CALIFORNIA COASTAL COMMISSION
455 MARKET STREET, SUITE 228
SAN FRANCISCO, CA 94105-2219
FAX (415) 904-5400
Voice (415) 904-5200

Th11b

Filed	4/16/21
60th Day:	6/15/21
75th Day:	6/30/21
Extended to:	12/20/21
Staff:	CT-SF
Staff Report:	12/2/21
Hearing Date:	12/16/21

STAFF REPORT: REGULAR CALENDAR

Consistency Determination No.: CD-0006-21

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 non-native, invasive house mice by aerial application of rodenticide-laden 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: Conditional concurrence

SUMMARY OF STAFF RECOMMENDATION

To protect and preserve the native, endemic species and habitats of the South Farallon Islands, the United States Fish and Wildlife Service (USFWS/Service) proposes to eradicate the non-native, invasive house mouse from the islands through the use of bait pellets treated with the rodenticide brodifacoum. An estimated 2,880 pounds of bait pellets, treated with a total of approximately 1.2 ounces of brodifacoum product (0.0004 ounces per pound) would be used in the eradication effort. The majority of these bait pellets are proposed to be deployed from a specialized bait spreading bucket slung beneath a helicopter. The bait would be applied in two separate efforts (each taking one to two days) spread 10 to 21 days apart. The first application would have a target of

16 pounds of bait pellets per acre and the second application would have a target of between 8 and 16 pounds per acre (unless monitoring indicates a lower rate would suffice). Bait would be applied across the dry land portions of the South Farallon Islands; areas below the Mean High Water Spring mark, which is the highest level of the tides that have been calculated from predictions over a 19-year period, would not be targeted. A small number of select areas – such as those that could not safely or effectively be reached through use of the helicopter – would be targeted for hand dispersal of bait or temporary placement of bait stations or traps. Eradication effectiveness would be evaluated by capturing and fitting numerous mice with radio collars prior to bait application and then tracking their fate once bait is dispersed. In addition, passive detection methods such as tracking tunnels and chew blocks would be deployed.

Prior to the first bait application event, a hazing program would be carried out targeted at dispersing western gulls from the islands and preventing them from returning until the bait pellets have degraded due to exposure to rainfall – estimated to take approximately five weeks. To expedite the degradation process, the project is proposed to be carried out between the months of October and December and would be implemented based on weather forecasts. These months were also selected due to the absence of breeding seabirds and marine mammals on the islands and the general low abundance of wildlife (relative to other seasons and months).

To evaluate project efficacy and help determine if adaptive management measures should be implemented to address unexpected adverse impacts, USFWS also proposes to hire a contractor who is not involved in bait dispersal activities to carry out a comprehensive mitigation and monitoring program. The focus of the program would be western gulls, raptors, arboreal salamanders (native endemic species), marine mammals, camel crickets (native endemic species), bait pellets, and brodifacoum residue in soil, water and tissues.

Key Coastal Act considerations include potential adverse impacts to environmentally sensitive habitat areas, marine resources and water quality as a result of bait dispersal and its movement into non-target areas and consumption by non-target species. USFWS proposes to implement a wide range of protection and mitigation measures to address these risks, including the hazing program, the capture and relocation or temporary holding of sensitive species (including burrowing owls, peregrine falcons and arboreal salamanders), collection of mouse carcasses, and implementation of spill and non-target species contingency plans. To further ensure that adverse impacts to coastal resources are avoided and minimized, **Condition 1** would require USFWS to develop and implement a plan for independent monitoring of bait application and gull hazing efforts. This plan would be required to include reporting to the Executive Director – between the first and second proposed bait dispersal events – of the effectiveness of gull hazing and any observed instances of bait consumption by non-target species or dispersal of bait into non-target areas (intertidal zone or marine waters). In addition, **Condition 2** would require USFWS to make several additions and revisions to its draft Bait Spill Contingency Plan prior to its finalization and implementation. These additions

and revisions would increase the effectiveness of the plan to address moderate and worst-case spill scenarios, including those that involve high volume spills of bait pellets into intertidal and marine environments. Finally, **Condition 3** would require USFWS to, at the conclusion of the process of adding to and revising the Draft Operational Plan, Draft Mitigation and Monitoring Plan and Draft Non-target Species Contingency Plan and prior to their finalization, provide these plans for Executive Director review and comment. In combination with the protection and mitigation measures proposed by USFWS, **Conditions 1, 2 and 3** would further ensure that the project does not result in adverse impacts to environmentally sensitive habitat areas, marine resources and water quality.

The staff therefore recommends that the Commission **conditionally concur** with the USFWS' consistency determination (No. CD-0006-21) and find the proposed project, as conditioned, consistent with the relevant, enforceable policies of the California Coastal Management Program, which consists primarily of the Chapter 3 policies of the Coastal Act. If USFWS does not agree to the condition, the Commission's action will be treated as an objection. The motion to conditionally concur is on page 6.

Table of Contents

EXHIBITS

APPENDICES

I. FEDERAL AGENCY'S CONSISTENCY DETERMINATION

Based on the review of the Proposed Action's compliance with the Coastal Zone Management Act (CZMA), the U.S. Fish and Wildlife Service has determined that the Proposed Action is consistent to the maximum extent practicable with the California Coastal Management Program (CCMP), pursuant to the requirements of the CZMA.

II. MOTION AND RESOLUTION

Motion:

> I move that the Commission conditionally concur with Consistency Determination CD-0006-21 on the grounds that the project described therein, if modified pursuant to the conditions recommended by staff, would be fully consistent, and thus consistent to the maximum extent practicable, with the enforceable policies of the CCMP.

Staff recommends a **YES** vote on the motion. Passage of this motion will result in a concurrence with the determination, provided the project is modified in accordance with the recommended condition, 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:

> The Commission hereby **conditionally concurs** with consistency determination CD-0006-21 by the U.S. Fish and Wildlife Service on the grounds that the project would be fully consistent, and thus consistent to the maximum extent practicable, with the enforceable policies of the CCMP, provided the U.S. Fish and Wildlife Service agrees to modify the project consistent with the condition specified below, as provided for in 15 CFR §930.4.

Conditions:

1. Independent Monitoring and Reporting. Prior to project implementation, the U.S. Fish and Wildlife Service (USFWS) shall provide for the Executive Director's review and comment a monitoring plan or plans for independent, third-party observation and reporting of all activities involving active gull hazing and the application of rodenticide bait on the South Farallon Islands. Activities involving bait application are expected to take between two and four days over the course of about three weeks. Gull hazing is expected to be conducted for about five weeks but could take longer if necessary. The plan or plans shall be carried out by one or more qualified and independent (i.e., non-USFWS and not the entity carrying out the eradication) entity or entities that shall have no financial interest in the outcome of the project. As soon as practicable following the first aerial bait application event and prior to any subsequent aerial bait application event, USFWS shall provide an interim progress report to the Executive Director to include the following: (a) a description of any spill or accidental dispersal of bait to non-

target areas (such as intertidal areas, marine waters, etc.), including the locations and approximate sizes of such areas, the estimated amount of material spilled or placed in non-target areas, any necessary clean-up or response measures taken, and an assessment of the effectiveness of those measures (if applicable); (b) any observed direct or indirect (e.g., through consumption of effected mice) consumption of rodenticide by individuals of non-target species (such as marine mammals, raptors, and seabirds), including the approximate number of non-target individuals observed to consume bait or mice, any observed reactions in those individuals following consumption and response measures taken; and (c) the results of gull hazing efforts, including the approximate number of gulls successfully and unsuccessfully flushed and the behavior of flushed and unflushed gulls during and immediately after bait application activities. The report shall include descriptions of the methods used for observing and reporting on these measures.

2. Revised Bait Spill Contingency Plan. Prior to project implementation, USFWS shall provide, for Executive Director review and comment, a revised Bait Spill Contingency Plan. USFWS shall implement the plan during all bait application activities. The plan shall be a revised version of the March 2021 Draft Bait Spill Contingency Plan (included as **Appendix F**) that shall be modified to include: (1) a description of worst-case spill situations, including those involving accidental discharge of a full bait deployment bucket into marine waters or intertidal habitat; (2) the response that would be triggered in the event of these worst-case spill scenarios to minimize adverse impacts to the terrestrial and marine environments, minimize spread or dispersal of spilled bait pellets into adjacent areas, and provide notification to appropriate response and resource protection agencies; (3) a list of equipment that would be maintained in immediately accessible locations and would be capable of responding to a worst-case spill volume, location and situation; (4) a description of logistical challenges raised in different spill and scenarios (access, points, ocean conditions, equipment needs) and how each would be addressed during a response; (5) a description of how bait pellets behave in marine waters (level and duration of buoyancy, typical time to sink, typical breakdown time); and (6) a description of the qualifications, training and protective gear needed for spill response personnel.

3. Final Project Plans. At the conclusion of the process of adding to and revising the Draft Operational Plan, Draft Mitigation and Monitoring Plan and Draft Non-target Species Contingency Plan and prior to their finalization, USFWS shall provide these plans for Executive Director review and comment. The Final Operational Plan shall address the parameters put in place around helicopter-assisted bait application operations (minimum visibility, maximum wind speeds, weather considerations, etc.).

III. APPLICABLE LEGAL AUTHORITIES

A. Standard of Review

The federal Coastal Zone Management Act (CZMA), 16 U.S.C. §§ 1451-1464, requires that federal agency activities affecting coastal resources be “carried out in a manner which is consistent to the maximum extent practicable with the enforceable

policies of approved State management programs." Id. at § 1456(c)(1)(A). The implementing regulations for the CZMA, at 15 C.F.R. § 930.32(a)(1), define the phrase "consistent to the maximum extent practicable" to mean:

> … fully consistent with the enforceable policies of management programs unless full consistency is prohibited by existing law applicable to the Federal agency.

This standard allows a federal activity that is not fully consistent with California's Coastal Management Program (CCMP) to proceed, if full compliance with the CCMP would be "prohibited by existing law." In its consistency determination, the USFWS did not argue that full consistency is prohibited by existing law or provide any documentation to support a maximum extent practicable argument. Therefore, there is no basis to conclude that existing law applicable to the Federal agency prohibits full consistency. Since USFWS has raised no issue of practicability, as so defined, the standard before the Commission is full consistency with the enforceable policies of the CCMP, which are the policies of Chapter 3 of the Coastal Act (Cal. Pub. Res. Code §§ 30200-30265.5).

Under the CZMA and California Coastal Act, the Commission has jurisdiction over certain activities within the "coastal zone," as that term is defined by the CZMA. Federal lands and waters are not a part of the coastal zone. Here, the proposed project will occur entirely on offshore federal lands (the Islands), surrounded by federal waters, that are managed by the USFWS. Consequently, the Commission's federal consistency review of the project focuses on analysis of the spillover effects that the proposed activities on federal land will have on coastal resources and uses within the coastal zone. Such spillover effects could include, for example, effects that activities on federal land will have on species that spend time on the Islands but also travel to and within the coastal zone (e.g., birds, marine mammals) and that could result in a population-level effect to such species.

B. Conditional Concurrence

The federal consistency regulations (15 CFR § 930.4) provide for conditional concurrences, as follows:

> (a) Federal agencies, … should cooperate with State agencies to develop conditions that, if agreed to during the State agency's consistency review period and included in a Federal agency's final decision under Subpart C … would allow the State agency to concur with the federal action. If instead a State agency issues a conditional concurrence:
>
> > (1) The State agency shall include in its concurrence letter the conditions which must be satisfied, an explanation of why the conditions are necessary to ensure consistency with specific enforceable policies of the management program, and an identification of the specific enforceable policies. The State agency's concurrence letter shall also inform the parties that if the requirements of paragraphs (a)(1) through (3) of the section are not met, then

all parties shall treat the State agency's conditional concurrence letter as an objection pursuant to the applicable Subpart . . . ; and
(2) The Federal agency (for Subpart C) … shall modify the applicable plan [or] project proposal,…pursuant to the State agency's conditions. The Federal agency … shall immediately notify the State agency if the State agency's conditions are not acceptable…; and
(3) The Federal agency…shall approve the amended application (with the State agency's conditions)…

(b) If the requirements of paragraphs (a)(1) through (3) of this section are not met, then all parties shall treat the State agency's conditional concurrence as an objection pursuant to the applicable Subpart.

IV. FINDINGS AND DECLARATIONS

A. Background

The proposed project by the U.S. Fish and Wildlife Service (USFWS/Service) to eradicate invasive house mice (Mus musculus) from the South Farallon Islands through aerial dispersal of rodenticide-laden bait pellets was previously brought before the Commission on July 10, 2019 as consistency determination number CD-0002-19. Prior to the Commission reaching a decision on that consistency determination, it was withdrawn by USFWS. In April of 2021, USFWS submitted a new consistency determination (the subject of this report and recommendation, number CD-0006-21) for the proposed mouse eradication project. This consistency determination and its supporting materials were also made available on the Commission and USFWS websites starting in May of 2021. While the proposed project is essentially the same as that previously considered (but not acted upon) by the Commission in 2019, USFWS included in its April 2021 consistency determination additional information and analysis in response to questions and concerns raised by the public and Commission in advance of and at the July 10, 2019 hearing. In particular, USFWS included:

• A set of implementation plans to govern project operations if the project is approved and a Record of Decision signed, including a Draft Operational Plan; Draft Mitigation and Monitoring Plan; Draft Bait Spill Contingency Plan; and Draft Non-target Contingency Plan. These four draft plans are summarized in USFWS' consistency determination and included as appendices (Appendices 3 through 6, starting on page 137). USFWS accelerated the preparation of these plans at the Commission's request and provided them in draft form with the consistency determination to provide an opportunity for Commission and Commission staff review and input. The plans would also be subject to further agency and expert review and refinement as part of the proposed project. As discussed further below, USFWS has committed to providing all four plans to the Executive Director for comment upon their finalization and prior to project implementation. In anticipation of this final review, **Condition 2** describes specific revisions and additions to the Bait Spill Contingency Plan that will bring it into conformance with Coastal Act policies and **Condition 3** would provide the Executive Director with an opportunity

to review and comment on the plans once they are completely developed and prior to their finalization;
• Further clarification of why USFWS has determined that the project is consistent to the maximum extent practicable with the California Coastal Management Program;
• A summary of the process used in selecting the preferred alternative for the project, including additional discussion of non-toxic methods that were considered and greater detail about why they were rejected (see **Appendix H**);
• Additional information on the background, operational details, and potential adverse impacts to the environment that may result from the project;
• Additional information on previous mammal eradication efforts on the South Farallon Islands; and
• A "Response to Comments" addressing common questions raised by the Commission and public regarding the previous consistency determination and hearing in July 2019. This "Response to Comments" document is included as **Appendix C** to this staff report and Appendix 1 of the USFWS Consistency Determination - starting on page 71).

