

US EPA ARCHIVE DOCUMENT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105

December 9, 2013

Gerry McChesney, Refuge Manager
Farallon National Wildlife Refuge
9500 Thornton Ave.
Newark, CA 94560

Subject: EPA comments on the Revised Draft Environmental Impact Statement for the South Farallon Islands Invasive House Mouse Eradication Project, Farallon National Wildlife Refuge, California (CEQ # 20130300)

Dear Mr. McChesney:

The U.S. Environmental Protection Agency has reviewed the above-referenced document pursuant to the National Environmental Policy Act, Council on Environmental Quality regulations (40 CFR Parts 1500-1508), and our NEPA review authority under Section 309 of the Clean Air Act. Our detailed comments are enclosed.

The U.S. Fish and Wildlife Service proposes to eradicate non-native house mice from the South Farallon Islands off the coast of California using aerially broadcast rodenticide in an effort to restore the ecosystem. EPA supports the goal of restoring the delicate Farallon Islands ecosystem. We requested to serve as a cooperating agency for the development of the subject Environmental Impact Statement due to our regulatory authority over the use of rodenticides. As a cooperating agency, EPA provided scoping comments (6/10/2011) and early input on the alternatives selection report and the Administrative DEIS (2/16/12 and 2/5/13 respectively). In our scoping comments, we raised potential conflict of interest issues if Island Conservation were to prepare the impact assessment and also carry out the eradication project. Since the DEIS does not include the disclosure statement, required by 40 CFR 1506.5(c), specifying that Island Conservation has no financial or other interest in the outcome of the project, it is unclear whether this issue has been addressed.

FWS is proposing to undertake a very difficult project that is considerably more complex than other recent island rodent eradications. For all rodent eradications, the bar for success is very high. Every last rodent must be eradicated for the project to be a success. The DEIS notes that mouse densities are especially high on the Farallones, and that mice are typically more difficult to eradicate than species of old-world rats. A review¹ of house mouse eradication attempts prior to 2008 could not determine any single underlying cause of success or failure, so there is considerable uncertainty regarding these operations. An additional complexity is that the proposed eradication is intended to eliminate an indirect impact on the species being targeted for restoration, primarily the ash storm petrel. In other eradication efforts, non-native rodents were known to have a direct impact on native species (i.e. - direct predation by rats on seabirds and/or other native fauna or flora); therefore, the effects of eradication were more easily predicted. On the Farallones, non-native mice are perceived to have an indirect impact on the

¹ MacKay, J.W.B.; Russell J.C. and Murphy E.C. 2007. Eradicating mice from islands: successes, failures and the way forward. In: Witmer, G.W.; Pitt, W.C. and Fagerstone, K.A. Managing vertebrate invasive species: Proceedings of an international symposium, pp. 294-304. USDA/APHIS/WA, National Wildlife Research Center, Fort Collins, CO., USA

ashy storm petrel by attracting burrowing owls that prey on the ashy storm petrel after mouse levels naturally decline due to seasonal effects on their food supply and fecundity. The premise of the project and the accurate assessment of impacts rely on predictions as to how several aspects of the ecosystem would respond to the elimination of mice. Even in cases of direct impact by rodents, predicting treatment effects has proven difficult and has resulted in more non-target mortality than expected². The complexity and uncertainties of the proposed project must be considered in assessing the significance of the impacts of the eradication effort, with the level of planning and needed forethought commensurate with the levels of uncertainty and risk. It does not appear that sufficient planning and consideration has occurred to anticipate outcomes other than the optimistic ones predicted in the Draft EIS.

The action alternatives propose to apply significantly more bait than authorized under the current pesticide labels. The RDEIS notes that a supplemental label would be needed from EPA for Alternative C (diphacinone), but does not acknowledge that the proposed use of brodifacoum, as proposed in Alternative B, would also require a supplemental label to be in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act. The registrant of the product selected for use would be responsible for submitting an application to EPA for revised labeling. More information should be provided in the Final EIS regarding how the proposed revised application rates, frequencies, and/or methods were determined to be necessary. We are concerned with wording in the RDEIS that bait application will be adaptively managed in the field. While on-the-ground circumstances may warrant changes in bait application during the eradication, these changes must be within the limits of the operative labeling. The project partners must anticipate the range of application rates and frequencies that might be needed. The registrant must have secured an amended or supplemental pesticide label that defines the boundaries within which bait application can be adaptively managed. Additional planning should occur to address possible needs to apply bait other than as originally intended but within limits set by labeling. Procedures should be developed to ensure that pesticide labels are not violated, and to avoid the type of on-the-fly decisions regarding bait application that resulted in pesticide label violations³ in the Rat Island eradication and may have increased non-target mortality.

We also are concerned with the potential impacts to gulls and the potential effectiveness of the proposed gull hazing operation, which appears rather optimistic. Failing to haze gulls effectively could lead to substantial gull mortalities, as occurred with glaucous-winged gulls in the 2008 Rat Island project, and the RDEIS acknowledges the potential for significant population-level effects to occur for the Western Gull. More importantly, the Gull Hazing Trial Report, included as Appendix E in the RDEIS, does not address the possible effects of hazing on mice. The report does note, however, that bait remained in plots at close to the original application rate for the duration of the trial, suggesting that mice did not feed on it as might have been expected. More study appears to be needed on hazing effects. Proceeding with the hazing operations without additional information on this aspect of the project could jeopardize the eradication.

Much information can be obtained from previous rodent eradication attempts and it is not clear that lessons learned from these projects have been integrated into the planning for the proposed project. We are aware that three recent rodent eradication attempts - Wake Atoll, Henderson Island, and Desecheo

² For example, the behavior of bald eagles in response to dead rats and birds from the Rat Island eradication was not predicted correctly and resulted in higher bald eagle mortality than expected, and the fish (mullet) and land crab mortality was not predicted for the Palmyra rat eradication. (Ornithological Council, 2010, *The Rat Island Rat Eradication Project: A Critical Evaluation of Nontarget Mortality*; USDA APHIS, 2012, *Final Report, Palmyra Atoll Rainforest Restoration Project*)

³ Notice of violations issued by the State of Alaska, Department of Environmental Conservation, 12/2011.

