

CALIFORNIA COASTAL COMMISSION

45 FREMONT STREET, SUITE 2000
 SAN FRANCISCO, CA 94105-2219
 VOICE (415) 904- 5200
 FAX (415) 904-5400
 TDD (415) 597-5885
WWW.COASTAL.CA.GOV



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STAFF REPORT: REGULAR CALENDAR

Consistency Determination No.: **CD-0002-19**

Federal Agency: **U.S. Fish and Wildlife Service**

Location: South Farallon Islands, Farallon Islands National Wildlife Refuge, San Francisco County ([Exhibit 1](#))

Project Description: Eradicate introduced, invasive house mice by aerial broadcast of rodent bait, hand baiting, bait stations, and traps in order to benefit native seabirds and restore natural ecosystem processes on the South Farallon Islands.

Staff Recommendation: Concurrence

SUMMARY OF STAFF RECOMMENDATION

The U.S. Fish and Wildlife Service (Service) submitted a consistency determination for the South Farallon Islands Invasive House Mouse Eradication Project in the Farallon Islands National Wildlife Refuge, located approximately 27 miles west of San Francisco. The ocean waters surrounding the Refuge are part of the Greater Farallones National Marine Sanctuary. The South Farallon Islands contain the largest seabird breeding colony in the contiguous United States, with approximately 300,000 to 350,000 birds of 13 species. Populations of five marine mammal species use the Islands for resting and breeding, and migratory birds stop on the Islands to rest and feed. Several rare species occur, including the ashy storm-petrel, the endemic Farallon arboreal salamander, and the endemic Farallon camel cricket.

Introduction of invasive mammals to the South Farallon Islands began in the 19th century and led to long-term ecological damage. House mice are the only remaining invasive mammal left on the Islands, and they continue to adversely affect breeding seabird populations, native invertebrates, and native vegetation. House mouse densities exceed 490 per acre at their annual peak and are among the highest recorded for any island in the world. The Service's 2008 *Comprehensive Conservation Plan* for the Refuge calls for restoration of degraded habitat and the eradication of invasive house mice from the Islands. The project goals and objectives include complete removal of house mice, restoration of native ecosystem functions, increased abundance of native vegetation, increased populations of certain seabirds and native invertebrates, and minimized negative impacts to non-target species and natural resources.

The Service proposes aerial broadcast of the rodent bait Brodifacoum-25D Conservation, using guidance and lessons learned from previous failed and successful island rodent eradication projects worldwide, and from results of eradication field trials conducted on the South Farallon Islands. The Service initially assessed 49 different potential mice removal methods, including mechanical, biological, and chemical methods using different delivery techniques. The Service is proposing to use Brodifacoum-25D Conservation due to its documented record of island mouse eradication success. Project implementation would take seven weeks, including two weeks for pre-eradication activities and five weeks for bait application, mitigation, and operational monitoring activities. Approximately 2,900 pounds of bait (which includes a total of 1.16 oz of brodifacoum rodenticide) would be applied in two separate applications (each taking one to two days), ten to 21 days apart. Bait would be systematically applied to all land areas of the Refuge above mean high water by a GPS-guided helicopter. Up to 12 acres of the Islands may require hand-baiting within caves and adjacent to intertidal zones, and bait stations would be placed in, under, and outside the two Island residences and four out-buildings. The project would be implemented in the November-December time period when the mouse population is declining and food stressed, and would occur no sooner than late 2020.

The South Farallon Islands are an environmentally sensitive habitat area (ESHA) due to their isolated nature, varied and extensive habitats, rare species present, and the ecological interaction with the adjacent productive marine environment. Section 30240 of the Coastal Act states that within an ESHA only uses dependent on the resources found within the ESHA shall be allowed. The Commission has consistently determined that restoration activities designed to restore habitat and/or improve ecosystem functions are allowable uses within an ESHA. The Commission has also found that restoration projects consistent with Section 30240 often include unavoidable temporary adverse effects to sensitive habitat or species, and that may necessarily involve permanent alterations to existing habitat when the goal of the project is to restore native habitats and ecosystem functions. The Service reports that since 2007, 28 of the 30 house mouse island eradication projects undertaken across the globe (those with documented methods and results) have been confirmed as successful. All but one of the successful mouse eradications that used a rodenticide used brodifacoum or another closely related second-generation anticoagulant.

Implementation of the proposed project will lead to non-target wildlife species mortality. Nevertheless, while this effect is unavoidable it would not be significant in the context of species populations in the region. The proposed invasive house mouse eradication project on the South Farallon Islands is a use (restoration) dependent on the ESHA resources of the Islands, and has

been designed to protect the ESHA from significant disruption of habitat values and to be compatible with the continuance of the ESHA. The proposed restoration efforts would result in significant long-term benefits to native seabirds, amphibians, terrestrial invertebrates, and plants and will help to restore natural ecosystem processes on the islands. The project includes contingency plans, monitoring programs, best management practices, mitigation measures, and a detailed final operational plan. The Service will provide final versions of these plans and programs to the Executive Director for review and comment prior to project implementation. The staff therefore recommends that the Commission find the project consistent with the environmentally sensitive habitat policy of the Coastal Act (Section 30240).

While the project is limited to upland areas on the Islands above the mean high tide line, the project includes the application of rodent bait down to the Mean High-Water Spring mark to ensure that all mice on the Islands are exposed to the bait. As a result, the project has the potential to adversely affect ocean water quality and marine resources. The Service acknowledges the potential for rodent bait to drift into the intertidal zone during aerial broadcast of the bait. However, given the physical and chemical properties of the bait formulation, the low water solubility of the rodenticide, the positive ocean water quality monitoring results from other recent successful island eradication projects using the same rodenticide, and the project design, implementation, and mitigation measures incorporated into the proposed project, the Service believes, and the Commission staff agrees, that any bait drift would lead to only very temporary and localized reductions in water quality with no adverse long-term effects to water quality, fisheries, intertidal invertebrates, or marine mammals.

Effects on marine resources would be similarly restorative, with temporary adverse effects minimized and monitored, and long term benefits far outweighing adverse effects. As designed, with numerous measures to minimize non-target mortality and to minimize adverse effects on ocean water quality and marine resources, the project has the greatest potential for successfully eradicating invasive house mice from the Islands and significantly improving seabird habitat and other marine resources. The project will maintain, enhance, and restore marine resources, will provide special protection to an area of significant biological resources, and will sustain and protect the biological productivity and quality of ocean waters surrounding the Islands. The staff therefore recommends that the Commission find the project consistent with the marine resources and water quality policies of the Coastal Act (Sections 30230, 30231, and 30232).

The staff recommends that the Commission **concur** with The Service's consistency determination CD-0002-19. The motion and resolution are on Page 5 of this report. The standard of review for this consistency determination is the Chapter 3 policies of the Coastal Act.

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EXHIBITS

- [Exhibit 1](#) – Location Map
- [Exhibit 2](#) – South Farallon Islands Topographic Map
- [Exhibit 3](#) – South Farallon Islands Aerial Photo View to the East
- [Exhibit 4](#) – South Farallon Islands Aerial Photo View to the West
- [Exhibit 5](#) – Memorandum: Ecological Resources and the South Farallones Mouse Eradication Project, Lauren Garske-Garcia, PhD, June 27, 2019

I. FEDERAL AGENCY'S CONSISTENCY DETERMINATION

The U.S. Fish and Wildlife Service has determined the project is consistent with the California Coastal Management Program.

II. MOTION AND RESOLUTION

MOTION:

*I move that the Commission **concur** with consistency determination CD-0002-19 that the project described therein is fully consistent, and therefore consistent to the maximum extent practicable, with the enforceable policies of the California Coastal Management Program (CCMP).*

STAFF RECOMMENDATION:

Staff recommends a **YES** vote on the motion. Passage of this motion will result in a concurrence with the determination and adoption of the following resolution and findings. An affirmative vote of a majority of the Commissioners present is required to pass the motion.

RESOLUTION TO CONCUR WITH CONSISTENCY DETERMINATION:

*The Commission hereby **concurs** with the consistency determination by the U.S. Fish and Wildlife Service, on the grounds that the project described therein is fully consistent, and therefore consistent to the maximum extent practicable, with the enforceable policies of the CCMP.*

III. FINDINGS AND DECLARATIONS

A. PROJECT BACKGROUND

The Farallon Islands National Wildlife Refuge (Refuge) is located approximately 27 miles west of San Francisco ([Exhibit 1](#)). The Refuge is managed by the U.S. Fish and Wildlife Service (Service) and encompasses 211 acres across numerous islands and islets. The South Farallon Islands total approximately 120 acres and include Southeast Farallon Island, West End (or Maintop) Island, and numerous small named and unnamed islets ([Exhibits 2-4](#)). The Refuge was established in 1909, expanded in 1969 to include the South Farallon Islands, and in 1974 all the emergent land except for Southeast Farallon Island was designated as wilderness. The ocean waters around the Islands below the mean high tide line are part of the Greater Farallones National Marine Sanctuary and are not included within the Refuge boundary nor are they within the project area. In addition, the Southeast Farallon Island State Marine Reserve (SMR) surrounds the South Farallon Islands, and the Southeast Farallon Island State Marine Conservation Area is adjacent to and offshore to the west and south of the SMR.