USFWS Commitments
As part of its consistency determination, USFWS also provided the following commitments to carry out additional consultation and reporting to the Commission:

The Service will notify the Executive Director of the Record of Decision when it becomes available. If the Record of Decision selects the preferred alternative, the Service is committed to the following notification process and process for review of revised implementation plans (i.e., Operational Plan, Mitigation and Monitoring Plan, Bait Spill Contingency Plan, and Non-target Contingency Plan) and reporting:

1. Notify the Executive Director when the implementation teams have been selected;

2. Notify the Executive Director when a target implementation period has been selected and of any changes to that period;

3. Notify the Executive Director of any significant modifications made to the Project subsequent to the Commission's concurrence with this Consistency Determination;

4. No later than two months prior to the start of Project operations, submit to the Executive Director draft final versions of all implementation plans (e.g., Operational Plan, Mitigation and Monitoring Plan, Bait Spill Contingency Plan, and Non-target Contingency Plan) for review of consistency with the Draft Plans provided in this Consistency Determination;

5. Notify the Executive Director when all environmental compliance permits and consultations have been obtained or finalized;

6. Notify the Executive Director of implementation progress, including the start and end of the operational phase, when bait applications have been completed, and any significant events; and

7. Provide the Executive Director a preliminary post-Project report and a final Project report once conclusions are made regarding achievement of the Project goals and objectives.

Project Purpose and Objectives

USFWS is proposing the project due to concerns about ongoing direct and indirect adverse impacts to native plant and animal species on the South Farallon Islands as result of the presence of house mice. As stated in its consistency determination, the stated purpose of this project is to "meet the Service's management goal of eradicating invasive house mice from the Farallon Islands National Wildlife Refuge in order to eliminate their negative impacts on the native ecosystem of the South Farallon Islands."

In the March 2019 "South Farallon Islands Invasive House Mouse Eradication Project Final Environmental Impact Statement" (FEIS), USFWS also lists the following objectives for the project:

1. Completely remove invasive house mice from the South Farallon Islands using the best available methods;

2. Meet the Farallon Islands National Wildlife Refuge's management and policy guidelines;

3. Minimize and mitigate any negative impact to the native species and other natural and cultural resources of the islands;

4. Ensure human safety is preserved during project implementation and mitigation;

5. Ensure that long-term benefits of mouse removal outweigh any short-term negative effects to ecological processes from project implementation; and

6. Prevent the future reinvasion of house mice through the implementation of a biosecurity plan.

Success at achieving these objectives would be evaluated based on the results of monitoring carried out immediately prior to and during project implementation as well as continuation of longer term native wildlife monitoring that will help determine how, how much and how quickly the natives species and habitats on the South Farallon Islands respond to an absence of house mice. Based on past efforts to remove invasive mammals (cats and rabbits) from the South Farallon Islands in the 1970s and black rats from Anacapa Island in the early 2000s, significant benefits would be expected within ten years.

Eradication effectiveness would be evaluated by capturing and fitting numerous mice with radio collars prior to bait application and then tracking their fate once bait is dispersed. In addition, passive detection methods such as tracking tunnels and chew blocks would be deployed following the second bait application to help determine if any mice remain on the islands.

B. Project Description

USFWS provides the following summary project description in its Consistency Determination:

> Following best practices for house mouse eradications from islands, the Project involves the aerial application of Brodifacoum-25D Conservation rodent bait as the primary application method to all mouse territories on the South Farallon Islands in order to eliminate the pervasive adverse effects of invasive house mice on the islands. The implementation of the Project is expected to take about 7 weeks, including 2 weeks for pre-eradication activities and 5 weeks for operational activities. During the operational period, bait would be applied in two separate applications (each taking one to two days), 10 to 21 days apart. The aerial broadcast of rodent bait would occur using a helicopter equipped with a specialized bait spreading bucket. Aerial application of rodenticide is recognized internationally as the most effective technique in rodent, including house mouse, eradication. All bait application would follow EPA-approved labeling requirements for this product.
>
> The Project would occur during the fall (between October and December), most likely in November or December, which is typically the optimal time to minimize non-target impacts. At that time of year, bird nesting is over and most breeding birds have departed from the islands, except for a small number of remaining ashy storm-petrel chicks that would still be visited and fed by parents in the early part of the operation (most fledge and depart by mid-November). This species is not expected to be impacted by operations because they nest in underground crevices and only feed on marine prey far from the islands. No marine mammal pupping occurs in fall, and remaining sea lion and fur seal pups born in summer are highly mobile and spending large periods of time in the ocean.
>
> Throughout the operational period, Service staff will be actively engaged in mitigation and monitoring activities to ensure that impacts remain within the parameters described in the FEIS. In all cases, the FEIS found that there would be no long-term significant adverse impacts on any resources (see Section 9. Environmental Consequences, below; FEIS Section 4.5.6.1). Monitoring will also continue after the operational period.

For a complete project description, including details on the proposed method of bait application, application rate and area, and rodenticide proposed to be used, please refer to pages 21 through 39 of the USFWS Consistency Determination[1] or **Appendix B.**

[1] Available on the USFWS and Commission websites.

Project Plans

In response to questions and concerns raised by the Commission at its July 2019 initial hearing on the proposed project, USFWS has prepared and included in its April 2021 consistency determination four different project implementation plans. These plans provide additional information about how a variety of contingency scenarios would be addressed and their development has helped guide USFWS planning efforts. The individual plans are summarized below and included as **Appendices D through G** of this report. The four plans have been provided in draft form to more easily allow for the inclusion of any modifications that may result from the Commission's review. In addition, the plans would also be further refined, expanded and revised based on expert feedback during the course of the USFWS contracting process and review by federal agencies such as the U.S. Department of Agriculture's Animal and Plant Health Inspection Service, Greater Farallones National Marine Sanctuary, and U.S. Environmental Protection Agency. Prior to project implementation, USFWS has committed to providing final versions of all four plans to the Commission's Executive Director for review and comment. Under its federal consistency regulations, the Commission has the ability to re-open its review of the project if the plans change in a manner that would result in adverse impacts from the project that are different than currently anticipated.

Draft Operational Plan

The Draft Operational Plan includes fine-scale operational logistics as well as project goals, objectives, desired outcomes and adaptive management processes. USFWS provides the following summary of its Draft Operational Plan:

> This Draft Operational Plan (Draft Plan) provides an outline of the operational procedures that will be used to assure a successful and safe eradication Project. Background information about the project is also provided for the benefit of operational team members. The Draft Plan is informed by the FEIS for the Project, along with additional research; experts in the field of island conservation, ecotoxicology, and island biogeography; and biologists who have been studying the plant and animal life on the South Farallon Islands for decades. It is also based on lessons learned and knowledge gained from more than 1,200 rodent eradication attempts on islands around the world, with over 700 successful eradications. These have included 89 that targeted house mice resulting in 64 that were successful. All but one of the successful mouse eradications used brodifacoum or another closely related second-generation anticoagulant. [The one successful effort that did not use brodifacoum involved hand trapping on a very small island of less than one acre.] Best practices from these efforts have been incorporated into this plan and will continue to be refined as the Project undergoes the permitting, planning, and implementation phases.
>
> This Draft Plan is also complimentary to and consistent with the other Project implementation plans including the Draft Mitigation and Monitoring Plan, the Draft Non-Target Species Contingency Plan, and the Draft Bait Spill Contingency Plan.

> This Draft Operational Plan will be further refined prior to Project implementation based on: 1) the Record of Decision for the FEIS; 2) input from an experienced contractor or cooperator enlisted to lead Project implementation with oversight from the Service; 3) input from the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDAAPHIS) and the U.S. Environmental Protection Agency (EPA), including incorporation of an expected supplemental rodenticide bait label (Appendix A); and 4) input from other regulatory agencies with relevant expertise. Contractors and cooperators with applicable expertise, along with applicable permitting agencies, will be engaged to assist the Service with refining and carrying out these plans, including development of more detailed protocols...

The Draft Operational Plan is provided as **Appendix D** and details the project site and operational logistics, target and non-target species, species protection measures to be implemented, a detailed discussion of bait application procedures (including timing, aerial application procedures, aerial broadcast application rates, bait loading operations, and preventive measures to keep bait from non-target areas), personnel health and safety, helicopter operations, and demobilization.

Draft Mitigation and Monitoring Plan

USFWS's Draft Mitigation and Monitoring Plan (included with this report as **Appendix E**), includes the following overview description:

> As part of the South Farallon Islands House Mouse Eradication Project (Project), mitigation and monitoring activities will be carried out before, during, and after each bait application. The goal of mitigation is to avoid and minimize impacts to non-target species and, where possible, eliminate risks to non-target species populations while ensuring the highest likelihood of Project success. The goal of monitoring is to provide data and information to managers to determine whether the observed nontarget outcomes are in line with expected outcomes as identified in the *South Farallon Islands Invasive House Mice Eradication Project: Final Environmental Impact Statement* (FEIS; U.S. Fish and Wildlife Service 2019), as well as to provide information needed to make potential adaptive management decisions during project implementation that will best ensure Project success.

The plan describes the methodology and logistics for proposed mitigation and monitoring activities that would be carried out on western gulls, raptors, arboreal salamanders, marine mammals, camel crickets, bait pellets, and brodifacoum residue in soil, water and tissues. The plan also describes how carcass collection and removal would be carried out subsequent to the bait dispersal activities. While the majority of proposed monitoring activities would be carried out on the islands and surrounding waters, monitoring would also focus on beaches along the San Francisco Bay Area shoreline. This monitoring would include collection and assessment of seabird carcasses from these beaches to look for signs of higher-than-normal mortality rates and determine if ingestion of poisoned bait on the islands may have been a cause of death for recovered birds.

Draft Bait Spill Contingency Plan

USFWS also developed and provided in its consistency determination a Draft Bait Spill Contingency Plan (included with this report as **Appendix F**) that describes the specific efforts that would be taken to minimize bait spills and respond to those that may accidentally occur. USFWS provides in the plan the following description regarding the reasons for its development and scope:

> However, because the risk of a bait spill cannot be completely eliminated, the FEIS called for the preparation of a Bait Spill Contingency Plan (FEIS Section 2.10.11), specifying that it will include information on: 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 the 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.
>
> This Draft Plan identifies measures that will be taken to respond to an unintentional bait spill that occurs outdoors into a marine or terrestrial natural environment (also referred to as a "release," which includes any spilling, leaking, emptying, discharging, escaping, dumping, or disposing into the environment, unless permitted or authorized by a regulatory agency). This plan is complementary to the Draft Operational Plan, which is the primary document that summarizes the resources at risk and details the measures that will be taken to prevent accidental bait drift. This draft is also complementary to the Draft Mitigation and Monitoring Plan, which contains additional information on monitoring that will be done if there is a bait spill incident.

USFWS also notes in the plan that it was only developed in draft form in order to provide an opportunity for revision and improvement as a result of pending "input of the implementation team and comments from appropriate federal and state agency reviews, including confirmation of the notification list and the ICS team." As part of its review of USFWS' consistency determination, Commission staff (including the manager of the Commission's oil spill program and staff ecologist) closely reviewed the draft plan and identified several revisions and additions that would enhance its thoroughness and effectiveness. These are described in **Condition 2** and include additional information, planning and equipment to address worst-case spill scenarios.

Draft Non-target Species Contingency Plan

USFWS also provided with its consistency determination a draft Non-target Species Contingency Plan (included with this report as **Appendix G**). As noted by USFWS,

> This Draft Plan outlines the steps that will be taken to respond to unforeseen events or circumstances that have a high likelihood of resulting in significant

negative impacts to non-target species from either exposure to rodenticide or disturbances resulting from the Project's activities.
…
This is a working document intended to be further refined prior to project implementation based on: 1) the Record of Decision that is expected to be issued on the FEIS that had selected Alternative B (aerial broadcast of Brodifacoum-25D) as its preferred alternative; 2) input from experienced contractors, cooperators and other experts enlisted to assist the Service with project implementation; 3) input from the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS) and the U.S. Environmental Protection Agency (EPA), including incorporation of an expected supplemental rodenticide label; and 4) input from other applicable regulatory agencies and experts.
…
This document addresses risks associated with an extreme, unforeseen event, such as unexpectedly high impacts from exposure to rodenticide to certain at-risk species or greater than expected (or permitted) levels of pinniped disturbance. The purposes of this Draft Plan are to:

1. Outline the triggers that will be used to identify potential extreme and unforeseen events.
2. Identify response procedures that could be used to avoid, minimize, or mitigate further risks to non-target fish and wildlife.
3. Identify chain of command, notification processes, and key personnel who will respond to incidents involving an extreme and unforeseen event.
…
Five scenarios are the focus of this Draft Plan:

- Potential failures or deficiencies of the gull hazing program, which is intended to reduce toxicant risks to western gulls (Larus occidentalis) to a less than significant level;
- Discovery of greater than expected impacts to Farallon arboreal salamanders (Aneides lugubris farallonensis);
- Possible exceedance of permitted marine mammal takes as a result of bait application or gull hazing activities;
- Discovery of exposure to rodenticide to commercial or recreational fishery species; and
- Discovery during Project implementation of the unanticipated presence of a species listed under the Endangered Species Act that is not otherwise covered by Section 7 consultation.

Each of these scenarios is described in the plan along with specific triggers and thresholds for action and adaptive response actions that would be considered under each scenario. These response actions are uniquely targeted to the various scenarios but include several common elements. These are: implementation of additional focused monitoring for 24 hours to determine how the scenario is progressing (resolving or continuing); modification of hazing activities (to increase effectiveness or reduce non-target species disturbance); delay of follow-up bait deployment activities; hand

collection of already deployed bait from all accessible areas; and cancellation of second bait deployment event.

Project Timing

A point of interest raised by the Commission and public regarding the proposed project concerns the need for it to be carried out within the targeted timeline of fall/winter 2022 and the possibility of delaying it until alternative means of mouse eradication are further developed or available. This is functionally akin to the "no project" alternative discussed in the FEIS, which analyzes the effects of not undertaking the project at all, or at least not for the foreseeable future.

While it is true that house mice are believed to have been present on the South Farallon Islands since roughly the late 19th century and have long been a target for eradication, until recent years there has not been a feasible and demonstrably effective method to eradicate them. This method is broadcast dispersal of rodenticide-laden bait and all island mouse eradications in the past 14 years have used it and been successful (Samaniego et al. 2021). No other attempts have been made on the South Farallon Islands because no other feasible methods have been available.

As the scientific understanding of the fragility of the Farallones ecosystem and the threats posed to its endemic and native species (such as the arboreal salamander, camel cricket, maritime goldfields, and ashy storm-petrel) grows, so too does the need for swift and meaningful conservation action. Many of the threats to this ecosystem and suite of species – climate change, declining productivity of oceanic foraging habitat, effects on the environment due to human uses (light pollution, oil and chemical spills), extended and severe droughts – cannot be effectively managed or will take sustained efforts for decades to overcome. While that work proceeds, there is also value in focusing on improving ecosystem resiliency at the Farallones by addressing other stressors – such as those related to the mice - that can be more readily and immediately managed. By reducing or eliminating those stressors, the ecosystem and suite of rare endemic species on the Farallones will be more able to adapt to and persist through longer-term and more intractable threats.

