Lehua Island Restoration Project
Frequently Asked Questions (largely from the July 25th Public Meeting)

The Department of Land and Natural Resources' Lehua Island Restoration Project partners have a sustained committed to transparency and effective communications with the people of Hawai`i regarding the proposed eradication of introduced, damaging (invasive) rats. On August 25, 2017, the Department of Land and Natural Resources (DLNR) and project partners hosted a meeting to further community dialogue. To address the most frequently asked questions, we offer the following:

Why Lehua Island, specifically? What is the cost-benefit analysis?
Lehua is one of the largest, most diverse seabird colonies in the main Hawaiian Islands. It historically provided (or provides) habitat for 17 seabird species[1] like the ESA[2] Threatened (and IUCN[3] Endangered) Newell's Shearwater (previously known to nest on Lehua) and the ESA Endangered Band-rumped Storm-petrel. The Black-footed and Laysan Albatrosses (both IUCN Near Threatened) breed on Lehua Island.

Lehua Island is home to 25 native plant species (including 11 endemics found only in Hawai`i). Lehua is an important part of native Hawaiian culture—the Ni'ihau community gather opihi (limpets) in adjacent marine waters and there are several important native Hawaiian cultural sites on island.

Lehua is imperiled by introduced, damaging (invasive) rats. Threatened Newell's Shearwaters are likely being restricted from breeding on Lehua Island due to predation from invasive rats. Smaller, open nesting seabirds such as terns and noddies are conspicuously absent from Lehua (save small numbers found in sea caves), an expected artifact of rat predation. In addition to eating birds, chicks, and eggs[4], rats forage on native plants and seeds, which impairs the entire ecosystem and contributes to erosion which can impair nearshore marine and coral ecosystems and fisheries.

A proven solution is available to restore the island and make it safe for birds, plants, and marine ecosystems, by removing invasive rats from Lehua island. There have been more than 650 projects to remove invasive rodents from islands around the world. These projects have led to hundreds of well-documented cases of island species recovery and ecosystem restoration[5]; projects where the long-term benefits to native species outweighed any limited, short-lived negative operational impacts.

A science- and values-based, cost-benefit analysis informed the Lehua Island Restoration Project, as reflected in the Final Environmental Assessment which required years of operational planning, trials, scientific research, and analysis. Projects partners agreed to pursue an invasive rat eradication only if their assessment concluded that long-term conservation benefits would outweigh any potential short-term risks. The project partners only wanted to pursue the project in partnerships with local and Native Hawaiian communities who, for the most part, value urgent native species preservation, island restoration, and cultural preservation over allowing invasive rats to continue their devastating impacts to Lehua's birds, plants, marine waters, and cultural resources.

How many rats are on Lehua? How did the rats get there?

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[1] Lehua Restoration Project Final Environmental Assessment, July 2017 (FEA), p21 https://www.fws.gov/pacificislands/documents/Lehua%202017%20Final%20EA_06Ju12017.pdf
[2] US Endangered Species Act
[3] International Union for the Conservation of Nature Red List of Endangered Species www.iucnredlist.org
[4] FEA, p21
[5] ibid, p22

The presence of rats on Lehua was reported as early as 1936 and documented in 1940[6]. Rats are the most prolific of all invasive species introduced to 80 percent of the world's island groups[7] and they are almost always introduced by humans (via boats). Rat populations fluctuate with availability of prey, forage items, availability of water to drink, and climactic conditions. Rat densities are difficult to estimate, but their mere presence is what is relevant. One pregnant female (or breeding pair) can infest an island quickly because brood gestation is ~25 days. Rats can have up to ten offspring at a time, which can then reproduce in approximately 60-90 days. Thus, populations can grow exponentially. The prolific breeding, coupled with non-native predation on birds, eggs, chicks, and plants and seeds, leads to ecosystem disruption, as seen on Lehua Island.

What permits are required for the project?

The permits and approvals come under the following authorities:

Federal[8]:

- ✓ *National Environmental Policy Act (NEPA) V*
- ✓ *National Historic Preservation Act (NHPA)*
- ✓ *Endangered Species Act (ESA)*
- ✓ *Migratory Bird Treaty Act (MBTA)*
- ✓ *Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)*
- ✓ *Marine Mammal Protection Act of 1972, as amended*
- ✓ *Water Pollution Control Act of 1948, as amended*
- ✓ *Coastal Zone Management Act of 1972, as amended*

State[9]:

- ✓ *Hawai`i Administrative Rules 13-124*
- ✓ *Hawa`ii Revised Statutes 343*
- ✓ *Various permits under the above Federal laws have been delegated to the State to administer*

Further authorities for action can be found under Final Environmental Assessment,

- ✓ *USCG permission is required to access and carry management projects on Lehua[10]*
- ✓ *Section 2.5 Authority for Action and Regulations Governing Action[11]*

Why an Environmental Assessment (EA) instead of an Environmental Impact Statement (EIS)?

