a catch per trap night result of 0.011. In addition, the seabird search team recorded any predators observed during seabird searches as an independent measure of predator occurrence.

#### *Training and outreach*

'Gall visited the resort at the start of the seabird fallout season to inspect lighting and provide observer training to '1'Hotel's Director of Loss Prevention and members of the search team. A new seabird search team was hired during seabird season in 2023. Additionally, the entire Loss Prevention team (14 people) was trained in seabird protocols to assist with recovery and transfer of any downed birds to Save Our Shearwaters. The Director of Loss Prevention also conducted awareness training for hotel staff, making 8 presentations to a total of 140 people.

### **HDOT Port Allen Harbor**

In his official capacity, Mr. Jade Butay executed both the ITP and the ITL on behalf of HDOT. Mr. Ed Sniffen should now be listed as the Principal Officer on the ITP and the ITL.

#### *Take*

There were no KSHCP covered seabirds documented at Port Allen Harbor in 2023.

#### *Downed bird search effort*

Searches were conducted twice each day at Port Allen Harbor as outlined and prescribed in the KSHCP 'an' HDOT's Participant Inclusion Plan. These surveys were performed each night within 3-4 hours after sundown and then again within 1 hour of sunrise, on 92 consecutive days, beginning on September 15th and concluding on December 15th. Port Allen Harbor is open to the public 24 hours per day with no on-site security presence. H. T. Harvey and Associates assigned trained field biologists to conduct the twice daily searches of Port Allen Harbor. H. T. Harvey & Associates biologists conducted 184 searches on consecutive nights and mornings in 2023.

In 2023, the downed seabird monitoring at Port Allen Harbor was conducted by two trained and seasoned H. T. Harvey & Associates field biologists- Rick Foulks and Mitchell Craig. Both biologists have been responsible for seabird search and monitoring activities at Port Allen Harbor for multiple years and are very familiar with the property and the user community. Searcher training in 2023 included site orientation review, discussion of circumstances and past fallout distribution characteristics, seabird habits and situational awareness, downed seabird response, rescue and KSHCP reporting procedures. In addition to the dedicated searchers, HDOT staff present on site during normal daytime work hours were also trained and capable of detecting downed seabirds and initiating the proper procedures for handling and reporting downed seabird incidents in the course of their normal operations. The 2023 monitoring program at Port Allen Harbor was enhanced by the skill of the trained searchers combined with the training and review of procedures prior to the beginning of the seabird fallout season. The training and preparations for the fallout season included a thorough

review of the search area and past distribution of downed seabirds and circumstances associated with those incidents. We also reviewed lessons learned about various factors affecting detection, such as vegetation cover and concealed spaces that birds light utilize for cover. In 2023, we used custom fabricated decoys of Newell's shearwaters as a training tool to assess detection likelihood and to build and maintain capacity of searchers. These exercises were valuable because they helped demonstrate searcher attentiveness and situational awareness, equating to the ability to quickly find and rescue downed seabirds when they are discovered. There were no circumstances that triggered in-season corrections or substantive retraining with respect to the standard monitoring protocols, response procedures, and reporting at Port Allen Harbor in 2023. There are no proposed adjustments to the current protocols at this time.

### *Lighting and facilities*

Standard security, worker, tenant, and public safety procedures at Port Allen Harbor require that some facility lighting remain on at night. The main light illuminating the parking lot and wall mounted lights along the seaward side of the warehouse are programmed to be on from 18:00 to 20:30 each night to provide for the safety of workers and visitors disembarking from tour boats and departing from the pier and parking area. At 20:30, the main warehouse light, which is shielded, goes off and the wall mounted lights along the south and west sides of the warehouse are reduced to 50% capacity (i.e. every other wall mounted light is turned off) and remain at this level until dawn each day. In 2022, HDOT Harbors Division replaced the warehouse siding and applied new paint utilizing a grayish color and flat texture which reduced glare caused by the wall-mounted lights. In addition, the shield installed over the main warehouse light fixture has further reduced the amount of light cast in the horizontal plane and thereby enhanced the effectiveness of light minimization at Port Allen Harbor. Combined, these measures continue to minimize light attraction exposure for seabirds and contribute to biological goals and objectives at Port Allen Harbor.

In 2022, HDOT replaced all of the warehouse siding and applied a paint color and texture intended to reduce glare and further minimize light attraction exposure risk for seabirds at Port Allen Harbor. This work was scheduled and completed prior to the 2022 seabird fallout season. Shortly after the 2022 season got underway, a new light shield was installed on the existing main warehouse light that is used to illuminate the parking and pedestrian way corridor between the pier and the mauka parking area utilized by many port users. The completion of the warehouse siding project and shielding of the main warehouse light have reduced the light attraction risk for seabirds considerably.

