Kahuamaʻa Seabird Preserve Management Report 2025

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Pacific Rim Conservation

INTRODUCTION AND BACKGROUND

The Kauai Seabird Habitat Conservation Plan (KSHCP) Participants' Committee, on behalf of all the individual Applicants, entered into an agreement with the Prime Contractor, Pacific Rim Conservation (PRC), to perform mitigation and project management measures outlined in the KSHCP. PRC has conservation biology and project management experience and holds recovery permits necessary to conduct its work under Section 10(a)(I)(A) of the Endangered Species Act and/or Sections 13-124-4 and 13-124-6 of the Hawaii Administrative Rules.

The KSHCP includes several mitigation activities, one of which was the establishment of a seabird preserve in Koke'e State Park. This preserve is now known as the Kahuama'a Seabird Preserv*e.* The preserve was created by construction of a predator exclusion fence enclosing approximately 2 hectares of suitable seabird breeding habitat and by establishing a seabird social attraction site within the fence. This report describes the management activities conducted at the Kahuama'a Seabird Preserve in 2025 by PRC. This report also will be included as part of the larger report that includes all aspects of the KSHCP. The specific management activities associated with management of the Kahuama'a Seabird Preserv*e* are:

1. Construction and long-term maintenance of the 2-hectare predator exclusion fence.
2. Installation and long-term maintenance of seabird social attraction equipment (sound system, speakers, solar panel, artificial nest boxes) within the fence.
3. Eradication of predators from within the fence and implementation of long-term predator control at the site.
4. Monitoring for predator incursions within the fence.
5. Barn owl control around the preserve and in the surrounding Kalalau Valley area.
6. Feral cat control around the SAS and neighboring source colonies in Kalalau Valley.
7. Invasive plant control within the enclosure and along a 50m strip outside the fence.
8. Monitoring of the covered seabirds and the artificial nest boxes, including the physical handling and banding of any birds encountered by trained, permitted staff.
9. Nocturnal acoustic monitoring of seabird activity in the area around the fence.

Table 1: Timeline of activities at the Kahuama'a Seabird Preserve since its inception in 2020.

	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																				
Sound system installation									x																				
Artificial nest box installation								x																					
Habitat restoration																													
Weeding								x		x		x			x		x	x				x		x			x		x
Out planting									x																				
Botanical surveys			x			x				x		x			x		x	x											
Predator control																													
Rodent trapping inside fence								x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	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
Seabird monitoring																													
Auditory surveys	x	x	x	x					x	x	x	x	x	x							x	x	x	x	x				

Fence maintenance

The predator exclusion fence was completed on 28 June 2021, and since then the focus has been on maintenance of the fence, preventing predator incursions, and responding to any incursions that occur. Fence inspections are done monthly, and the fence also is checked opportunistically when working in the area. Fence inspections include checking the

integrity of the hood, mesh, posts, and skirt, clearing any fallen branches or other obstructions, and covering any exposed areas of the skirt. The path surrounding the outside of the fence experiences soil erosion due to traffic from humans, pigs, goats, and deer, and also from rainfall and drainage. The fence is in good condition overall and required no major fence maintenance in 2025, but various small fence maintenance actions were conducted occasionally. Activities have included covering areas of the skirt where it had been exposed by erosion from rain or rooting of feral pigs, weed-whacking along the exterior of the fence to remove invasive plants and facilitate fence inspections. In August 2025, the skirt was starting to be exposed in the southwest corner of the fence. This was a problem area several years ago due to rooting by feral pigs around the fence. This problem was corrected by digging underneath the skirt and then reburying it deeper (Figure 1).

Figure 1. Before (left) and after (right) fence maintenance that involved burying the skirt deeper on the southwest corner of the fence to prevent rodents from getting under the skirt.

Seabird Surveys, Social Attraction, and Biological Monitoring

Biological monitoring

To facilitate effective, long-term monitoring at the site, in 2020 a monitoring grid was installed to conduct bird, vegetation, and rodent surveys (Figure 2). The grid consists of stations inside the fence spaced 25 m apart and marked with white PVC poles. The grid is maintained monthly.

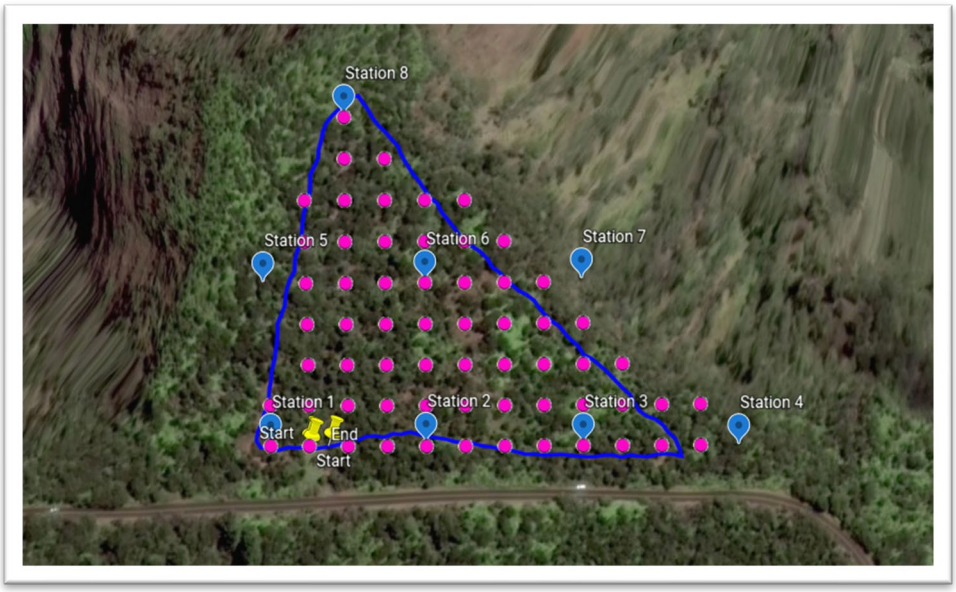

Figure 2**.** Biological monitoring grid installed at the Kahuamaʻa Seabird Preserve. The blue line is the fence, the pink dots are the 25-meter grid points, and the blue stations were used for forest bird surveys but are no longer in use.