Consistent with US Environmental Policy Act (NEPA) and Hawai`i Environmental Policy Act (HEPA) review processes, EA's generally include a brief discussion of the proposals need, alternatives, environmental impacts, and agencies/persons consulted. If, based on the EA, the agency determines the action will not have significant environmental impacts, the agency may issue a Finding of No Significant Impact (FONSI). A FONSI is a document that presents the reasons why the agency has concluded that there are no significant environmental impacts projected to occur upon implementation of the action. If the EA determines that the environmental impacts of a proposed action will be significant, then an EIS may be is prepared.[12] Based on the Lehua Island Restoration Project Final EA, the US Fish and Wildlife Service and the Hawai`i Department of Land and Natural Resources each issued a FONSI. Thus, an EIS was unwarranted.

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[6] FEA, p20

[7] Atkinson, I. A. E. (1985). The spread of commensal species of *Rattus* to oceanic islands and their effects on island avifaunas. In P. J. Moors (Ed.), Conservation of Island Birds (pp. 35-81): ICBP Technical Publication No. 3.

[8] Agency Publication Form p1 (DLNR filing FEA w/ HI Office of Env. Qual. Cont.), p1

[9] ibid

[10] Final Environmental Assessment (FEA) p12

[11] Ibid p23-28

[12] ibid

How is it possible for there to be "no significant impact" when you're dropping rodenticide?
"A Finding of No Significant impact" (FONSI) is a legal term under the US Environmental Policy Act and the HI Environmental Policy Act.[13] A FONSI is the determination issued by an agency that, after conducting an Environmental Assessment (EA), the proposal will not have significant environmental impacts. This is the conclusion of the lead agencies because the preponderance of the science, studies, trials, and studies have shown that the potential for short-term risks is extremely low and well offset by the expected long-term conservation benefits.

Why can't you just trap the rats on Lehua, like on Nā Pali Coast? Or just use bait boxes?
Lehua Island's steep cliffs and difficult terrain pose logistical challenges that make this approach both impractical and unsafe. The nature of the terrain prevents bait or traps from being delivered into every potential territory; to try to do so would put the safety of island restoration personnel at risk. Out of 650 rodent eradications, only 10 have used trapping as the sole removal method, and the largest of these was only 163 acres—Lehua is 284 acres.

Have any trials been done?
Around the world, there are hundreds of peer-reviewed scientific publications related to scores of island invasive rodent eradications. Specific to Lehua, there have been multiple trials and studies conducted specifically for this restoration project and other trials analyzed in the Final Environmental Assessment (FEA).

In 2015, inert (non-toxic) rodent bait trials in Lehua marine waters found "*…pellets in the terrestrial environment would break down and be undectable in 35-40 days…(Mazurek 2015)…Complete breakdown of pellets in the water would be quick…data collected shows that pellets disintegrated within 30 minutes…and no pellets were found after 24 hours (Mazurek 2015)."*[14]

Additionally "…w*hile the 2015 bait trial demonstrated that fish would consume inert bait, a recent laboratory studies showed that black triggerfish (*Rhinecanthus aculeatus*), smallmouth bass (*Micropterus dolomieu*) and fathead minnows (*Pimephales promelas*) refuse to eat bait pellets containing diphacinone (USGS Columbia Environmental Research Center)...which indicates that some fish species can detect and avoid bait containing diphacinone."*[15]

The 2009 attempt to eradicate invasive rats from Lehua also serves as a trial. Multiple factors evaluated as potential causes of the eradication failure[16] have been taken into consideration for this proposal.

How toxic are the conservation bait pellets in marine environments?
Of the ~11 tons of bait proposed to be used in this project, a mere fraction of that is the actual rodenticide diphacinone. About 99.995 percent of the bait is comprised of non-toxic, human food-grade ingredients specifically designed for target species palatability.