The Service states in the March 2019 *South Farallon Islands Invasive House Mouse Eradication Project Final Environmental Impact Statement* (FEIS) that the South Farallon Islands hold the largest seabird breeding colony in the contiguous United States, with approximately 300,000 to

350,000 birds of 13 species. Populations of five marine mammal species use the Islands for resting and breeding, and migratory birds stop on the Islands to rest and feed. Several rare species occur, including the ashy storm-petrel, the endemic Farallon arboreal salamander, and the endemic Farallon camel cricket. The FEIS states that:

*[I]ntroductions of invasive mammals to the South Farallon Islands in the 19th and early 20th centuries have led to long-term ecological damage. Introduced European rabbits (*Oryctolagus cuniculus*) and domestic cats (*Felis catus*) had caused severe impacts to vegetation and birds until they were both removed from the islands in the early 1970s (Ainley and Lewis 1974).*

The FEIS states that house mice are the only remaining invasive mammal on the Farallon Islands, and that they are adversely affecting the native Farallon ecosystem, notably breeding seabird populations of ashy and Leach's storm-petrels, native invertebrates such as the endemic camel cricket, arboreal salamanders, and native vegetation:

*[Invasive house mice] provide a temporary food source for migratory burrowing owls (*Athene cunicularia*) that switch to preying on rare ashy storm-petrels after the mouse population crashes. House mice also consume native invertebrates, including the endemic Farallon camel cricket, altering the makeup of the Farallon invertebrate fauna and competing with native wildlife such as the endemic Farallon arboreal salamander. Mice also consume large numbers of seeds and other plant parts of native vegetation, reducing native vegetation cover in favor of hardier, invasive plants. At their annual peak, invasive house mice on the South Farallones are present in extremely high densities, numbering over 490 per acre (1,200 per hectare) (Appendix C). House mouse densities recorded from the South Farallon Islands are among the highest for any island in the world (Appendix C, Pearson 1963, Mackay et al. 2011).*

The FEIS further documents the adverse impact that invasive house mice exert on the Farallon environment:

House mice are small rodents, around 0.5-0.7 oz (15-20 g) in mass. They are prolific breeders, with females commonly producing six to eight litters a year, each with four to seven young, which mature within three weeks and are reproductively active soon after (Witmer and Jojola 2006). Mice typically reside in burrows or crevices and individuals rarely travel outside of a 49-66 ft² area (15-20 m²) surrounding their burrow, although occasional forays of longer distances do occur (Triggs 1991, Ruscoe 2001). House mice are omnivorous opportunistic feeders, and mice on the Farallones eat both vegetation and invertebrates year-round and have been found with eggshell fragments and seabird feathers in their stomachs during the seabird breeding season (Jones and Golightly 2006). The population of invasive house mice on the South Farallones is highly cyclical, growing steadily and rapidly throughout the summer with a peak in October, reaching some of the highest densities ever recorded, followed

by a crash throughout the winter as food resources decline to an annual low in April (Irwin 2006, Jones and Golightly 2006).

In 2008 the Service published its *Comprehensive Conservation Plan* for the Refuge, which in part called for the restoration of degraded habitat and the eradication of invasive house mice from the South Farallon Islands. In January 2009 the Commission's Executive Director administratively concurred with the Service's consistency determination CD-064-08 for the *Plan*, determining it to be an environmentally beneficial activity and consistent with the Chapter 3 policies of the Coastal Act. In 2013 the Service published a Draft EIS and a Revised Draft EIS to support a proposed invasive house mouse eradication project on the South Farallon Islands. During the nearly four-month comment period, the Service received more than 550 individual comments from the public and interested agencies. The Service published the Final EIS in March 2019 and it includes revisions made in response to comments received on the Revised Draft EIS, and is tiered from the policy decision set forth in the *Comprehensive Conservation Plan* to eliminate invasive house mice. The Final EIS is incorporated by reference into the subject consistency determination for the proposed South Farallon Islands invasive house mouse eradication project.

The FEIS includes a history of island rodent eradication projects worldwide and in particular efforts to eliminate house mice:

Steady advances in planning and methodology, including the development of second-generation anticoagulants, and access to accurate satellite navigational guidance (Bellingham et al. 2010) have contributed to an accelerating rate of eradication success and has resulted in the removal of rodents from increasingly larger and more biologically complex islands. The systematic application of bait containing rodenticides, particularly second-generation anticoagulants, has been central to this record of success (Howald et al. 2007).

The FEIS further states that success rates have improved over time and that since 2007, 28 of the 30 house mouse island eradication projects undertaken (those with documented methods and results) have been confirmed as successful. All but one of the successful mouse eradications that involved rodenticides used brodifacoum or another closely related second-generation anticoagulant:

Between the years of 2005 and 2015, 100 percent of all mouse eradication attempts on islands (30 in total) used brodifacoum; 93 percent of these attempts were successful at removing mice from islands (Samaniego 2016). Among the second-generation anticoagulant rodenticides, brodifacoum and bromadiolone appear to be the most effective compounds (Bhattacharyya and Borah 2016). Brodifacoum has been successfully used for mouse and rat eradications worldwide because of its toxicity to rodents and the fact that a lethal dose can be readily consumed in a short period of time. The specific product Brodifacoum-25D Conservation outlined in Alternative B [The Service's proposed project in the subject consistency determination] has been used successfully to eradicate rodents on five islands. Brodifacoum-25D Conservation is similar to the bait CI-

25, which was specifically developed for rodent eradication and used successfully on Anacapa Island in 2001 to remove black rats.¹ The product was initially developed for use in dry California coastal island environments like the Farallon Islands.

The FEIS also includes a discussion of lessons learned from past rodent eradication projects, including those that failed and those that were successful, and references a 2013 meeting of international eradication specialists who determined that:

The most likely reasons for eradication failure include nontarget bait consumers that can consume bait intended for the target species, succumb to bait consumption, or act as a secondary toxicant source to their predators; failing to get sufficient bait into every rodent territory to ensure that every target individual can receive a lethal dose; and failure to sufficiently monitor and mitigate impacts to non-target species at a level that is both within permitted levels and socially acceptable (Keitt et al. 2015).

As a result, the Service incorporated lessons learned and best management practices arising from past eradication projects into the planning and implementation processes for the proposed South Farallon Islands project. These measures are described in the following section of this report.

B. PROJECT DESCRIPTION

The Service states in its consistency determination that it proposes to eradicate invasive house mice from the South Farallon Islands by aerial broadcast of the rodent bait Brodifacoum-25D Conservation as the primary method of bait delivery. The Service states that it selected the proposed project after extensive review of agency and public comments on the Revised Draft EIS, and after it conducted several pre-eradication studies, reviewed lessons learned from past eradication projects, and consulted with the U.S. Department of Agriculture (Animal and Plant Health Inspection Service, Wildlife Services), U.S. Environmental Protection Agency, Greater Farallones National Marine Sanctuary, and California Department of Fish and Wildlife.

The FEIS states that the goals for removing invasive house mice are to:

- Restore native ecosystem functions altered by invasive house mice;
- Increase the abundance and recruitment of native vegetation;
- Increase the population sizes of ashy and Leach's storm petrel seabirds;
- Increase the productivity and abundance of endemic Farallon arboreal salamanders, endemic Farallon camel crickets, and other native invertebrates;
- Improve the wilderness character of the Farallon Islands; and
- Improve species and ecosystem adaptability and resilience in light of projected future climate change.

¹ In November 2000 the Commission's Executive Director concurred with the U.S. Fish and Wildlife Service's negative determination ND-104-00 for use of the rodenticide Brodifacoum to eradicate invasive black rats from Anacapa Island in Channel Islands National Park.

The FEIS states that the objectives for eradicating invasive house mice include:

- The complete removal of invasive house mice from the South Farallon Islands using the best available methods;
- Meet the Refuge's management and policy guidelines;
- Minimize and mitigate any negative impact to the native species and other natural and cultural resources of the islands;
- Ensure human safety is preserved during project implementation and mitigation;
- Ensure that long-term benefits of mouse removal outweigh any short-term negative effects to ecological processes from project implementation; and
- Prevent the future reinvasion of house mice through the implementation of a biosecurity plan.