Seabird Surveys

Ground Searching

Prior to fence construction, auditory surveys and burrow searches were conducted in the area of the Kahuama‘a Seabird Preserve to document whether any seabirds were present and to ensure that construction activities did not impact any nesting seabirds. Survey areas consisted of three transects covering each side of the fence line: one covering the 80-m section of old ungulate fence line facing east, one covering the 300-m northeastern facing fence line, and one encompassing the 50-m section facing west (Figure 3). 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. Two transects were created for the seabird burrow surveys inside the ungulate fence, covering a total area of 0.39 acres. Transects were spaced 5 m apart, running parallel to the northeastern side of the fence line. Two staff equipped with GPS units and pink flagging walked each transect from east to west. The total seabird survey area covered was 14,172.1m^2 (3.50 acres), including 10,614.88m^2 (2.62 acres) outside the fence line and 1,583.48m^2 (0.39 acres) inside the fence line. No Newell’s Shearwater or Hawaiian Petrel chicks, adults, or burrows were detected during surveys.

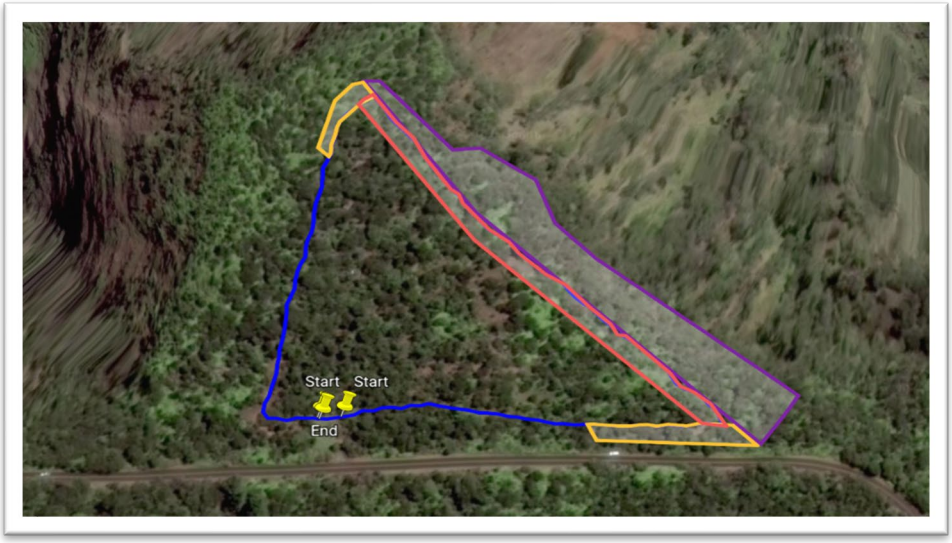

Figure 3: Seabird survey area at Kahuama‘a. The blue line is the fence, and the yellow, pink, and purple polygons are the areas of potential seabird nesting habitat in which thorough ground searches were done before fence construction.

Seabird Auditory Surveys

Auditory surveys were conducted on eight dates in 2025: 13-14 May, 12-13 June, 7-8 July, and 4-5 August. On each pair of dates, two observers conducted surveys for two hours after sunset and then again for two hours before sunrise the following morning, which are the peak calling times for HAPE and NESH, respectively. A few surveys were shorter than prescribed because of weather, and there were a total of 1650 minutes, or 27.5 hours, of data collection. During auditory surveys, observers listened and looked for seabirds. When seabirds were detected, the following data were collected: species, time, number of individuals detected, number of calling bouts, compass bearing, and estimated distance from observer. During auditory surveys, the sound system broadcasting NESH calls was turned off to ensure that it did not interfere with the survey.

Table 2: Total number of seabird detections and average calling rate during nocturnal auditory seabird surveys at Kahuama‘a in 2024.

Species	Total # detections	Average calls per hour
Newell’s Shearwater	470	17.1
Hawaiian Petrel	29	1.1
Band-rumped Storm-petrel	0	0

Newell’s Shearwaters were the most frequently detected species, as in all previous years. The average calling rate of Newell’s Shearwaters in 2025 was 17.1 per hour, which was higher than the rate in 2024 (15.1 calls/hr) but lower than

that in 2023 (35 calls/hr). The average calling rate of Hawaiian Petrels in 2025 was 1.1 calls/hr, which was lower than the rate in 2024 (6.2 calls/hr) and much lower than in 2023 (12 calls/hr). Band-rumped Storm-petrels were not detected at all in 2025, or in 2024, and were last detected in 2023. The reason for the decline in calling rate of all three species is unknown. Hawaiian Petrels and Newell's Shearwaters both were observed flying closely overhead on several surveys and appeared to be circling the site.