Island - have failed. These efforts all attempted to eradicate rat species. The Wake Atoll Rat Eradication Review⁴ concluded that planning and associated research did not seem to adequately address some of the key issues and the general complexities of the project, and that the number of information gaps noted during the planning process should have led to serious consideration of postponing the project until those issues were more fully addressed. This is our main concern for the Farallon project. Our attached detailed comments identify some of the planning and information gaps that we recommend be addressed during the planning stage.

The RDEIS does not identify a preferred alternative. Therefore, pursuant to EPA's *Policy and Procedures for the Review of Federal Actions Impacting the Environment*, we must rate each of the alternatives listed in the RDEIS. As stated above, we are concerned that sufficient planning and research have not occurred regarding hazing effects, and that adaptive management and contingency plans for bait application have not been developed. We are also concerned that lessons learned from previous eradication attempts elsewhere have not been fully integrated into the proposed project. These deficiencies apply regardless of which rodenticide is used. However, because brodifacoum is more toxic generally to a broader range of species and has higher potential for secondary poisoning to birds than does diphacinone, the net adverse impacts to resources would be greater if brodifacoum were used and the eradication failed because of these planning deficiencies. Therefore, we rate Alternative B (brodifacoum) as Environmental Objections – Insufficient Information (EO-2) and Alternative C as Environmental Concerns – Insufficient Information (EC-2) (see enclosed “Summary of Rating Definitions”). Brodifacoum is highly toxic to wildlife and should only be used when the project has planned for all reasonably foreseeable contingencies and has the best possibility of success, so that impacts to non-target species do not occur without the benefit of mouse eradication.

We rate the No Action Alternative as Lack of Objections (LO) based primarily on the October 22, 2013 finding by the U.S. Fish and Wildlife Service that, while burrowing owl predation on the ashy storm petrel, together with western gull predation, may be causing short-term population effects, the current best available scientific and commercial information does not show that these combined impacts are resulting in a long-term downward trend in the species population on the Farallon Islands⁵. Additionally, the RDEIS states that, under the No Action Alternative, the FWS would continue management activities focused on protecting storm-petrels, including nest habitat construction and possibly predator management when feasible. This rating also assumes that permitting mechanisms to allow for translocation of burrowing owls in the future may be available, and that lower-risk rodenticide baits and less-toxic eradication methods for use in ecosystem restorations could be developed. We encourage FWS to take a leadership role and invest in research on less-toxic eradication methods for future eradication projects⁶.

We emphasize that EPA supports the concept of a well-planned restoration. We acknowledge that FWS, the government agency with trust responsibility for managing wildlife within a national wildlife refuge, is responsible for determining the acceptability of nontarget mortalities versus benefits to vulnerable species.

⁴ Prepared by Derek Brown, Island Management and Pest Eradication Consultant; William Pitt, USDA APHIS; and Bernie Tershy, Coastal Conservation Action Lab, July 2013

⁵ 78 FR 62527 - available: <http://www.gpo.gov/fdsys/pkg/FR-2013-10-22/pdf/2013-24170.pdf>

⁶ For example, there appears to be potential for developing a chemical sterilant; and we are aware of one company's strong expressed interest in pursuing an island-based field trial using such a product. Such studies could determine whether this approach is practicable for island conservation applications.

We appreciate the opportunity to review this RDEIS and look forward to continuing to work with FWS on improving the project. When the Final EIS is released for public review, please send one copy to the address above (mail code: CED-2). If you have any questions, please contact me at (415) 972-3521, or contact Karen Vitulano, the lead reviewer for this project, at 415-947-4178 or vitulano.karen@epa.gov.

Sincerely,

/s/ Angeles Herrera for

Jeff Scott, Director
Waste Management Division and
Communities and Ecosystems Division

Enclosure: Summary of EPA Rating Definitions
EPA's Detailed Comments

cc: Connie Anderson, State Water Resources Control Board
Adolfo Gallo, California Department of Pesticide Regulation

Rodenticide issues

Rodenticide application

For both rodenticides, the RDEIS is proposing the following uses that are inconsistent with the pesticide label:

1. Third brodifacoum application at 8 pounds per acre (lb/ac) if bait from a previous application is severely degraded by rainfall (p. 77). The label allows two applications.
2. Third and fourth diphacinone applications at 43 lb/ac. Labels allows two broadcast applications but at a much lower maximum rate. Proposed rate of 43 lb/ac is approximately 3.5 times the label rate; it is not clear how this rate was established.
3. Back-baiting in case of interrupted operations
4. Flying steep areas a second time to increase the application rate in these areas during each application because “applying more bait to steeper areas is appropriate as these areas increase the island’s surface area.” (p. 77)

Under the provisions of the Federal Insecticide, Fungicide and Rodenticide Act, as amended, any proposed increase in maximum rates above current limits set by the labels requires acceptance by EPA’s Office of Pesticide Programs through amendment of the label for that registered product or by some other applicable authorized mechanism. The RDEIS notes the need for a supplemental label for the higher diphacinone application rates; however, based on the description of the alternatives in the RDEIS, a supplemental label would be needed for both products to allow for the additional applications.

The higher proposed application rate for diphacinone should be explained. The RDEIS states that a higher bait application would be required for diphacinone to ensure a longer period of bait availability (p. 49). The projection that more diphacinone bait would be needed than brodifacoum bait overlooks the likelihood that mice exposed to the brodifacoum bait would feed on it for approximately as many days as susceptible mice would feed on the diphacinone bait. This is due to the lag period mentioned between the onset of feeding and the development of symptoms of anticoagulant poisoning. That lag period is essentially the same for first- and second-generation anticoagulants.