The Service identified key lessons from previous island rodent eradication projects in designing the proposed project in order to minimize potential adverse effects to non-target species and resources on the South Farallon Islands. The FEIS states that:

. . . many of these lessons learned were taken specifically from an evaluation of the Rat Island, Alaska rat eradication project (reference). Other major sources of information came from the best practices for mouse eradications in New Zealand (Broome et al. 2017), an evaluation of rodent eradications on tropical islands (Ornithological Council 201.), and more recent eradications at Palmyra Atoll (Pitt et al. 2015), Desecheo Island (Shiels et al. 2017), and Pinzon Island (Galapagos Islands; Rueda et al. 2016, in press). It is essential to have a broad understanding of the non-target species that are likely to be present in the region during the eradication operation and exposure windows. If sufficient data are unavailable to accurately determine a species' presence and behavior, planners should use worst case scenario planning and developing detailed contingency plans that can provide a framework for decision-making during operations, as well as reduce the likelihood of making ill-informed or unevaluated mistakes (Section 2.6.5).

As a result, the Service designed the proposed project using the following guidance measures gleaned from past eradication projects:

a) The Service has evaluated and determined the likely density and expected behavior of the target species prior to developing the bait broadcast plan. It is imperative to use sufficient bait to ensure that every target individual receives a lethal dose of the toxicant, while limiting the amount of bait used in total to minimize impacts to non-target species.

b) The Service intends to monitor bait uptake during the operation and continually assess rodent activity to ensure that there is sufficient bait to provide a lethal dose to every individual, as well as ensure that non-target individuals are not impacted in a manner inconsistent with NEPA and other permits.

c) Detailed mitigation measures, including feasible carcass and bait removal, with contingency plans have been developed to provide a framework for adaptive management, outline mitigation protocols, and determine the appropriate command structure, if an unexpected incident were to occur.

d) Reasonable efforts have been made to assess both primary and secondary impacts to non-target species prior to the development of a detailed operational plan. A broad range of alternatives, including a range of toxicant and non-toxicant approaches, were considered and evaluated by the Service. The Service's approach included a detailed Alternatives Assessment Process (Section 2.6), a justification for dismissed alternatives (Section 2.7), and evaluation of both agency and public comments (Appendix P) from the RDEIS prior to choosing a preferred alternative.

e) Clear lines of communication and standard terminology are essential to any complex eradication project. A project command structure would be developed in the operational plan. The operational plan should provide as much detail as possible to minimize the likelihood of conflict between personnel, as well as reduce the potential to fail to eradicate the target species or have a greater than expected level of impact to non-target species.

f) The Service has committed to employing a sufficient number of staff and resources for the project with sufficient funding to continue mitigation and monitoring efforts to continue mitigation and monitoring efforts until the risk to island resources has been reduced to a negligible level. This will be determined by assessing the risks to island resources and clearly defining significance thresholds based on the best available data (Section 4.5.6).

The Service also undertook house mouse eradication field trials on the Farallon Islands to collect site-specific information to support the design of the proposed project. The trials had three objectives: (1) determine the parameters necessary to eradicate mice; (2) evaluate risks to non-target native species; and (3) identify and develop measures to avoid, minimize, and mitigate any potential impacts. The field trials included a house mouse density estimate study, bait palatability and preference trials, bait exposure and efficacy rate studies, bait availability studies, bait station field test, mapping of accessible and sensitive wildlife areas, collection of mouse samples and genetic analysis, bait degradation trials, gull hazing trials, and a salamander toxicity study.

After incorporating lessons learned from previous eradication projects and the results of the field trials, the Service designed the proposed project to include the following elements as described in the consistency determination and FEIS:

- Implementation would take seven weeks, including two weeks for pre-eradication activities and five weeks for bait application, mitigation, and operational monitoring activities. Bait would be applied in two separate applications (each taking one to two days) ten to 21 days apart. Bait would be systematically applied to all land areas above

the Mean High Water Spring mark (the highest level that spring tides reach on the average over a period of time, often 19 years) on the South Farallon Islands, which includes Southeast Farallon Island, West End (or Maintop) Island, and the smaller associated offshore islets including Saddle Rock, Sugarloaf, Chocolate Chip, Arch Rock, Finger Roack, Aulon Islet, and Sea Lion Islet, totaling approximately 121 acres.

- Aerial application of Brodifacoum-25D Conservation rodent bait, in the form of a compressed cereal grain pellet weighing approximately 0.35 oz (1 gram). The pellet contains 0.0025 percent brodifacoum, a second-generation anticoagulant. The bait product is registered with the EPA and would be applied in compliance with EPA and the Federal Insecticide, Fungicide and Rodenticide Act bait label. A supplemental label will be acquired to allow the Service to adopt bait label specifications to suit the specific needs of the project (e.g., aerial application over steep terrain).
- The total amount of bait needed for the project is 2,917 pounds, of which 1.16 oz is brodifacoum rodenticide. Approximately 1,945 pounds of bait pellets would be delivered during the first application and approximately 972 pounds during the second application. The first application would use three bucket loads of bait and require three hours of helicopter flight time over the Islands. The second application would require two bucket loads but the same amount of flight time. If bait buckets are loaded on the mainland 30 miles away, the turn-around time for each load would be approximately one hour. Each aerial application operation could be completed in less than one day.
- Aerial broadcast of the rodent bait would be conducted by a GPS-guided helicopter using a specially designed bait spreading bucket, which can be set to three different configurations depending on topography, distance to the shoreline, and exclusion zones. Each low-altitude flight swath would overlap the previous by approximately 50 percent to ensure no gaps in bait coverage. Slope areas over 45 degrees may be flown a second time to ensure consistent application rates across the Islands, and would require an EPA-approved supplemental bait label to outline specific operational protocols. The proposed aerial application program is similar to those used in recent successful mouse and rat island eradication projects.
- Up to 12 acres of the Islands may require hand-baiting to fill in gaps in aerial application, such as within caves, adjacent to sensitive intertidal zones, or in high-use gull roosts. Bait would be applied at the same rate as aerial application. In addition, approximately 50 bait stations would be placed in, under, and outside the two residences and four out buildings on the Islands. Bait stations may also be placed in other selected sites on the Islands to minimize bait consumption by non-target species.
- The Service states that the best time to implement a rodent eradication project is when the rodent population is low or declining and food-stressed. The proposed project would be implemented in the November-December time period, as mouse populations on the Islands typically peak in October and then decline as food resources become scarce and cold winter storms commence. At this time the vast majority of the Islands' seabirds are not breeding, are absent, or are near their lowest annual abundance. The fall period is

after sea lion and fur seal pupping has ended, and before female northern elephant seals start giving birth. Baiting during the late fall would also maximize the chance that normal heavy seasonal rainfalls in December and January would rapidly degrade rodent bait, reducing the duration over which non-target species would be exposed to risk.

The Service reports that contingency plans, monitoring programs, and a final operational plan will be developed prior to implementation of, and incorporated into, the project. The consistency determination states that the Service has begun development of a Bait Spill Contingency Plan that will address the risks associated with the storage, transport, and use of rodenticide bait and identifies appropriate response actions in the event of a spill:

At a minimum, the Bait Spill Contingency Plan will outline the following types of information: 1) natural resources at risk; 2) response strategy; 3) precautions that will be taken to minimize risk of a marine or terrestrial bait spill; 4) the response activities, including discovery and control, assessment, notification procedures, and disposal of spilled material; 5) necessary response resources and appropriate preparedness activities; 6) description of Incident Command System (ICS) structure, ICS contacts; and other relevant information necessary to help respond to an unforeseen spill; and 7) appropriate response activities in designated wilderness areas. As part of Bait Spill Contingency Plan development, the Service will consult or coordinate with relevant federal, state, and local agencies and organizations for input and assistance.

The Service has also commenced development of a Non-Target Contingency Plan that will address the potential risk of exposure to and subsequent unexpected adverse impacts from rodenticide bait to non-target fish and wildlife of the Islands and adjacent ocean waters:

At a minimum, the Non-target Contingency Plan will address the risks associated with non-target fish and wildlife exposure to rodenticide bait, particularly western gulls, pinnipeds, raptors, and marine fish; disturbance to pinnipeds as a result of rodenticide bait application and hazing activities; and response of operation personnel in the event of an incident. The Non-target Contingency Plan will also outline the triggers the Service will use to identify the need for response action and the contingency responses that will be put in place to minimize the consequences of eradication activities to non-target biota. Other similar types of information provided in the Spill Contingency Plan, such as a description of the ICS with contacts, and essential response equipment and supplies, will be included.