The eradication of house mice from the South Farallon Islands presents a unique and significant opportunity to address and eliminate a stressor causing substantial and widespread adverse impacts to a suite of species and habitats. A delayed response to this opportunity increases the risk to those species and habitats. While at the present time, there is no strong evidence that the endemic species and habitats on the Farallones are facing imminent collapse or extinction[2], that does not mean these species and habitats are robust and thriving. Several of them (including the arboreal salamander and camel cricket) exist nowhere else on the planet and are extremely rare; others like the maritime goldfields and ashy storm-petrel rely on the South Farallon

[2] Recent research, however, indicates that a fungal disease known for killing amphibians and blamed for the extinction of hundreds of species globally was found among the Farallon arboreal salamander population (Cowgill et al. 2021). The disease appears to have been present in the population since the 1990s at a level of less than 20% but the high rate of mortality it results in (~71%) is cause for concern.

Islands for half or more of their global population. As described in the sections below, all of these species are being adversely affected by house mice and would benefit from their eradication. Failure to achieve this eradication immediately would allow those existing adverse impacts to continue, prolong the compromised condition of the Farallones ecosystem and therefore increase the risk of more catastrophic loss or collapse if other adverse impacts were to manifest or worsen.

In an email to Commission staff on this issue, USFWS provides the following additional perspective:

> The global breeding population estimate for ashy storm-petrels is only a little over 8,000 breeding birds (Ainley et al. 2021). The South Farallon Islands are the single most important breeding site for this species, which is listed as endangered by the IUCN, is a USFWS Bird of Conservation Concern, and is a California Bird Species of Special Concern. As documented in the CD, the Farallon colony has been in decline, largely as a result of house mouse impacts, for the last 15 years, with a rate of decline that puts them in jeopardy of colony extinction. Added to the impacts of mice is the threat of climate change (see CD Section 10.4.1). For example, since 2009 there have been at least three unprecedented, large-scale die-offs of seabirds in the eastern North Pacific Ocean (Brandt's cormorant, Cassin's auklet, and common murre) that have been linked to climate change-related ocean warming. Similar, future seabird die-offs are predicted. Because of their rarity and limited distribution, a die-off of the magnitude recorded in these other species could be catastrophic to ashy storm-petrels. Removing mouse impacts could help buffer the species from such an event.
>
> The adverse impacts from invasive mice together with the devastating effects of global climate change also pose an imminent threat to other rare and endemic species on the Farallons (see CD Section 9.2.1). The Farallon Leach's storm-petrel colony was estimated to contain about 1,400 breeding birds in the 1970s. Today, few birds are known to breed on the Farallones, putting this species at risk of extinction on the islands in the near future. Furthermore, changing weather patterns could result in changes in the pattern of the mouse annual population cycle, potentially resulting in greater ecosystem impacts. For example, a recent change in mouse behavior has resulted in house mice attacking and killing large numbers of albatross chicks at Midway Atoll. For the endemic Farallon arboreal salamander, the prompt removal of mouse impacts could buffer the species from impacts of climate change and from chytrid fungus, which has severely depleted many amphibian populations worldwide (FEIS Section 3.4.3.1).
>
> The fragility of the native species at risk from invasive house mice on the Farallones and their vulnerability to other human-induced threats such as climate change present us with an imperative to act expeditiously. As documented in our CD, we propose to use proven and internationally recognized best practices to conduct this restoration project successfully. The imperative to implement the proposed project is in full alignment with the State of California's commitment to

undertake bold strategies to fight climate change. In October 2020, Governor Newsom signed Executive Order N-82-20 which acknowledged that “California's rich biodiversity is increasingly threatened by loss of habitat, spread of invasive species … and increasingly frequent and severe climate impacts” (https://resources.ca.gov/Initiatives/Expanding-Nature-Based-Solutions). The Executive Order directed state agencies to support actions that build climate resilience. Similarly, in furtherance of the Coastal Act’s mandate to "protect, conserve, restore, and enhance" the state's coastal resources, the Commission has committed to address the impacts of climate change in its regulatory activities and work to reduce the detrimental impacts of global warming on the California coast (https://www.coastal.ca.gov/climate/climatechange.html).

C. Consultations and Other Agency Approvals

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; and (2) a special closure permit for temporary boating closures in waters offshore of the South Farallon Islands. Due to the proximity of the proposed project to state-designated marine protected areas, Commission staff reached out to and coordinated with staff from CDFW, the California Fish and Game Commission and Ocean Protection Council during the course of its review of the USFWS' consistency determination. No specific concerns with the proposed project or staff recommendation were raised by these staff.

Tribal Governments
As part of its review of USFWS' consistency determination, Commission staff sent a request to the California Native American Heritage Commission on June 9, 2021 to obtain a contact list of Native American Tribes with potential cultural connections to the Farallon Islands[3]. On July 1, 2021 Commission staff received from the Native American Heritage Commission the requested contact list. The Tribes included on this list include the Amah Mutsun Tribal Band of Mission San Juan Bautista, the Costanoan Rumsen Carmel Tribe, Indian Canyon Mutsun Band of Costanoan, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area, the Ohlone Indian Tribe, and the Wuksache Indian Tribe/Eshom Valley Band. Commission staff reached out to each of these Tribes on August 9, 2021 and November 16, 2021 via email and on September 14, 2021 by mailed letter to provide copies of USFWS' consistency determination and FEIS, share scheduling information regarding the Commission's hearing on the project and to invite questions, feedback and further coordination. No responses to these invitations were received as of the publication date of this report. Any feedback received subsequent to the report's release will be provided as an addendum to the report.

Commission staff did, however, receive correspondence from Lou-Anne Fauteck Makes-Marks, Ph.D., noting that the Farallon Islands have cultural significance for the Ohlone and encouraging that they be included in outreach efforts by Commission staff. This correspondence is described further below in the section of this report on cultural resources and several representatives of the Ohlone were included in Commission staff's outreach efforts.

D. Project Alternatives

Potential project alternatives were a significant point of interest during the Commission's consideration of USFWS' prior consistency determination for the proposed project and have continued to be so for many members of the public. In particular, interest has focused on the potential use of a contraceptive to control or eradicate the mouse population on the islands as well as information about other methods less controversial

[3] In May of 2021, shortly after receiving the consistency determination from USFWS, Commission staff also reached out to USFWS staff to understand the status of any prior, pending or ongoing Tribal consultations USFWS was engaged in and to offer further coordination during the Commission's outreach efforts. USFWS staff noted that no Tribal or cultural concerns had been raised during the project's NEPA process and determined that no Tribal coordination was necessary under Section 106 of the National Historic Preservation Act.

than rodenticide that have been, or could be, used by USFWS to achieve the project purpose. In response, USFWS dedicated particular attention to providing, in its April 2021 consistency determination, a more robust and comprehensive discussion of the project alternatives it considered and analyzed before developing the proposed project. As part of this more comprehensive discussion, USFWS' consistency determination includes Appendix 2 – Alternatives Selection Process Report – which details the specific alternatives it considered and how these alternatives were objectively evaluated and compared to select first a subset for additional analysis and ultimately, a preferred alternative to propose. This Alternatives Selection Process Report is also provided as **Appendix H** to this report.

In addition to reviewing this information, Commission staff, led by its staff ecologist, also carried out its own, independent assessment of potential project alternatives. This process included consultation with experts and review of relevant scientific literature and materials. The following section, developed by the staff ecologist, provides a summary of the results of that assessment that also draws on key information from the discussion of project alternatives in USFWS' consistency determination and the project FEIS.

Selection Process

USFWS undertook a rigorous and systematic alternatives analysis to identify feasible options for eradicating house mice from the Farallones. Initially, 49 alternatives were studied before selecting the two presented in the FEIS for in-depth analysis. Categorically, these included the use of rodenticides, trapping, the introduction of non-native predators, contraception, gene drive, and disease. Three modes of bait administration were also considered: ground stations, hand application, and aerial dispersal (i.e. helicopter). A Structured Decision Making framework was used to organize the assessment around the specific goal of mouse eradication while aggregating and integrating multiple factors for a robust quantitative analysis.

To understand the trade-offs among alternatives and incorporate risk tolerances, the Service used an Alternatives Selection Model that relied on a combination of analytical matrices and expert modeling. The first step was to assess each alternative's fit with the Service's Minimal Operational Criteria of 1) consistency with select Service management and policy guidelines; 2) feasibility of implementation; and 3) compliance with human safety and logistical guidelines. Concurrently, a parallel analysis scored and ranked each potential approach for likely environmental impacts to 35 specified island resources along with the operational considerations associated with implementing it at the Farallones (i.e. availability and potential to succeed of each method). In evaluating the environmental concerns, biological, physical and social criteria were assessed. Relative to each of the resources taken into consideration, the biological criteria specifically evaluated toxicant hazards based upon exposure potential, toxicity to the given resource, the risk of disturbance based on delivery methods, and the risk to habitat alterations. Potential mitigating actions known to have been effective in eradication efforts elsewhere were also taken into consideration in the risk assessments and scores were adjusted where mitigation strategies could further reduce risk.

Altogether, a dozen products were generated in this selection process including a series of matrices that were then combined for a final quantitative analysis. Of the wide range of alternatives considered, including, a sustained population control program; the use of bait stations; hand broadcasting of bait; trapping of mice; introduction of disease targeting the mice; introduction of a biological control agent such as snakes or cats; fertility control; and burrowing owl relocation, only seven of the 49 alternatives passed the Minimum Operational Criteria and these all involved rodenticides currently registered for use with the US EPA; all other alternatives were subsequently dismissed from further consideration. The reasons for dismissal are varied and include risks to human health and safety, infeasibility, likelihood of large-scale, unacceptable impacts to nesting seabirds and their habitats, unavailability, or uncertainty of success.

The following summarizes the many alternatives considered and elaborates on several the Commission has previously expressed interest in, even though the Service had already dismissed them from further consideration at the time of the FEIS. It is worth noting that the Service examined these as primary modes of eradication but has also anticipated that additional tools would be necessary during follow-up such as localized bait stations or trapping following an initial rodenticide treatment if monitoring indicated pockets of mouse persistence; these secondary measures would be expected to be more focused than the primary treatments and adjusted for the specific circumstances (terrain, season, etc.), as appropriate.

Rodenticide Alternatives

A total of 15 different rodenticide products were considered in combination with various modes of delivery (i.e. stationed, hand and/or aerial broadcasting). Of these, seven are presently authorized for some type of control use in the United States and met the Minimum Operational Criteria. Only two of these seven are presently authorized for island eradications and conservation purposes, however. These were consequently selected as the alternatives for in-depth analysis.

<u>Brodifacoum 25-D Conservation</u>

Globally, 52 of 64 successful mouse eradications have relied on brodifacoum. It is considered a very potent second-generation anticoagulant that is typically effective for small rodents in a single dose. The high effectiveness allows for less bait and fewer applications to be used, thus minimizing opportunities for poisoning non-target species and areas. Mice ingesting a lethal does typically die within four to five days. As noted in the FEIS,

> It has been the toxicant most frequently used for successful rodent eradications undertaken around the world (Howald et al. 2007, Samienago 2016, and DIISE 2015). Brodifacoum was made a restricted-use pesticide in 2008 by EPA. Due to their potential risk to non-target species, several second-generation anticoagulant rodenticides, including brodifacoum, are no longer registered for use in the United States in products geared toward consumers and are registered only for the commercial pest control and structural pest control markets, as well as for conservation purposes such as those aimed to protected islands from invasive rodents.

Under Assembly Bill (SB) 1788, the California Ecosystem Protection Act, signed into law in September of 2020, use of Brodifacoum and other second generation anticoagulants in California was also prohibited under most circumstances. However, the law established a small number of exemptions, including for "The use of any second generation anticoagulant rodenticides for the eradication of nonnative invasive species inhabiting or found to be present on offshore islands in a manner that is consistent with all otherwise applicable federal and state laws and regulations." If carried out consistent with all other applicable state and federal laws and regulations, this exemption to the SB 1788 prohibition would apply to the proposed project.

As described in the FEIS, Brodifacoum was selected as the preferred alternative primarily due to its proven effectiveness at successfully achieving the type of eradication proposed by USFWS:

> From extensive research we determined that the broad-scale application of rodenticide bait products is the only available and proven method of eradicating house mice on islands as large and rugged as the South Farallones. Howald et al. (2007) reported that brodifacoum was the toxicant used in more than 71 percent of rodent eradication campaigns and in 91 percent of the total area treated. Of the 61 confirmed successful island mouse eradications, 48 of them used brodifacoum and one relied on diphacinone (Samaniego 2016). 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 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. The product was initially developed for use in dry California coastal island environments like the Farallon Islands.

<u>Diphacinone</u>
A first generation anticoagulant, diphacinone also received serious consideration by the Service. As another rodenticide that can be deployed through cereal bait pellets, in many respects, diphacinone would provide similar logistical challenges and benefits to brodifacoum. As noted in the FEIS, it has some advantages:

> The primary advantage of diphacinone as a rodenticide for island eradication purposes is the lower risk it poses to non-target organisms relative to second-generation anticoagulants. Diphacinone has comparatively low persistence in animal tissues, which reduces but does not eliminate the risk to non-target vertebrates (Fisher 2009). Laboratory trials have also indicated that diphacinone

has a lower toxicity to birds when compared with brodifacoum (Erickson and Urban 2004, Eisemann and Swift 2006) and other second generation anticoagulants, although recent research suggests that the toxicity of diphacinone to some birds, particularly raptors, may be higher than previously thought (Eisemann and Swift 2006, Rattner et al. 2010, Rattner et al. 2001, Rattner et al. 2012).

However, there are also several important drawbacks to consider. Diphacinone is: 1) less potent; 2) would require at least three treatments/dispersal events rather than two; 3) degradation trials showed that its bait pellets resist breakdown and persist in a form that can be consumed by non-target species such as gulls for significantly longer (over 17 weeks rather than two to ten weeks, depending on rainfall).

As a result of these differences, even though diphacinone is less toxic, carrying out the proposed project using diphacinone would significantly increase the likelihood of exposure and adverse impacts to non-target species. More bait pellets would need to be dispersed, thus resulting in more available for non-target consumption and increasing the risk of spills and disturbance to sensitive wildlife. The bait pellets would also persist in the environment for far longer before breaking down, thus necessitating repeated gull hazing efforts, logistically challenging and dangerous collection efforts, or resulting in high levels of non-target poisoning. For these reasons and others, diphacinone was rejected by the Service as a preferred alternative.

Other rodenticides

As suggested above, approximately half of the rodenticides considered in the FEIS did not meet the Minimum Operational Criteria because they are not currently registered for use in the U.S. and the timeline to get to such a point tends to be quite extended due to high degrees of uncertainty concerning their potential efficacy. Of those that met the Minimum Operational Criteria, five were authorized for some type of control use in the U.S. but not authorized for island eradication and/or conservation purposes. These included a subacute toxicant (cholecalciferol), two first generation anticoagulants (warfarin and chlorophacinone), and two second generation anticoagulants (bromadiolone and difethialone). Subacute toxicants such as cholecalciferol affect the consuming targets within 48 hours and generally require at least two treatments separated by a few weeks to be effective; cholecalciferol also has a history of bait shyness/limited consumption by targets and resistance, which have been recognized as one of the reasons some past eradication efforts using rodenticides have failed (MacKay et al. 2007). Warfarin, chlorophacinone, and bromadiolone all have histories of resistance/limited effectiveness in rodents as well. Difethialone has a particularly long half-life in soil of 635 days, meaning that it persists in the environment significantly longer than other products considered. Both first and second generation anticoagulants generally require 48-72 hours to affect their targets and as discussed in the context of the selected alternatives above, the difference between these is their relative toxicity, with first generation products generally requiring more and larger dose events than second generation anticoagulants. Given these many considerations along with the lack of current authorization for intended use, the Service dismissed these rodenticides from further analysis.