No Barn Owls were detected during auditory surveys in 2025 or 2024, compared to two owls detected in 2023 and 19 detected in 2022.

Seabird Social Attraction

Once the predator-proof fence was completed, the social attraction component of the project was implemented to encourage the target seabird species to visit the project site and eventually breed. Social attraction is a well-established conservation strategy to encourage seabirds to breed in a prescribed location by simulating colony activity through the playback of recorded calls. The installation of artificial nest boxes can make the site more attractive and can decrease the time until breeding begins, and eventually may increase colony productivity by providing ready-to-use nest sites.

The sound system was designed and built by Eric VanderWerf (PRC) and was installed on 12 May 2021. The system consists of a solar panel, a rechargeable 12-volt battery, two directional waterproof speakers, and a waterproof pelican case that houses a solar charge controller, an mp3 file player, and an amplifier. The speakers are directed towards the northeastern facing slope to attract birds that are flying in Kalalau Valley.

The system played a mix of several different 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 colony and included different calls typical of colony sounds to make it as attractive as possible. The system automatically turned on at sunset and off at sunrise. The system was deployed from March to October, which is the period of highest prospecting activity by all three target seabird species. During times when acoustic surveys were being conducted, the sound system was turned off to assist in detecting real birds.

Decoys of a Newell's Shearwater and a Hawaiian Petrel were placed near one of the speakers in 2025 to provide another form of social attraction. In general auditory attractants are thought to be more important for nocturnal seabirds like Newell's Shearwater and Hawaiian Petrel, but decoys may help.

In addition to the acoustic attraction system, 100 artificial nest boxes suitable for both Hawaiian Petrels and Newell's Shearwater were constructed and installed at the site in 2021 (Figure 4). These artificial nest boxes are an important part of best management in a social attraction site because they provide nest sites that are ready to use and thus can expedite the process of establishing a breeding colony at a new site. Burrow excavation by a newly established breeding pair can take a year or more. Artificial burrows have been used in almost all successful social attraction sites documented in the literature. Not only do they increase the likelihood of earlier success at the social attraction site and increase the density of nesting pairs in an area, they also make the monitoring of nests easier and less likely to cause disturbance to burrows and birds. Burrows were constructed by a local contractor using specifications provided by PRC and were painted with reflective roofing sealant to reduce the internal temperature of the boxes and to prevent wood rot. Burrows were installed along the northeastern ridge on the steepest slopes within the reserve and within the area where the sound system was deployed. Burrows were monitored weekly during the breeding season in 2025.

Figure 4: Photographs of completed artificial nest boxes installed at Kahuama‘a Seabird Preserve.

A Newell’s Shearwater was documented in trail camera photos visiting the social attraction site within the Kahuama’a Seabird Preserve on three nights in 2025, on 14 May, 18 May, and 22 May (Figure 5). These were the first visits to the preserve by a Newell’s Shearwater and represent an important milestone for the project. In the photo on 14 May the bird can be seen calling, probably in response to the sound system. On all three occasions the bird was near a decoy. A Hawaiian Petrel was documented in trail camera photos visiting the social attraction site within the Kahuama‘a fence on 20 June 2025 (Figure 6). A single Hawaiian Petrel also visited the social attraction site on multiple nights in 2024. The sound system operated properly during the entire season. It is hoped that visitation by Newell’s Shearwaters and Hawaiian Petrels will increase in future years.

Figure 5. Photos of a Newell’s Shearwater visiting the social attraction site within the Kahuama’a Seabird Preserve on 14 May 2025 (left) and 18 May 2025 (right). These were the first visits to the preserve by a Newell’s Shearwater. In the photo at left the bird can be seen calling, probably in response to the sound system. On both occasions the bird was near a decoy.

Figure 6. Photo of a Hawaiian Petrel visiting the social attraction site within the Kahuama'a Seabird Preserve on 20 June 2025.

HABITAT RESTORATION

The Kahuama'a Seabird Preserve predator-proof fence is expected to benefit native vegetation and rare plants, in addition to providing high-quality seabird nesting habitat. The habitat at the site is dominated by native vegetation, but certain invasive plants are present, especially within the understory. Seabird habitat suitability mapping exercises consistently identify native vegetation as an important 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 and that are present and targeted for removal at the Kahuama'a Seabird Preserve are listed in Table 3.

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

Common Name	**Scientific Name**	**Priority**
Strawberry guava	*Psidium cattleianum*	*1*
Himalayan (kahili) Ginger	*Hedychium gardnerianum*	*1*
Australian tree fern	*Sphaeropteris cooperi*	*1*
Blackberry	*Rubus argutus*	*2*
Banana poka	*Passiflora tarminiana*	*2*
Beardgrass	*Schizachyrium microstachyum*	*2*
Koster's curse	*Clidemia hirta*	*2*
Daisy fleabane	*Erigeron karvinskianus*	*3*
Air plant	*Kalanchoe pinnata*	*3*

In 2025, PRC removed invasive plant species regularly during other field work. The dominant species addressed were Himalayan ginger, banana poka, and blackberry. Primary areas in which the team weeded were along the main 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 fern (*Dicranopteris linearis*), which is known to promote seabird breeding.