All bait will be distributed over land with deflectors used when baiting adjacent to the shoreline. The proposal, consistent with rules and regulations governing the rodenticide application, acknowledges a negligible amount of bait will drift into shallow nearshore waters. Bait pellets degrade quickly in water and will sink to the sea floor. Diphacinone scarcely dissolves in water (it is almost insoluble) and thus

[13] See preceding question.
[14] FEA, p54-55
[15] Ibid, p71-72
[16] Ibid, p14

most remains in the pellet fragments and sinks to the sea floor.[17] Diphacinone rapidly breaks down in water when exposed to ultraviolet light (e.g. sunlight)[18]; a likely fate for some drifted bait. Eventually, the rodenticide breaks down into carbon dioxide, water, or non-toxic intermediate compounds.

How will bait contribute to the cumulative effects of pesticides/herbicides on the West side of Kauai?
Given how little bait will drift into Lehua's nearshore marine waters, that diphacinone barely dissolves in water, that the rodenticide begins breaking down in 30-60 days (faster in water when exposed to ultraviolet (sun) light, that fish in laboratory tests rejected bait with diphacinone, and the ~ 19 miles of open ocean between the two islands, it appears highly unlikely that project-derived diphacinone will reach Kauai.

What are the risks to corals, fish, and marine mammals?
Samples deliberately collected by scientists of fish, invertebrates (crabs and limpets), and seawater collected days after aerial application of diphacinone on Mōkapu and Lehua (2009) showed no detectable levels of diphacinone in their tissues.[19] Lab and field studies have demonstrated that fish will consume inert bait pellets (with no rodenticide) however, lab studies found fish did not consume bait containing the rodenticide diphacinone.[20]

> The Environmental Assessment concludes: "*Given the relatively small amount of bait that would be expected to enter the marine environment, the rapid dissolving of pellets, and that fish appear to avoid diphacinone, it appears consumption of rodenticide baits would be unlikely. In the unlikely event of fish ingesting diphacinone, the study on black triggerfish, smallmouth bass, and fathead minnows indicate that they are amongst the least sensitive animals to the effects of diphacinone."*[21]

How will this effect fishing limits?
There is no impact to fishing limits. Mitigation measure 18, prescribed by the US Fish and Wildlife Service in its *Finding of No Significant Impact* (FONSI) states:

> *Signs will be placed on the island alerting visitors of the operation and the presence of rodenticide on the land and potentially in the nearshore environment: however, because of the low risk of contamination of nearshore marine organisms and the very low risk of humans being impacted from consumption of these organism there will be no moratorium imposed on harvesting marine organisms.*[22]

What if non-targets species get sick or die? How will that get recorded and reported?
The FEA contains a "Proposed Environmental Monitoring Plan" by USDA APHIS Wildlife Services National Wildlife Research Center.[23] The purpose of this environmental monitoring plan is to assess the potential persistence of diphacinone in various environmental compartments after this eradication action.[24] The monitoring plan calls for baseline data collection prior to the application of bait and monitoring and data collection following. Samples will be collected from seawater, soil, limpets (*Opihi*), Natal lightfoot crab,

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[17] FEA, p71
[18] Hayes, W.J. and E.R. Laws (ed.). 1990. Handbook of Pesticide Toxicology, Vol. 3, Classes of Pesticides. Academic Press, Inc., NY.
[19] Ibid, p72
[20] Ibid, p71
[21] Ibid, p72
[22] USFWS FONSI, 11 July 2017
[23] Ibid, Appendix E, p152-156
[24] Ibid, p152

and multiple samples from the following classes of fish: 1) resident (non-pelagic) reef fish 2) black triggerfish (*Rhinecanthus aculeatus*); and 3) prized near-shore game fish.[25]

> *"Non-target carcass surveys: Throughout the course of field activities associated with eradication efforts, any non-target organisms (species other than rats) found dead would be collected and submitted for chemical residue analysis to assess whether the organism had been exposed to rodenticide intoxication."*[26] This will include very prescriptive 'chain of custody' protocols to ensure confidence (quality assurance and quality control) in the sample collection independence, testing, a chemical analysis.

The death of the following, post-rodenticide applications, will be reported to HDOA in compliance with the aerial application permits approved for Lehua Island Project:

- Ten (10) or more birds of any species,
- Twenty-five (25) or more fish of any species,
- Any endangered or threatened birds or marine mammals.

The total number and species of carcasses collected will be reported by the Lehua Team Leader to the Assistant Incident Commander and Incident Command Team.

Why would we spend this money to protect birds and put Endangered Monk Seals at risk?