Following review and discussions with the agencies, HDOT installed a steel shielding to the main light fixture at the front end of the warehouse late in 2022; the shield continued to function properly, as intended, in 2023, to direct light illuminating from the fixture downward, and reduce apparent outward radiance of light. This light is needed to ensure the safety of the pedestrian public entering and leaving the harbor especially during the first few hours of darkness. The shield does not appear to compromise safety requirements and is a good added minimization measure. All standard light minimization schedules for shutdowns along the side of the warehouse fronting the cruise vessels functioned properly in 2023. No additional changes were proposed or implemented in 2023. At this time, there are no facility changes that could affect the covered seabird species being considered or proposed.

### *Predator control*

Prior to the start of the 2023 seabird fallout season, biologists performed reconnaissance level surveillance of Port Allen Harbor to evaluate the initial numbers of predators of seabirds at Port Allen Harbor, to establish a baseline from which to assess the efficacy of predator control during the course of the season. On three consecutive nights, observers spent 60 minutes at Port Allen Harbor to enumerate cats on property. One cat was observed loitering near the entrance to the harbor on September 10. In 2022, there were no cats observed on three separate surveys of Port Allen Harbor between September 9-13, 2022. Predator control activities at Port Allen Harbor in 2023 were focused on trapping in areas where cats are known to be present, based on past monitoring data and what was being reported by biologists. H. T. Harvey & Associates search biologists typically record the number and locations of free-roaming cats that are observed during downed seabird search and monitoring activities, during both evening and pre-dawn survey periods, and report those

observation quickly and efficiently to HDOT Harbors Division personnel. Three cats were recorded at Port Allen Harbor in 2023. Harbors Division staff deployed one Tomahawk-style live trap at Port Allen Harbor, four days per week, Monday through Thursday. Two cats were captured (October 13 and 28) at Port Allen Harbor in 2023. Harbors Division retains the services of a licensed animal control team that are notified and take possession of cats, when captured, the same day. Although evaluating the efficacy of HDOT's predator control efforts at Port Allen Harbor in 2023 was limited by small sample sizes, the information gathered in 2023 suggests on-site animal control efforts are very successful.

#### *Training and outreach*

A total of two PowerPoint presentations were made to eight staff members providing administrative support or working at HDOT Port Allen Harbor that included a review of the Fact Sheet, KSHCP Downed Wildlife Protocol and Incident Documentation and Reporting Form. Periodic check-ins with HDOT Harbors Division staff at HDOT Port Allen Harbor and Nawiliwili Harbor to inquire where assistance may be needed, provide advance notice ahead of periods of higher fallout probability (new moon), heighten awareness, and revisit fundamental elements of seabird awareness, rescue, response, and reporting requirements was also done in 2023.

#### **Sheraton Kauai Resort**

The Sheraton Kaua'i Resort (SKR) retained Dr. Adrian Gall of ABR Inc in October 2023 to serve as the resort's seabird biologist. Gall and ABR staff assisted Loss Prevention Supervisor Dan Sheldon with preparing downed seabird reports and the KSHCP annual report.

#### *Take*

Sheraton documented eight downed Newell's Shearwaters, six of which were released alive from SOS, and two were dead.

#### *Downed Bird Search effort*

SKR's 2023 seabird search effort was conducted by the Security Department with 4–5 dedicated searchers. Daily seabird searches were conducted 1 hour before sunrise (6–7 am) and 3–4 hours after sunset (9–11pm). Searchers used flashlights to search a mapped route of property to include vegetation, under covered areas, and open areas. Daily honu surveys began 15 May. They were conducted every morning before sunrise with one security officer walking the length of the beach lawn and making visual observations of Poipu beach.

In 2022, SKR management introduced a \$250 Incentive Program to reward qualifying associates, contractors, and guests who located a downed seabird or bird decoy. This incentive resulted in random searches by associates and guests in addition to the dedicated search by Security personnel.

SKR associates, contractors, and guests qualified for the \$250 reward if the following criteria were met:

- The first associate(s)/guests to locate a downed bird or decoy must contact Security and remain with the bird until Security could recover the bird and place in SOS Aid Station or report a decoy to Project Technician.
- If multiple associates/guests found a bird at the same time, they could split the reward.
- Associates are required to be on-duty during search.
- Qualifying species included Newell's Shearwaters, Hawaiian Petrels, Band-rumped Storm-petrels, Wedge-tailed Shearwaters, and decoys.

#### *Lighting and facilities*

In 2023, SKR set up 20 BLE (Bluetooth) solar lights on the grounds of the ocean side of the property. Three of those lights were activated only by motion sensors and the remaining 17 lights remained off completely during the fallout season to minimize light attraction.