PREDATOR CONTROL AND ERADICATION

The susceptibility of the covered seabirds to predation by feral cats and barn owls suggests that feral cat and barn owl control will result in an increase in the reproduction and numbers of seabirds breeding in Kalalau Valley. Based on the locations of breeding colonies within the Kalalau Valley (Section 5.4, Figure 5-1 and *Appendix A: Kahuama'a Seabird Preserve Management Plan*), it was estimated that trapping along the rim of Kalalau Valley would achieve a 30% reduction in the number of shearwaters predated by feral cats. Therefore, cat trapping locations were selected to follow the rim of Kalalau Valley to protect key seabird nesting populations in Kalalau Valley and at key ingress points into Kalalau Valley. Feral cats are known to use the roads and trails in the vicinity of the Kahuama'a 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 Natural Area Reserve), and Honopū, all of which are potential source populations for the Kahuamaʻa Seabird Preserve.

Site Descriptions

Kalalau Rim. The Kalalau rim is a high cliff area which falls over a thousand meters into the Kalalau Valley. Due to the steepness and inaccessibility of the cliffs, there are many rare, endemic plants that 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 comprising much of the ground cover. Kokeʻe road follows the Kalalau rim and was selected as a logical location for trap placement.

Alakaʻi Swamp Trail. Feral cats have been observed on the road to Pihea by Hawaii Division of Land and Natural Resources (DLNR) staff, and DLNR camera data reflects significantly higher numbers of cats moving along trails and fence lines than in 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 Alakaʻi region. This area covers critical ingress points into seabird colonies and was not being managed for cats prior to the KSHCP and thus fills a critical need in protecting key listed seabird populations.

Cat Trapping Methods

Detailed trapping methods can be found in the appendix of the KSHCP. In summary, Tomahawk live traps have been used each year 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 were either baited with food or had lures inside designed to attract the 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 included cat toys, metal lids, 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 10 trap nights per trap every month. Traps that were not monitored by real-time transmitting cameras (described below) were manually checked every 48 hours. Traps with cameras attached were generally opened on a Monday and closed on Friday, and their transmitting cameras were checked daily. When traps were not active, they were locked open without bait to allow cats to enter and become familiar with them, increasing the likelihood of successful trapping during subsequent visits.

The number and location of traps has varied somewhat in each year of the KSHCP. Traps have been relocated occasionally because of issues with theft or vandalism or in an attempt to increase the chance of trapping cats and avoiding non-target animals. In 2025, 16 Tomahawk live traps were located every 100 m along the last 1.4 km of the Alakaʻi Swamp Trail, starting about 1 km from the trailhead on Camp 10 road. Care was taken to locate traps off the trail where they were not visible to the public and to cover them with foliage. An additional 22 Tomahawk live traps were located along the western side of the road along Kalalau Rim extending about 0.5 km along the road from Puʻu O Kila lookout and 0.5 km surrounding the Kahuamaʻa Enclosure. Traps were placed 5-10 m off the road and camouflaged using the same protocols described above.

Fifteen out of 16 cat traps on the Alakaʻi Swamp Trail and 18 out of 22 cat traps along the Kalalau Rim also have Goodnature A24 rat traps deployed near them to reduce bait removal from the traps by rats and increase the chance of trapping cats, which are the primary target.

Trail Cameras

Initially, 15 of 16 cat traps along the Alakaʻi Swamp Traill and 18 of 22 traps along the Kalalau Rim were accompanied by a Cuddelink Cuddeback camera, which was intended to transmit pictures in real time via cellular service to PRC predator technicians to alert them to possible captures. These cameras were used for both camera trapping and monitoring purposes. The cameras were deployed in a chain to transmit pictures to a “home” camera where all images could be viewed in the field and retrieved by replacing a single SD card. The Cuddelink “home” camera was located near Pihea Junction, which allowed for traps to be checked without physically visiting each trap. Camera data were 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 cellular service close enough to either trapline to warrant use of this type of camera.

There have been problems with theft of cameras and with functionality of the automated Cuddeback camera system because of poor cellular coverage. After the theft of two cameras in 2022 and four more in 2023, all cameras were removed from traps on the Alakaʻi Swamp Trail in early 2024. Some of the cameras were repositioned on traps along the Kalalau Rim instead, so that all traps in that area have a camera. Four additional trail cameras have been placed along the predator fence to help monitor for the presence of cats. If cats are photographed along the fence, additional Tomahawk traps are deployed in an effort to catch them.

Rat Eradication and Control in the Kahuama'a Predator Exclusion Fence

Efforts to eradicate rats from inside the fence began in 2021 shortly after the fence was completed (Table 1), using a combination of bait stations and traps. At each of 63 points in the 25-m grid in the fenced area (Figure 1), a tamper-resistant Protecta ® plastic bait station (Bell Laboratories, Madison, Wisconsin, USA) was placed to shield bait from rain and reduce the risk of poisoning to non-target species. Each bait station was filled with up to eight 1-oz Ramik mini-bars® (HACCO Inc., Randolph, Wisconsin, USA) containing 0.005% diphacinone. Diphacinone is the only rodenticide approved for conservation purposes in Hawai'i and thus was the only option available for this project. Bait stations were serviced twice per week during the first month. After that, the frequency was adjusted based on level of consumption 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 2021. At every other grid point, rat tracking tunnels (N=31) were deployed as an additional method to measure the level of rodent presence and were run over a 24-hour period every 3 months.

Barn Owl Observations and Control

Barn Owl control in the Kahuama'a area is done by Hallux Ecosystem Restoration. PRC previously had intended to conduct Barn Owl control before or after evening and morning surveys, if any were observed, but PRC has observed very few Barn Owls in general and has refrained from Barn Owl control so as to not interfere with hunting efforts by Hallux. During the 2025 season, no Barn Owls were observed by PRC during nocturnal auditory seabird surveys. However, a Barn Owl was photographed by a trail camera perched on a log within the Kahuama'a burrow area on 7 August, and another Barn Owl was photographed by a trail camera outside the fence on 3 September (Figure 7). For the 2026 season, PRC intends to enquire with Hallux if they would be okay with PRC resuming Barn Owl control efforts around the Kahuama'a fence, provided we coordinate the timing to avoid nights when they are hunting.