The RDEIS states that application rates of Brodifacoum-25D Conservation would be determined during the development of the detailed operational plan and adaptively managed as necessary during the operation (p. 77). Because the application rates bear on the assessment of impacts, they should be identified. We are concerned with the proposal to adaptively manage application rates in the field. Once rates are established, they should be adhered to during the operation, and changes only made according to a clear protocol. The miscommunications and errors made during the Rat Island eradication, during which the applicator Island Conservation upwardly adjusted bait application rates during the operation, should be avoided. Changes to baiting rates in the field should be thoroughly documented. In no case may the limits on application rates established by the label for the product used in the project be exceeded, with some allowances for swath overlap (as covered by the labeling). Planning should occur for contingencies that are reasonably foreseeable.

Recommendations: Specify the proposed application rates of the two rodenticide products in the FEIS. The basis for the rates should be explained, especially if they would deviate from the label. If rates or additional applications above the current pesticide labels are proposed, the FEIS should state that a supplemental label will be pursued from EPA.

A bait application protocol should be established that anticipates and addresses possible contingencies. For each contingency, develop a structured decision-making tool that addresses the application of bait other than as planned and that requires a written assessment of the amount of bait already on the ground, a comparison to the approved label rate and target rates, a written assessment of the additional bait to be applied, a calculation of the total amount of bait that would be applied, and the increase in the potential risk to nontarget species⁷.

In addition, EPA has the following suggestions for bait application:

1. The RDEIS discusses the schedule for bait application on p. 64. If consistent with operational safety, broadcast applications should begin and conclude as close as possible to sunset so that as much bait as possible is available to mice on the first evening of exposure. See Gull Hazing comment below.
2. Application operations are likely to contribute to keeping gulls away from baited areas during the time of treatment. Late afternoon operations could help prevent them from taking bait at the time when the most bait is available. Although there was evidence of a learning curve regarding bait acceptance during the trial with placebo bait, many gulls that learned to take bait then likely are still alive and still on island.
3. Bait station baiting should precede aerial applications by a few days so that mice in the areas so treated have less chance of emigrating from those areas to broadcast-treated areas which have been depleted of bait by other mice and other species. Although little latency between time of bait loading and time of rodent entry and feeding on bait is expected with house mice, baiting the stations a few days before the aerial operation begins should offset any latency that may occur.
4. Consider requesting a supplemental label that would allow broadcast baiting near structures occupied by humans. The RDEIS indicates that bait stations would be used in these areas but spacing bait stations at 20-meter intervals would not be sufficient and could easily miss some mice. Spacing units at intervals of 2-4 meters would be more appropriate, but deploying and maintaining such a density would be time-consuming and labor-intensive. Under circumstances such as those proposed for this project, in which all humans present would be adults involved with the project, label restrictions intended primarily to protect small children and domestic animals could be adjusted via a supplemental label.

Applicator Certification

The RDEIS states: "All bait application activities (aerial broadcast, hand broadcast and servicing of bait stations) would be conducted by or under the supervision of one or more pesticide applicators licensed by the State of California." Please note that this certification must be in the appropriate category and FWS must confer with the California Department of Pesticide Regulation for this determination.

⁷ These recommendations were provided in the report *The Rat Island Rat Eradication Project: A Critical Evaluation of Nontarget Mortality* prepared by the Ornithological Council

Recommendation: Contact Adolfo Gallo at the California Department of Pesticide Regulation to determine appropriate certification and/or licensing required for this application. Mr. Gallo can be reached at Phone: (916) 445-3895; Fax: (916) 445-4033, or E-Mail: agallo@cdpr.ca.gov.

Additional pesticide-related comments

- The discussion of the history of rodent eradications in Section 2.5 should be updated to include results of more recent eradication efforts, especially those involving house mice and/or either of the products under consideration in Alternatives B and C or the Brodifacoum 25W product (EPA Reg. No. 56228-36). Some such projects would include Rat Island, Palmyra Atoll, Mokapu Island, Desecheo Island, Wake Atoll, Lehua Island, Cocos Island, and Henderson Island.
- In the discussion of anticoagulant rodenticides in Section 2.6 (p. 39), we recommend indicating the basis for classifying anticoagulants as being “first-generation” or “second-generation” (i.e., the latter were synthesized in order to kill rodents that are resistant to the former) and explaining why having a delay between time of ingestion and onset of symptoms is especially useful to eradication efforts.
- There is an error on page 44 regarding the use of toxicants other than diphacinone or brodifacoum (Section 2.7.1). The second sentence erroneously states that Compound 1080 (Sodium Fluoroacetate) is “not registered with EPA for any purpose”. This substance no longer is registered as a rodent control agent. There are valid U.S. registrations for use of Sodium Fluoroacetate in Livestock Protection Collars to kill coyotes that prey on sheep and goats. Use of such products in California was halted via a 1998 State ballot initiative, but Livestock Protection Collar products remain registered and are used in some other States.
- Regarding the dismissed alternative of using bait stations as the primary method of bait delivery (p. 44-45), it is EPA’s opinion that the spacing of bait placements likely would have to be much tighter than the 20 meter by 20 meter grid that is discussed here. Spacing of bait stations at intervals of 2-4 meters might be needed to ensure that ample bait is available to every house mouse in the treated area.
- The discussion of “Bait Palatability and Preference Trials” on page 48 correctly identifies the substance pyranine as a fluorescent dye, but it should not be identified as a biomarker, as it is not systemic and is not likely to show up in secondary consumers.
- The discussion of “Bait Application Rate” on p. 58 should make it clear that the registrant of the candidate products must be the party that would have to request any modifications to current accepted labeling.

