



**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
**NATIONAL MARINE FISHERIES SERVICE**

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August 21, 2017

Mary Abrams  
Field Supervisor  
U.S. Fish and Wildlife Service  
Pacific Islands Fish and Wildlife Office  
300 Ala Moana Boulevard, Room 3-122  
Honolulu, Hawaii 96850

RE: Request for Not Likely to Adversely Affect Concurrence for Lehua Island Ecosystem Restoration Project (NMFS #PIR-2017-10193, I-PI-17-1540-AG)

Dear Ms. Abrams:

On July 10, 2017, the U.S. Fish and Wildlife Service (USFWS) submitted a letter and a Final Environmental Assessment Lehua Island Ecosystem Restoration Project July 2017 (EA) to the National Marine Fisheries Service (NMFS) Pacific Islands Regional Office. The USFWS as lead federal action agency for the proposed action and with the cooperation of the US Coast Guard (USCG) was seeking our written concurrence under Section 7 of the Endangered Species Act of 1973, as amended (ESA; 16 U.S.C. §1531 et seq.), that the Lehua Island Ecosystem Restoration Project (proposed action) may affect, but is not likely to adversely affect Hawaiian monk seals (*Neomonachus schauinslandi*) or their designated critical habitat.

On August 2, 2017, NMFS requested additional information on the effects of the proposed action on monk seals, and recommended that the USFWS also consider the effects of the proposed action on green sea turtles (*Chelonia mydas*), hawksbill sea turtles (*Eretmochelys imbricata*), and the Main Hawaiian Island false killer whales (*Pseudorca crassidens*). On August 9, 2017, the USFWS provided additional information on the proposed action and requested our concurrence that the action may affect, but is not likely to adversely affect Hawaiian monk seals and their designated critical habitat, green sea turtles, hawksbill sea turtles, and Main Hawaiian Island false killer whales.

This letter was prepared by NMFS in response to the request of the USFWS and pursuant to Section 7(a)(2) of the ESA and its implementing regulations at 50 CFR 402, and concludes that the proposed action may affect, but is not likely to adversely affect federally endangered Hawaiian monk seals or their designated critical habitat, threatened Hawaiian green sea turtles, endangered hawksbill sea turtles, or the endangered Main Hawaiian Island false killer whale.

This letter underwent pre-dissemination review using standards for utility, integrity, and objectivity in compliance with applicable guidelines issued under the Data Quality Act (section 515 of the Treasury



and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554). The concurrence letter will be available through NMFS' Public Consultation Tracking System [<https://pcts.nmfs.noaa.gov>]. A complete record of this consultation is on file at the Pacific Island Regional Office, Honolulu, Hawaii.

Proposed Action and Action Area: The USFWS is proposing to eradicate non-native rats from Lehua Island. Lehua Island is a federally owned sea-bird sanctuary, administered by the USCG. The USFWS is a technical partner, cooperating member of the Lehua Island Restoration Steering Committee, and lead action agency for the proposed restoration project and this consultation, and the USCG is a cooperating agency permitting access to the property. Pursuant to 50 CFR 402.07, the ESA Section 7 consultation responsibilities are being fulfilled through the lead action agency, the USFWS.

The proposed action involves the aerial broadcast of bait pellets containing the rodenticide diphacinone (50 ppm) to eliminate rats from Lehua Island during the summer of 2017. Where helicopter spreading is limited or not feasible, bait pellets would be spread by hand. If rats persist after one year, then the FWS would apply bait pellets containing brodifacoum (25 ppm) to complete the eradication project.

The action area includes the island of Lehua, its immediate surrounding waters, and the staging areas on the north end of the island of Ni'ihau and the west side of Kaua'i. Lehua is approximately 30 km west of the island of Kaua'i, Hawaii, and approximately 1.2 km north of Ni'ihau. Although two staging areas are being considered for the action, the island of Ni'ihau and Kaua'i, the USFWS expect to use only one. However, both areas are considered in this consultation. The preferred staging area on Ni'ihau would be located on the north end of the island, approximately 1.2 km from Lehua. The alternative staging site on Kaua'i would be on the west side of the island. A temporary camp would be established on Ni'ihau, which would be used to stage staff, fuel, bait and equipment. A temporary field camp would also be established on Lehua for up to 10 people to conduct monitoring of the aerial-delivery and to conduct hand-delivery of the bait, as necessary.