Figure 7. Photos of Barns Owls perched inside the Kahuama'a fence on 7 August 2025 (left) and flying outside the fence on 3 September 2025.

Results

Kahuama'a Predator Eradication

No cats were detected within the fence upon fence completion and thus were considered to have been eradicated through passive methods, since cats can escape from inside the fence but cannot re-enter. Rats and mice were abundant in the fence area prior to fence construction, with about half of tracking cards having rat or mouse track, or both (Figure

6). Rats and mice were thought to have been eradicated by the end of 2021 based on tracking tunnel data, but both rats and mice have been detected on tracking cards inside the fence since then (Figure 8). It is not clear if these individuals represent a small remnant population or occasional incursions into the fence. If they are incursions, the way in which they entered the fence is unknown. A resurgence of Polynesian rats was documented in October 2022 (Figure 8), after which the entire baiting grid was re-activated, because Polynesian rats are more difficult to remove with traps. The baiting grid has been maintained continuously since then, and 10 A24 rat traps also have been deployed continuously. Data from trail cameras indicate a small number of Polynesian rats remain inside the fence (Figure 9), but are rarely detected by tracking tunnels and have not been removed despite the presence of traps and bait. The type of bait used in A24 traps was changed in 2025 in an effort to catch the remaining few rats, but it has not made any difference. Additional different baits will be tested in 2026.

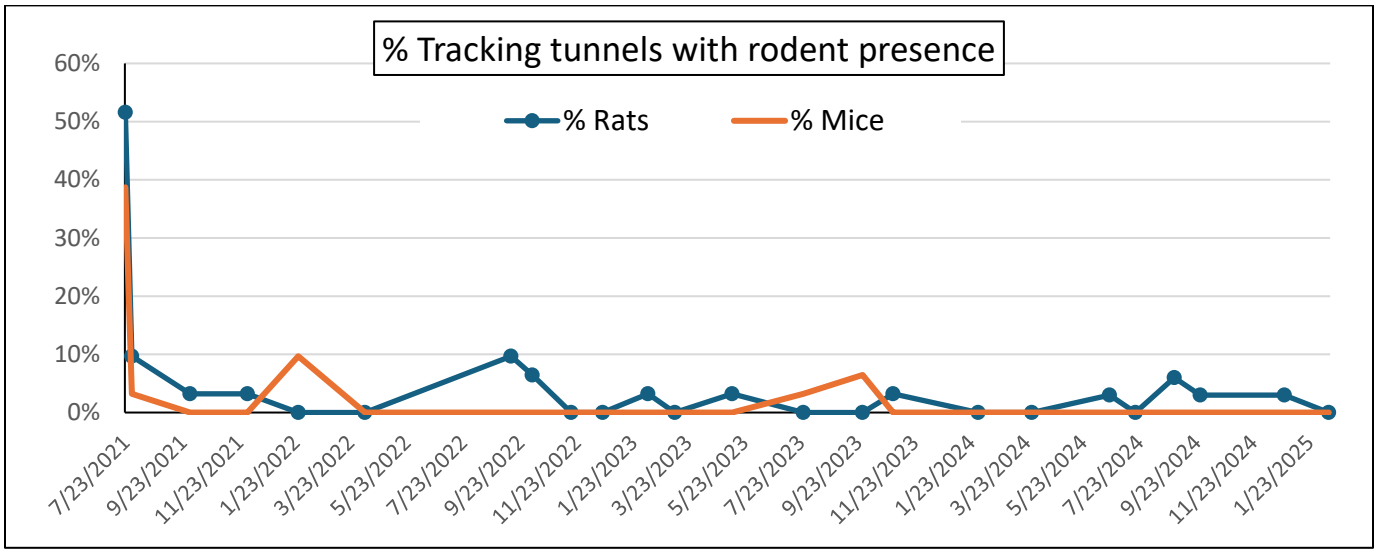

Figure 8. Proportion of tracking tunnels with rat and mouse tracks over time at the Kahuama‘a Seabird Preserve.

Figure 9: Polynesian Rat photographed by a trail camera around burrows on 10/25 and 11/23.

Cat trapping

Cat traps were operated for a total of 3,496 trap-nights in 2025, including 2,024 trap-nights along the Kalalau Rim Trail and 1,472 trap-nights along the Alakai Swamp Trail (Figure 10). The KSHCP prescribes that cat traps be operated for a minimum of 300 nights per month. This goal was achieved in 2025 in all months except January and June. This goal has generally been achieved in most months since the KSHCP began, with a few exceptions caused by bad weather that prevented access, vehicle maintenance, or staff availability. The number of trap-nights has remained fairly steady in each year of the KSHCP (Figure 11).