Mitigation Measures

Gull Hazing

The predictions of hazing success in the RDEIS seem remarkably optimistic. While the results of the gull hazing trial were positive, the trial was substantially limited compared to the conditions that would prevail during actual project implementation. For example, the Gull Hazing Trial Report states that the trial demonstrated the ability to keep a majority of Western Gulls off the South Farallon Islands for a period of 12 days. The actual hazing would need to occur for 90 days (p. 167) or for as long as there is bait on the ground. The report states that signs of gull habituation were noted, but the report does not provide any results of these observations. Regardless, the risk of habituation would tend to increase over time. In addition, the trial involved baiting 4 relatively small plots totaling approximately 3

hectares. The operational area for the actual project totals approximately 49 hectares (p. 58). This vastly increased area containing bait would appear to require a much greater hazing effort. According to the Gull Hazing Trial Report, for the hazing trial, between 10 and 12 people were employed each day to conduct all monitoring and hazing activities, and when gull numbers were greatest during morning and evening periods during the trial, “a near-constant effort was required to keep all birds off the island”. The RDEIS states that for the actual project, a team of up to 10 personnel would deploy a range of hazing techniques (p. 68). It is not clear that this level of effort will be sufficient to avoid significant gull mortality, especially with the risk of habituation that could occur with a longer operation.

In addition, the Gull Hazing Report did not indicate whether hazing affected house mouse behavior. In our comments on the Administrative DEIS, we suggested that this be evaluated, indicating that the hazing stimuli and the effects associated with an increased human activity, could have an effect on mouse foraging patterns. No information regarding effects on mice is included; however, the statement in the Gull Hazing Report that “bait remained in all four plots at close to the original application rate for the duration of the trial” suggests that mice took little of it⁸.

Recommendations: We recommend that the FEIS disclose the limitations and uncertainty of applying the results of the trial to the actual project. FWS should discuss the likelihood of reaching a 90% hazing success during the actual project, which the project partners determined is needed if brodifacoum is used so as not to surpass the threshold of 1,700 dead gulls, over which significant population level effects to the Western Gull could occur. Discuss whether resources are available to carry out the effort. Council on Environmental Quality guidance to federal departments and agencies on the appropriate use of mitigation and monitoring in NEPA documents⁹ states that agencies should not commit to mitigation measures absent authority or expectation of resources to ensure that mitigation is performed. Discuss the observations that were noted regarding habituation. Ideally, hazing methods should be tested to determine the timing of habituation occurrence so that this information can be incorporated into the Gull Hazing Plan. The issue of whether mice are affected by hazing operations should be addressed before the project proceeds.

The FEIS should discuss the timing of gull hazing. If, as reported, the primary times for gulls to feed on island are 2 hours before sunset and 2 hours after sunrise, project personnel should consider baiting as late in the afternoon as possible so that baiting activities contribute to the hazing. If gulls are hazed/disturbed right at application time, most of the bait will be available to mice during the first evening and any bait that mice consume or cache then will not be directly available to gulls. We note that, although the initial trials with placebo bait did show a lag between application and uptake by gulls, there was a subsequent sharp increase in gulls taking bait. Western gulls are long-lived birds and most of the gulls that learned to take placebo bait probably are still alive and using Farallon habitat. Consequently, the lag time for gulls accepting toxic bait could be very short to essentially non-existent.

Clarify/correct Table 2.5 (p. 82) which states that flight time required for hazing for Alternative B is only 5 weeks; elsewhere the RDEIS states that 60 days would be required.

⁸ 7th page of *Methods* section of report (report has no page numbers).

⁹ http://energy.gov/sites/prod/files/NEPA-CEQ_Mitigation_and_Monitoring_Guidance_14Jan2011.pdf

Bait drift into the marine environment

The RDEIS identifies some mitigation measures to minimize the risk of incidental bait drift into the marine ecosystem (p. 71), but refers to them as adaptive management measures and states that more careful consideration would be required prior to implementing such measures during the eradication because they add complexity and risk to the proposed operation. It is not clear, then, which will be adopted for the project or incorporated as components of the proposed action. Courts have ruled that agencies should discuss mitigation measures, along with an assessment of whether they can be effective, in the EIS¹⁰. In addition, CEQ makes clear in its guidance¹¹ that mitigation commitments should be carefully specified in terms of measurable performance standards or expected results, so as to establish clear performance expectations.

The RDEIS states several times that the bait deflector will minimize, and in several places, *prevent* bait drift into the marine environment (p. 120, 170, 171, 172, 200, 202). On page 214 it states - “bait drift into the marine environment - if it occurs...”. The EIS should be clear that bait drift *would* occur. The RDEIS states that the use of bait deflectors and trickle buckets has been shown to be effective at reducing the extent of bait drift into the marine environment during aerial broadcasts (p. 71); however, the USDA Palmyra Report warned that, “*evidence on Palmyra Atoll suggests the use of the deflector during directional baiting should not be considered the ultimate mitigation tool for reducing the amount of bait directly entering into aquatic environments. For future operations, the potential for bait to enter the marine environment must be a factor in the aquatic risk assessment and further methods to minimize the amount of bait entering the marine environment should be fully explored. The amount of bait that enters the aquatic environment from an aerial broadcast depends on shoreline configuration, island topography, overhanging vegetation, bird activity affecting flight lines, wind strength and direction, weather conditions, and pilot experience. On islands where these factors increase the potential for bait to enter marine environments, additional mitigation measures may be needed to protect sensitive marine environments. To reduce the potential for bait drift into sensitive marine environments, additional mitigation measures could include offsetting the shoreline directionally baited (deflector) swath 20m landward from the mean high tide line and dribble baiting or hand placement (hand baiting, bait stations, etc.) of the unbaited shoreline swath. However, the methods used to reduce bait drift would have to be tailored to site specific requirements*”.

Recommendation: The FEIS should discuss the potential effectiveness of this mitigation measure for this project’s site conditions. Discuss and consider the factors that increase the potential for bait to enter marine environments that are identified above. Especially relevant are the irregular shoreline, the excessive bird activity from gulls, and the proposal to fly steep areas a second time (shorelines on the Farallones are steep) to increase the application rate in these areas (p. 77). Discuss the mitigation suggestion of offsetting the shoreline directionally baited (deflector) swath 20 meters landward from the mean high tide line.