#### *Predator control*

The predator control vendor set 10 traps which were checked on a daily basis with a total of 3,140 trap nights during the course of the year with a trapping rate of 0.004 cats/traps/night. The property has seen a steady improvement in predator control compared to a trapping rate of 0.018 cats/traps/night in 2022 and no predators removed in 2021 despite 728 trap nights.

#### *Training and outreach*

Worker Seabird Awareness and Response Training was presented to 346 SKR associates to identify covered species and establish procedures. Dedicated Searcher training placed emphasis on search intensity, search method, and reporting. Security staff were also provided with sunrise/sunset schedule and moon phase calendar at the beginning of each month during fallout season. Brochures with a detailed description of Newell's Shearwaters, Hawaiian Petrels, and Band-rumped Storm-petrels were placed in guest rooms and available at Front Desk. Seabird coloring books were also available for guests and visitors. Security personnel attended monthly department meetings of various hotel departments to remind associates of seabird search efforts and predator control.

### **Royal Sonesta Kauai Resort**

After two years of reduced occupancy as a result of the pandemic, the Sonesta Resort resumed normal operations in 2022. Dayton Yamashita (Security Manager) is now the facility contact for the KSHCP. Daniel Esaki (Director of Security) continued to have responsibility for KSHCP compliance, and Sonesta once again hired Kaupena Kinimaka to assist with KSHCP compliance during the 2023 seabird fledging season. Sonesta retained Dr. Adrian Gall (ABR, Inc.) in November 2023 to serve as the resort's seabird biologist. Dr. Gall and ABR staff assisted with preparing downed seabird reports and the KSHCP annual report.

#### *Take*

Six downed seabirds, all of which were Newell's Shearwaters, were found on the property in 2023. All were released alive by SOS.

#### *Downed Bird Search effort*

Searches were conducted through the day, 7 days a week. The entire staff (~239 employees) was responsible for searching their respective work areas during work hours. During the seabird season, search patrols were conducted twice daily within 1 hour before sunrise (6—7am) and 3—4 hours after sunset (9—11pm) with a rotating security staff team of 24 people that were trained for the targeted searches. Six searchers (three in the evening and three in the overnight shift) conducted the dedicated searches for downed seabirds, Honu, and predators during the seabird season. Sonesta Resorts General Manager and Director of Security were responsible for overseeing the seabird protocols, bird searches and recovery, record keeping and reporting.

#### *Lighting and facilities*

No modifications to lighting were done in 2023 after extensive modifications in 2022.

#### *Predator control*

Sonesta Resort hired a commercial pest control service that systematically monitored for predator presence throughout the year. Five traps were deployed and checked daily during the seabird season for a total of 455 trap nights and a catch rate of 0.051 catches per trap night. The resort also posts signs within the resort prohibiting outdoor feeding of cats.

#### *Training and outreach*

Seabird Awareness and Response Training was completed prior to September 15 and within the first day of employment for new employees hired within the fallout season. The training PowerPoint was updated with additional pictures and

content and is included as Attachment C to Sonesta Resort's annual report. Ten PowerPoint presentations were made to a total of 239 staff members that included a review of the fact sheet, KSHCP Downed Wildlife Protocol and Incident Documentation and Reporting Form.



## MINIMIZATION COMPLIANCE SUMMARY

The purpose of this section is to summarize the results of KSHCP Participant compliance monitoring and implementation of minimization measures at participant facilities, and to enable the agencies to monitor compliance with minimization actions at participant facilities. The Participant Annual Reports are a vital component in this process (KSHCP 6.6.2.2(5) and 6.8.1). Effectiveness monitoring helps identify if and when specific measures are effective, or less effective, and provides information on whether existing or proposed minimization or mitigation measures can or should be modified, through Adaptive Management (see [Section 6.9](#)), or whether the KSHCP itself should be considered for amendment.

To facilitate the agencies' effectiveness monitoring, this report summarizes the methods used to minimize light attraction exposure risk for the covered seabirds, ensure sufficient on-site predator control, and that training and outreach, designed to increase the likelihood of finding downed seabirds, is effective. The evaluations presented here are based on the information contained in the Participant Annual Reports. Although not required by the KSHCP, this report suggests evaluation criteria to assist the agencies regarding Participant minimization efforts and efficacy. A separate discussion of the effectiveness of mitigation activities implemented at the Kahuama'a Seabird Preserve in 2023 is provided above.