Nine cats were captured in 2025, including six along the Kalalau Rim and three on the Alaka‘i Swamp Trail, resulting in an overall catch rate of 0.0026 cats/trap-night. As required by the KSHCP, all cats were humanely euthanized. This rate is the same as the average trapping rate of 0.0026 cats per trap night over all years from 2021-2025. A total of 173 rodents

were incidentally captured in cat traps between the two sites in 2024, including 147 black rats (*Rattus rattus*), 21 Norway rats (*R. norvegicus)*, and 0 Polynesian rats (*R. exulans*), and 5 house mice (*Mus musculus*), for a trapping rate of 0.049 rodents per trap night. This rate was higher than the average rate of 0.033 rodents per trap night from 2021-2025 and is the highest rate in any year so far. All rodents were humanely euthanized. Most cats were captured during the spring and summer months (Figure 12), perhaps related to increased movement of cats and the presence of young during the cat breeding season; this pattern has been typical of all years. The number of rodents trapped varied among months, with a decrease during the summer months, again typical of all years (Figure 12). In addition, a total of at least 243 rodents were removed with A24 rat traps in 2025, including 131 on the Alaka'i Swamp Trail and 112 on the Kalalau Rim Trail (Figure 13). The numbers of cats and rodents trapped have varied among years (Figure 14). Trapping effort and trap locations have been similar among years and the yearly variation is thought to be random.

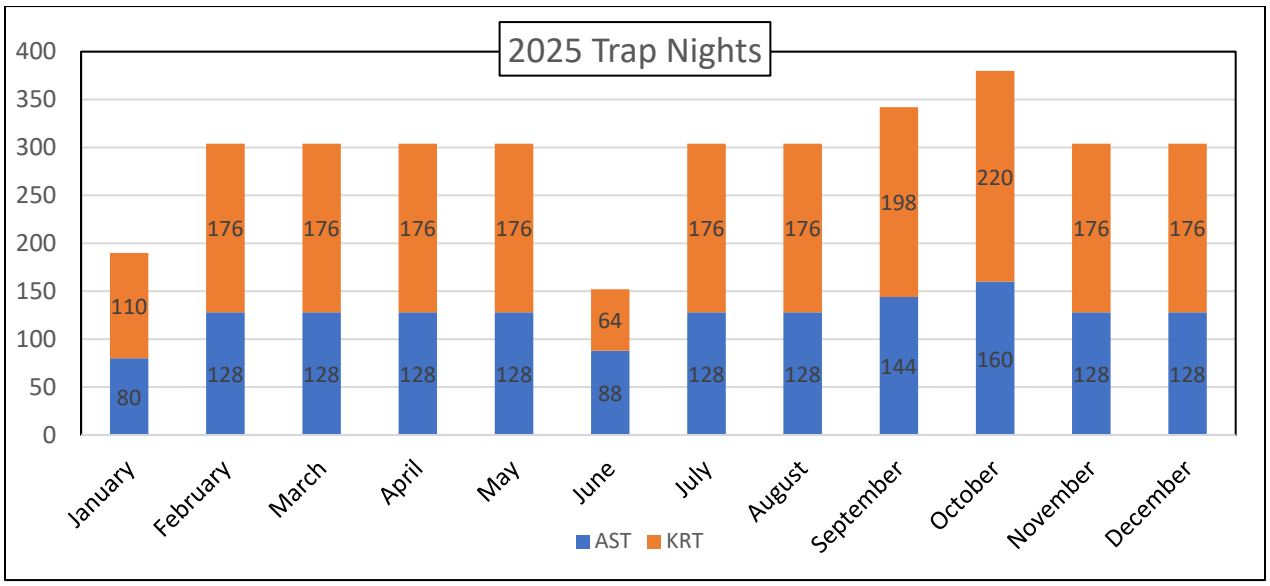

Figure 10. Number of cat trap-nights in 2025 on the Alaka'i Swamp Trail (AST) and Kalalau Rim Trail (KRT). The KSHCP prescribes a minimum of 300 trap-nights per month.

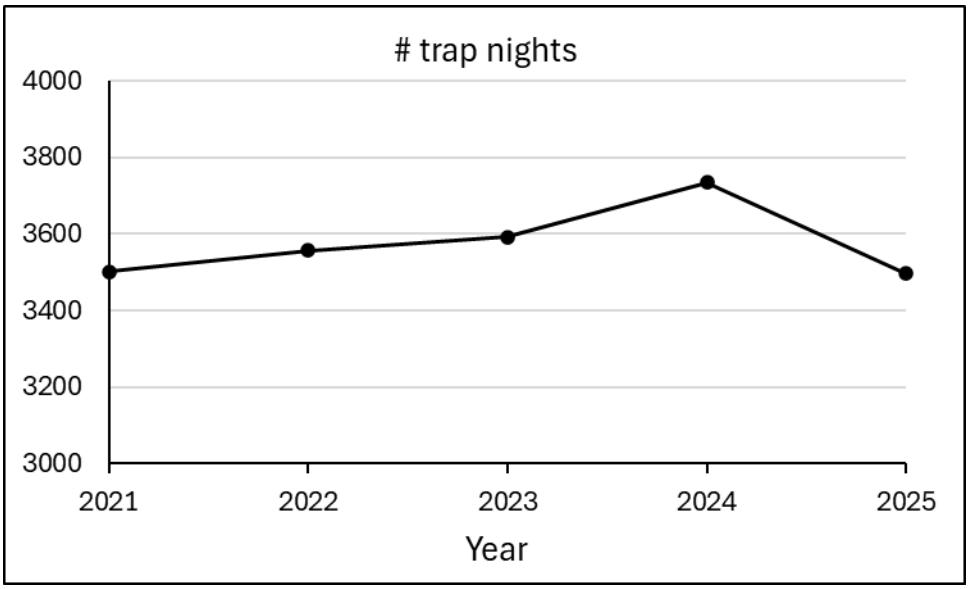

Figure 11. Number of cat trap-nights each year of the KSHCP.