Non-Rodenticide Alternatives
A variety of alternatives that do not rely on rodenticides were considered including different modes of mouse trapping, the relocation of owls to alleviate stress on seabird populations, the introduction of non-native mouse predators, mouse contraception, mouse gene drive (genetic manipulation to induce sterility or interfere with reproduction), and the introduction of mouse-specific disease – each of these is discussed below.

In addition, the Service also considered mouse control (i.e. reducing and maintaining populations at an acceptable level) rather than eradication (i.e. complete elimination of the species from an operational area) as a potential solution. As discussed in the FEIS, rodent control efforts typically require indefinite ongoing management of significant cost and effort while yielding relatively temporary and less ecologically meaningful benefits than eradication (Pascal et al. 2008). Moreover, control efforts may pose long-term risks to non-target species through chronic disturbance and damage to habitats and interruptions to treatment could result in rapid rebound of mouse populations. Further, long-term control strategies that involve more limited or targeted application of rodenticide would result in the presence of these toxic materials on the islands on an ongoing and indefinite basis, thus increasing the risk to non-target species and the environment. Additionally, control strategies typically need to be implemented on a continuous basis or multiple times throughout the year (replacing traps, refilling bait stations, re-applying control measures) and therefore cannot be timed to correspond to the periods in which non-target species (particularly gulls, other seabirds and marine mammals) are least susceptible to disturbance (outside of breeding or nesting seasons) or present on the islands in low numbers.

Importantly, a mouse control strategy would also not achieve USFWS' objective of permanent island-wide conservation and restoration benefits to the Farallones ecosystem. By contrast, rapid eradication followed by ongoing monitoring, targeted follow-up operations, and biosecurity measures to ensure mice are in fact eliminated from and not reintroduced to the islands stands to provide expansive long-term ecosystem benefits even when there may be short-term ecological costs (Croll et al. 2015, Jones et al. 2016, Newton et al. 2016, Rueda et al. 2019). Further, broad scientific consensus provides that where feasible, eradication of invasive species from islands should be the primary goal in order to conserve the disproportionate levels of biodiversity and endemism in these ecosystems (Parkes and Panetta 2009, Veitch et al. 2019).

Mechanical Alternatives
Mechanical alternatives are those that rely on physical or manual operations as opposed to the deployment of rodenticides or use of biological controls. To Commission staff's knowledge, there are no records of successful mouse eradication from islands of similar area to the South Farallon Islands that have used these techniques.

<u>Trapping</u>
Two primary modes of trapping were considered as alternatives – live trapping and snap trapping. Both would require the placement of traps across the entirety of the

islands to be treated, at an interval of approximately every 30 feet in order to account for the small home ranges of mice. This would necessitate several thousand traps, which would need to be baited, checked, reset and rebaited on a daily basis for a period likely extending over years. The Service estimates that this would require at least 50 personnel working on-foot year-round and even more during the peak mouse season. Not only is this infeasible for financial and logistical reasons, much of the island cannot be safely accessed on foot given its rugged steep terrain. In addition, the disturbance caused by humans trampling the island at this level over an extended period would undoubtedly result in adverse impacts to wildlife, particularly during their most sensitive periods of breeding, and damage the landscape including by inadvertent damage to native vegetation, spread of invasive non-native vegetation, displacement of scree and loose rock habitat supporting endemic salamanders and storm petrels, and collapsing of the underground burrows many species rely upon (e.g., Cassin's and rhinoceros auklets, Ptychoramphus aleuticus and Cerorhinca monoserata, respectively). Population-level impacts would be expected to result from this disturbance, among seabirds as well as marine mammals.

In the case of live trapping, mice would also have to be euthanized and subsequently incinerated, thereby increasing costs further. If snap traps were used, large, sustained volumes of mouse carcasses would likely attract scavengers not typical on the islands. Finally, there are no records of trapping efforts alone proving successful in island rodent eradication. For these reasons, trapping operations to eradicate mice from the South Farallon Islands would not be a feasible alternative to the proposed project.

Translocation of burrowing owls

Seasonal removal of burrowing owls was not considered by USFWS as one of the 49 alternatives for the proposed project as it would not meet its overarching goals of eradicating mice from the Farallones and addressing the ongoing damage they are causing to the islands' habitats and native species. Burrowing owls are themselves listed on the California Department of Fish and Wildlife's list of California Species of Conservation Concern and are provided with a variety of regulatory protections; the need to regularly capture and translocate them from what would be an otherwise natural migratory stopover would potentially do more to distress the owls than it would benefit the overall island ecosystem. Additionally, while translocation activities would alleviate hyperpredation on ashy storm petrel populations, it would not rectify the many other mouse impacts including those on the endemic Farallon arboreal salamander, the endemic Farallon camel cricket, and native vegetation. Thus, ongoing removal of the burrowing owls from the ecosystem would not meet project goals and could potentially impose adverse impacts on sensitive species, including the owls themselves.

In its consistency determination, USFWS also notes other challenges associated with this alternative as a long-term solution:

> Removing burrowing owls would not address the purpose of the mouse eradication project on the South Farallon Islands, which is to eliminate all negative impacts from the mice on the Farallon ecosystem. The house mouse eradication is expected to have multiple, significant long-term benefits, including increasing the

> productivity and abundance of the endemic Farallon arboreal salamander, the endemic Farallon camel cricket and other invertebrates, increasing the abundance and recruitment of native vegetation, improving wilderness character, and restoring ecosystem processes altered by non-native mice. Moreover, the cost and logistics of a perpetual burrowing owl control effort make it an unrealistic option.

It should be noted, however, that the FEIS describes a limited effort that was carried out by the Service in 2012 to "to capture owls that stayed past the normal migration period and relocate them to the mainland." This effort was implemented due to the rarity and protected status of burrowing owls and USFWS' concerns about the starvation and loss of birds that persisted on the islands past the time the mouse population crashed and they became unavailable as reliable prey. As observational reports accumulated about owls avoiding starvation by switching to prey on storm-petrels, the relocation efforts were discontinued. As described in the FEIS and verbal communications with Commission staff by USFWS, the capture of owls was extremely challenging given the islands' difficult terrain and it posed a risk to USFWS personnel as well as the owls and endemic species and habitats on the islands. Because the efforts did not provide a clear benefit to the owls (in terms of mitigating a loss of owls due to starvation), those risk were determined by USFWS to be unacceptable.

Introduction of non-native predators

The potential introduction of non-native predators to eradicate mice from the National Wildlife Refuge would be inconsistent with the Refuge's management plan and be counterproductive to prior eradication efforts at the Farallones, including that of cats in the 1970's. In order to succeed, predators would have to be capable of accessing and killing every mouse on the island without disrupting native wildlife. Ecological principles and a long history of biological control efforts turned catastrophic around the world inform the determination that there would be a significant risk of major impacts to native wildlife on the islands and that threats would likely be exacerbated rather than alleviated as intended.

Theoretical Alternatives

Theoretical alternatives are those that were considered hypothetically but which continue to lack practical evidence to support safe implementation. Each of these alternatives relies on emerging technologies that would manipulate mouse body functions directly through experimental methods, which in some cases have not been fully realized beyond technical hurdles. Despite progress on some fronts, to date, none of these have been successfully employed or attempted for mouse eradication, anywhere in the world.

Contraception

When the proposed project was presented to the Commission in 2019, there had been considerable interest in alternatives relying on contraceptive strategies to control mouse fertility. At that time, only one product was registered and available for addressing rodent populations and it was determined to be a non-viable alternative despite theoretical advantages; in the time since, progress has been made on a second contraceptive product – both are discussed below.

The product ContraPest by Senestech remains the only contraceptive rodent product currently registered for general use with the U.S. Environmental Protection Agency. Its use was contemplated by staff in 2019 and discussed in the staff report addenda. At that time, several issues were identified as limiting its feasibility for mouse eradication from the Farallones, consistent with the Service's earlier determination. These included that: 1) the product's intended use is for controlling rather than eradicating rodents; 2) it's application is intended for indoors and immediately around structures rather than open wilderness areas outside; 3) it was designed to target rat species, not house mice (which have significantly different life history characteristics); and, 4) it must be administered as a liquid bait, which would require the placement and maintenance of thousands of bait stations across the landscape – as discussed above in regards to mechanical trapping alternatives, this would not be realistic for many reasons at the Farallones.

In lab studies with rats, the ContraPest product has been documented to provide 2-3 months of reproductive suppression beginning a few weeks after ingesting sufficient bait (Siers et al. 2017). However, one of the key challenges with contraceptive products is that because the effects are reversible, all target animals need to be routinely dosed in order to maintain population suppression. Staff is unaware of any efforts documenting the successful use of fertility control products alone to achieve rodent eradication (versus their control). Such an application remains theoretical, based on expectations of animal mortality exceeding fecundity. In practice, the statistical tail of populations treated may be long sustained and risk remaining a source for rebound if not consistently addressed. Thus, while eradication with a contraceptive product may be theoretically possible, it may not necessarily be practical. In addition, ContraPest has yet to be tested on an array of non-target species and there would be concern with the inadvertent exposure of active ingredients to other mammals on the Farallones (such as seals, sea lions, and elephant seals) or in surrounding waters. ContraPest uses two active ingredients - vinylcyclohexene dioxide (or VCD), which is an ovotoxic chemical that selectively destroys ovarian follicles, and triptolide, which is a botanically-derived product affecting reproductive capacity in both males and females. Both of these ingredients act non-specifically, meaning they could affect non-target species in the ecosystem. The effects on such non-target species have not been studied. Since ContraPest is not designed for the target species, house mice, and the bait administration methods would be expected to be at least as impactful as that for other methods dismissed from further analysis (such as mechanical trapping), ContraPest would not be considered a viable option for mouse eradication on the South Farallon Islands.

Since the 2019 hearing, staff has learned of another product in development by the some of the same founders who patented ContraPest, and are now affiliated with the FYXX Foundation, an organization working to develop alternatives to rodenticides. Based on testimony provided to the Commission at several hearings in 2020 and 2021 by Dr. Loretta Mayer and in subsequent conversations with Commission staff, staff's understanding is that this newer product is being designed to address some of the

specific concerns previously expressed regarding the infeasibility of using a contraceptive product to achieve rodent eradication in a setting like the South Farallon Islands. In particular, the FYXX Foundation product would be formulated for mice and be delivered in cereal pellet form, similar to that which would be used for administering the preferred alternative, brodifacoum. The intent is that pellets would be aerially delivered, whether via helicopter or potentially drones in more targeted situations. Unlike ContraPest, which relies on two active ingredients with different specific effects on target rats, the FYXX Foundation product would rely on only one of these, triptolide. The ingredient has also been used in rodent fertility control applications in China. Specifically, triptolide acts to suppress reproductive abilities in both male and female mice, by impairing sperm development, disrupting follicle development to a limited extent, and delaying estrous (Jacoblinnert et al. 2021). Reportedly, triptolide is metabolized quickly and does not persist in soils or water. While progress in the development of non-rodenticide alternatives is clearly being made and there is collective interest in generally minimizing the use of pesticides, many significant hurdles remain to be addressed before the emerging product could potentially be used in an environment like the South Farallon Islands.

First, contraceptive strategies remain a means of population control, and there have yet to be any successful instances demonstrating their efficacy in mouse eradication[4]. As discussed above, use of contraceptives for eradication remains theoretical. Broad scientific consensus maintains that whenever an invasive species can feasibly be eradicated from a system, particularly on islands, that should be the goal for a multitude of reasons including native system release from both direct and indirect invader effects, the risk of population rebound in response to unanticipated events and/or changes in management effort, limiting adverse effects on non-target species due to ongoing management operations, and ongoing financial costs (Veitch et al. 2019). Thus, until a suitable contraceptive product has been proven effective in meeting the goal of *eradication*, it could not be considered a feasible alternative.

Second, while there is one under development, at this time, there continues to be no available contraceptive product available for the house mouse. Based on testimony provided to the Commission at its September 10, 2021 hearing by Dr. Mayer, the timeline for the FYXX Foundation's new mouse-specific product's development, testing, regulatory approvals, and market availability is unclear but at least several years away. This time horizon was additionally highlighted in meeting minutes provided by Dr. Mayer from a September 8, 2021 call with representatives of the FYXX Foundation and several partners in island restoration, including USFWS and U.S. Department of Agriculture.[5] An estimate of greater than three years was presented as the minimum time to product

[4] One of the key differences between eradication and control has to do with the frequency and duration of effort – one to several efforts vs ongoing or sustained efforts. Eradication is often defined as the complete and permanent removal of all populations within a defined area by a time-limited effort. Control is often defined as removing a portion of the population or preventing breeding from a portion of a population through continual, sustained efforts.

[5] Meeting minutes from an Island Restoration MOU Partners Conference Call on September 8, 2021, where the purpose was to learn about FYXX Foundation and their rodent contraceptive product as well as share information on eradication of rodents from islands. Participants included members of the US Fish & Wildlife Service, US Department of Agriculture, National Park Service, The Nature Conservancy, Island Conservation, and FYXX Foundation.

availability although, based on the meeting minutes, representatives of agencies responsible for regulatory authorization indicated that timeline was a “best case scenario” and that a wide margin of error should be assumed based on numerous uncertainties and specifics at each step, and taking into consideration delays associated with COVID.

While Dr. Mayer has stated that the basic science to support the development of a mouse contraceptive product has been completed and an initial test is pending, significant steps in the course to an available product remain. These include experimental design and environmental studies (including assessments of effects to non-target species), field testing, and EPA registration. In California, a product would additionally have to be authorized by the Department of Pesticide Regulation, which has its own process for product review and consideration. With respect to field trials, it should be recognized that this would not be as simple as a single effort in a non-island situation, or even on a small island. Before a new product could be considered for use on an area as large and as sensitive as the South Farallon Islands – a peer-reviewed body of evidence would be necessary to build and learn from (Bomford and O'Brien 1995, Cromarty et al. 2002, Veitch et al. 2019). In other words, once a product is fully developed and available, a substantial amount of additional time is likely to be required for these studies to be completed in less sensitive locations before a defensible case could be made for use within a Wildlife Refuge or designated Wilderness area.

Expectations for when the FYXX Foundation’s mouse contraceptive product might become available and considered feasible for the application contemplated in this consistency determination should be grounded in these timing realities and acknowledge that substantial uncertainties exist. Currently, it is not reasonably known when the option may become available but it is at least several years out.