The Service reports that monitoring of operational, mitigation, and ecosystem restoration objectives will be conducted before, during, and after the proposed eradication project, that monitoring plans will be completed prior to project implementation in accordance with USFWS best management practices, and that these plans will be based on protocols used in monitoring plans for recent island rodent eradication projects. The consistency determination provides additional information on the project's monitoring components:

An extensive monitoring program would be conducted to track and document mouse eradication success, bait uptake and degradation, success of mitigation measures, toxicant exposure to the environment, and population-level changes of conservation measures (see FEIS Section 2.10.10). Typically, attempted rodent eradications are not deemed a success until no rodents have been detected for two years after project implementation. Mitigation monitoring will include gull hazing success and searches for impacted birds and other wildlife. The latter will include monitoring of coastal beaches, to be conducted by the Greater Farallone National Marine Sanctuary's standardized Beach Watch program. Results of mitigation monitoring could be used to adaptively manage the eradication project if necessary. Samples of soil, water, and various organisms including birds, terrestrial and intertidal invertebrates, and fishery species would be collected and analyzed for rodenticide exposure, adapted from other rodent eradication project monitoring plans. The final monitoring plan will be developed in consultation with USDA-APHIS, Greater Farallones National Marine Sanctuary, National Marine Fisheries Service, State Water Resources Control Board, and California Department of Fish & Wildlife, and will be included in the final mouse eradication operational plan.

The Service also reports that it will develop in conjunction with the USDA, EPA, and permitting agencies an overall Final Operational Plan for the mouse eradication project which will incorporate detailed project implementation procedures and the above-referenced plans and monitoring programs. As these plans and programs are developed, the Service will provide draft versions to the Executive Director for review and comment.

The Service currently anticipates that implementation of the proposed project would occur no sooner than the late fall of 2020.

C. PROJECT ALTERNATIVES ANALYZED

In 2011, preparation of an Environmental Impact Statement commenced in order to “assess the most appropriate action alternatives for removing all mice from the Farallon Islands” consistent with the 2009 *Comprehensive Conservation Plan* for the Farallon Islands National Wildlife Refuge. The FEIS reports that 49 different potential mice removal methods were initially assessed for inclusion in the EIS process, including mechanical, theoretical, biological, and chemical methods using three different delivery techniques. The methods analyzed came from comments received during the EIS public scoping period and a review of previous mouse and rat eradication projects across the globe. Methods were assessed to determine if they were consistent with management and policy guidelines for projects within the National Wildlife Refuge System, were feasible to implement, and met human safety and logistical guidelines. Concurrently, each method was scored and ranked for likely environmental impacts to Island resources and operational considerations. Thirty-five resources were scored and analyzed for each method.

Based on these assessments and analyses, the FEIS reports that in addition to the No Action alternative:

[T]wo action alternatives were developed by resource specialists within the Service, experts in island rodent eradications, and experts on the Farallon Islands' resources, as well as input from other applicable government regulatory agencies. In addition, the action alternatives reflect feedback received from agencies and the general public during scoping and the RDEIS public comment period.

The action alternatives selected to eradicate invasive house mice were Alternative B (the proposed project) which proposes aerial broadcast of Brodifacoum-25D Conservation, and Alternative C which proposes aerial broadcast of a different rodenticide, Diphacinone-50 Conservation. The FEIS states that the Service's integrated pest management policy allows it to:

. . . take pest management actions when pests threaten the health of native wildlife, are detrimental to refuge management objectives, and the method for removing pests does not interfere with refuge management objectives. The choice of a pest control method is guided by the following, in order of importance: human safety, environmental integrity, effectiveness and cost.

...

The two alternatives also include the only rodenticides legally available and registered for island rodent eradication use in the United States: Diphacinone-50 Conservation and Brodifacoum-25D Conservation.

As noted earlier in this report, all of the successful house mouse island eradication projects used rodent bait containing a rodenticide. The FEIS states that Alternative B was selected over Alternative C because of brodifacoum's documented record and greater potential to successfully eradicate house mice and because of the lack of a demonstrated record of island eradication success for diphacinone.

The FEIS includes an analysis of project alternatives considered but dismissed and those alternatives are summarized as follows. Other rodenticides were investigated but had not been tested in rodent eradications and/or were not registered with the EPA for conservation use on islands. Annual control of the mice population (rather than eradication) would require thousands of personnel hours and control activities would result in repeated disturbance to sensitive breeding seabirds, marine mammal, wilderness character, and sensitive habitats. A control project would not generate island-wide conservation and restoration benefits. Using only rodent bait stations (approximately 61,000) is not technically feasible to implement, would pose safety hazards to personnel, and would not meet project objectives. Hand broadcasting rodent bait and trapping are infeasible due to Island topography and the adverse impacts to habitat and non-target species. Research on the use of taxon-specific diseases to control invasive species populations is ongoing but there are no pathogens presently available with proven efficacy at eradicating rodents, and the introduction of novel diseases into the environment carries unknown risks to non-target species. Fertility control has been used with limited success as a method of pest management for a few invasive species but the effectiveness of experimental fertility control techniques in the wild is presently unknown. The capture and translocation of wintering

burrowing owls from the South Farallon Islands, where they feed on mice until the mice population drops in the winter whereupon they feed on seabirds, would reduce predation on seabirds but does not address the many other threats that mice pose to the Farallon Islands ecosystem. Finally, the No Action alternative would allow invasive mice to remain on the South Farallon Islands and continue to adversely affect sensitive habitat and species.

D. OTHER GOVERNMENTAL APPROVALS AND CONSULTATIONS

U.S. Fish and Wildlife Service (Service)

The Service has consulted with its own agency's Regional Migratory Bird Permit Office (RMBPO). The non-target take of birds as a result of the proposed project would not constitute take under the Migratory Bird Treaty Act of 1918 and a permit would not be required. Hazing deterrent efforts also do not require a permit but have been reviewed and agreed upon by the RMBPO. Capture, translocation, or temporary captivity will be undertaken in accordance with the terms of a permit issued by the RMBPO. The Service will obtain approval of a Pesticide Use Proposal (PUP) from the Service's National PUP Coordinator.

National Marine Fisheries Service (NMFS)

The Service has completed informal Endangered Species Act Section 7 consultation with the NMFS regarding black abalone and essential fish habitat. NMFS concurred that the proposed project is not likely to adversely affect black abalone and its designated critical habitat. NMFS determined that a decrease in water quality from the inadvertent introduction of contaminants into the marine environment and essential fish habitat would be temporary and minimal and not require conservation recommendations. The Service will also consult with the NMFS under the Marine Mammal Protection Act to obtain an incidental harassment authorization for pinniped protection.

Greater Farallones National Marine Sanctuary

The Service will coordinate with the Sanctuary on applicable permitting requirements due to overflight and potential bait drift onto waters of the Sanctuary.

Bureau of Alcohol, Tobacco, Firearms and Explosives (ATF)

The Service will obtain a permit from the ATF to store and use pyrotechnics for use in gull hazing activities.

San Francisco Bay Regional Water Quality Control Board (RWQCB)

The Service will obtain a National Pollutant Discharge Elimination System permit from the RWQCB for potential bait drift into ocean waters.

California Department of Fish and Wildlife (CDFW)

The Service will obtain the following permits applicable during project implementation: (1) a collection permit from the CDFW for collection of salamanders and raptors; (2) a special closure permit for temporary boating closures in waters offshore of the South Farallon Islands; and (3) marine take permits under the Marine Life Protection Act.

California Department of Pesticide Regulation (DPR)

The Service will ensure that a pesticide applicator license is obtained from the DPR by the individual(s) leading the pesticide application.

California State Office of Historic Preservation (SHPO)

The Service will complete consultation with the SHPO for historic resources located on South Farallon Islands.

E. ENVIRONMENTALLY SENSITIVE HABITAT

Coastal Act Section 30240 states:

- (a) Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*
- (b) Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

The Service states in its consistency determination that the South Farallon Islands constitute an environmentally sensitive habitat due to their isolated nature, varied and extensive habitats, rare species present, and the ecological interaction with the adjacent productive marine environment. The FEIS provides detailed information on the natural resources found on the Islands and a summary of that information follows.

The Farallon Islands host the largest seabird breeding colony in the contiguous United States. Approximately 25 percent of California's breeding marine birds, with 350,000 individuals of 13 species, are found on the Islands, along with 50 percent of the world's population of the rare ash storm-petrel. Most habitat types on the Islands are occupied almost continually by breeding seabirds between late March and mid-August. The Islands provide a stopover location for hundreds of species of migrant birds, bats, and insects. The majority of raptors visit the Islands during the fall migration period. Burrowing owls are the most numerous raptor species present from fall through spring and several individuals remain through the winter, feeding on house mice in the fall and storm-petrels in the winter and spring.

The Islands support the rare and endemic Farallon arboreal salamander and Farallon camel cricket. The Service states that invasive house mice compete for invertebrate prey with the salamanders and possibly feed on salamander juveniles and eggs. The mice prey on camel crickets as do burrowing owls, which are attracted to the Islands due to the presence of the mice. The diversity of vegetation on the Islands is low compared to the mainland due to the harsh marine environment, limited habitat types, sparse soil coverage, guano, and continuous trampling by seabirds and pinnipeds. The Islands flora includes at least 44 species, of which 18 are native, including the maritime goldfield. The Service reports that invasive house mice feed heavily on

plant seeds and other plant parts, including those of the goldfield, and that mouse predation is likely suppressing native plant populations in favor of more hardy non-native perennial plants.