Bait would be delivered in shipping containers directly from the manufacturer in the continental US. Bait would be shipped in either 23 kg bags, or in 318 kg bags, and transported in pods on skids. The shipping containers would remain locked and staged at the staging site on Ni'ihau or Kaua'i. Fuel would be stored in 208 L drums, and held in a separate site in close proximity to the base of operations. The site where the fuel would be held would meet EPA-approved spill, prevention, control, and countermeasure rules.

The eradication effort would consist of the application of diphacinone three times across the entire island up to the high tide line at a maximum rate of 30 kg/ha. Whole-island coverage would be attempted using a helicopter and a specialized bait-spreading bucket. Supplemental hand application of bait pellets would be conducted in areas where use of a helicopter would be limited or not feasible. Each application would be separated by approximately 5 – 7 days. If necessary, brodifacoum would be applied at a maximum rate of 18 kg/ha, followed approximately 5 – 7 days later by a second application of 9 kg/ha. These rates are dictated by the EPA label.

The proposed application of diphacinone would be conducted sometime during the months of July – September 2017 to coincide with the dry season on the island. The summer months would be the optimum time to conduct the action as it should coincide with a population minimum of rats (due to the yearly shortage of food and water), and would also be the optimum time to minimize risk to non-target species, as the breeding season for black-footed and Laysan albatross would be near an end. The summer dry season also provides the best opportunity to avoid rainfall that would reduce the

effectiveness and delivery of the bait pellets. If necessary, the application of brodifacoum would occur during the same window of opportunity in 2018.

Species and Designated Critical Habitat That May Be Affected by the Proposed Action: Species and designated critical habitat that may be exposed to the activities that comprise the proposed action are endangered Hawaiian monk seals and their designated critical habitat, threatened Hawaiian green sea turtles, endangered hawksbill sea turtles, and endangered Main Hawaiian Island false killer whales. Detailed information about the biology, habitat, and conservation status of these species may be found at <http://www.nmfs.noaa.gov/pr/species/index.htm>. In designated areas of the Main Hawaiian Islands (MHI), critical habitat for monk seals includes the marine environment with a seaward boundary that extends from the 200-m depth contour line (relative to mean lower low water), including the seafloor and all subsurface waters and marine habitat within 10 m of the seafloor, through the water's edge 5 m into the terrestrial environment. The essential features of monk seal critical habitat are: terrestrial areas and adjacent shallow, sheltered aquatic areas with characteristics preferred by monk seals for pupping and nursing; marine areas from 0 to 200 m in depth that support adequate prey quality and quantity for juvenile and adult monk seal foraging; and significant areas used by monk seals for hauling out, resting or molting. Detailed information on Hawaiian monk seal critical habitat can be found at [http://www.fpir.noaa.gov/PRD/prd\\_critical\\_habitat.html](http://www.fpir.noaa.gov/PRD/prd_critical_habitat.html).

Analysis of Effects: In order to determine that a proposed action is not likely to adversely affect listed species, NMFS must find that the effects of the proposed action are expected to be insignificant, discountable, or beneficial as defined in the joint United States Fish and Wildlife Service (USFWS)-NMFS Endangered Species Consultation Handbook: (1) insignificant effects relate to the size of the impact and should never reach the scale where take occurs; (2) discountable effects are those that are extremely unlikely to occur; and (3) beneficial effects are positive effects without any adverse effects (USFWS & NMFS 1998). This standard, as well as consideration of the probable duration, frequency, and severity of potential interactions, was applied during the analysis of effects of the proposed action on ESA-listed marine species, as is described in detail in the consultation request and supporting documents.

The USFWS identified the following stressors for the proposed action: exposure to sublethal or lethal amounts of rodenticides; injury from project-related air or ground activities; injury from collision with a boat; temporary disturbance from human activities; and effects to designated Hawaiian monk seal critical habitat.