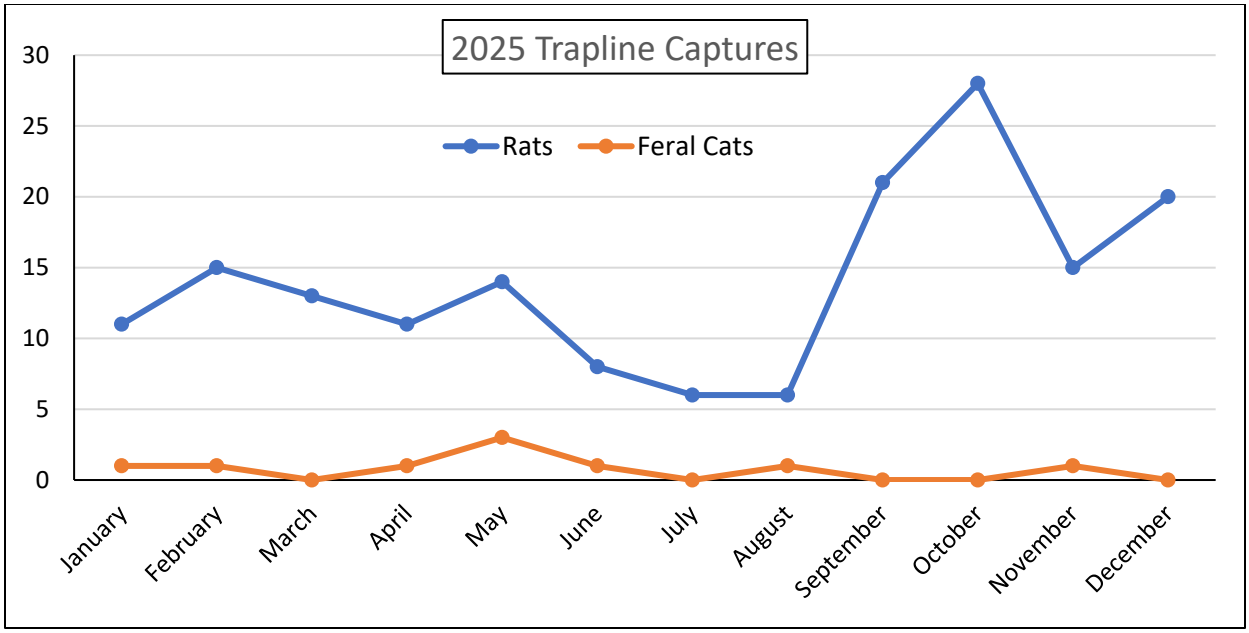

Figure 12: Total number of rodent and feral cat captures along traplines in 2025.

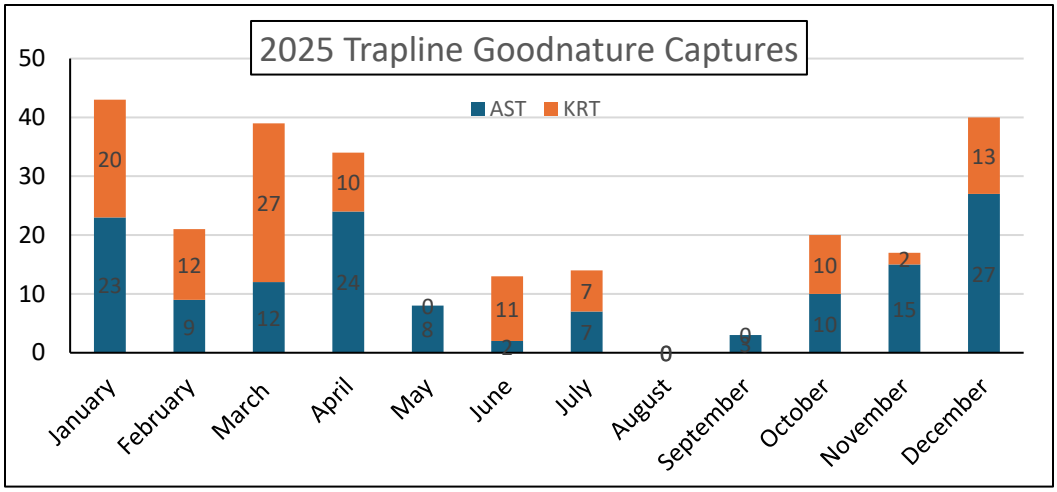

Figure 13. Number of rodents removed with Goodnature traps in 2025 by month.