### Lighting and facilities minimization

Measures to avoid and minimize the impacts of light attraction on the Covered Species are an integral part of the KSHCP. The avoidance and minimization measures outlined below are detailed in Appendix E of the KSHCP (*Guidelines for Adjusting Lighting at Facilities*) and reflect the best available science on seabird-friendly lighting. Briefly, these light minimization measures include:

- Deactivate non-essential lights
- Install full cut-off light fixtures
- Shield light fixtures
- Angle lights downward
- Place lights under eaves
- Shift lighting according to moon phase (during the fall-out period)
- Install motion sensors for motion-activated lighting
- Decrease lighting levels
- Decrease visibility of interior lights
- Use light-less technologies
- Plant vegetation around lights to reduce light visibility
- Lower height of lights
- Use longer light wavelengths

### Results

Overall, the KSHCP Participants ensured that lighting at their Facilities was reduced and modified in compliance with the guidelines set forth in the KSHCP. In some cases, specific lights were completely turned off at the Facilities for the duration of the season. Compared to the 2020 and 2021 Annual Reports, the 2023 reports contained minimal reporting of lighting changes, so it is assumed that lighting changes were not made if they were not reported. Based on the reports and photos provided, all participants have made significant efforts towards reducing light attraction exposure risk to the covered seabirds, at their respective Facilities since the implementation of the KSHCP began in 2020.

### Predator control

Seabirds that are downed at Participant facilities are vulnerable to direct mortality, if depredation by free-roaming dogs, cats, rats, or other predators. Downed seabirds that are subsequently depredated are considered lethal take (see KSHCP [Section 4.2.1](#)). In order to receive incidental take authorization from the USFWS and DLNR, KSHCP Participants are required to reduce the presence of predators at their facilities for the duration of the fallout season. The KSHCP requires that Participants "Conduct a predator trapping and removal program throughout the Covered Property immediately

prior to and throughout the fallout season . . . unless alternative methods are included in an approved PIP . . .”(KSHCP Section 5.3.2).

Although not required by the KSHCP, from a compliance standpoint, one possible metric the agencies may to evaluate efficacy of predator control programs being implemented at Facilities would be whether participants met the minimum number of days of predator control (i.e. conducted trapping throughout the seabird fallout season); a criteria could be based on the number of traps placed relative to the size of the property (i.e. density). While the KSHCP does not provide explicit guidelines for trap spacing at participant Facilities, it allows each participant to implement its own agency-approved predator control plan. One source of best practice guidelines developed and published by the [Pacific Invasives Initiative](#) and used Pacific-wide recommend, in general, a minimum trap spacing of one trap every 500 meters (1640 feet) to as dense as one trap every 50 meters (164 feet). Thus, the minimum of one trap every 500 meters (one trap for every 15 acres, equivalent to 0.067 traps/acre) has been used by Pacific Rim Conservation as a baseline for selecting the minimum number of traps \ based on the size of the covered property or facility. Additionally, the number of animals caught per trap per night was calculated for each facility. This metric is a useful measure of animal abundance over time and can be used to track progress over many years in removing harmful small carnivores from a diverse range of landscapes; as minimization measures continue at each of trapping continues (in the absence of areas where cats immediately outside the area are being fed), we expect removal rates to decrease over time as management actions lessen densities in the vicinity of KSHCP Facilities.

Below, this report compares Participant predator control activities relative to the best practice guidelines presented by the Pacific Invasives Initiative. Of the 191 Facilities included in the KSHCP as of 2023, 47 Facilities were required to conduct predator control. Only 25 of 47 Facilities (53%) conducted and active predator control program, resulting in gaps in predator control coverage. Although it should be noted that 25 Facilities conducting predator control is an increase of four Facilities compared to 2022. Facilities that did not conduct predator control include 19 of 32 (60%) covered properties owned by Kaua’i County. Of the 25 Facilities that did conduct predator control, 24 of these were deemed to be effective on the basis of having achieved the minimum number of trap nights (at least one trap on each night of seabird season) and trap placement, which in 2023 represents a two-fold improvement over 2022. Predator control efforts implemented by each KSHCP Participant at their respective Facilities in 2023 is summarized in Table 6 (below) summarizes the predator control efforts made by each participant and property.

*Table 6: Predator control effort and results for KSHCP Participant Facilities on Kaua’i in 2023.*

Participant	Location	Conducted predator control?	# trap nights	Effort/ trap night	Changes needed?
A & B	Hokulei Shopping Village	Yes	386	0.049	No
A & B	Port Allen Commercial properties	Yes	370	0.068	No
A & B	The Shops a Kukuiula Shopping Center	Yes	371	0.030	No
A & B	Waipouli Town Center	Yes	125	0.016	No
County of Kaua'i	Bryan J. Baptiste Sports Complex	Yes	123.75	0.097	No
County of Kaua'i	Ele'ele Wastewater Treatment	Yes	35.5	0.141	No
County of Kaua'i	Hanapepe Transfer Station	Yes	78	0.346	No
County of Kaua'i	Kaua’i Economic Opportunity	Yes	43.25	0.277	No