To minimize the likelihood of interactions with listed species, these minimization measures would be followed:

- All project personnel on the ground would maintain a 100 foot buffer from seals during operations. During aerial bait broadcast, helicopters would avoid hovering near seals and would avoid distributing pellets over seals on the shore.
- Prior to the application of bait pellets containing rodenticide, the bait delivery system (bait bucket, controller, GPS unit, and helicopter) would be tested and calibrated to ensure an accurate application rate.
- An onboard computer linked to a GPS and light bar would guide the pilot along pre-programmed flight lines over the island at a prescribed airspeed, which would ensure an even application rate.
- Aerial application of pellets would not occur during wind speeds in excess of 35 mph.
- Aerial application of bait pellets would not occur when heavy rains are forecast to occur within 72 hours.

- The bait bucket would be fitted with a deflector that spreads bait only out to one side (120° pattern) to minimize bait application directly into water. Every reasonable effort would be made to minimize risk of bait drift into the water; however, it is inevitable that a small number of pellets would roll or bounce into the ocean. The pilot and the on-the-ground observers would visually monitor the application of bait and if a malfunction is detected operations would cease until the problem is corrected.
- Bait would be applied at the lowest rate possible to achieve eradication and any bait spilled would be collected and disposed of according to label instructions.

Approximately 15 monk seals could be present on Lehua during the proposed project. During a 2015 placebo trial at Lehua, monk seals did not interact with the pellets, so the USFWS determined that direct exposure, via consumption of bait pellets, was not likely to occur. Because monk seals prey on a variety of nearshore species (lobsters, eels, fish, octopus), there is a greater likelihood that monk seals would be exposed to the rodenticides through the consumption of contaminated prey (secondary exposure). During the 2015 placebo trial, the USFWS noted in the EA that 29 nearshore species of fish consumed the bait (Mazurek 2015), but the species were not identified, so it is unclear if any of the species would normally be prey items for monk seals.

Assuming past projects are reasonable surrogates for predicting the amount of baited pellets that may enter the marine environment during the proposed action, the USFWS described a range from less than 0.15 pellet/m<sup>2</sup> to up to in 2.3 pellets/m<sup>2</sup> could enter marine waters. The USFWS characterized the results from an eradication project on Anacapa Island as a “best case scenario”, where the amount of bait entering the marine environment was less than 0.15 pellet/m<sup>2</sup> following a bait pellet application rate of 15 kg/ha (Howald et al. 2009). For the “worst case scenario”, the USFWS provided information about the eradication project that occurred at Palmyra, where faulty equipment and island features resulted in 2.3 pellets/m<sup>2</sup> entered the marine environment.

For the Lehua eradication project, based on an application rate of 20 kg/ha for diphacinone, and a total area of 18,600 m<sup>2</sup> for the island, the “best case scenario” for the total amount of bait pellets that would likely enter the marine environment per application is 5.6 kg or 0.20 pellets/ m<sup>2</sup>. Under the Palmyra “worst case scenario”, the total amount of bait pellets that USFWS predicts could enter the marine environment per application would be 16 kg or 0.55 pellets/m<sup>2</sup>. If the USFWS needed to do a follow-up effort with brodifacoum, the highest application rate would be 18 kg/ha. Under the same scenarios, the USFWS predicts that the total amount of bait pellets that would enter the marine environment would range from 5 kg per application under the best case scenario, to 9.6 kg per application under the worst case scenario, resulting in a predicted range of 0.27 to 0.50 pellets/ m<sup>2</sup>. As described, these exposure scenarios assume that the distribution of pellets and rodenticide is equally spaced along the Lehua coastline of 6,195 m outward to a drift distance from high tideline of 3 m, which is approximately 18,600 m<sup>2</sup> of nearshore area where bait could drift or be detected.