Carcass Removal

The RDEIS states that carcass removal will occur to reduce the threat of secondary poisoning (p. 69). While the systematic searches for carcasses would be limited to accessible areas, at an estimated 1,200

¹⁰ Methow Valley 490 U.S. at 352; *Neighbors of Cuddy Mountain v. U.S. Forest Service*, 137 F.3d 1372, 1381 (9th Cir. 1998). While NEPA does not require a fully developed plan that will mitigate all environmental harm before an agency can act, omission of a reasonably complete discussion of possible mitigation measures would undermine the action-forcing function of NEPA and prevent the agency and interested parties from properly evaluating the severity of the adverse effects. *Methow Valley Citizens Council*, 490 U.S. at 352

¹¹ http://energy.gov/sites/prod/files/NEPA-CEQ_Mitigation_and_Monitoring_Guidance_14Jan2011.pdf

mice per hectare (p. 12) in the project area of 49 hectares, this would result in many hundreds to thousands of mice collected. While it is likely that many anticoagulant-killed dead mice will die underground or in other inaccessible areas, there could still be significant surface kill¹². The RDEIS does not discuss how the carcasses would be managed and disposed.

In addition, this mitigation measure does not discuss the final disposition of gull carcasses, which, according to Appendix F, could number approximately 1,900 if 28 days pass before significant rainfall following rodenticide application, and over 2,600 if 117 days pass before significant rainfall following application. This prediction could be a substantial underestimation, however, as the Gull Risk Assessment did not model a third application of brodifacoum or a fourth application of diphacinone, which the RDEIS proposes. The number of applications is one of the most sensitive parameters in this prediction. The RDEIS acknowledges that the target to nontarget victim ratio will go down with each successive treatment (i.e. more nontargets will be killed in later applications). An additional application, especially of brodifacoum, could result in significantly more gull deaths.

The RDEIS does not discuss where the gulls would likely go after they have been hazed from the islands for several weeks. Because of the close proximity of the Farallones to San Francisco and open space coastal habitat in San Mateo and Marin Counties, we are concerned that the gulls could ingest a fatal dose of brodifacoum, die on the mainland and be a source of secondary poisoning to wildlife there. Coyotes abound in Marin and San Mateo counties and could ingest dying or dead birds. Even in San Francisco, there are coyotes in every large urban park and a large number of pet dogs that utilize off-leash areas. At the very least, the birds could pose a nuisance if large numbers of carcasses or dying birds wash up on San Francisco's or nearby beaches.

Because of this concern, we reiterate our previous recommendation to FWS that monitoring for non-target carcasses be extended to mainland beaches, especially if brodifacoum is used (since a much smaller quantity of bait pellets of brodifacoum would be lethal: 18-24 bait pellets, as opposed to 1,550-2,004 diphacinone bait pellets). The RDEIS states that notification would be made to inform the general public of the timing of the eradication and the potential hazards posed by the activity; however, the focus of the notification appears to be on boaters. The RDEIS states that regular, standardized surveys of mainland Gulf of the Farallones beaches *may* be conducted to search for dead birds that could have been exposed to rodenticide (p. 73).

Recommendation: In the FEIS, detail how mouse and gull carcasses would be handled and disposed. If disposal would occur on the Farallones, the impacts of such disposal to soil and water should be assessed and disclosed in the FEIS. The additional proposed rodenticide applications (assuming they are allowed by a supplemental label) should be modeled to update potential gull mortalities in the FEIS.

Identify the potential locations and range where gulls could travel and provide notification to all segments of the public that could encounter dead gulls. Public notification should include information on the toxicity of rodenticides to dogs, which are more sensitive to rodenticides than many other species, and whom to contact if dead gulls are found during the project window.

Detail how gull carcasses would be monitored on mainland beaches. Commit to active

¹² Assumptions of high numbers of victims dying underground come from rat trials, so estimates using this assumption should be guarded. There also seems to be no justification for assuming that the specific anticoagulant rodenticide used would affect the proportion of killed mice that died above ground.

monitoring of mainland beaches during the entire implementation period when bait or mouse carcasses are available. Develop a plan for disposal of gull carcasses collected and assess impacts from this disposal, as appropriate.

Specify how or whether sick or injured wildlife that may be found by the public or during monitoring would be treated under the action alternatives and who would be responsible for this treatment.

Bird Capture

The RDEIS states that attempts would be made to capture raptors (falcons, hawks, kites, eagles, and owls) and ravens present on the island prior to and during bait application (p. 70). It states that bird capture techniques have been utilized effectively for island rodent eradications throughout the world such as Anacapa, and Rabida and Bartolome islands in the Galapagos, but no other information is included. As written, the RDEIS implies that the prospect of bird capture is likely.

Recommendation: Discuss bird capture results from Anacapa, and Rabida and Bartolome islands in the Galapagos as well as from Palmyra. Indicate the percentage of birds captured in each case, and any mortalities that occurred among captive birds and known mortalities of their conspecifics that were not captured. Consider this information when projecting success of this mitigation measure on the Farallones, comparing and contrasting project and island conditions in order to disclose, and apply to the proposed project, the most relevant lessons learned.

Disclosure and commitment to mitigation

Reference is made to the best management practices established by the U.S. Fish and Wildlife Service in Alaska (p. 32, 69, 72). We understand that these measures were developed in response to the high unexpected non-target mortality that occurred on Rat Island. Since these measures are not identified, it is not clear that the project has incorporated all best practices into the project, nor is it clear to what extent the referenced practices would reduce the impacts of the proposed project. In general, mitigation commitments should be clearly identified, both for public disclosure and so that their impacts effectiveness can be accurately assessed¹³.

Recommendation: Identify the best management practices established by the U.S. Fish and Wildlife Service in Alaska and discuss them in relation to the project. All project mitigation measures and best management practices should be explicitly identified in the FEIS, with commitments to their implementation included in FWS's Record of Decision. A discussion of the effectiveness/expected results of these measures should be included. FWS should discuss funding and indicate whether the resources are available to ensure implementation of proposed mitigation measures, as well as identify the party responsible for implementation. A well-developed mitigation and monitoring plan should accompany the FEIS. The plan should discuss the adaptive management strategy, which identifies mitigation measures that would apply in the event that initial mitigation commitments are not implemented or effective.