A third significant challenge to the use of a fertility control alternative on the South Farallon Islands is that the effect of contraceptives on target species are reversible and therefore, necessitate regular ongoing administration to be effective. A recent research review on the status of fertility control options for rodents specifically cites the rapid reversibility of botanically-derived products such as triptolide as a recurrent challenge (Jacoblinnert et al. 2021). Dr. Mayer has advised that the FYXX Foundation’s product in development has variable efficacy (depending on an animal’s sex and age at the time of first dosing) that ranges from a few months to perhaps a wild mouse’s lifetime in the case of males that are first exposed when young. Efficacy in female mice apparently tends to be less. Dr. Mayer has estimated that the mouse-specific product in development would need to be administered at no less than 3-month intervals. Even if a product is developed and proven to be successful, because mice are estimated to live for around 18 months on average in the wild, it would be expected that several doses per year for a sustained period of no less than 18 months would be necessary to suppress the island mouse population.

The need for repeated dosing with contraceptives raises the issue of adverse operational impacts that would be associated with reliance on such an alternative. Even

with an aerially delivered pellet, ongoing disturbance would be necessary throughout the year, including over highly sensitive periods for native wildlife (such as breeding and nesting periods) in order to ensure suppression effects did not reverse and allow mouse populations to rebound. The nesting period is generally a very sensitive phase in life histories and the South Farallon Islands are specifically used by many species of seabirds for exactly this purpose. Peak abundances of nesting seabirds on the islands often occur in the spring and late summer and are staggered between the 13 species that use the islands. Similarly, marine mammal pupping is a sensitive time, which occurs for the five species during the winter and spring. Given the overlaps of these sensitive periods and the narrow window when island populations of transient species are at their lowest, it would not be possible to avoid or even minimize endemic wildlife and habitat disturbances associated with repeated application or dispersal of contraceptive-laden bait events throughout much of the year.

Dispersal of bait via drones has been suggested as a potential solution to this issue of wildlife and habitat disturbance. While a novel concept, this remains hypothetical and without adequate quantitative support (Wallace et al. 2017). It is conceivable that smaller, quieter drones (relative to a helicopter) may impose less or even negligible stress on some wildlife. At the same time, abundant evidence of wildlife (particularly seabird) disturbance from drones is available. As a recent example, in May 2021 at the Bolsa Chica Ecological Reserve, the use and landing of a drone resulted in the complete abandonment of a nesting colony of elegant terns, causing as many as 2000 eggs to perish in the absence of incubation and protection from predators.[6] Elsewhere, studies have demonstrated that drones used for monitoring can provoke species-specific responses (Brisson-Curadeau et al. 2017, Weimerskirch et al. 2017, Barr et al. 2020), and in these cases, drones were simply flying over animals and not dispersing pellets from low altitude. The relative size of drones is much more comparable to the animals themselves and may be perceived as a predator. Also, because of their size, drones would presumably require more flight time than helicopter operations, which may extend periods of disturbance and stress on animals. Additionally, it is important to consider that the landscape on the South Farallon Islands is largely devoid of canopies or other visual refuge opportunities from perceived aerial threats. How animals there might respond to the repeated presence of drones, or during more sensitive life history phases, is unknown and would require careful study prior to any operational implementation.

Finally, as noted in the case of ContraPest, the effects of rodent contraceptives on non-target species remain unknown. This is also the case for the FYXX Foundation's product currently in development. As avoidance of non-target species would not be possible, it is critical to understand what risks may be associated with the product so that it may be evaluated fairly. The necessary research to inform such an assessment has not yet been conducted and will require time to acquire and evaluate. Until such time as this information is available, use of the product currently under development on the South Farallon Islands would be the equivalent of an untested experiment carried

[6] https://www.latimes.com/california/story/2021-06-07/thousands-of-eggs-abandoned-after-drone-crash-at-orange-county-nature-reserve

out within one of the most environmentally sensitive and protected areas in coastal California. The magnitude and duration of reproductive suppression or other more dangerous unintended effects on non-target species would be virtually unknown and therefore extremely difficult to effectively minimize or mitigate. These challenges would affect not only operational planning and logistics but also limit the likelihood of the project receiving necessary regulatory permits and authorizations.

As the Service determined in 2019 and has reaffirmed in the present submission, the use of mouse contraception as an alternative to the proposed project has been dismissed for the time being because it cannot meet their Minimum Operational Criteria. While Dr. Mayer's testimony indicates that development of a mouse contraceptive is in progress and may present a viable alternative worthy of consideration in future years, currently and for the immediately foreseeable future, there is no available product to evaluate. The Commission similarly concludes that, while technological advances and further study may eventually demonstrate that mouse contraceptives could reduce or eliminate mouse populations on islands, there remain many uncertainties surrounding the technological feasibility, practical feasibility, safety, and effectiveness of the use of contraceptives for the purposes of mouse eradication. At this time, they are not a feasible, less environmentally damaging alternative, and it does not appear that they will present a feasible alternative in the near future. Delaying the proposed project for years or decades until such a time, if ever, that mouse contraceptives have been developed, adequately tested, and prepared for use in a location such as the Farallones would allow the ecological harm that that the mice are causing on the islands to continue.

Gene Drive

Another non-rodenticide alternative contemplated in the FEIS is the use of genetic engineering tools, which were dismissed at that time due to their theoretical nature and the many challenges yet to be overcome. Gene drive is both a slow natural process and a genetic engineering tool that has increasingly gained attention due to rapidly advancing technologies such as CRISPR (Alphey et al. 2020). In the latter case, genetic code is intentionally modified in a population to specifically manipulate heritable traits and accelerate their expression across the population. In the context of biological control and species eradication, gene drive focuses on sex-biasing techniques that push a population towards a single-sex constitution and thereby, reduces or eliminates the population over multiple generations. To date, nearly all gene drive efforts related to species eradications have been limited to invertebrate pests (i.e. mosquitoes) and none of these have moved beyond laboratory investigations; there have been no known successes in the development of vertebrate gene drive tools (Campbell et al. 2019).

There is presently one multi-national research effort underway to explore the potential to develop and use such tools for the eradication of house mice from island ecosystems in order to preserve biodiversity (Campbell et al. 2019, Serr et al. 2020) – exactly the situation targeted by the proposed Farallones project. Despite progress, the technologies being investigated by the Genetic Biocontrol of Invasive Rodents Program (GBIRd, http://www.geneticbiocontrol.org/) to address mouse eradications have yet to surmount numerous technical challenges and other major considerations remain, including animal behavior, hazard analyses and biosecurity, social and cultural

concerns, ethics, and regulatory settings. These will need to be resolved before gene drive strategies may even be considered for field testing. Furthermore, if and when such field testing were to become feasible in the future, GBIRd has committed to clear criteria for test site selection and by those, the Farallones would not qualify (Long et al. 2020). Thus, gene drive technology is still a demonstrably nascent field of study that may hold promise a decade or more into the future but presently, cannot be considered a viable alternative for the proposed project. The Service has also determined that gene drive could not meet their Minimum Operational Criteria.

Disease
Introduction of a fatal disease to eradicate mouse populations is a concept that has been researched extensively. Despite this, no product or process is presently available. If developed in the future, the Service suggests that introduction might involve bringing infected mice or food dosed with an infectious agent to the islands and would likely need to occur as multiple events over a period of years. As with other alternatives contemplated, the need for multiple treatment events over a long time period means that disturbance to native wildlife would be on-going and risks imposing population-level impacts to those species during particularly sensitive life phases. In addition, there is an inherent risk of disease mutating over time and either becoming less effective on the target species or transferring to non-target species. The Service determined that the introduction of disease could not meet their Minimum Operational Criteria and for these many reasons would not be a feasible alternative.

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.

South Farallon Islands
The proposed project would be located on the South Farallon Islands, within the Farallon Islands National Wildlife Refuge (Refuge). The Refuge is located approximately 27 miles west of San Francisco (**Exhibit 1**). The Refuge is managed by USFWS 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 and 3**). 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 primary islands that make up the South Farallon Islands, West End and Southeast Farallon Island, are two of the six islands within the United States identified as global priorities for invasive mammal eradication (Holmes et al. 2019).

Environmentally Sensitive Habitat

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 ashy 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.

Mouse Population

The invasive house mouse, pictured here (photo credit, Jim Tietz), is believed to have been introduced to the South Farallon Islands by sailors in the early to mid-19th century. The population of mice on the Farallon Islands fluctuates seasonally based on the availability of food. The population is highest in late summer/fall when plant seeds and insects are most abundant and lowest in late winter/early spring when these food sources

become scarce. Recent sampling efforts indicate that during peak seasons, Southeast Farallon Island can have roughly 500 mice per acre – amongst the highest density of mice on any island in the world – and greater than 60,000 total mice. Although this population crashes in the winter months, because mice become sexually mature at three weeks of age and can bear multiple litters in short succession, the population quickly rebounds when conditions improve. Estimates indicate that a single mouse pair can be responsible for producing up to 1500 offspring in a single year.

The FEIS provides additional details about the habitat and diet of mice on the South Farallon Islands:

> Mice typically reside in burrows or crevices and individuals rarely travel outside of a 49-66 ft^2 area (15-20 m^2) 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 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 Service also 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.

As discussed further below, these feeding habits (which adversely affect several native endemic plant and animal species) – and those of the predatory owls that research indicates overwinter on the islands due to the presence of the mice – result in ongoing adverse impacts to the islands' ecosystem, habitats and native species.

For these reasons, eradication and removal of mice from the islands has long been a conservation goal for USFWS. Although other invasive terrestrial mammals that were previously present on the South Farallon Islands have already been removed, a feasible and effective method of removing mice has not historically been available. As noted in the FEIS, "Only in recent decades has a safe, effective method--the targeted, short-term use of rodenticide--proven successful for complete eradication of rodents from islands. Successful rodent eradications have now been conducted on over 700 islands worldwide, including 64 for house mice and the highly successful rat eradication at Anacapa Island in the Channel Islands National Park."

Anacapa Island

As the first such project involving aerial application of rodenticide in California and North America, the eradication of black rats from Anacapa Island by the National Park Service in the early 2000s provided a particularly important example to USFWS that the

eradication of mice from the Farallones may also be possible. The Anacapa Island project was reviewed by the Commission in late 2000 (as ND-104-00) and also involved the use of helicopters to disperse brodifacoum-laden cereal bait pellets across the island as well as subsequent monitoring to determine project benefits and adverse impacts. The project followed roughly five years of efforts to control the rat population on Anacapa Island through the use of trapping and rodenticide-laden bait stations. After discontinuation of the control program due to limited efficacy, high long-term costs and personnel efforts – and documentation of successful rodent eradication efforts in New Zealand using aerial dispersal of rodenticide bait – the National Park Service developed an eradication plan for Anacapa using similar techniques.

As discussed in Howald et al. (2005 and 2010), in many respects, the Anacapa Island project was significantly more complicated and risky compared to the current USFWS proposal. For example, a native, non-target deer mouse is present on Anacapa Island (which is technically comprised of three closely adjacent main islands) along with large populations of western gulls, grain-eating songbirds, and extremely rare native seabird species. Additionally, the project faced legal challenges and public opposition, was the first attempt at rodent eradication through aerial dispersal of rodenticide bait in North America and was carried out on an island dominated by very steep, rocky terrain that is only eleven miles offshore of major populations centers in Ventura and Oxnard. Despite these challenges, the effort has been reported as a success in that it (1) resulted in the eradication of black rats; (2) did not result in adverse impacts to non-target species (including the native deer mouse) that significantly exceed expectations or persisted beyond two to three years following the effort; (3) did not result in any observations of poisoned non-target species on the mainland coast or outside of the island; and (4) resulted in substantial, immediate, and ongoing benefits to native species and habitats.

Because USFWS' proposed project for the South Farallon Islands is closely modeled after the earlier National Park Service effort at Anacapa Island, that earlier project likely provides a relevant indication of the types of adverse impacts and benefits that would be seen as a result of the proposed project at the Farallones. Howald et al. (2010) elaborates on the adverse impacts and benefits observed during and after the Anacapa Island project:

> Brodifacoum concentration in the bait pellets declined by > 90% in a 6-month period (Table 1). Of the 48 soil samples only one taken at 6 months post-rodenticide application tested positive for brodifacoum (Table 2). Seventeen percent of terrestrial insect samples tested positive for brodifacoum, whereas all vegetation samples were negative (Table 2). No bait was observed being spread directly into the ocean. Small amounts of bait were observed entering the ocean indirectly by bouncing off cliffs. Divers detected bait entering the marine environment at three locations; densities were estimated at 0.15 pellets m-2. Neither fish nor marine invertebrates were observed consuming the bait. Seawater and marine invertebrates tested negative for brodifacoum residues (Table 2). Bait in the ocean had completely dissolved within 5 hours.
>
> …

> A total of 94 birds (16 species) were identified from carcass searches following rodenticide applications (49 in 2001 and 45 in 2002). Of the 63 birds tested for brodifacoum, 59 (94%) tested positive. All raptor carcasses collected tested positive for brodifacoum, as did two western gull *Larus occidentalis* carcasses and many passerines (Table 3).
> …
> Approximately 68% of the known raptors were live captured prior to rodenticide applications (37 birds in total, including eight peregrine falcons Falco peregrinus, nine red-tailed hawks Buteo jamaicensis, four barn owls Tyto alba and six burrowing owls Athene cunicularia; Howald et al., Reference Howald, Faulkner, Tershy, Keitt, Gellerman, Creel, Garcelon and Schwemm 2005). Most were released on the mainland in suitable habitat; peregrine falcons were held and released back onto Anacapa 3 weeks after rodenticide applications. Some raptors not captured, including a burrowing owl, survived the rodenticide applications. Three barn owls, six burrowing owls and an American kestrel Falco sparverius either died in captivity or were found dead during carcass searches; all tested positive for brodifacoum (Table 3).
> …
> The conservation benefits of the eradication to seabirds were quickly realized. Exploiting the eradication campaign as an experimental manipulation, Jones et al. (Reference Jones, Henry, Howald, Tershy and Croll 2005) documented elevated predation on Xantus's murrelet by rats using artificial nests. A concurrent study documented the recovery of nesting Xantus's murrelets on Anacapa following rat eradication: average hatching success increased from 42 to 80%, average nest predation decreased from 52 to 7%, and average nesting attempts more than doubled (Whitworth et al., Reference Whitworth, Carter, Young, Koepke, Gress and Fangman 2005). Four months following the rodenticide applications Cassin's auklet Ptychoramphus aleuticus, a seabird highly susceptible to rat predation and previously not documented as nesting on Anacapa Island, began nesting there (Whitworth et al., Reference Whitworth, Carter, Young, Koepke, Gress and Fangman 2005).

Other Invasive Species and Eradication Efforts on South Farallon Islands
In addition to the house mouse, the South Farallon Islands have also been invaded by several species of non-native plants and terrestrial mammals that have significantly altered and degraded the habitats and native species they support.

As noted in the FEIS,

> The Farallon Islands ecosystem evolved in the absence of terrestrial mammals. However, introductions 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). With the removal of

> introduced rabbits and cats, house mice (Mus musculus) are the only remaining invasive mammal on the Farallones.