The consistency determination addresses the potential impacts to the environmentally sensitive terrestrial habitat of the Islands and the species the habitat supports:

The eradication project does have the potential for short-term adverse impacts to non-target terrestrial wildlife. Besides small mammals, birds are especially sensitive to rodenticides. Western gulls and other species of gulls are particularly at risk because they will actively uptake bait if permitted to do so. Raptors and scavengers could be impacted by consuming exposed mice or birds. While salamanders are not considered to be at high risk of rodenticide impacts, there is concern because the Farallon population is endemic. Invertebrates are generally not affected by anticoagulant rodenticides.

The FEIS provides detailed information on expected impacts to biological resources from the proposed project, but first discusses the basis on which impact significance is determined:

Many of the species that utilize the South Farallones have large ranges and interact at a population level with other individuals spread out over an area much larger than the South Farallones. Consequently, the most appropriate context within which to consider impacts to the biological resources found on the South Farallones is at the population level, whether it be just to the local population (i.e., Farallon Islands region) or range-wide population. The intensity of each effect is dependent on numerous variables specific to.

In general, impacts to the individual, however major, are not considered significant (unless impacts to individuals also impact the population). Individuals can experience grave impacts from operations in the short-term without having a long-term effect on the population. Since the Service is charged with managing refuges with a focus on populations rather than individuals (601 FW1; 601 FW 3), with the exception of ESA and MMPA-listed species (see Section 4.5.2.1) it was determined that significance would be considered in the context of population-level impacts to species utilizing the South Farallones. As an example, species that have large populations and/or a wide range, and thus are capable of rapidly recovering from losses, are unlikely to suffer long-term, population level effects from factors that impact one or a small number of individuals including death of the individual(s). Results of risk analyses for individual animals contributed to the overall significance determination for each biological taxon evaluated, but effects to individuals are not considered interchangeable with the significance determination for each biological resource.

The FEIS next states that birds that primarily eat seeds and grains, and omnivorous species such as gulls, would initially be most at risk of primary exposure to brodifacoum. Predators and scavengers that feed on mice, birds, mouse or bird carcasses, or large

invertebrates would initially be at risk of secondary exposure to brodifacoum. The risk of exposure would begin to decline rapidly within approximately 30 days of the final bait application as the mouse population declines and bait pellets are consumed or disintegrate.

The FEIS examined potential impacts to raptor species that are known to visit the Islands and determined that because toxicant and disturbance risks are limited to the few individuals of these species that would likely be present on the islands during project implementation, no long-term negative or positive population-level impacts would occur to any raptor species. If peregrine falcons or burrowing owls are present during project implementation, efforts would be made to capture and hold all individuals until exposure risk declines to an acceptable level, or possibly translocate some or all individuals off the island.

The FEIS examines potential project effects on western gulls:

The estimated number of individuals likely to occur on the islands during operations is between 14,000 and 32,000 western gulls. However, with a successful hazing program the Service will likely keep the number of individuals landing on the Farallones to a minimum level. Because of their long lifespan, population level impacts were considered to be long-term if impacts to the regional population were detectable after 20 years (Section 4.5.4.4, Appendix N). Mortality of more than 1,700 western gulls would have to occur in order to affect the regional population level after 20 years (Appendix N). The hazing program would keep the number of individuals that would experience lethal effects to below 1,700. Therefore, no long-term negative or positive impacts to the regional population are expected.

Additional information on the proposed gull hazing program is provided later in this section. The FEIS also determined that while some non-target species mortality could occur, no population-level impacts would occur to other gull species, seabirds, land birds, and shore birds as a result of project implementation.

The FEIS states that despite the anticipated low risk to arboreal salamanders for rodent bait application, approximately 40 individuals will be captured and held for the duration of the risk period and then released. In addition, because invasive mice compete with salamanders for food, the Service anticipates that salamanders will benefit from mouse eradication. While the Service states that existing information suggests that brodifacoum consumption by insects generally does not cause mortality, it did determine that there could be some risk to Farallon camel crickets based on feeding habits and project ground operations. However, the Service concluded that the eradication of invasive mice and the resulting decrease in burrowing owl numbers will likely result in long-term benefits to the cricket population.

The FEIS reports that monitoring data from projects that used brodifacoum indicate either no or insignificant levels of soil or marine sediment contamination. Due to the very low

solubility of brodifacoum in water, plant uptake is unlikely to occur. Post-application monitoring for the Anacapa Island rat eradication project tested negative for brodifacoum residue in all plant samples.

The FEIS and consistency determination describe project mitigation measures incorporated into the project to minimize or avoid adverse effects on biological resources. Those measures are summarized as follows:

- Project implementation would occur in November and December outside the breeding seasons for most wildlife and when wildlife populations are near their annual minimums.
- GPS guidance of helicopter flight paths and use of a calibrated bait bucket provide for precise control of bait application to ensure bait is applied evenly and non-target areas (e.g., shoreline areas) are avoided.
- Gull hazing would begin shortly prior to application of rodent bait and continue until exposure risk is reduced to a negligible level. The objectives are to reduce the risk of gull mortality and to reduce the risk of mice eradication failure by reducing pellet consumption by species other than mice. The 2012 gull hazing trial used a range of techniques, demonstrated the ability to keep all but a few western gulls off the Islands for an extended period of time, and caused only minimal disturbance to other bird species and pinnipeds. The proposed hazing techniques include lasers, spotlights, pyrotechnics, biosonics, predator calls, air cannons, effigies, and kites. To minimize the potential for gulls habituating to hazing techniques, the hazing program would be adaptively managed based on real-time monitoring of efficacy. Based on the hazing trials, hazing would be concentrated along Island coastlines, hazing tools would be used sporadically and only where needed, and hazing would occur only in small areas of the Islands at any one time. The gull hazing plan has been approved by the Service's Office of Migratory Birds.
- Carcasses of mice or other species exposed to rodenticide pose a threat to potential scavengers. Following the start of eradication, systematic searches of all accessible areas would be made to remove dead mice and other carcasses suspected of containing rodenticide residue. Collection will continue until the risk of rodenticide exposure is negligible.
- Retrieving, moving, or crushing rodent bait so that it is inaccessible to gulls may be conducted in areas that are safely accessible to ground crews. Unless non-target risk is determined to be unacceptably high, retrieving, moving, or crushing rodent bait would be initiated no sooner than 10 days after final bait application to ensure that all invasive mice have sufficient access to bait.
- Attempts would be made to capture raptors present on South Farallon Island prior to and during bait application. This work would continue as long as bait or

carcasses remain available and palatable. If present, resident peregrine falcons would be held off the Island and in a captive facility until it is determined safe to return. Migrant raptors including burrowing owls would be transported off the Island and released into suitable habitat on the mainland. Capture techniques have been implemented effectively for island rodent eradications elsewhere. Methods involving capture and translocation or temporary captivity will be performed in accordance with the terms of a Special Purpose Miscellaneous Permit issued by the Regional Migratory Bird Permit Office of the U.S. Fish and Wildlife Service.

- Approximately 40 endemic Farallon salamanders would be collected prior to bait application on Southeast Farallon Island. Collected individuals would be housed in captivity on the Island until the risk of exposure is deemed negligible or current monitoring of wild salamanders indicates that the eradication project has had no effect on the population. The collection size retains sufficient genetic diversity in the population should an unexpected, large mortality event occur. Collection and holding of salamanders will follow established protocols and individuals will be returned to their location of capture.
- Scheduling the project in the late fall avoids the breeding season for seabirds and pinnipeds. However, thousands of birds and a few thousand pinnipeds would likely be present on the Islands on any given day during the operational window. Prior to the eradication, project personnel would be briefed on the strategies and techniques for minimizing wildlife disturbance that will be implemented during the project and monitoring time periods.

The FEIS states that the Service has also incorporated into the project additional operational measures to minimize the likelihood of operational failure:

The Service has committed to ensuring that the eradication operation is fully staffed for the duration of the implementation. The detailed Operational Plan would determine the exact number of personnel needed for each position type, a description of the responsibilities for that position, and the duration of time that position will need to be staffed.

The Service has committed to allow the operational team the opportunity to fully review the operational plan, ask questions, and suggest revisions prior to initiation. Additionally, key personnel would be given the opportunity to approve the operational details and make minor modifications, if necessary and permissible, prior to implementation.

The Service will develop a detailed and clearly laid out command structure to be utilized during the operation. Each position's job description would be outlined and included in the command structure conceptual model that would be included in the operational plan. As much information as possible regarding who to contact during an incident would be included in the operational plan and outlined in relevant contingency plans. This will streamline on the ground decision-

making, allow for real-time adaptive management, and reduce confusion and “on-the-fly” decision-making during the operations. It is critical to work through any unresolved planning details prior to initiating operations.