As recommended in our scoping comments and comments on the Administrative DEIS, we suggest that FWS consider, as a potential mitigation measure, provide funding assistance to organizations that treat secondary rodenticide poisoning of birds.

¹³ http://energy.gov/sites/prod/files/NEPA-CEQ_Mitigation_and_Monitoring_Guidance_14Jan2011.pdf, p. 13

Post-project monitoring

The RDEIS states that monitoring of operational, mitigation, and ecosystem restoration objectives would be conducted before, during, and after the proposed mouse eradication (p. 72) and that monitoring would be conducted in accordance with the best management practices established by the U.S. Fish and Wildlife Service in Alaska without identifying these practices. The proposed monitoring does not include monitoring for rodenticide residues, except for intertidal invertebrates and then only “if greater than negligible bait drift into the marine environment is detected”. It is not clear how this will be determined.

The recommendations from the USDA Palmyra Atoll Rodent Eradication Monitoring Report, September 2012, stated that future projects should include monitoring for toxicant residues in fish, insects, crabs, and other organisms for at least 90 days post broadcast, and noted that residues in non-target organisms persisted 7 months after the first bait application. Thus, the risk of exposure to other organisms may persist for many months post application.

Recommendation: Identify the U.S. Fish and Wildlife Service in Alaska’s BMPs that pertain to monitoring. Identify how more than negligible bait drift will be determined. Incorporate tissue monitoring for toxicant residues in fish, insects, crabs, and other organisms for at least 90 days post broadcast.

Independent third-party review of project

In our scoping comments, EPA raised concerns regarding potential conflict of interest issues with Island Conservation preparing the impact assessment and most likely also carrying out the eradication project, since there are few entities that have expertise in the latter. We assume that the necessary disclosure statement has been filed per 40 CFR 1506.5 (c) specifying that Island Conservation has no financial or other interest in the outcome of the project. Additional effort to ensure objective post-project reporting would be prudent, to maximize lessons learned, so they can be applied to future projects.

Recommendation: We recommend that FWS arrange for an independent post-project review.

Impact Assessment

Determining significance

The RDEIS defines significance in terms of long-term (5+ years) impacts only (p. 119). While we understand that long-term population effects to biological resources are the primary interest of the project partners, the definition of “significantly” in the CEQ Regulations (40 CFR 1508.27) does not indicate that significance is associated only with long-term effects. In fact, the CEQ regulations clearly state that, in assessing the context of an impact when determining significance, “both short- and long-term effects are relevant” (40 CFR 1508.27(a)). The CEQ regulations do state that the impact discussion will include “the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity” (40 CFR 1502.16). The disclosure of impacts would be clarified if the significance of both short and long-term effects was assessed, especially since it appears that there is the potential for significant short-term effects to occur.

The impact assessment should also include an analysis of risks should the eradication not be successful. This is important since house mouse eradications historically have had relatively high failure rates. The RDEIS notes that, of the 82 house mouse eradication attempts, 50 were successful (p. 38) - a 61% success rate. The RDEIS also notes that the success rate for house mice has improved in recent years;

still, the risk of failure is substantially greater than for rat eradications. Therefore, the possibility exists that resources may have to withstand impacts from rodenticide applications along with the continued impacts from mice. The State Water Resources Control Board also commented during scoping on the need to consider the possibility of eradication failure in the impact assessment (Appendix O).

Recommendation: The FEIS should assess the significance of short term and long-term effects to resources. Long-term beneficial effects that are expected from a successful eradication can be addressed when discussing the relationship between short-term uses of the environment versus long-term productivity.

Discuss and assess the risk of eradication failure and the ability of resources, especially those most affected by mice, to withstand both the impacts from rodenticide applications along with the continued impacts from mice.

Comparing the alternatives

The CEQ Regulations emphasize the importance of the alternatives analysis, stating it is the heart of the EIS (40 CFR 1502.14). The RDEIS provides a comparison of the two alternative actions in Table 2.5; however, the comparison is not meaningful because it does not consider the differences in toxicity of the two rodenticides, which is the main difference between the alternatives. Diphacinone is less persistent and less toxic to birds when compared to brodifacoum. Therefore, application rates, total applied bait and amount of rodenticide applied, concentration of rodenticide within the bait, and even bait availability, are not comparable. Providing this information unqualified in a side-by-side comparison table can lead to misinterpretation by the public.

Because the description of the two actions does not consider this difference in toxicity, it does not reflect potential differences in the need for hazing and other mitigation measures. The RDEIS identifies Alternative C (Diphacinone) as requiring an extra 10 weeks of flight time for hazing (p. 82) and an extra 15 days of total hazing (90 vs. 105 days - p. 198). The Administrative DEIS included information on the available LD₅₀ data¹⁴ for the two rodenticides, noting that it is estimated that it will take approximately 18-24 brodifacoum bait pellets and approximately 1,550-2,004 diphacinone bait pellets to cause a lethal effect in most gulls. If this information is accurate, it is not clear whether a reduced need for hazing has been considered for Alternative C, or whether less bird capture would be necessary. Both of these activities cause disturbance impacts.

Recommendation: In comparing the alternatives, the FEIS should clarify how the difference in toxicity of the two products affects the other comparison factors, If reduced toxicity could translate into operational differences (e.g., reduced hazing effort or bird capture), these should be distinguished in the description of alternatives.