In its CD, USFWS expands on this history and the positive results that have been observed following the removal of rabbits and cats from the islands:

> Since assuming stewardship of the South Farallon Islands in 1969, the Service has worked with its partners to protect and restore the islands' habitats and native species. For example, feral European rabbits (*Oryctolagus cuniculus*) and domestic cats (*Felis catus*), which were introduced to the islands by prior inhabitants, caused extensive damage to native flora and fauna. In early efforts to begin Farallon restoration efforts, the Service eradicated these non-native mammals through trapping and shooting in the early 1970s (see Section 3.1 in the FEIS). These actions, along with better protections of the islands, have created conditions allowing extirpated seabird species, like the rhinoceros auklet (*Cerorhinca monocerata*), to recolonize the islands and many other seabird populations to increase dramatically. Since the early 1970s, rhinoceros auklets have increased to over 3,000 breeding birds (McChesney et al. 2013). Tufted puffins (*Fratercula cirrhata*) have increased from about 70 breeding birds to about 400, while common murres (*Uria aalge*) have increased from about 50,000 breeding birds to over 250,000 (Johns and Warzybok 2019). However, other sensitive species on the Refuge remain at reduced population levels or are declining, and remain vulnerable to the impacts of invasive mice.

These results are consistent with those from other islands around the world that experienced significant ecosystem and native species benefits following the eradication of invasive species. Although the list of such success stories is long, several notable examples include:

> • Pinzon Island in the Galapagos: eradication of rats through the use of the rodenticide brodifacoum in 2019 resulted in the survival of Galapagos tortoise hatchlings for the first time in over 120 years and expected benefits to 15 other native species of plants and animals (Rueda et al. 2019).
> • Hawadax (Rat) Island, Alaska: eradication of rats through the use of the rodenticide brodifacoum in 2008 resulted in the initial loss of 41 bald eagles but the subsequent widespread recovery of the island ecosystem, including unexpected restoration of intertidal habitats (Kurle et al. 2021). Post-eradication monitoring has demonstrated that adverse impacts, including those to bald eagles, persisted for a limited duration and subsequently recovered beyond pre-eradication baseline conditions (Zilliacus and Croll 2020).
> • Anacapa Island, California: eradication of rats through the use of the rodenticide brodifacoum in 2001-2002 resulted in increased abundance of several native species such as the Scripps's murrelet, deer mouse, and intertidal algae as well as re-colonization by Cassin's auklets (Newton et al. 2016).

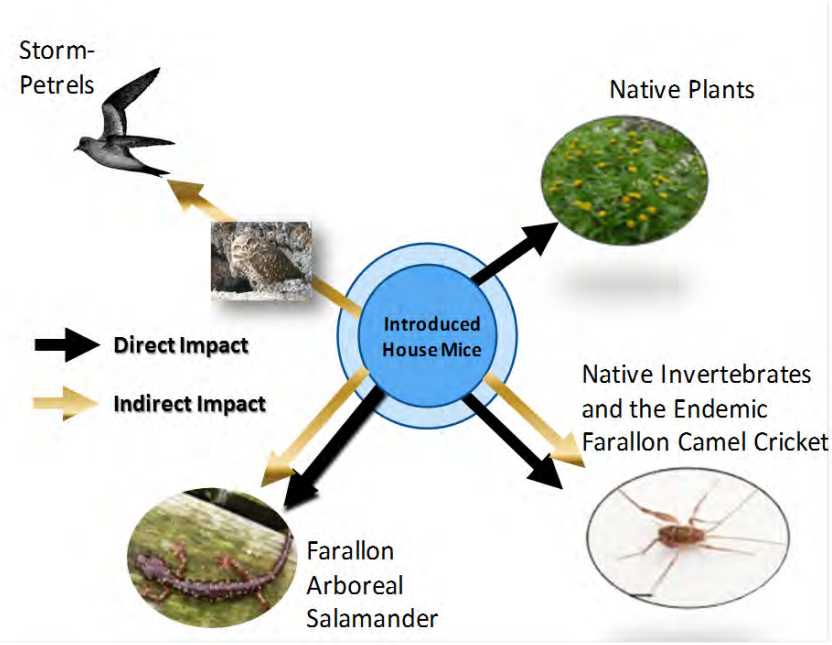
While it contributed to a range of benefits to the islands' ecosystem and native species, the eradication of rabbits and cats from the South Farallon Islands in the 1970s also removed some predation (cats) and food competition (rabbits) stressors from the house mouse population. This release from stressors has likely contributed to the extremely high number of mice currently present on the islands.

In addition to these terrestrial mammals, aggressive invasive plants like New Zealand spinach, narrowleaf plantain, sweet fennel, curly dock, and several species of European grasses have become dominant over large swaths of the islands.

The proposed project has been developed by USFWS in direct response to the persistent, ongoing adverse impacts that house mice have on the South Farallon Islands' native species and ecosystem. The following two sections of this report provide an in-depth discussion of these impacts and the benefits predicted to occur as a result of their elimination.

Adverse Impacts of Mice on South Farallon Islands
As discussed in the FEIS and USFWS' CD,

> Invasive house mice are negatively impacting the Farallon Islands ecosystem both directly and indirectly. Some of the impacts have been documented on the Farallones while others have been inferred based on documented invasive mouse impacts on other islands. Figure 1.3 [below] demonstrates the house mouse food web on the South Farallon Islands.



> …
> Directly, mice feed on native insects, plants, seabirds, and most likely the endemic Farallon arboreal salamander (Aneides lugubris farallonensis), and compete for food with the native salamander, lowering their population size. Indirectly, mice

> unnaturally sustain a wintering population of migrant burrowing owls (Athene cunicularia). These owls arrive on the islands during their fall migration, when the mouse population is at its annual peak. Multiple [owls] are encouraged by the abundance of mice as a primary prey resource to remain on the islands through the winter instead of continuing on their migration, as most migrant landbirds that stop at the islands do. When the mouse population crashes and mice are no longer available as owl prey, the owls switch to preying primarily on the rare ashy storm-petrel (Oceanodroma homochroa), and, most likely, the similar Leach's storm-petrel (O. leucorhoa), until the owls depart in spring. The owls also prey extensively on the rare, endemic Farallon camel cricket (Farallonophilus cavernicolus) and other native insects, another indirect impact of the mice. Mice also impact the natural character of the Farallon Wilderness. Together, these direct and indirect impacts significantly alter the natural balance of the Farallon ecosystem.

Native Invertebrates and Amphibians

While neither the Farallon arboreal salamander nor Farallon camel cricket are protected under the state or federal endangered species acts, both are rare, endemic species that have very limited populations and are found nowhere on Earth other than the Farallon Islands. Both species are believed to have gained access to the islands over ten thousand years ago when the sea level was lower and the islands were connected to the mainland California coast by land. The subsequent isolation of the islands separated these species and allowed them to evolve distinctly from their mainland relatives. However, despite their long histories on the islands, both species' survival is at risk due to their isolation, limited range and small population sizes, which make them additionally vulnerable to the effects of climate change. Predation by and competition with the mice and burrowing owls represent significant ongoing stressors to the cricket and salamander species. As described in the FEIS:

> Evidence from the South Farallones and other islands (see Sections 1.2.5.4 and 4.5.3.6) suggests that mice impact native invertebrates both directly and indirectly (Rowe-Rowe et al. 1989, Jones and Golightly 2006, Angel et al. 2009). Analysis of mouse diet on Southeast Farallon Island showed high consumption of native invertebrates including the endemic Farallon camel cricket (Jones and Golightly 2006). By means of hyperpredation (see Section 1.2.2.1), mice indirectly impact native invertebrates by encouraging large numbers of burrowing owls to over-winter on the Farallones. These owls consume large numbers of invertebrates, mainly beetles (Coleoptera) and Farallon camel crickets (Chandler et al. 2016, Mills 2016). The combined mouse and owl predation are likely suppressing numbers of the rare cricket and other invertebrates. Reductions in invertebrate populations may have other ecosystem impacts since many invertebrates are important pollinators of plants, help to decompose dead plant and animal matter, and provide food sources for migratory birds stopping to refuel at the islands (e.g., Seastedt and Crossley 1984, Angel et al. 2009, St. Clair 2011).
>
> …
>
> Although there have been no studies on the direct effects of invasive house mice on salamanders and other amphibians, likely impacts can be inferred about the

> impacts of mice on endemic Farallon arboreal salamander by comparing the two species' ecologies. Salamanders feed primarily on insects and other small invertebrates (Lee 2010). Insects have been shown to be a major prey item of house mice on the Farallones and other islands (Rowe-Rowe et al. 1989, Jones and Golightly 2006, Angel et al. 2009). Thus, mice and salamanders compete for the same prey. Given the opportunistic, omnivorous diet of house mice (Berry 1968, Jones and Golightly 2006), it is also possible that mice consume salamander eggs and/or juveniles, especially during periods when mice are food stressed. Farallon arboreal salamanders lay their eggs in summer (Boekelheide 1975), with young appearing in the fall (Lee 2008). Thus, juvenile salamanders begin to emerge to the ground surface when mice are most abundant, increasing their risk of predation by mice.

Although the FEIS notes that monitoring in recent years indicates the number of owls overwintering on the South Farallon Islands has been below the average of over six per year with a range of between two and eleven observed between 2005 and 2012 (Nur et al. 2013) and assessments of diet demonstrates roughly 2% is comprised of invertebrates such as the camel cricket (Chandler et al. 2016), the restricted population of endemic invertebrates on the islands suggests that some degree of indirect adverse impacts is likely occurring as a result of the mice prompting burrowing owls to remain on the islands. The more significant adverse impacts to invertebrates are those associated with direct predation by mice, however.

Native Vegetation

The high number of invasive mice on the South Farallon Islands are also negatively affecting native plant species and habitats, as described in the FEIS:

> House mice likely impact Farallon native plants both directly and indirectly. Seeds and other parts of native plants, especially the ecologically important maritime goldfield (Lasthenia maritima; an annual), are major food items of Farallon mice (Jones and Golightly 2006). The large numbers of native seeds consumed by mice likely reduces native plant abundance and may also give more hardy invasive plants (mostly perennials and aggressive European grasses) a competitive edge. For example, on Marion Island, mouse predation on seeds and young shoots of the native sedge Uncinia compacta has nearly led to that plant's extirpation, and mice are thought to be similarly impacting the herbaceous plant Acaena megellanica (Angel et al. 2009). Some studies suggest that mice prefer feeding on native plants on islands, possibly because island natives lack the defensive traits (e.g., chemical compounds) that help reduce palatability (Angel et al. 2009). Indirectly, mice may impact native plants by reducing populations of important pollinators (Angel et al. 2009, St. Clair 2011).

Adverse impacts to native vegetation by mice (foraging on seeds and shoots) also facilitates the spread and persistence of invasive plants on the island and hinders native plant and habitat restoration activities. In turn, this leads to adverse impacts to other

native species on the islands, such as breeding seabirds, as discussed in a 2013 USFWS report on the ashy storm petrel:

> Invasive New Zealand spinach (Factor A) restricts access to ashy storm-petrel nest sites for a portion of the population during the height of the breeding season, which likely results in some ashy storm-petrels remaining at the entrance of crevice breeding sites for a longer period of time. This longer entrance time further increases vulnerability of ashy storm-petrels to avian predation from burrowing owls and western gulls.

Ashy storm-petrel

Invasive house mice are also causing direct and indirect adverse impacts on other rare species and habitats found on the Farallon Islands, including the native seabirds that nest there. One of these seabirds is the ashy storm-petrel. As described by the U.S. Geological Survey's Western Ecological Research Center,

> The Ashy Storm-Petrel (Oceanodroma homochroa) is a species of seabird found exclusively off the coast of California and Baja California, Mexico. The species is considered "Endangered" by the International Union for Conservation of Nature and is a California species of special concern. Ashy Storm-Petrels (hereafter storm-petrels) spend most of their lives at sea, but come ashore during the spring and summer to nest in burrows and crevices on offshore rocks and islands.

The ashy storm-petrel roosts and breeds on offshore rocks and islands and research indicates that more than 40-50% of the world's population breeds on the South Farallon Islands (Carter et al. 2016). In 2009 and 2013, in response to petitions and legal challenges from the Center for Biological Diversity aimed at addressing what it considers to be a species whose survival is "precarious and requires rapid action," USFWS considered listing the species as threatened or endangered under the Endangered Species Act. However, at the completion of its scientific review processes, USFWS found at the time that such listing was not warranted. In the summary of its 2013 analysis provided in the Federal Register, USFWS estimated the total global population of ashy storm-petrels at between approximately 18,000 and 21,000 birds and noted that after experiencing consistent population growth for several years in the early 2000s, the population stabilized:

> The Service's review of this data found a significant average increase in the ashy storm-petrel population index of 22.1 percent per year from 2000-2006, and a mean non-significant decrease in the ashy storm-petrel population index on SE Farallon Island of 7.19 percent per year from 2007 to 2012 (Service 2013, p. 21). We conclude that the population is currently experiencing fluctuations due to various factors, including avian predation. After assessing the best available scientific data, we have concluded that there is no consistent long-term trend in the species' population nesting on SE Farallon Island.

Data collected and analyzed in more recent years by one of USFWS' research partners, Point Blue Conservation Science, however, indicates that the population of ashy storm-petrels on the South Farallon Islands may be declining. As noted in an email from USFWS staff received on November 22, 2021:

> Point Blue staff reported to [USFWS] that their preliminary modeling results show a 2.7% per year decline, equating to an overall decline of 32%, in ashy storm-petrel capture rates on the South Farallon Islands since 2007.

Based on the best scientific information available to it, USFWS has determined that direct and indirect adverse impacts due to mice are likely contributing to the decline in population of ashy storm-petrels on the South Farallon Islands. As discussed in detail in the FEIS:

> House mice primarily impact Farallon ashy and Leach's storm-petrels indirectly. Indirect impacts through hyperpredation consists of a transient burrowing owl population that is initially subsidized by the mice; when the mouse population crashes, the owls switch to preying on storm-petrels (Chandler et al. 2016, Mills 2016). Like many other species of birds, burrowing owls stop at the South Farallon Islands on their fall migration. Most owls arrive at the islands between late September and October (DeSante and Ainley 1980, Richardson et al. 2003), when the mouse population is at its annual peak (Figure 1.4). This high mouse abundance leads to several burrowing owls remaining on the island through the winter instead of continuing on their migration, as most other migrant landbirds reaching the islands do. Intensive studies have shown that burrowing owls feed primarily on mice during the period of October to mid-January. However, as the mouse population naturally declines in the winter months, the owls switch to preying mainly on storm-petrels from February until the time when most owls have departed the islands in April (Chandler et al. 2016, Mills et al. 2016). Chandler et al. (2016) reported that mice and storm-petrels made up 98 percent of burrowing owl diet, with similar proportions of mice in the early period and storm-petrels in the later period.
>
> The hyperpredation situation of owls preying on mice then switching to storm-petrels is considered to be one of the primary threats to the Farallon storm-petrel populations (Carter et al. 2008; Nur et al. 2013a, in review). Bradley et al. (2011) estimated that 40% of depredated storm-petrel carcasses found on Southeast Farallon Island in 2003-2011 were killed by burrowing owls. This equated to a minimum of 90-108 storm-petrels depredated by burrowing owls per year, but actual numbers were likely considerably higher because it only included frequently accessed portions of the island (Figure 1.5). However, these totals may underestimate total predation because only easily accessible portions of Southeast Farallon Island were surveyed (Bradley et al. 2011).
> …
> Indices of burrowing owl abundance and predation on storm-petrels significantly increased in the later years examined, when an average of 6.2 owls (range is two to

> 11 owls) were known to occur on the islands in mid-winter (Nur et al. 2013a). Capture-recapture analyses of storm-petrel population trends revealed two divergent trends: a strong increasing trend from 2002-2005/6, with a significant change in trend from increasing to decreasing for the period 2006-2012. The declining trend in abundance after 2005 was associated with low rates of adult survival, high abundance of over-wintering burrowing owls and high incidence of owl-killed storm-petrels compared to before 2005. For the period 2000 to 2012, a model including a linear negative effect of burrowing owl abundance best described annual storm-petrel survival (Nur et al. 2013a, in review). In other words, in years with more overwintering burrowing owls, storm-petrel survivorship was reduced.