Summary

Commission Ecologist Dr. Lauren Garske-Garcia reviewed several sections of the Final Environmental Impact Statement and visited South Farallon Island with U.S. Fish and Wildlife staff on May 7, 2019, to understand on-the-ground conditions and discuss concerns as well as opportunities for the proposed house mouse eradication project. Dr. Garske-Garcia prepared a memorandum summarizing her analysis and conclusions regarding the proposed project and its consistency with the environmentally sensitive habitat, marine resources, and water quality policies of the Coastal Act. The memorandum is attached to this report as [Exhibit 5](#). The following are the significant conclusions from this memorandum:

- *Eradicating the invasive house mouse from the South Farallon Islands through a focused and strategic effort is not only feasible, but in-line with the conservation goals of the Refuge;*
- *The project would use a targeted conservation approach to eradicate the house mouse through acute exposure as opposed to the chronic dosing frequently used to control pest populations on the mainland.*
- *The timing for project implementation, along with incorporated avoidance and mitigation measures, can minimize impacts to non-target species and the environment while achieving important conservation goals.*
- *The project design follows similar rodent eradication efforts that have been successfully implemented while also benefitting from the lessons learned through experience and incorporation of even more refined methodologies.*

The primary objective of the proposed invasive house mouse eradication project on the South Farallon Islands is to restore more natural ecosystem functions on the Islands. The Service acknowledges and the Commission agrees that the South Farallon Islands are an environmentally sensitive habitat area (ESHA) due to their isolated nature, varied and extensive habitats, rare species present, and the ecological interaction with the adjacent productive marine environment. Section 30240 of the Coastal Act states that within an ESHA only uses dependent on the resources found within the ESHA shall be allowed. The Commission has consistently determined that restoration activities designed to restore habitat and/or improve ecosystem functions are allowable uses within an ESHA. The Commission has also found that restoration projects consistent with Section 30240 often include unavoidable temporary adverse effects to sensitive habitat or species, and that may necessarily involve permanent alterations to existing habitat when the goal of the project is to restore native habitats and ecosystem functions. The question before the Commission is whether the temporary adverse effects will significantly disrupt habitat values, or whether they will not do so because they have been minimized to an extent that the project will not result in significant disruption, while also being necessary and acceptable side

effects of a restoration project that, overall, will lead to the realization of long-term benefits to the ESHA.

The proposed project has a long history dating back at least ten years; the Commission staff has participated at several junctures in the Service's development of the proposed project. In its 2009 *Comprehensive Conservation Plan* for the Refuge, the Service identified the need for restoration of degraded habitat and the eradication of invasive house mice from the South Farallon Islands. As noted above, the Executive Director administratively concurred with the Service's consistency determination for that *Plan* in January 2009. The Service initiated planning for a project to meet that objective in 2011 and published a Revised Draft EIS in October 2013; the Commission staff met with Service staff in December 2013 and provided general comments on the action alternatives. After five years of additional work on the project, the Service published a Final EIS in March 2019. The FEIS includes analysis of numerous project alternatives and documents the incorporation of lessons learned from previous failed and successful island rodent eradication projects into the proposed project. The Service reported in the project FEIS that a number of earlier island rodent eradication projects across the globe were either inadequately designed or implemented and as a result oftentimes led to significant non-target species mortality. The Service also reports that since 2007, 28 of the 30 house mouse island eradication projects undertaken across the globe (those with documented methods and results) have been confirmed as successful. All but one of the successful mouse eradications that used a rodenticide used brodifacoum or another closely related second-generation anticoagulant. As a result, the Service determined that the proposed project, as designed with numerous measures to minimize non-target mortality and to minimize adverse effects on Island habitat and species, holds the greatest potential for successfully eradicating the invasive house mouse from the South Farallon Islands.

The Commission acknowledges that implementation of the proposed project will lead to non-target species mortality, in particular, the death of an unknown number of western gulls. The Commission understands that this effect is unavoidable, and at the same time, and based on the documentation in the project FEIS, the Commission agrees with the Service that this effect would not be significant in the context of the western gull population in the region. The Commission also notes the success of the gull hazing trial which suggests that the Service will be able to keep western gull mortality below the threshold level (1700 birds) that would adversely affect its regional population. Other project alternatives discussed in the FEIS and consistency determination that do not use a rodenticide, including measures to attempt control of mice population, would not generate as much non-target species mortality but also would not successfully eradicate the last remaining non-native mammal from the Islands.

The Commission also notes that should the proposed project not be implemented in the manner described in the consistency determination or is having effects on coastal resources substantially different than described in the consistency determination, the Commission has the ability to "re-open" its decisions on the consistency certifications under the remedial action provisions of the federal consistency regulations at 15 CFR §930.65, which states in part that:

(a) Federal and State agencies shall cooperate in their efforts to monitor federal license or permit activities in order to make certain that such activities continue to conform to both federal and State requirements.

(b) The State agency shall notify the relevant Federal agency representative for the area involved of any federal license or permit activity which the State agency claims was:

(1) Previously determined to be consistent with the management program, but which the State agency later maintains is being conducted or is having an effect on any coastal use or resource substantially different than originally described and, as a result, is no longer consistent with the management program

In conclusion, based on the documentation provided in the FEIS and consistency determination, the Commission agrees with the Service that the proposed invasive house mouse eradication project on the South Farallon Islands is a use (restoration) dependent on the ESHA resources of the Islands, and has been designed to protect the ESHA from significant disruption of habitat values and to be compatible with the continuance of the ESHA. The Commission further finds the proposed restoration efforts would result in significant long-term benefits to native seabirds, amphibians, terrestrial invertebrates, and plants and will help to restore natural ecosystem processes on the islands. The project includes contingency plans, monitoring programs, best management practices, mitigation measures, and a detailed final operational plan. The Service will provide final versions of these plans and programs to the Executive Director for review and comment back to the Service prior to project implementation. Therefore, the Commission finds that the proposed project is consistent with the environmentally sensitive habitat policy of the Coastal Act (Section 30240).

F. MARINE RESOURCES AND WATER QUALITY

Coastal Act Section 30230 states:

Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.

Coastal Act Section 30231 states:

The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion

of ground water supplies and substantial interference with surface waterflow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

Coastal Act Section 30232 states:

Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.

As noted in the project background section of this report, the ocean waters around the South Farallon Islands below the mean high tide line are not included within the Farallon Islands National Wildlife Refuge or within the project implementation area. The surrounding ocean waters are part of the Greater Farallones National Marine Sanctuary. In addition, the Southeast Farallon Island State Marine Reserve (SMR) surrounds the South Farallon Islands, and the Southeast Farallon Island State Marine Conservation Area is adjacent to and offshore to the west and south of the SMR. While implementation of the proposed project is limited to the South Farallon Islands above the mean high tideline, the project holds the potential to affect water quality and marine resources within the intertidal zone and ocean waters surrounding the islands. This is due to the fact that house mice on the Islands are often found on and around the shoreline; as a result, the project calls for rodent bait to be applied down to the Mean High-Water Spring mark (the highest level that spring tides reach on the average over a period of time, often 19 years) to ensure that all mice on the Islands are exposed. The project therefore needs to be analyzed for potential effects on water quality and marine resources.

The FEIS states that marine water quality within the Sanctuary is “considered generally good, largely due to the rugged nature of the coastline and the strong currents of the open ocean.” Seabirds nesting or foraging on the Islands (discussed in the previous section of this report) are also protected as marine resources under Section 30230 of the Coastal Act. In addition, the FEIS documents the intertidal invertebrates, nearshore fish, and marine mammals found in the waters surrounding the Islands. Critical intertidal and subtidal habitat for the federally endangered black abalone was designated in 2011 but the last sighting of black abalone at the South Farallon Islands was in 2012. There is a wide diversity of fish species in the waters adjacent to and seaward of the South Farallon Islands, including nearshore rockfish, lingcod, California halibut, kelp greenling, big skate, Pacific sardine, and Dungeness crab. Recreational and commercial fishing is not permitted within the Southeast Farallon Marine Reserve that surrounds the Islands. In the adjacent Southeast Farallon Marine Conservation Area commercial and recreational take of salmon by trolling is allowed, and the ocean waters outside these two areas are important recreational and commercial fishing grounds. California sea lions, northern elephant seals, Pacific harbor seals, northern fur seals, and Steller sea lions are marine mammals that are present year-round on the Islands and surrounding waters, and are protected from harassment and harm under the federal Marine Mammal Protection Act.

The FEIS states that white sharks are common in the nearshore waters surrounding the South Farallon Islands during the fall months where they prey mainly on young elephant seals and sea lions:

The central California white shark population is one of the best studied in the world (Klimley and Ainley 1998), though population numbers are low – estimated recently at 219 – and of major conservation concern (Chapple et al. 2011). Shark feeding events, tagging, and photo-identification studies have shown that sharks are generally present around the Farallones between August and December, but most feeding events occur between late September and early December. Many of the same individuals return year after year. By January, white sharks depart central California for waters between Baja California, Mexico, and Hawaii (Weng et al. 2007, Jorgensen et al. 2009).