Because there is no data on the toxicity of diphacinone and brodifacoum on marine mammals, the USFWS used the coyote as a surrogate mammal, which has been found to have the highest toxicity value of any mammal when exposed to diphacinone and brodifacoum. Based on a lethal dose for 50 % of the test animals (LD50) of 0.6 mg/kg and lowest observed effect level (LOAEL) of 0.3 mg/kg for diphacinone in coyotes; an average size 66 kg juvenile monk seal would have to consume 678 kg fish to reach the LD50 level and 338 kg of fish to reach the LOAEL level. A juvenile monk seal consumes about 5.3 kg of food daily. Based on the same level of exposure to diphacinone, an average size, 170 kg adult monk seal would have to consume 1,695 kg fish to reach the LD50 level and 847 kg fish to reach the LOAEL. Adult monk seals consume about 6.8 kg of food daily. A 200 kg juvenile and a

700 kg adult false killer whale, which are averages sizes, would have to consume 2,035 kg, and 7,117 kg of fish contaminated with diphacinone to reach the LD50 level, respectively; and 1,018 kg and 3,559 kg of fish to reach the LOAEL level, respectively. A 200 kg juvenile false killer whale consumes approximately 16 kg of food daily and 700 kg adult consumes approximately 24.5 kg.

For brodifacoum, the LD50 level for coyotes is 0.25 mg/kg, and the LOAEL is 0.003 mg/kg. Using these exposure levels, a 66 kg juvenile monk seal, a 170 kg adult monk seal, a 200 kg juvenile false killer whale, and a 700 kg adult false killer whale would have to consume 220 kg, 708 kg, 845 kg, and 2,969 kg of prey to reach the LD50 level of brodifacoum, respectively. To reach the LOAEL level of brodifacoum in coyotes, a juvenile monk seal, adult monk seal, a juvenile false killer whale, and an adult false killer whale would have to consume 3.4 kg, 8.5 kg, 10.2 kg, and 35.6 kg of contaminated prey items, respectively. Based on the low amount of pellets predicted to enter marine waters, the volume of pellets that would be necessary for monk seals or whales to consume indirectly through their prey, and the fact that bait pellets are expected to disintegrate to mush within 30 minutes of entering the water, the likelihood of monk seals or whales being exposed to toxic levels of these rodenticides is extremely low.

Since there is no information on the effects of exposure to diphacinone and brodifacoum to marine sea turtles, the USFWS evaluated the effect of their proposed action using the terrestrial ornate wood turtle (*Rhincolemmys pulcherrina*) as a surrogate species. Test subjects in the USDA National Wildlife Research Center study cited by the USFWS were fed high doses of diphacinone (1.7 mg/kg in two doses, one week apart) or brodifacoum (0.79 mg/kg in two doses, one week apart). After ingestion, and prior to necropsies, none of the turtles exposed to either rodenticide died or showed any signs of ill health. Necropsies showed that the turtles that ingested diphacinone had a mean concentration of 1.30 µg/g of the rodenticide in the livers, while the turtle (size of 319 g) with the highest concentration of brodifacoum in the liver had 2.02 ppm, which indicated it received 0.5 mg of the rodenticide.

Based on the levels detected in the livers from the USDA study, a 15 kg juvenile green sea turtle would have to consume 1.9 kg of bait or 1,900 1 g pellets to have the same concentration of brodifacoum in its liver. An adult green sea turtle (weighing 147 kg) would have to consume 18.4 kg or 18,400 pellets. An average-size adult hawksbill (57 kg) would have to consume approximately 7 kg or 7,000 pellets. Because the diphacinone pellets are formulated at 50 ppm, compared to 25 ppm for the brodifacoum pellets, the amount of bait pellets that each of the turtles described in the scenarios above would have to consume would be half the amount listed for the brodifacoum baited pellets. We would expect that the most likely route of exposure for turtles to the rodenticides would be through direct consumption of the pellets, and as noted above the risk of directly consuming pellets is quite low. The risk that turtles would receive doses through secondary routes, like the consumption of fish is even more remote. First, fish are an unlikely prey source for both green and hawksbill turtles but more importantly, in the unlikely event they did consume fish that had eaten the rodenticides, an inordinate amount of contaminated prey, 10 times or more the dose that they would need to consume directly to reach a lowest lethal dose. This scenario is extremely unlikely to occur in a large part because fish do not make up a substantial part of the diet of hawksbill or green sea turtles.