More recent data cited in the FEIS, however, suggests that the trend of higher numbers of overwintering owls on the islands (between two and eleven) has not persisted and may be related to an apparent drought-related reduction in the mouse population:

> In more recent years (2013-2016), numbers of burrowing owls wintering on the Farallones has been lower than most years of the 2005-2012 period. Anecdotal observations suggest that reduced burrowing owl abundance was likely associated with reduced mouse abundance, a possible result of prolonged drought. The reduced owl abundance resulted in reduced owl predation on storm-petrels. In turn, storm-petrel population size was more stable during this brief period (Nur et al 2018, in review). This finding provides further support for the benefits of reducing burrowing owl numbers on the Farallones.

Anticipated Benefits of Mouse Eradication

As discussed in detail in the CD and FEIS, USFWS expects the eradication of mice from the South Farallon Islands to benefit the islands' endemic invertebrates, amphibians, seabirds, and plant species. USFWS also notes in the FEIS that it expects the eradication of mice to enhance the wilderness character of the Farallon Wilderness by "allowing the wilderness to be more influenced by natural forces."

<u>Invertebrates</u>

House mice on the South Farallon Islands feed extensively on the islands' invertebrate population, including the endemic camel cricket. Elimination of mouse predation through eradication is discussed in the FEIS as likely to result in a more robust invertebrate population:

> Mouse eradication efforts have led to documented increases in naïve invertebrate populations on many islands (Newman 1994, Ruscoe 2001, St. Clair 2011). For example, on Mana Island, New Zealand, the populations of the Cook Strait giant weta (Deinacrida rugosa), a native insect in the same order as the endemic Farallon camel cricket, increased noticeably after mouse eradication (Newman 1994). Both mice and burrowing owls, which are attracted to the Farallon islands by the mice, consume large numbers of terrestrial invertebrates on the islands, including the endemic Farallon camel cricket (Jones and Golightly 2006, Chandler et al. 2016). Removing this additional predation pressure will likely benefit the

> endemic cricket and other species and help restore the diverse Farallon invertebrate fauna to a more natural balance.

The magnitude of this effect, however, is difficult to predict. It is possible that in the absence of mouse predation, those invertebrates that would otherwise be consumed, will instead persist and augment the remaining population. However, it is also possible that the removal of a dominant predator would result in unforeseen effects or new competitive interactions that would inhibit population growth of the invertebrate species. Without a detailed understanding of all the factors influencing the camel cricket population on the islands and how those factors will respond to the absence of mice, it may not be appropriate to assume a significant benefit in terms of population growth. However, the current situation and ongoing high levels of mouse predation undoubtedly suppress the islands' invertebrate and cricket populations and increase their susceptibility to degradation or collapse due to other environmental and anthropogenic stressors that may arise (climate effects, drought, fire, disease, etc.). Without this suppression, those populations are likely to be more resilient and capable of adapting to or successfully weathering other stressors. As such, mouse eradication has the potential to result in both direct and indirect benefits to the islands' invertebrate populations.

<u>Amphibians</u>
Although there is less evidence of a direct connection between mouse eradication and benefits to the Farallon Islands' endemic arboreal salamander, USFWS believes that data from other islands indicates that benefits are likely. The FEIS expands on this rationale:

> The eradication of mice on the South Farallones would likely benefit the islands' endemic Farallon arboreal salamander by removing both the presumed predation pressure on salamanders from mice and competition with mice for invertebrate prey. The Farallon arboreal salamander population is expected to benefit as a result of increased productivity, juvenile survivorship, and/or adult survivorship in response to complete mouse removal. For example, after a successful mouse eradication on Mana Island, New Zealand, populations of McGregor's skinks (Cyclodina macgregori) and common geckos (Hoplodactylus maculatus) increased significantly (Newman 1994). Both of those species are of a similar size to the Farallon salamander and were presumably subject to the same pressures likely supplied by house mice on Farallon salamanders.

Similar to the camel crickets, the likelihood and magnitude of benefits to the Farallon salamanders that would result from mouse eradication are unknown. Relevant examples from other locations and limited documentation of direct impacts from mice on salamanders suggest that some level of benefit is likely but insufficient information is available to accurately predict and ensure it.

Native Vegetation

As noted previously, invasive mice also feed extensively on the seeds and young shoots of native plants on the South Farallon Islands. This not only limits the ability of these plants to survive and spread but it also makes native plant and habitat restoration efforts more challenging. USFWS expects the removal of mice from the islands to augment both active and passive restoration of the islands' native plant communities, in part by enhancing their ability to compete with the invasive plants that are also present there, as described in the FEIS:

> The native plants of the Farallones evolved without predation pressure from mammals such as house mice. These mostly annual plants are currently at a competitive disadvantage against the more aggressive invasive plants like New Zealand spinach (Tetragonia tetragonoides), narrowleaf plantain (Plantago coronopus), and several species of European grasses that have become dominant on large parts of the islands (Hawk 2015, Holzman et al. 2016). Eliminating mouse predation to native plant seeds and shoots will likely increase germination and survival rates of plants like the maritime goldfield, helping to improve the conditions of the native Farallon plant community.

Maritime goldfields (Lasthenia maritima), a small annual with distinctive yellow flowers and shallow roots, characterize the native plant community across the Farallon landscape. Adapted to salty, windy areas and soils made acidic by nitrogen-rich bird waste, it is almost exclusively found on small rocky islands between Vancouver Island (British Columbia) and the Farallones. The maritime goldfield populations at South Farallon Island are the largest known, accounting for approximately 40% of the worldwide population and are preferentially used by many seabirds, including gulls, for nesting material. Though challenging to quantify, the eradication of mice from the Farallones would be expected to have both direct and indirect benefits on native goldfield populations (i.e. relief from mouse herbivory and mice acting as vectors for competing vegetation seed dispersal, respectively). Additionally, native pollinators relying on goldfields are also likely to benefit.

Storm-petrels

USFWS expects that storm-petrels that nest and roost on the South Farallon Islands will also benefit from the successful eradication of mice from the Islands. As a result of the assessments of owl predation and ashy storm-petrel population trends and associated research (including the modeling efforts carried out by Nur et al. (2013 and 2019), discussed above), USFWS predicts that eradication of the mice would benefit the ashy storm-petrel, and provide it with a greater ability to survive other stressors such as those resulting from climate change, fluctuations in food availability, commercial fishing and other human activities (oil spills, artificial night lighting, plastics, etc.) and predation by western gulls. It also predicts that this would allow the ashy storm-petrel population to continue to exist above the level that would jeopardize its existence or require its listing under the Endangered Species Act as threatened or endangered. As discussed in detail in the FEIS:

> The removal of house mice from the South Farallon Islands is expected to substantially reduce or eliminate hyperpredation of ashy and Leach's storm-petrels by burrowing owls (See Section 1.2.2). The best scientific evidence available to the Service indicates that if mice are removed from the South Farallon Islands, few if any of the burrowing owls that now arrive on the islands in the fall would overwinter. Studies conducted on seasonal fluctuations in owl diet on the South Farallones support the hypothesis that owls depend on mice for survival during the fall (Chandler et al. 2016, Mills 2016). By the time the owls switch from preying on mice to storm-petrels in the winter and spring, most owls have been on the island for several months (Chandler et al. 2016; Point Blue, unpublished data), having settled awaiting their spring departure to the breeding grounds.

Without the mice to feed on, USFWS believes the small number of owls that currently overwinter on the islands would not stay those several months and would instead continue on their annual migration. The owls would be prompted to leave due to the lack of easily accessible food – at the time of their initial arrival, storm-petrels are only present in low numbers and would not likely present enough of a prey source for the owls to stay. Storm-petrels do not return in large numbers and become abundant on the islands until around the time the mouse population crashes in January, as shown in the table below.

Table 1 – General Months of Peak Abundance

	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Burrowing Owl			X	X	X*	X*	X*	X*	
House Mouse	X	X	X	X	X	X			
Ashy Storm-Petrel	X	X				X	X	X	X

*Overwintering owls

This scenario is described in detail in a recent study carried out by Nur et al. (2019):

> Second, in future years, with no mice on the South Farallon Islands, we expect owl predation on storm petrels will be reduced compared to the present, not increased. Our argument hinges on the timing of arrival of burrowing owls during the fall, and the presence and availability of storm petrels during fall and early winter. Burrowing owls arrive almost entirely in September–November; median arrival date is 16 October (n = 182). Following mouse eradication, owls arriving in those months would have no abundant or reliable prey of any kind as most storm petrels have departed by October, and by the end of October, only some late breeders remain (Point Blue, unpublished data). From mid-November until late-December, storm petrels are rare or entirely absent and only begin to return to the South Farallon Islands in significant numbers in late January (Ainley et al. 1990). In the absence of mice, it is not energetically feasible that burrowing owls would be able to sustain themselves during the period between late October and late January, especially from mid-November on. There are no abundant insect prey on the South Farallon islands, which accords with Chandler et al.'s (2016) finding that, overall, insects formed less than 1% of the diet biomass of burrowing owls. Nor are there reptile or

> amphibian prey available to owls. In short, in the absence of mice, prolonged stopover on the Farallon Islands is neither attractive nor feasible for burrowing owls. Nevertheless, short-term stopovers during fall migration may result in some predation of storm petrels. More information is needed regarding behavior and energetic requirements of burrowing owls during migration, as well as availability of storm petrels as prey during the fall, as opposed to the winter and spring.
>
> While it is reasonable to expect that owl predation on storm petrels can be substantially reduced in the long term with mouse eradication, we cannot assume eradication will result in 100% reduction in owl predation. In fact, in the absence of their primary prey, in the years following mouse eradication, predation on storm petrels during September and October, when owls first arrive on the island during migration, may increase compared to the present. The payoff to mouse eradication, we postulate, is reduction in the current high levels of predation in the late winter and spring months, when storm petrels are found in large numbers and are susceptible to owl predation, as well as benefits to other native species that comprise the South Farallon Islands ecosystem.

Research has been carried out to quantify the benefit to the storm-petrel population that would result from limiting the number of owls that overwinter on the islands. As described in the FEIS, this research indicates that even a modest reduction in the number of owls overwintering on the islands would result in a significant increase in the storm-petrel population over subsequent years. The magnitude of the benefit is predicted to vary based on the level of reduction in the overwintering owl population and the general population trajectory of storm-petrels (increasing or decreasing):

> Nur et al.'s (2018, in review) modelling results demonstrated levels of uncertainty in the scenario outcomes. However, under all three trend scenarios, median results displayed a strong projected effect of reduction on Farallon ashy storm-petrel population trends due to owl predation even after just 10 years. Under Scenario A [based on the storm-petrel population trend between 2006 and 2012 of a 4.36% decline per year], future storm-petrel trends shift from an expected average 38% decline after 10 years under baseline owl numbers to a 13% storm-petrel decline with 50% owl reduction. An 80% decline in owl numbers leads to an expected 2% increase in storm-petrel numbers. Given that the Farallon colony represents nearly 100% of the regional population (Carter et al. 1992, McChesney et al. 2013), estimates of expected changes for the Farallon colony would extend to the regional population.
>
> Similar effects to Scenario A are seen under Scenarios B ["moderate" storm-petrel decline of 2.14% per year] and C [roughly stable storm-petrel population trend of 0.12% increase per year] after 10 years. Not surprisingly, impacts of owl reduction are more marked after 20 years. For example, under Scenario B and no owl reduction, storm-petrels are expected to decline 40% after 20 years. With owl reductions of 50% and 80%, storm-petrels are expected to increase by 6% and 37%, respectively. For Scenario C, the expected values based on median

> outcomes is a 54% or 89% storm-petrel increase after 20 years with 50% or 80% owl reduction, respectively, compared to median storm-petrel decline of 1.3% with no owl reduction.

Although these modeling efforts - carried out specifically to evaluate the potential effect of mouse eradication on the ashy storm-petrel population – provide a strong indication that the population will respond positively, any modeling effort or wildlife management activity carries with it some uncertainty. As described in USFWS' 2013 report on the ashy storm petrel, its population on the Farallones is affected by a range of factors – such as food availability, predation by western gulls, human influences (fishing activities, artificial lighting, plastic pollution), and degradation of nesting habitat by invasive plants – that may work independently or in combination to affect its population and potentially overshadow the expected benefits that would occur as a result of mouse eradication. As revealed by the modeling effort, however, these effects to the storm-petrel population would likely occur regardless of the proposed project. Removing the additive effect of the direct and indirect adverse impacts of the mice would therefore reduce their severity.

Other Species

Notably, several recent rodent eradication efforts have yielded unexpected ecosystem and habitat benefits. For example, the eradication of rats at Anacapa Island and Rat Island both resulted in the unforeseen recovery of intertidal habitats, including the abundance and diversity of algal species and associated invertebrates. These results indicate that similar benefits may also occur at the Farallones if the mice are removed.

Potential Adverse Impacts

USFWS' 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 [seabird and marine] 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 [Endangered Species Act] and [Marine Mammal Protection Act]-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 poisoned 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, carcasses are collected or decompose and bait pellets are consumed or disintegrate due to exposure to rainfall. USFWS included a report on the results of field trials carried out on the Farallones over two years to determine the degradation rate of the bait pellets proposed to be used. These results show that the pellets would turn to mush and become at least half-covered in mold – thus becoming unpalatable to non-target species such as gulls - within between two and ten weeks, depending on the amount of rainfall. Based on the results and to minimize the risk of exposure to non-target species, USFWS' operational plan calls for the project to be carried out shortly before a significant rainfall event is forecast:

> However, receiving a significant rain event soon after bait has been deployment and is no longer needed on the ground, is a desired situation in order to break down remaining bait pellets so they are no longer available and palatable to non-target wildlife. As a result, the actual timing of the Project will be informed by a close evaluation of weather conditions, both for safety of personnel during helicopter operations and to ensure optimal bait application conditions. Weather and gull hazing efficacy are the primary drivers for determining the ultimate implementation schedule.