Impacts to the Farallon arboreal salamander

Impacts to the Farallon arboreal salamander are predicted to be not significant (p. 203) despite a medium toxicant risk from brodifacoum and available secondary pathways from consuming invertebrates who have consumed toxicant (p. 139). The RDEIS does acknowledge uncertainty associated with the toxicant effect of brodifacoum and diphacinone to amphibians and states that, to mitigate for this uncertainty, up to 40 individual salamanders would be captured and held for the duration of toxicant risk (p. 135). However, the RDEIS does not state whether this type of salamander ever has been successfully held in captivity for up to 90 days. Amphibians have closed circulatory systems and we expect they

¹⁴ LD₅₀ = Lethal Dose to 50 percent of animals

would be vulnerable to anticoagulants, especially brodifacoum, if exposure occurred. Amphibians also tend to be carnivorous and could be exposed to rodenticide secondarily through eating small organisms that had ingested bait. The RDEIS does not fully discuss the impacts from habitat modification on the salamander if mice were eradicated. For example, if the salamanders use burrows, the removal of burrowing mammals could reduce available burrows. Such habitat modification was found to be a concern in an endangered species risk assessment EPA conducted for diphacinone on the California Tiger Salamander.

The RDEIS identifies a low fecundity for this species (p. 98), and states that the Farallon islands contain the entire population of the species (p. 172). Because of this, the population could be devastated if significant unexpected impacts did occur. Considering these factors and the uncertainty regarding toxicity, it is not clear that the statements that impacts would be not significant (p. 203) or that no unavoidable adverse impacts to amphibians are anticipated (p. 214, 215) are sufficiently supported.

Also uncertain is the benefit that that eradication would have on the salamander. The RDEIS states that the level of uncertainty is too great to determine whether mouse eradication would significantly benefit salamanders (p. 173), and that the use of stable isotope analysis is proposed to assess the diet of both house mice and salamanders on Southeast Farallon Island to expand an understanding of the predatory and competitive impacts of mice on SEFI and help predict the response of the salamander population if mice are removed (p. 99). It is not clear whether/when this study will occur and whether the results will be available in the FEIS. Despite this uncertainty as to the benefits that mouse eradication would have on the salamander, the RDEIS includes “benefits to the salamander” in the project need statement (p. 13), and as a project goal for the mouse eradication (p. 14).

Recommendation: Provide the underlying support for the conclusion that there would be insignificant impacts to the Farallon arboreal salamander from the project. Clarify and amend, where needed, the statements for project need and goals that the eradication will necessarily benefit the salamander. Specify whether and when the isotope analysis would be performed and how results could affect the impact assessment conclusions.

Impacts to Gulls

The RDEIS is vague regarding the expected Western gull mortality. The predicted mortality is only disclosed in the appendices, and the RDEIS does not clearly compare the differences in expected gull mortality among alternatives. The Western Gull Risk Assessment (Appendix F) concluded that 90% hazing success is required to ensure that the threshold of 1,700 gulls killed is not surpassed for different initial application dates of brodifacoum and to cover a range of possible dates for the first significant rain. This information was carried forward into the body of the EIS for both alternatives, concluding that use of both rodenticides would not exceed this threshold under positive conditions, but no distinction between alternatives, in relation to gull mortality, is disclosed.

Recommendations: In the assessment of impacts to gulls, identify the differences in gull mortality expected under the two action alternatives under various conditions. Include this information in the body of the FEIS.

Predicting impacts to specific resources

The project is being driven by indirect impacts (attracting burrowing owls that then predate on seabirds, as opposed to direct predation on seabirds by rodents). Predicting ecosystem response is difficult even for direct impact eradications, as ecosystems are complex. The complexity and uncertainties associated with this project, as compared to other rodent eradication projects, should be disclosed and fully

discussed, and the uncertainty acknowledged when predicting impacts. In several discussions, impacts are not fully assessed or impact predictions are presented with more certainty than may be warranted. In other areas, impacts are not assessed consistently.

A few examples include:

- The RDEIS states that gulls could be exposed to rodenticide through secondary uptake from consuming carcasses, including mice (p. 140), which implies that gulls consume mice. The RDEIS does not discuss what portion of gull's diets consists of house mice, and what food items would likely replace this component of their diet if mice are eliminated. Is it possible that gulls, which currently are responsible for half of the predation on storm-petrels, would increase predation on storm-petrels if mice were no longer available?
- The RDEIS states that both mice and burrowing owls consume large numbers of terrestrial invertebrates on the islands, including the endemic Farallon camel cricket (p. 25). Camel crickets and other invertebrates comprised 37 percent of the items found in burrowing owl pellets from September through December, but from January to May the number of invertebrate prey items was nearly twice this rate (78 percent of the total). What is especially revealing is that in January, after the mouse population had crashed and before storm-petrels had arrived back in large numbers, the owls showed a large spike in invertebrate consumption, reaching 85 percent of all prey items. Overall, invertebrates made up 67 percent of the prey items in owl diet over the entire winter, and over 42 percent of the invertebrates consumed were endemic Farallon camel crickets (p. 20). What is the likelihood that burrowing owls could be sustained by these insects, presumably higher in abundance with mice eradicated, until storm petrels arrive? What is the risk to the survival of the endemic Farallon camel cricket? The RDEIS does not discuss this impact and concludes a significant beneficial impact would occur to the cricket.
- How might the raptors, who may now be feeding on mice - for example, the breeding peregrine falcons and various species of hawks, kites, eagles, and owls - respond to the elimination of mice as a food source? What potential effects could result if these species increased predation on native species?
- The FWS currently attempts to manage invasive plants through manual control and the selective application of herbicides (p. 53). Since mice consume invasive plants (p. 225), is there an expectation that a greater use of herbicides would be needed when mice are eradicated?
- Impacts to bats are not assessed. The RDEIS states that a number of bat species visit the Farallones, and that hoary bats migrate to Farallones from late August through October (p. 99). It notes that island invertebrates play an important ecological role as prey items for migrant bat species on the Farallones (p. 100), and that toxic residues have been found in the tissues of various invertebrate species (p. 137).
- Sublethal effects - the RDEIS states that the amount of uncertainty regarding sub-lethal effects of anticoagulants on species is unknown and precludes its assessment in this document (p. 139) citing to 40 CFR 1502.22. However, 40 CFR 1502.22 lists the requirement to obtain the information if costs are not exorbitant, or to include (1) a statement that such information is incomplete or unavailable; (2) a statement of the relevance of the incomplete or unavailable information to evaluating reasonably foreseeable significant adverse impacts on the human environment; (3) a summary of existing credible scientific evidence which is relevant to evaluating the reasonably foreseeable significant adverse impacts on the human environment;

and (4) the agency's evaluation of such impacts based upon theoretical approaches or research methods generally accepted in the scientific community. EPA provided information regarding sublethal effects to raptors and birds in our comments on the Administrative DEIS.