County of Kaua'i	Kapaa Transfer Station	Yes	94.5	0.159	No
County of Kaua'i	Kealia Fire Station	Yes	5.25	0.190	No
County of Kaua'i	Lima Ola Housing Development	Yes	70.75	0.269	No
County of Kaua'i	Lihue Police Department/Vidinha Stadium	Yes	61.5	0.114	No
County of Kaua'i	Lihue Transfer Station	Yes	115.5	0.511	No
County of Kaua'i	Lihue Wastewater Treatment	Yes	67	0.060	No
County of Kaua'i	Lydgate Park	Yes	159	0.176	No
County of Kaua'i	Spouting Horn Park	Yes	46.5	0.043	No
County of Kaua'i	Hanapepe Veterans Cemetery	Yes	57.75	0.225	No
County of Kaua'i	Remaining 19 Category 3 properties	No	0	0.000	Conduct predator control
HDOT	Lihue Airport	Yes	1020	0.011	No
HDOT	Nawiliwili Harbor	Yes	108	0.074	No
HDOT	Port Allen	Yes	52	0.038	No
Kaua'i Coffee Company	Factory and Fields- Kalaheo	Yes	10	0.300	Increase # trap nights
EssexEssex House Condominium Corporation	Royal Sonesta Kauai Resort	Yes	455	0.051	No
NCL	Two vessels	Yes			N/A (not required)
Sheraton Kauai Resort	Sheraton Kauai Resort	Yes	3150	0.004	No
SOF-XI Kauai PV Hotel, LP	1 Hotel Hanalei Bay	Yes	364	0.011	No

In total, 326 feral cats were removed from participant Facilities during the 2023 seabird fallout season- an increase of 19% over the 274 feral cats removed in 2022. Predator control efficacy varied among Participant Facilities which related to effort, expertise, and site-specific variables such as proximity to known feral cat colonies and the experience and skill of contractors selected to conduct the work. Despite the presence of some variability, predator control efforts have shown increasing success in each successive year with substantive improvements compared to the first 3 years of KSHCP implementation.

#### *Conclusions and recommendations*

All of the KSHCP Participant Facilities that participated in predator control appear to have sufficient trap coverage based on the size of their facility. The one property that did conduct predator control, but where trapline effort was

determined insufficient, deployed traps for only 10 of the 92 nights of the seabird season. Thus, simply increasing the number of trap nights would bring that property into conformance with the criteria discussed above.

### Training and Outreach

An important step in reducing mortality of downed seabirds is quick discovery and rapid and efficient recovery (i.e. securing the rescued seabird and admission to a licensed rehabilitation facility, such as SOS, for rehabilitation). This is most likely to occur when on-site staff and workers are properly able to identify the covered seabirds, and that they are able to understand and fully implement the basic procedures for detecting grounded seabirds, and safely rescuing them.

As anticipated in Participants' approved PIPs, each KSHCP Participant conducted annual training and outreach for workers and personnel at their facilities. The training is specific to the KSHCP and the covered seabirds in order to help workers spot downed seabirds and how to respond in a timely and effective manner. The goal was to train workers who will be responsible for the monitoring of downed seabirds at facilities, and who may find a downed seabird incidentally while performing other duties. In 2023, 2,380 staff and workers associated with the KSHCP participant Facilities were directly trained on seabird identification and response. While there was a decrease from 2022, this was primarily due to NCL operating only two ships in 2023, and the reduced number of vessels reduced the number of persons trained in their comprehensive staff training program. The quality of materials and information presented across all KSHCP Participants was high and Participants should be commended for the amount of effort that was put into staff training in 2023.

In addition to training of workers and staff, Participants also produced and offered seabird outreach materials tailored to their customers, guests, or the public who may be present at their facilities during the seabird fallout season. These materials were meant to supplement efforts of Participant staff members by encouraging more "eyes on the ground" to identify and recover downed seabirds. For tourism-based facilities (1 Hotel Hanalei Bay, Royal Sonesta Kauai Resort, Sheraton, and NCL) outreach to guests was the main form of public outreach. Commercial properties (HDOT, Kaua'i County and Port Allen Commercial facilities) posted informational fliers in staff rooms and common areas around property to further reinforce training. Retail properties owned by A&B received a tri-fold brochure, and a letter outlining seabird friendly lighting requirements. Overall, outreach at each KSHCP Participant Facility was adequate and professionally presented.