There have been no documented cases of impacts to seals or sea lions after an aerial bait application, including the 2009 bait application on Lehua Island.[27] There may be up to 15 Monk Seals expected on/near Lehua during the proposed time of the operation. Monk Seals forage entirely offshore in deep waters, and sometimes spend days away from the island before returning to Lehua Island to sleep and digest. [28] The few bait pellets that drift to water will be close to shore, degrade quickly, and are unlikely to be ingested by near-shore fish.[29]

Because of Monk Seal foraging habits, it is unlikely they would prey on fish that have consumed rodenticide pellets. If a seal did forage in the nearshore environment there would be a very low probability it would encounter fish that had consumed rodenticide of any consequence. [30] Thus, it is unlikely that the proposed project would expose monk seals to a sufficient quantity of rodenticides to have any negative effects.[31] Furthermore, given the large size of Monk Seals and the potential amount of bait that could drift into marine waters, it is almost certainly impossible that there would be enough bait to sufficiently affect a seal.

How do we know this isn't this going to be another failed project like the Henderson Island Eradication?

There are never any guarantees for success. About 9 in 10 island invasive species eradication projects are successful on the first try. Most rodent eradications (>70%) utilized a more potent rodenticide, brodifacoum, which has a higher probability of success. However, the Lehua project partners selected diphacinone because it has lower potential short-term risks, which aligns better with local conservation values. Diphacinone, however, has a lower probability of success and has been used for less than ten

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[25] Ibid, p153
[26] Ibid, p154
[27] Ibid, p69-70
[28] Ibid
[29] Ibid, p71
[30] Ibid, p69-70
[31] Ibid

percent of all rodent eradications worldwide.[32] The partnership is optimistic they have maximized the opportunities to succeed because of their robust science-based planning.

Why weren't more local people incorporated into the steering committee?
The Lehua Island Restoration Project was developed in cooperation with project partners, the native Niʻihau community, the owners of Niʻihau, the Robinson family, the native Hawaiian community, local residents, state and federal regulatory agencies, and non-governmental organizations. The legal requirements for community input for the project assessments were exceeded by the partnership. In service to the public, the partnership embraced its responsibilities to community engagement and consultation by exceeding these minimum standards with three public meetings and other efforts including:

- The DLNR and USFWS sent press releases to local newspapers, garnering multiple articles in local newspapers announcing the public meeting dates and locations.
- Two meetings were held to solicit input, questions, and concerns about the proposal.
- A radio interview with an open call-in Q&A session with several project partners answered questions and announced the second meeting.
- A third meeting to respond to the community's meeting and online input.

The partnership is unwavering is its focus on effective communications, public relations, and transparency and maintains a team focused on these efforts.

How much will the project cost? Who is funding it? Where is the money going?
This project was initiated more than five years ago and has been sustained through a mix of private philanthropic gifts, government funding, and in-kind support from the partners. That has supported the development of the Environmental Assessment and the necessary trials and studies designed to inform it. The implementation phase of the proposed project (July 1– October 1, 2017) is estimated at ~$700,000. Funding has covered the project partnerships staff time (state employees, non-profit Island Conservation employees) for goods and services provided and will be expended on bait and equipment, helicopter contractors and supplies, and native Niʻihau residents hired to assist with the operation.

Why was the Robinson Family involved? Will the Niʻihau community be affected?
The project partners take their responsibility and commitment to work with the local peoples and communities on projects like this very seriously. The native peoples of Niʻihau, and owners of Niʻihau, engaged with the project partners early on and offered important local and native wisdom and perspective on the proposal. They played important roles in the development of the Lehua Island Restoration Proposal because they are the closest community to Lehua Island, which is an important cultural and fishing resource for their community. They served on the project's steering committee and directly informed the development of the project. The Robinsons generously agreed to allow the project partners to stage the operation from Niʻihau Island, and to use their aircraft and vessels to assist the operation. The project will employ several local native Niʻihauans to assist with the operation. The partnership made similar efforts to engage with native Hawaiian people and communities of Kauai. The partners remain committed to constructive and transparent communication with all local communities.

What happens next? What are the plans for restoration?
Determining the success of the invasive rat eradication would occur approximately one year from the operation. When detecting the presence or absence of rats, a certain density of rodents is necessary for

[32] Parks et al, Diagnosing the cause of failure to eradicate introduced rodents on islands: brodifacoum versus diphacinone and method of bait delivery Conservation Evidence (2011) 8, 100-106

easy detection. Many conservationists are eager to engage Lehua Island in further restoration efforts once the island is safe from rodents.

Restoration activities are somewhat limited so long as there are invasive rats eating the birds, plants, and seeds. Many of the organizations involved with the restoration project anticipate developing and implementing restoration projects that will help to restore the island for native birds, plants, and a healthier marine environment.