- Impacts to crabs are unclear. The RDEIS states that impacts to intertidal invertebrates would be negligible (p. 176). It also discusses toxicity to land crabs, citing investigations that found that crabs readily consumed brodifacoum bait with no lethal effects, with other studies demonstrating that land crabs are not negatively affected by anticoagulant rodenticides, although crabs could be sources of secondary exposure (p. 137). However, the USDA Palmyra Atoll Rodent Eradication Monitoring Report, September 2012, found dead land crabs containing brodifacoum residues. These findings should be discussed and impacts to any crab species clarified.
- Inconsistent disturbance risk is identified for birds that would be captured. The RDEIS identifies high disturbance risk for burrowing owls that would be captured (p. 154) but does not identify this risk for other raptors that the RDEIS indicates would be captured and held to reduce rodenticide exposure. These include ferruginous hawk, rough-legged hawk and Cooper's hawk, northern harrier and red-tailed hawk, sharp-shinned hawk and American kestrel, merlin, short-eared owl and long-eared owl, barn owl, northern saw-whet owl and white-tailed kite (p. 149-153).
- Inconsistent analysis is also present for pinnepeds (p. 202), the golden crown kinglet (p. 188), and black abalone (p. 205) when evaluating the two rodenticide alternatives.

Recommendations: Because almost all of the past rodent eradications were intended to halt direct impacts to birds by rodents and the results were more easily predicted, we recommend that FWS consider the possibility of, and describe in the FEIS, potential alternative ecosystem responses to the eradication in addition to the one presented in the RDEIS. We recommend revisiting some of the impact conclusions and providing clarifications and/or corrections as noted above. Because of the complexity of this project and the difficulty in predicting ecosystem response, the project partners should develop requirements during planning and project implementation to anticipate and handle unexpected future events. This contingency planning should be part of the adaptive management plan and included in the FEIS.

Additional comments on the impact assessment

- The discussions of residues in waters around the Farallones (Section 4.4.1.3 - Alternative B: Aerial Broadcast of Brodifacoum, p. 121) should include data from Palmyra and should compare the potential sea water contamination that could occur from the planned treatments to determinations of how much brodifacoum got into the marine environment via the high-rate applications on Palmyra and the big spill in New Zealand.
- The discussion of water sampling results for diaphacinone (Section 4.4.1.4 - Alternative C: Aerial Broadcast of Diphacinone, p. 122) cite the Mokapu and Lehua Islands as examples where no residues were found. It should be noted that the Mokapu example is more appropriate than the Lehua one because coastal treatments were greatly curtailed on Lehua.
- The discussion of soil residues of brodifacoum in Section 4.4.2.3 (p. 123) should include application rates in terms of amount of active ingredient.
- For impacts to breeding seabirds under the No Action Alternative (p. 130), which primarily discusses impacts to the ash storm petrel, include the October 22, 2013 finding by the FWS

that protection of this species under the Endangered Species Act is not warranted at this time.

- The RDEIS states that mice have the potential to act as vectors for diseases that could negatively impact sea lions (p. 131). Any evidence of pathogens harbored/vectored by Farallon house mice should be disclosed. If there is no such evidence, that should be stated clearly.
- The discussion of toxicity to birds and mammals (p. 134) cites a 2009 report for an observation made in 2010.
- The “Tasheva 1995” citation in the discussion of toxicity to amphibians (p. 134) seems to refer to the same document as the “WHO 1995” citation presented elsewhere in the RDEIS.
- In the discussion of secondary exposure on p. 138, the more recent data on retention of brodifacoum in invertebrate tissues (e.g., data from Palmyra) should be included.
- In the discussion of impacts of brodifacoum on Glaucous-winged gulls (p. 164), the heavy mortality suffered by this species following brodifacoum bait applications on Rat Island in 2008 should be discussed.
- In the discussion of cumulative impacts to birds for the No Action alternative (p. 230), any known or predictable effects of the continued presence of house mice on efforts to make nest site improvements should be discussed.

Depredation permits for burrowing owls

When assessing a burrowing owl translocation alternative, the RDEIS states that “...at this time the USFWS Office of Migratory Birds is not issuing depredation permits to take or translocate native wildlife (including burrowing owls) except in certain cases to protect endangered or threatened wildlife. Thus, because ash storm petrels are not listed on the Endangered Species list, obtaining such a permit would not be possible at this time.” (p. 46). This is confusing because the project does propose capture and translocation of burrowing owls and other raptors as mitigation. We also are aware that FWS has developed an internal memo clarifying that a Special Purposes Miscellaneous permit can be issued, if applicable, for the unintended take of migratory birds as a result of invasive species control projects that benefit migratory birds, including those that involve pesticide applications.

Recommendation: Clarify the use of depredation permits for the project and their availability from the Office of Migratory Birds. Discuss the potential use of Special Purposes Miscellaneous permits and whether their use would make the burrowing owl translocation alternative feasible. If so, this alternative should be evaluated in the FEIS.

Minor comments/errors

- Tissue Residues - In many places, tissue residues are reported in units of milligrams per liter (mg/L). Those should likely be milligrams/kilogram (mg/kg).
- Aquatic Toxicity - In several places, references are given as “Ecotox...”. The original study references would be more appropriate.
- In Table 2.5—comparing action alternatives – the description of Alternative B’s bait application duration does not seem correct. If 3 applications are conducted and spaced a maximum of 21 days apart, the operation could take up to 43 days (day 1, 21 days later and 21 days later).
- Apparent typos exist on p. 206 where the impact assessment for “other gastropods” refers to black abalone (black abalone is treated separately in the document), and to camel crickets.