## TAKE MONITORING EFFECTIVENESS

Take monitoring compares actual rates of take to permitted levels of take, based on each Participant's approved Covered Seabird Monitoring Plan in its Participant Inclusion Plan (PIP). Methods for determining the amount of take of covered species ("take calculations") are set forth in KSHCP Section 6.2.2.1. Each Participant's ITP and ITL requires that the Participant "calculate their annual lethal and non-lethal take using the methodology described in the KSHCP and with the discovery rate within their approved Participant Inclusion Plan." This summary of take monitoring effectiveness first summarizes Participants' covered seabird monitoring, and then presents tables comparing the Participants' calculated rates of take to permitted amounts. Each permit and license also has a take limit based on a 5-year rolling average, which is not addressed in this report,

The take calculation begins with finding and documenting downed seabirds. Protocols for recovery of downed seabirds set forth in KSHCP section 5.3.4.1. These general guidelines are summarized in KSHCP table 6-4 (repeated below as Table 7), but are also modified for those Participants who have different site-specific protocols in an agency-approved PIP.

*Table 7: Take monitoring components and KSHCP guidelines used by KSHCP Participants.*

Take monitoring component	KSHCP Guideline
Detailed maps of the property indicating structures and property features (including all light sources); topography; any unsearchable areas; and the proposed search route	All searchable areas must be covered in defined search routes (attach map). Justify "unsearchable areas". <sup>i</sup>
Description of annual training for searchers	Must cover seabird identification, seabird handling, appropriate downed birds search methods, and response procedures. Recommend training to occur immediately prior to Sept 15 (start of fallout season). <sup>i</sup>
Time of Year of searches	Searching should occur twice nightly between Sep 15 and Dec 15. <sup>i</sup>
Frequency of searches	Minimum of twice nightly (or more frequently if possible); searching should be intensified during the peak of fallout (Oct 1 –15). <sup>i</sup>
Time of day of searches	The peak of fallout generally occurs around 2 hours after sunset – <b>searches should therefore commence 3-4 hours after sunset.</b> An additional search should take place within <b>1 hour before sunrise</b> to find birds that were grounded during the night. <sup>i</sup>
Search methods	Specify, e.g. vehicle versus walking; looking under and around objects as opposed to just patrolling; searching with flashlight, etc. <sup>i</sup>
Record keeping method	Downed Wildlife Form and photographs required for each bird found.

Presence of seabird predators on site (cats, dogs, mongoose)	Record any predators seen during searches and inform management taking actions to reduce predators at facilities, and what action(s) taken to remove predators from the area. Records should include the type and date of predators sighted, and the timing of response actions and outcome. li
Number of searchers needed to cover area.	Depends on site conditions and safety considerations. <sup>i</sup>

i See Section KSHCP Section 5.3.4.1.

ii See Section KSHCP Section 5.3.2.

#### *Honu Monitoring and Protection*

It is anticipated that take of Honu will be avoided through monitoring and measures to protect turtle nests. These measures include avoiding and minimizing Honu hatchling disorientation due to lighting at beachfront facilities by implementing best lighting practices as specified in PIPs, and protecting any nests at facilities via shielding as needed. Thus, Participants with the potential to have Honu on their property were required to determine the status of Honu nests and to report on the monitoring and measures taken to avoid take of Honu if nest(s) were found.



Table 8: Summary of results of take monitoring at KSHCP Participant covered properties and facilities on Kauaʻi in 2023.

Owner	Property or Facility	# of birds found	Search routes provided	Training documents?	Search dates	Search times	Methods documented?	Take log submitted	Predator presence recorded on site	Report submitted on time?
A & B	Hokulei Shopping Village	2	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	Yes	yes	No
A & B	Port Allen Commercial	5	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	Yes	yes	No
A & B	The Shops at Kukuiaula	0	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	N/A	yes	No
A & B	Waipouli Town Center	0	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	N/A	yes	No
County of Kauaʻi	Multiple	1	No	No	Sept 15 – Dec 15	Once daily	Yes	No	yes	Yes
HDOT	Lihue Airport	3	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	Yes	yes	Yes
HDOT	Nawiliwili Harbor	8	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	Yes	yes	Yes
HDOT	Port Allen Harbor	0	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	Yes	yes	Yes
Essex House Condominium Corporation	Royal Sonesta Kauai Resort	6	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	Yes	yes	Yes
Kauai Coffee	Factory and Kalaheo	00	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	N/A	yes	Yes
NCL	NCL	2	No	Yes	Sept 15 – Dec 15	Continuous (min. twice per 8-hour shift)	Yes	Yes	No	Yes
SOF-XI Kauai PV Hotel, LP	1 Hotel Hanalei Bay	20	Yes	yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	Yes	Yes	Yes
Sheraton Kauai	Sheraton Kauai Resort	8	Yes	Yes	Sept 15 – Dec 15	3-4 hrs after sunset, and 1 hr of sunrise	Yes	Yes	Yes	Yes

## TAKE MONITORING AND SUMMARY OF CHANGES

This section reports on the outcomes and whether cumulatively, Participants are in compliance with the KSHCP.