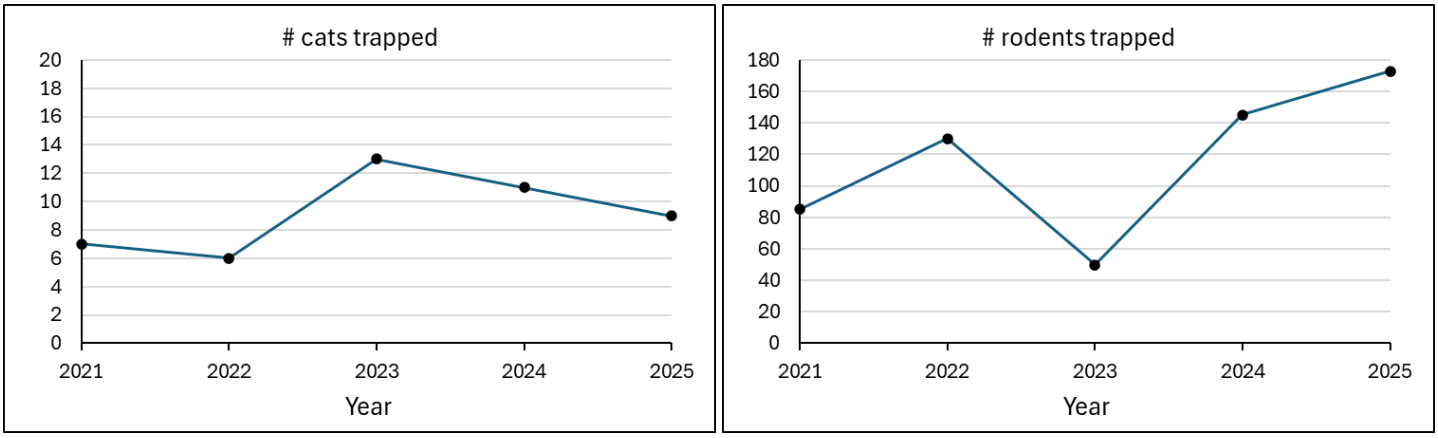

Figure 14. Numbers of cats and rodents trapped in each year of the KSHCP. Note the difference in scales for numbers of cats and rodents.

Camera monitoring

All trail cameras were removed from traps along the Alakai Swamp Trail in early 2024 because of chronic problems with theft and vandalism. All 22 traps on the Kalalau Rim Trail still have cameras, and there has been no problem with theft in that area, and there are four additional cameras positioned along the predator fence. The automated Cuddeback system is no longer enabled, since it did not work as intended because of poor cell coverage and camera connectivity in the dense forest. Cats were observed in images from trail cameras on multiple occasions throughout the year. The color pattern of cats visible in photos matched those of cats trapped, suggesting that all cats known to be in the area were eventually removed. Rats and mice have been observed on every camera deployed on the Kalalau Rim. Black Rats made up the majority of trail camera observations. Other animals such as pigs, dogs, and black-tail deer have been observed on game cameras occasionally. Dogs are commonly observed on game cameras at both Alakaʻi Swamp Trail and Kalalau Rim. Dogs have been photographed inspecting, crawling into, and sniffing traps that are baited.

Discussion

Objectives and protocols for monitoring progress and success are described in detail in *Appendix A: Kahuamaʻa Seabird Preserve Management Plan* for the KSHCP. These objectives involve three aspects of biological monitoring:

1. predator eradication/suppression;

2. vegetation (habitat) management; and

3. seabird response to management.

The predator exclusion fence was completed during the prescribed time frame and has been maintained as needed. Some maintenance has been required, but overall the fence has held up well and has been effective at excluding ground predators.

All predators were eradicated from the fenced area, including feral cats, rats, and mice, and the fence has been maintained in a largely predator-free state since it was completed. Monitoring with tracking cards has shown that a small number of Polynesian rats, possibly just a single individual, have persisted inside the fence and have been difficult to remove despite the present of numerous traps and bait stations. This low level of Polynesian rat presence is not a serious threat to seabirds, and efforts will continue to remove the remaining individual(s).

Biological monitoring of seabirds and their habitat commenced on schedule in 2021, and all required surveys were completed during that time to provide an inventory and baseline of the flora and fauna present at the Kahuamaʻa Seabird Preserve. Prescribed surveys have been completed each year since then to monitor responses. Auditory surveys have shown that all three listed seabird species regularly fly past the site, with Newell's Shearwater in particularly high numbers based on call rates. The number of seabird detections has declined since 2023 for unknown reasons, but substantial numbers of Newell's Shearwaters and Hawaiian Petrels are still detected during auditory surveys.

The social attraction program, consisting of 100 artificial nest boxes and a solar-powered sound system that broadcasts Newell's Shearwater calls, was installed as prescribed and has been maintained and operated properly each year. Monitoring of the social attraction site inside the fence has documented the presence of single Hawaiian Petrels on the ground in 2023, 2024, and 2025, and a single Newell's Shearwater in 2025. All possible actions have been taken to make the site as attractive as possible, and it is hoped that visitation by Newell's Shearwaters and Hawaiian Petrels will increase and that both species will begin breeding. The proximity of a large Newell's Shearwater colony was one of the reasons that Kahuamaʻa was selected as the social attraction location, but 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 Kahuamaʻa because the social attraction calls are less attractive than the existing large colony that presumably has many breeding pairs already. Hawaiian Petrel colonies are located further away, and yet that species appears to be more attracted to the site.

Cat control along the Alakaʻi Swamp trail and Kalalau Rim has been implemented successfully in each year of the KSHCP, and a total of 46 feral cats have been removed from the area. These cats could have accessed seabird colonies and their removal likely has helped to protect existing seabird colonies and maintained them as potential sources of birds to colonize Kahuamaʻa.

Table 4: 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.	Completed.
2.D. Breeding activity by Covered Seabirds documented at the mitigation site by Years 5-7 of KSHCP implementation.	Not yet achieved.
2.E. Cumulative upward trend in Covered Seabird breeding documented at the mitigation site by Year 10 of KSHCP implementation.	Not yet achieved.
2.F. Continued cumulative upward trend in Covered Seabird breeding documented at the mitigation site by Year 20 of KSHCP implementation.	Not yet achieved.
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.	Ongoing.
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.	Ongoing.
2.I. Annual protection of any Honu nests adjacent to facilities via shielding or other measures to avoid light attraction take.	Ongoing.