Based on the analysis provided, the USFWS has determined that the primary and/or secondary ingestion of rodenticides by Hawaiian monk seals, Main Hawaiian Islands false killer whales, green sea turtles, and hawksbill sea turtles is highly unlikely, and the risk of sublethal and lethal effects would be discountable.

Air and ground-based operations associated with the proposed project have the potential to cause Hawaiian monk seals to move from terrestrial haul out areas into the ocean. However, these

operations are anticipated to be of short duration and only in specific areas around Lehua Island. The proposed ground operations would be similar in scope to other activities by the State of Hawaii Department of Fish and Wildlife that have been done historically on Lehua. The ground operations would likely be ongoing for six weeks, or less, and all personnel and the temporary camp would be 30 m inland, and away from the shoreline. Based on the limited duration of the actions, and adherence to the protocols listed above; the USFWS has determined that the risk of temporary disturbance from human activities and of injury to listed species from project-related air or ground activities would be discountable.

The preferred location of the base for staging operations would be Ni'ihau. Transport to and from Lehua via Ni'ihau would be either by small boat or helicopter. The base camp would be established with a minimum number of trips to get supplies and personnel on the island, and except in the case of an emergency, the camp and staff would remain for the length of the project and follow-up surveys. If necessary, transport of personnel and material to and from Lehua Island via Kauai would be done using an established and approved helicopter tour operator, to reduce or eliminate the use of a boat. Based on the limited number of trips that would require the use of a vessel, and the short duration of the project; the USFWS has determined that the risk injury to a listed species from collision with a boat would be discountable.

All activities performed for this project would be inland, with the exception of hand delivery of bait along the coastline to ensure coverage of those areas that were not covered by the aerial applications. The USFWS expects that the essential features of designated critical habitat - terrestrial areas and adjacent shallow, sheltered aquatic areas; marine areas from 0 to 200 m in depth that support adequate prey quality and quantity; and haul out/resting areas – would have limited, low level exposure to the rodenticides and other activities associated with the proposed action. Even so, the USFWS used two exposure scenarios to describe the potential for the rodenticides to enter marine waters, as described above, and found that effects of the proposed action to prey quality and quantity would be insignificant. Similarly, the exposure of terrestrial areas and haul-out areas that are essential features of critical habitat is likely to be of very limited duration and at extremely low levels that adverse effects are extremely unlikely and should never reach the scale that take would occur. The USFWS has determined that the likely impacts from the Lehua eradication project to designated Hawaiian monk seal critical habitat would be insignificant.

Considering the information provided by the USFWS during this consultation and the best scientific information available about the biology and expected behaviors of the ESA-listed marine species considered in this consultation; NMFS agrees that: 1) the list of ESA-listed species and critical habitats potentially exposed to the effects of the action is correct, 2) the suite of identified stressors is comprehensive, and 3) the assessment of exposure risk and significance of exposure to those stressors is accurate.

Conclusion: NMFS concurs with the USFWS determination that the Lehua Island Ecosystem Restoration Project is not likely to adversely affect Hawaiian monk seals, green sea turtles, hawksbill sea turtles, and the Main Hawaiian Islands false killer whales, and that the action would not adversely affect Hawaiian monk seal critical habitat. This concludes consultation under the ESA for species under NMFS's jurisdiction. However, this consultation focused solely on compliance with the ESA. Additional compliance review that may be required of NMFS for this action (such as assessing impacts on Essential Fish Habitat) would be completed by NMFS Habitat Conservation Division in separate communication, if applicable.

ESA Consultation must be reinitiated if: 1) a take occurs; 2) new information reveals effects of the action that may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the identified action is subsequently modified in a manner causing effects to listed species or designated critical habitat not previously considered; or 4) a new species is listed or critical habitat designated that may be affected by the identified action.

Sincerely,

**GARRETT.ANN.**

**M.1365883323**

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Ann M. Garrett  
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cc: Reese Brand Phillips, USFWS  
NMFS File No.: PIR-2017-10193  
PIRO Reference No.: I-PI-16-1540-AG

## Literature

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