In total 53 Newell's Shearwaters and two Hawaiian Petrels were found on Participants' Facilities during the 2023 seabird fallout season. This was the first documented Hawaiian Petrel take of the program, with the number of Newell's Shearwaters more than double the Newell's Shearwater take from 2022. Both Hawaiian Petrels (100%), and 49/53 (92%) of the downed Newell's Shearwaters were released alive after being brought to, and receiving care from, the Save our Shearwaters (SOS) facility. No downed Band-rumped storm-petrels or Honu nests were found during the 2023 season. Five additional Newell's Shearwaters were found by A&B personnel near Port Allen, but not on A&B property (i.e. not covered under the KSHCP); two were released alive and the rest were either found dead or euthanized upon intake at SOS. A Wedge-tailed Shearwater was also found in the Port Allen area; this bird was turned in to SOS by the A&B searchers and was reportedly released alive.

Seabird fallout on at KSHCP facilities was again high in 2023, especially for Newell's Shearwaters and increased over numbers reported in 2022. Lethal take increased considerably as the numbers of birds that are documented increases, since the KSHCP applies a discovery rate of at least 50% and mandates a take calculation method that assumes a certain mortality rate for discovered birds.

The well-documented close association between the new moon lunar period and peak fledging of Newell's Shearwaters on Kaua'i was again evident in the 2023 fallout patterns. Peak fallout vulnerability occurs during a roughly three-week period and nearly half of the downed seabirds that were documented on KSHCP Participant Facilities were found over a single week in October which closely followed the trend observed in 2022. The timing of the moonrise and moonset may further affect light attraction vulnerability of seabirds, particularly for Newell's Shearwaters, during peak fledging. Specifically, during the roughly 11-day period between October 10-20, 2023 (corresponding with the relative peak in fallout), the moon rose no earlier than 3 AM (and in most cases no earlier than one to two hours prior to sunrise) and set no later than about 11 PM (and in most cases either before or within one hour after sunset), thereby resulting in very limited periods of actual moonlight even on nights that did not correspond to a new moon. Understanding how the lunar cycle affects seabird fallout vulnerability allows KSHCP Participants to plan accordingly for enhanced search and light attraction minimization vigilance during and leading up to the peak fledging period.

*Table 9: Summary of all covered seabirds documented at KSHCP Participant properties and facilities on Kaua'i in 2023*

Date	Time	Property	Species	Status	#
8/22/23	15:15	Pride of America	NESH	Alive- released	1
9/24/23	6:35	Pride of America	HAPE	Alive- released	1
10/7/23	21:13	Sheraton Kauai Resort	NESH	Alive- released	1
10/8/23	21:44	Royal Sonesta Kauai Resort	NESH	Alive- released	1
10/8/23	18:53	Royal Sonesta Kauai Resort	NESH	Alive- released	1
10/8/23	21:00	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/9/23	12:30	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/9/23	22:15	Nawiliwili Harbor	NESH	Alive- released	1
10/10/23	21:23	Sheraton Kauai Resort	NESH	Alive- released	1
10/10/23	unknown	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/10/23	2030	Port Allen Marina Center	NESH	Alive- released	1
10/11/23	20:31	Sheraton Kauai Resort	NESH	Alive- released	1
10/11/23	2239	Port Allen Marina Center	NESH	Alive- released	1

10/11/23	0545	Port Allen gravel parking Lots	NESH	Found dead	1
10/12/23	19:51	Royal Sonesta Kauai Resort	NESH	Alive- released	1
10/12/23	12:57	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/12/23	19:28	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/12/23	630	Kaua`i County-Faye Park	NESH	Alive- released	1
10/13/23	unknown	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/13/23	6:00	Sheraton Kauai Resort	NESH	Alive- released	1
10/13/23	20:02	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/14/23	unknown	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/14/23	10:10	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/14/23	21:40	Nawiliwili Harbor	NESH	Alive- released	1
10/14/23	22:00	Nawiliwili Harbor	NESH	Alive- released	1
10/14/23	2143	Port Allen Marina Center	NESH	Alive- released	1
10/14/23	2223	Port Allen Steel Warehouse	NESH	Alive- released	1
10/15/23	unknown	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/15/23	21:27	Nawiliwili Harbor	NESH	Alive- released	1
10/15/23	2125	Hokulei Village	NESH	Alive- released	1
10/16/23	21:14	Sheraton Kauai Resort	NESH	Alive- released	1
10/16/23	18:54	Sheraton Kauai Resort	NESH	Alive- released	1
10/16/23	9:18	Royal Sonesta Kauai Resort	NESH	Alive- released	1
10/16/23	21:31	Royal Sonesta Kauai Resort	NESH	Alive- released	1
10/16/23	20:09	Royal Sonesta Kauai Resort	NESH	Alive- released	1
10/16/23	8:10	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/16/23	21:06	Lihue Airport	NESH	Alive- released	1
10/17/23	09:00	Lihue Airport	NESH	Alive- released	1
10/17/23	20:58	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/18/23	9:01	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/18/23	22:53	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/18/23	21:19	Nawiliwili Harbor	NESH	Alive- released	1
10/19/23	12:30	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/19/23	23:25	Nawiliwili Harbor	NESH	Alive- released	1
10/19/23	0549	Hokulei Village	NESH	Alive- released	1
10/20/23	7:30	1 Hotel Hanalei Bay	NESH	Alive- released	1
10/20/23	0:45	Sheraton Kauai Resort	NESH	Found dead	1
10/20/2023	21:10	Nawiliwili Harbor	NESH	Alive- released	1
10/25/23	00:30	Lihue Airport	NESH	Found alive; euthanized	1
11/01/2023	22:05	Nawiliwili Harbor	NESH	Alive- released	1
11/11/23	6:28	1 Hotel Hanalei Bay	NESH	Alive- released	1
11/12/23	12:39	1 Hotel Hanalei Bay	NESH	Alive- released	1
11/17/23	5:27	Sheraton Kauai Resort	NESH	Found alive; euthanized	1
11/22/23	3:49	1 Hotel Hanalei Bay	NESH	Alive- released	1
11/29/23	20:14	1 Hotel Hanalei Bay	HAPE	Alive- released	1