The FEIS and consistency determination provide detailed information on potential impacts to water quality and marine resources from the proposed project. Regarding the potential for rodent bait to enter ocean waters and affect water quality, the FEIS states:

Even if bait does drift into the water bodies on or around the South Farallones at the full application rate, it would be very unlikely to contribute to detectable levels of brodifacoum in the water column. Physical and chemical properties of the bait formulation, low water solubility of rodenticide and strong chemical affinity of brodifacoum to the grain matrix, significantly reduce the chance of rodenticide contaminating aquatic or marine environments. An example of the low contamination risk posed to water by brodifacoum was provided in 2001 when a truck crashed into the sea at Kaikoura, New Zealand, spilling 18 tons of Pestoff 20R (20 ppm brodifacoum) cereal pellets into the water. Measurable concentrations of brodifacoum were detected in water samples from the immediate location of the spill within 36 hours; however, after nine days concentrations were below the level of detection (0.02 µg/L or parts per billion) (Primus et al. 2005). Similar to Kaikoura, the Farallones are characterized by their steep rocky coastline, high wave action, and strong currents which would break down any bait pellets relatively quickly if they were to accidentally drift into the marine environment. In a more recent study, Pitt et al. (2015) documented that no sea water samples out of 27 collected were positive for brodifacoum following rodenticide bait application on Palmyra Atoll; only one of seven freshwater samples collected from the same study were positive for brodifacoum.

Environmental testing during rodent eradications and eradication trials in the California Current marine system and elsewhere have failed to detect more than trace amounts of brodifacoum in any water samples taken after bait application (Buckelew et al. 2005, Buckelew et al. 2008, Howald et al. 2010, Pitt et al. 2015). Other studies have suggested similar findings, where minimal to no nearshore contamination of ocean biota, suggestive of water contamination, was detected following analysis of post-application samples at Anacapa Island and Ulva Island (Buckelew et al. 2005, Howald et al. 2010, and Masuda et al. 2015).

The consistency determination examined potential project effects on the federally endangered black abalone and its critical habitat:

. . . an extensive survey conducted at the South Farallon Islands in 2015 found no black abalone (Roletto et al. 2015). Even if black abalone were present at the islands, risk of exposure to brodifacoum would be very low and impacts if exposed also would be expected to be low. No impacts to black abalone critical habitat are expected. For these reasons, this project is not likely to adversely affect black abalone or black abalone critical habitat.

The consistency determination states that only very small quantities of rodenticide are expected to inadvertently enter the marine environment during project implementation, and that the risk of exposure to brodifacoum by any fishery species is very low:

Based on available literature, including data from previously completed rodent eradication projects on islands where brodifacoum was used, exposure to toxicant by marine invertebrates and fish has been minimal and highly limited in spatial extent. It is anticipated minimal numbers of nearshore fish will be exposed to bait pellets, and even fewer numbers of fish are anticipated to experience acute effects. Furthermore, impacts will be spatially limited to the immediate vicinity of the South Farallon Islands where bait may be inadvertently deposited into the marine environment but anticipated to degrade rapidly due to the bait formulation.

The FEIS examined potential project impacts on marine mammals and concluded that: (1) due to their feeding habits it is very unlikely that pinnipeds would be harmed as a result of direct or indirect toxicant consumption; and (2) ground, air, and hazing operations would cause disturbances to individuals periodically during the expected six-week-long project operation but would not reach Level A harassment under the Marine Mammal Protection Act.

The FEIS and consistency determination describe mitigation measures incorporated into the project to minimize or avoid adverse effects on water quality and marine resources. The Service states in the consistency determination that substantial effort will be made to minimize bait drift into the marine environment, and that it will acquire and comply with all necessary permits and authorizations from the Greater Farallones National Marine Sanctuary, EPA, and the Regional Water Quality Control Board to account for any unintended discharge into ocean waters surrounding the Islands.

The Service's proposed bait application techniques include the following mitigation measures to minimize bait drift into ocean waters:

- The coastal boundary for the operation, Mean High-Water Spring (MHWS), would be flown and mapped prior to bait being applied;

- Helicopter flight lines for spreading bait would be confined to areas above the MHWS mark;
- Bait application by helicopter would be guided by GPS;
- Rodent bait aerially broadcast along the coast would be applied using a bait spreading bucket configured with a deflector providing a 120-degree swath pattern;
- A trickle bucket with a narrow (<33 ft or <10m) swath would be used to complete linear features and sections of coastline considered too challenging for deflector and full swath bucket configurations;
- Bait application would not be conducted in wind speeds exceeding 30 knots.

The Service would also consider reducing the swath width of bait bucket configurations and reducing helicopter flight speed if monitoring of the efficiency of aerial application indicates more precision placement of bait is required. The FEIS also states that:

In addition to the use of bait stations in and around structures, bait stations may also be installed in small areas where the risk of bait drift into the marine environment from aerial application is considered to be high

As discussed previously in this report, the Service has begun development of a Bait Spill Contingency Plan that will address the risks associated with the storage, transport, and use of rodenticide bait and identifies appropriate water quality protection and response actions in the event of a spill (see page 12, above).

The Service consulted with the National Marine Fisheries Service (NMFS) to determine if additional protective measures were necessary for black abalone and its critical habitat. The NMFS stated in its April 9, 2019, letter to the Service that given the conservation and monitoring measures incorporated into the proposed project, there is a chance that very small amounts of bait could drift into intertidal and subtidal habitats, but that this is unlikely to contribute to detectable levels of brodifacoum in ocean waters. The NMFS concurred with the Service that the proposed project is not likely to adversely affect black abalone and designated critical habitats. The NMFS also stated in its April 9, 2019, letter to the Service that the proposed project would adversely affect Essential Fish Habitat (EFH) caused by a decrease in water quality from inadvertent introduction of contaminants into the marine environment. However, the NMFS determined that these adverse effects will be temporary and minimal and made no additional EFH conservation recommendations.

The FEIS identifies measures to minimize adverse effects on marine mammals that will be implemented during project operations:

Sudden pinniped flushing events can result in stampeding, which can result in injuries to certain animals. To minimize the chances of such occurrences,

pinnipeds will first be herded slowly towards the water to clear areas of animals immediately prior to baiting. Most pinnipeds are expected to return to haul-outs within a few hours of flushing. While no pinniped species will be actively breeding at the time of implementation, the two sea lion species and northern fur seals will still be nursing pups born during in the June-July period. Pups of their ages are highly mobile, are left alone for several days at a time, and enter the water regularly.

During each application of rodent bait, all points on the Farallones would most likely be subject to at least two overflights by the helicopter. Over the course of bait application operations, which would entail two to three applications depending on the alternative, there would likely be two to six days during which the helicopter would operate. The responses of animals to aircraft disturbance and the adverse effects of this disturbance vary considerably between species and different seasons. However, given the short duration of operations, impacts of helicopter disturbance to seabirds and pinnipeds are expected to be short-term and would not result in significant harm to individuals or their populations.

The Service states that marine mammal Incidental Harassment Authorization would be acquired from the NMFS prior to project implementation due to the potential harassment or “take” of hauled-out pinnipeds on the Islands from helicopter overflights and the presence of humans during hand baiting work. In addition, and as discussed previously in this report on page 12, the Service has commenced development of a Non-Target Contingency Plan that will address the potential risk of exposure to and subsequent unexpected adverse impacts from rodenticide bait to non-target fish and wildlife of the Islands and adjacent ocean waters, including disturbance to pinnipeds as a result of bait application and hazing activities.

Summary

The primary objective of the proposed invasive house mouse eradication project on the South Farallon Islands is to restore more natural ecosystem functions on the Islands. While the project is limited to island upland areas above the mean high tide line, the project includes the application of rodent bait down to the Mean High-Water Spring mark to ensure that all mice on the Islands are exposed to the bait. As a result, the project holds the potential to adversely affect ocean water quality and marine resources. The Service acknowledges the potential for rodent bait to drift into the intertidal zone during aerial broadcast of the bait. However, given the physical and chemical properties of the bait formulation, the low water solubility of the rodenticide, the positive water quality monitoring results from other recent successful island eradication projects using the same rodenticide, and the project design, implementation, and mitigation measures incorporated into the proposed project, the Service has determined that any bait drift would lead to only very temporary and localized reductions in water quality. In addition, the Service determined that the bait pellets would disintegrate and disperse rapidly, the brodifacoum would not persist in the marine environment, and no adverse long-term effects to water quality, fisheries, intertidal invertebrates, or marine mammals would occur.