Table 10: Total 30 year take of Covered Seabirds as calculated in Participants' PIPs.

Property or Facility	NESH		HAPE		BANP	
	Lethal	Non-lethal	Lethal	Non-lethal	Lethal	Non-lethal
A&B- Multiple	104	80	3	3	1	1
Kaua'i County-Multiple	276	217	17	4	4	0
HDOT-Lihue Airport	22	43	3	6	1	2
HDOT-Nawiliwili Harbor	13	48	2	6	0	0
HDOT-Port Allen Harbor	53	68	0	0	0	0
Kauai Coffee	34	26	0	0	0	0
Royal Sonesta Kauai Resort	33	21.2	1	1	1	1
NCL	30	30	6	6	6	6
1 Hotel Hanalei Bay	125	475.2	6	6	1	1
Sheraton Kauai Resort	81	64	1	0	3	1

Table 11: Calculated seabird take for all KSHCP Participants in 2023.

Property or Facility	NESH		HAPE		BANP	
	Lethal	Non-lethal	Lethal	Non-lethal	Lethal	Non-lethal
A&B- Multiple	8.72	5.28	0	0	0	0
Kaua'i County-Multiple	1.12	0.88	0	0	0	0
HDOT-Lihue Airport	2.24	1.76	0	0	0	0
HDOT-Nawiliwili Harbor	1.85	7.04	0	0	0	0
HDOT-Port Allen Harbor	0	0	0	0	0	0
Kauai Coffee	0	0	0	0	0	0
Royal Sonesta Kauai Resort	6.72	5.28	0	0	0	0
NCL	1.12	0.88	1.12	0.88	0	0
1 Hotel Hanalei Bay	4.39	16.72	0.231	0.88	0	0
Sheraton Kauai Resort	6.24	1.76	0	0	0	0
<b>Total 2023 Participant Take</b>	<b>32.40</b>	<b>39.6</b>	<b>1.351</b>	<b>1.76</b>	<b>0</b>	<b>0</b>
Take 2020-2022	41.91	31.4	1.1	0	0.12	0.88
<b>Cumulative Participant Fledgling Take Since May 2020</b>	<b>74.31</b>	<b>71</b>	<b>2.451</b>	<b>1.76</b>	<b>0.12</b>	<b>0.88</b>
Maximum Anticipated Annual Take of Fledglings*	30	45	2	2	1	1
Maximum Anticipated Take of Fledglings over 30 years*	900	1350	60	60	30	30

\* From KSHCP Table 4-1. Table 4-1 also separately describes maximum anticipated take of adults or sub-adults and eggs/chicks.

#### Facility changes-

There were no changes in ownership during the 2023 seabird season. However, prior to the start of the 2023 season, A&B sold one of its properties at Port Allen that was previously covered by the KSHCP.

## **FINANCIAL REPORT**

The financial report is attached as a separate document produced by the fiscal sponsor, the National Fish and Wildlife Foundation (NFWF). As required by the contract between NFWF and the KSHCP Participants, the report period covers 1 Oct 2022- 30 Sept 2023. Financial reports are therefore presented on this fiscal year basis. Budget overages described in the 2022 report have been resolved through multiple change orders, and there are not any cost overages expected in the foreseeable future. It should be noted that in June 2025 the contract for this project will come up, and costs may vary at that point depending on the contractor selected for this project.