The Commission agrees with these conclusions reached by the Service. As noted in the previous section of this report, implementation of the proposed project would help to restore natural

ecosystem processes on the South Farallon Islands. Such restoration projects often include unavoidable temporary adverse effects to sensitive habitats. The potential exists in the proposed project for just such temporary adverse effects to water quality and marine resources. However, the Commission finds that those potential effects have been minimized to the greatest extent feasible through project design, and that those potential effects are outweighed by the significant long-term benefits to ecosystem restoration on the Islands that would arise from the eradication of invasive house mice. The Commission again notes that the Service reports that since 2007, 28 of the 30 house mouse island eradication projects undertaken across the globe (those with documented methods and results) have been confirmed as successful. All but one of the successful mouse eradications involving rodenticides used brodifacoum or another closely related second-generation anticoagulant. As a result, the Service determined, and the Commission agrees, that the proposed project, as designed with numerous measures to minimize non-target mortality and to minimize adverse effects on ocean water quality and marine resources, holds the greatest potential for successfully eradicating invasive house mice from the Islands and significantly improving seabird habitat.

As referenced in the previous section of this report (see page 21, above), Commission Ecologist Dr. Lauren Garske-Garcia prepared a memorandum summarizing her analysis and conclusions regarding the proposed project. The memorandum is attached to this report as [Exhibit 5](#). The memorandum states on page 4 that while bait drift into the marine environment seems inevitable, data support the Service's conclusion that the rodenticide to be used in the proposed project will degrade rapidly in aqueous environments with ultraviolet exposure, and that with monitoring and mitigation measures, and a spill contingency plan, impacts to coastal water quality and marine resources will be temporary and minimized.

In conclusion, based on the documentation provided in the FEIS and consistency determination, the Commission agrees with the Service that the proposed invasive house mouse eradication project on the South Farallon Islands will help to restore natural ecosystem processes on the Islands while protecting water quality and marine resources. The project includes contingency plans, monitoring programs, best management practices, mitigation measures, and a detailed final operational plan to ensure that these resources are protected and temporary adverse effects minimized to the maximum extent feasible throughout project implementation. With these measures, the Commission concludes that the proposed project will maintain, enhance, and restore marine resources, will provide special protection to an area of significant biological resources, and will sustain and protect the biological productivity and quality of ocean waters surrounding the Islands, and is, therefore, consistent with the water quality and marine resource protection policies of the Coastal Act (Sections 30230, 30231, and 30232).

G. PUBLIC ACCESS AND RECREATION

Coastal Act Section 30210 states:

In carrying out the requirements of Section 4 of Article X of the California Constitution, maximum access, which shall be conspicuously posted, and recreational opportunities shall be provided for all the people consistent with

public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse.

Coastal Act Section 30214(a) states in part:

The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case including, but not limited to, the following:

- (1) Topographic and geologic site characteristics.*
- (2) The capacity of the site to sustain use and at what level of intensity.*
- (3) The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area and the proximity of the access area to adjacent residential uses.*

Coastal Act Section 30220 states:

Coastal areas suited for water-oriented recreational activities that cannot be readily provided at inland water areas shall be protected for such uses.

The Farallon Islands National Wildlife Refuge is closed to the public and there are no public recreational opportunities available on the Islands of the Refuge due to the fragility of the natural resources on the Islands, the difficult access conditions, and the purpose of the Refuge as a preserve for breeding birds. Access to the South Farallon Islands is strictly monitored and limited to U.S. Fish and Wildlife Service staff, approved contractors, special use permit holders, and the U.S. Coast Guard. The consistency determination states that:

Limited facilities on Southeast Farallon Island (SEFI) support refuge operations and maintenance, and a research field station that supports the protection and stewardship of the islands' resources. Embarking onto SEFI is extremely challenging due to the lack of public docking facilities, harsh weather conditions and equipment reliability. Furthermore, nearly every part of the islands are utilized for nesting or roosting by seabirds or pupping and hauling out by marine mammals. There are no public accommodation or recreation facilities on any of the islands.

As a result of the existing prohibition of public access to the South Farallon Islands, the proposed project would not affect public access to or recreation on the Islands.

The ocean waters surrounding the South Farallon Islands are not included within the Refuge boundary and are not managed by the Service. This offshore area is managed primarily by the Greater Farallones National Marine Sanctuary and the State of California manages the commercial and recreational take of marine resources in the area. The Sanctuary was established

in 1981 and expanded in 2015. The 5.34-square-mile Southeast Farallon Island State Marine Reserve was established in 2010 by the State Fish and Game Commission and the take of all living marine resources is prohibited. The adjacent 12.95-square-mile Southeast Farallon Island State Marine Conservation Area was concurrently established and extends seaward to the west and south of the marine reserve. The take of all living marine resource is prohibited in this area except for the recreational take of salmon by trolling and the commercial take of salmon by troll fishing gear. Also in 2010 the Fish and Game Commission designated the Southeast Farallon Island Special Closure which prohibits access to all waters within 300 feet of the Islands in order to protect sea bird rookeries and marine mammal haul-out sites.

The consistency determination addresses the existing recreational use of the waters offshore of the Refuge:

Several wildlife-viewing boats conduct natural history tours throughout the year or seasonally (weather permitting) to the waters surrounding the islands. These tours focus on whales, seabirds, pinnipeds, and sharks. Because of frequent rough sea conditions, visiting boats to the waters surrounding the Refuge are few during the November-December period. The wildlife-viewing opportunities associated with the Farallones extend to the nearby mainland coast, as well as to some of the seabird species that breed on the Farallones and forage near the mainland.

In addition to guided tours, private pleasure boats occasionally visit the waters surrounding the South Farallones. However, due to the often-unsettled nature of the weather and seas, general recreational boating is much less common near the islands than within or just offshore of the more protected waters of the San Francisco Bay.

The FEIS further notes that the immediate surrounding waters provide an estimated 3,500 “wildlife viewing visitor days” annually.

The consistency determination summarizes the potential effects of the proposed project on existing public recreation in the waters offshore of the Refuge:

As a safety precaution, the Service likely will request that the California Department of Fish & Wildlife implement a vessel closure in the area immediately surrounding the South Farallon Islands (within approximately 0.5 miles) during the days of aerial bait application. This closure is expected to range from two to four days for Alternative B [the proposed project], depending on weather and other operational factors. These closures would be a minor short-term inconvenience to the few recreational boaters that visit these waters during the late fall.

In addition, the FEIS states that fishing is already prohibited within 0.5 miles of the Islands and that because of frequently rough seas and seasonal fishing closures for many species, fishing boats are rarely observed within 0.5 miles of the Islands during the proposed project implementation period.

The consistency determination also addresses recreational shark cage diving in waters offshore of the Islands:

In recent years from one to five permitted recreational shark cage diving ventures operate within 0.5 miles of the islands on many days (weather permitting) from late September until late November. Shark diving permits are issued by the Greater Farallones National Marine Sanctuary. For Alternative B [the proposed project], closures around the island could result in from two to four lost shark diving days (See Section 3.5.4 of the FEIS); however, since shark diving boats are not present every day, the number of days they would be impacted would likely be less.

The FEIS further states that efforts will be made to keep shark diving operators informed of schedules for aerial bait application and vessel closure periods during the implementation of the proposed project in order to minimize any adverse economic impacts to their operations.

The Commission agrees with the Service that the proposed invasive mouse eradication project will not affect public access and recreation on the South Farallon Islands as no such access or recreation currently exists due to the established purpose of the Refuge to protect sensitive habitat and species. The project will not result in any changes to recreational or commercial fishing opportunities in the ocean waters offshore of the South Farallon Islands currently open to those activities, nor will it change any existing restrictions on fishing within the State Marine Reserve and the State Marine Conservation Area surrounding the Islands. Temporary vessel closures within one-half mile of the Islands during the two to four days (not consecutive) of aerial bait applications will result in only minor impacts on recreational boating and fishing and shark diving operations in the ocean waters surrounding the Islands. Therefore, the Commission finds that the proposed project is consistent with the public access and recreation policies of the Coastal Act (Sections 30210, 30214(a), and 30220).

SUBSTANTIVE FILE DOCUMENTS

1. CD-0002-19 (U.S. Fish and Wildlife Service, South Farallon Islands Invasive House Mouse Eradication Project, Farallon Islands National Wildlife Refuge).
2. CD-064-08 (U.S. Fish and Wildlife Service, Comprehensive Conservation Plan for Farallon National Wildlife Refuge).
3. ND-104-00 (National Park Service, Eradication of Black Rats on Anacapa Island, Channel Islands National Park).
4. Final Environmental Impact Statement for South Farallon Islands Invasive House Mouse Eradication Project, Farallon Islands National Wildlife Refuge, March 2019, and accompanying technical reports.
5. April 9, 2019, Endangered Species Act Section 7(a)(2) Concurrence Letter and Magnuson-Stevens Fishery Conservation And Management Act Essential Fish Habitat Response for the South Farallon Island Invasive House Mouse Eradication Project, from National Marine Fisheries Service to U.S. Fish and Wildlife Service.