As discussed further below and in its Draft Operational Plan, USFWS is also proposing to carry out gull hazing on the South Farallon Islands and to collect animal carcasses (including mice and birds) with signs of rodenticide exposure from all accessible areas on the islands and carefully selected mainland shorelines (those shown to be most likely to accumulate bird carcasses, based on long-term monitoring by the Greater Farallones National Marine Sanctuary) in order to minimize secondary poisoning risks and other adverse impacts to non-target species.

Raptors

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. Nevertheless, USFWS would also capture and hold or relocate all raptors found on the islands, as described in the Draft Operational Plan (included as **Appendix D**):

> Attempts will be made to capture all raptors found on the island prior to and during bait application activities. Capture efforts will continue to occur for as long as the risk of exposure is considered to remain substantial (i.e., bait pellets or carcasses of exposed wildlife remain available and palatable). Methods involving capture and translocation or temporary captivity will be carried out in accordance with the terms of a Special Purpose Miscellaneous Permit issued by the Service's Regional Migratory Bird Permit Office.
>
> If peregrine falcons are captured, they will be held off-island in a captive facility until it is determined safe to release them, given the high likelihood that some individuals may return to the Farallon Islands.
>
> Other species including burrowing owls that are considered at low risk of returning to the islands will be transported off the island and released into suitable habitat on federal lands on the mainland.

Successful efforts carried out by USFWS in 2012 to capture overwintering burrowing owls from the South Farallon Islands and re-locate them to the mainland indicates that this approach could be effectively implemented. Similar capture and hold or relocate efforts for raptors were also carried out by the National Park Service during the Anacapa Island rat eradication project and successfully protected nearly 2/3 of the approximately 55 raptors know to be present prior to and during the project. Due to their greater distance from shore and more limited habitat, fewer raptors are typically present on the South Farallon Islands.

Western Gulls

The FEIS also examines potential project effects on western gulls. This species has its largest known breeding colony of Southeast Farallon Island and is a relatively abundant and common type of gull found extensively in coastal areas and cities, around landfills,

marinas, and fishing operations from British Columbia through Baja, California. Western gulls are not listed as a protected species and are considered by the International Union for the Conservation of Nature (IUCN) to be of “least concern” with an estimated population of between 115,500-118,500 individuals that is currently increasing. Western gulls are omnivorous and opportunistic feeders known to prey on other seabird species. Research carried out on the Farallon Islands from the 1970s through the mid-2000s found western gull predation on the ashy storm-petrel to be significant, resulting in between a 1% and 2.5% percent annual mortality rate of breeding ashy storm-petrels. The FEIS provides the following assessment of potential adverse impacts to western gulls as a result of the proposed project:

> 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.

In its April 2021 consistency determination, USFWS subsequently revised downward the number of gulls that would have to be lost in order to affect the regional population after 20 years. The number was reduced from the 1,700 noted above to 1,050. This is less than 1% of the total population of western gulls and between 3.3% and 7.5% of the population likely to be on the islands during the proposed project. It is important to note that this number – 1,050 gulls – is <u>not</u> the number of gulls that USFWS expects to be lost as a result of the project, instead it is USFWS’ significance threshold for population-level impacts. As USFWS notes in its consistency determination:

> While it is important to be aware of these numbers, the Project is not expected to have anywhere near this amount of gull mortality due to thorough mitigation and monitoring planning. One of the primary goals of the Project is to minimize non-target impacts. Mitigation measures for gulls are designed to keep mortality of western gulls well below a level that result in a significant population level impact, including conducting the operation during the time of year when western gull numbers on the islands will be near their annual minimum, and a comprehensive gull hazing program designed to deter gulls from landing on or remaining on the islands long enough to be exposed to the bait or exposed mice.

The primary method USFWS is proposing to protect western gulls from accidental poisoning (due to consumption of bait or poisoned carcasses) is a hazing program. The program would involve the use of noise-makers, fireworks, lasers, passive visual deterrents and other similar methods to cause gulls to leave their roosts on the islands and move to the California mainland during the bait application effort and until bait and

mouse carcasses are no longer available to feed on – estimated at between two and ten weeks based on the results of bait degradation trials. Although the rat eradication effort at Anacapa Island – which also supports a large population of western gulls – did not include a hazing program and only resulted in the observed mortality of two gulls, USFWS believes that a hazing program is a necessary precaution to avoid and minimize adverse impacts of its project. To test the efficacy of gull hazing, USFWS carried out a trail program in 2012 using a range of sound and visual methods to flush gulls from the islands and keep them away for an extended period. Based on the report provided as Appendix E of the FEIS, at the beginning of the trial, over 3,700 gulls were present on the islands and during hazing, "the average number of gulls present on the islands for any length of time during the day was only 327." These reduced levels were maintained for a period of 12 days before returning to pre-hazing levels within two weeks of the cessation of hazing efforts. Based on these results, gull mortality is expected to be effectively minimized through implementation of the hazing program.

In addition to timing the project during the season when gulls numbers at the islands are lowest, continually collecting and removing mouse carcasses during the project, and implementing a hazing program, USFWS would also monitor gull behavior on an ongoing basis during the project – as described in the Draft Mitigation and Monitoring Plan included as **Appendix E** - so that adaptive management measures can be taken if gull mortality or feeding on bait pellets exceeds the low levels USFWS expects. Such adaptive management measures that would be considered include stopping initial bait deployment event prior to completion, canceling the second proposed bait deployment event, collecting already dispersed bait from all accessible areas, implementing additional hazing measures, capturing gulls suspected to have ingested bait pellets and transport them to a local wildlife rehabilitation facility for administration of Vitamin K, care, and rehabilitation, or delaying project start until more optimal weather conditions are forecast.

These measures and associated action triggers are discussed in detail in the Draft Non-target Species Contingency Plan included as **Appendix G**. In the days immediately prior to the first proposed bait application and after hazing efforts have begun, the action trigger would be the presence of more than 200 gulls on the islands for more than three hours. This would trigger additional monitoring, an increase or change in hazing efforts, a delay in bait application until hazing is more effective and cancelation of the bait application event if it is not. Subsequent to bait application, the action triggers would be changed to: (1) the return or presence of more than 300 gulls on the islands for more than three hours within 24 hours after bait application; (2) an observation of more than 50 gulls in baited areas with evidence of likely exposure (e.g., foraging on bait); or (3) discovery of more than 20 sickened or dead gulls showing physical signs of rodenticide poisoning are discovered on the islands and/or mainland. Under any of these circumstances, 24 hours of additional monitoring would be carried out, followed by one or more of the following actions if the situation has not resolved itself: (1) modification of hazing methods (i.e. use more pyrotechnics, deploy more effigies, and increase human presence); (2) delay of the second aerial bait broadcast until sufficient hazing success is achieved; (3) reduction of bait availability by manually removing pellets in difficult to

haze areas; (4) manual removal of bait pellets from all accessible areas; and (5) cancellation of second bait drop if USFWS determined that none of the above measures are adequate.

In addition to these measures, **Condition 1** would also require USFWS to develop and implement a program of independent monitoring that includes providing a report to the Executive Director regarding hazing efficacy and exposure of non-target species to rodenticide bait. This report would be provided as soon as feasible following the initial bait application event and prior to any subsequent bait application. Receipt of the report would provide the Executive Director an opportunity to discuss the results with USFWS and evaluate if the project continues to be consistent with the Coastal Act or if additional review by the Commission may be warranted.

Other Non-target Species

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 from the proposed bait, as an extra precaution, approximately 40 individual salamanders will be captured and held for the duration of the risk period and then released. The low anticipated risk is due to the low likelihood that salamanders would ingest bait pellets (they are not known to consume grain or cereals) and research showing that even when directly fed rodenticide laced crickets exclusively for 14 days and exposed to very high levels of rodenticide bait pellets, fragments and dust continually for ten days, similar species of salamander had mortality levels that ranged from 24% to 75% (FEIS Appendix Q). The conditions in this research represents extreme conditions that would be nearly impossible to replicate in the field but only produced modest levels of mortality. Therefore, although the best available science indicates that the collection and protection of Farallon arboreal salamanders is not necessary, because this number of salamanders can be collected without significant effort and due to their extreme rarity, the measure was determined by USFWS to be warranted to provide the highest level of certainty that the project would not have the potential to result in a significant adverse impact or risk to the salamander population. In addition, as discussed in detail above, because invasive mice compete with salamanders for food and may prey on them directly, the Service anticipates that salamanders would 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 would likely result in long-term benefits to the cricket population that would far exceed any adverse impacts that may occur as a result of the project.

The FEIS reports that monitoring data from other rodent eradication 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.

Secondary Exposure

Because brodifacoum is not easily metabolized and broken down into less dangerous compounds in the bodies of most animals, it is known to injure or kill animals that consume the carcasses of others that die due to brodifacoum exposure. This is known as secondary exposure and it has the potential to occur on the Farallon Islands, surrounding waters and mainland California coast if birds or mice that consume bait pellets or poisoned carcasses move off of the islands. Based on observations from past mouse eradication efforts on other islands, the majority of mice that consume bait pellets are likely to return to their underground burrows and die within days, thus becoming unavailable as prey for gulls, raptors or other predators. However, the FEIS notes several possible means of secondary exposure to wildlife on the islands:

> At the Farallones, several species would be at risk of exposure to rodenticides through a secondary pathway. House mice may be at risk of secondary exposure by consuming invertebrates, such as crickets or other insects, dead birds, and other mice that have previously consumed bait. In addition, a small percentage of house mice diet may include soil (Beyer et al. 1994), which could be contaminated with rodenticide following bait application. Shorebirds, landbirds and salamanders may be at risk of secondary exposure to rodenticide through the consumption of invertebrates that have previously consumed bait and contaminated soil or other environmental media. Gulls and raptors present on the Farallones would also be at risk to secondary exposure by potentially consuming poisoned mice and/or non-target species.

In addition, gulls or raptors that may be exposed to brodifacoum on the islands could also travel to the mainland coast before perishing or be washed ashore there if they die at sea. Based on the efforts to minimize non-target species exposure (gull hazing, raptor capture, monitoring and adaptive management), the location of the islands offshore roughly 30 miles offshore, the absence of such observations with the Anacapa Island project that was only 11 miles offshore and the low likelihood of at-sea mortalities washing ashore, such movement of brodifacoum exposed birds to the mainland coast is expected to be very unlikely. However, USFWS is proposing several measures to help minimize secondary exposure pathways to the mainland if such birds do come ashore. These are described in both the Draft Mitigation and Monitoring Plan and Draft Non-target Species Contingency Plans and include: (1) stopping or modifying the project if 20 or more sickened or dead gulls with signs of rodenticide poisoning are discovered on the mainland; (2) collection of all dead beach-cast gulls from monitored mainland beaches during project implementation; (3) establishment of a hotline “for the public to report observations of dead or sickened gulls in other mainland areas” and dispatch of personnel to those areas “to investigate and collect or capture dead or sickened birds

suspected of rodenticide poisoning for possible residue sampling and to remove them from being scavenged;" (4) coordination with the Greater Farallones National Marine Sanctuary's Beach Watch program to share data from its standard shoreline surveys conducted every two weeks at 59 beaches from Manchester Beach in Mendocino County south to Point Año Nuevo in San Mateo County, including two beaches east of the Golden Gate Bridge; and (5) more frequent Beach Watch monitoring carried out at a pre-selected sampling of two to ten beaches with historically high deposition rates of dead gulls and beaches with known high concentrations of live gulls. Selected beaches for increased monitoring likely will be between Otonoe Beach in Sonoma County and Half Moon Bay State Beaches in San Mateo County. Increased monitoring would range from daily to weekly. As a final measure, USFWS has also stated in its Draft Mitigation and Monitoring Plan that it would also "partner with a wildlife rehabilitation facility or veterinarian to provide care for captured live birds and the administration of Vitamin K, which can reverse the toxic effects of anticoagulant poisoning."

Regarding sub-lethal effects of secondary exposure and other broader effects on the environment, the FEIS also describes recent research indicating that brodifacoum may persist in the environment longer than previously understood:

> Until recently, results from post-eradication monitoring programs have determined that there is not widespread and high rodenticide contamination of fish and wildlife, suggesting that residues do no persist long-term. However, two recent studies highlight the potential for rodenticide residues to persist long-term in the environment. At Desecheo Island, biological sampling the week prior to the 2016 rat eradication attempt revealed that brodifacoum residues can persist in parts of the food web for up to 4 years (Shiels et al. 2017). Low level brodifacoum contamination (generally < 100 µg/g) was detected in a small number of samples consisting of rat, bird, lizard, or insect tissue. An additional case of elevated brodifacoum body burden was described for lava lizards from Galapagos Islands, where livers from lizards contained detectable brodifacoum concentrations (> 10 ppb) greater than 800 days after bait application (Rueda et al. 2016). These findings suggest that post-eradication monitoring programs, including the one proposed for the South Farallon Islands, should, at a minimum, include multi-year (e.g., ≥ 2 years) monitoring of terrestrial organism rodenticide residues and a hazard assessment of the potential impacts, including sublethal effects, associated with vertebrate exposure to lingering rodenticide residues in the environment.

In its consistency determination, however, USFWS notes that monitoring of the Palmyra Island project found that "no population-level impacts occurred and brodifacoum residues declined to negligible or non-detectable levels within a few years (Siers et al. 2016, Wegmann et al. 2019)."

USFWS also proposes a variety of efforts and mitigation measures to help minimize secondary exposure and the persistence of brodifacoum in the environment. First, the hazing program would be implemented along with operational parameters (such as delaying bait application during high wind or low visibility periods and using specialized

bait dispersal buckets to direct the placement of bait away from intertidal and marine areas) to minimize exposure of non-target areas and species to rodenticide baits or exposed carcasses. Second, USFWS would collect and safely disposal of bird and mouse carcasses from all accessible parts of the islands and the mainland beach areas most likely to receive beach-cast carcasses. Third, focused bait dispersal and non-target exposure monitoring would be carried out prior to, during and after bait application to inform the implementation of adaptive management measures – including halting or canceling the project and collecting already dispersed bait. Fourth, broad, long-term environmental monitoring would be carried out following the conclusion of bait application activities to determine if, how much, and where brodifacoum may be persisting in the environment as well as how quickly it is degrading. This monitoring would include soil and water as well as plant and animal tissues. Its full extent is described in the Draft Mitigation and Monitoring Plan included as **Appendix E**, including the following details of the suite of animal species that would be monitored. This monitoring would help with the identification of potential sub-lethal effects on wildlife due to persistent presence of low levels of brodifacoum in the environment:

> Environmental (i.e., water, soil, and non-target fish and wildlife) monitoring will be led by a contractor or cooperator following specific protocols developed for the South Farallon Islands. The Residue Monitoring Plan will assist in tracking the environmental fate of rodenticide in the environment, characterizing the extent and period of exposure to non-target biota, and informing when it is safe to release or allow captured and held native wildlife (e.g., Farallon arboreal salamanders, peregrine falcons) back into the wild. Necropsies and tissue samples from collected dead birds will be evaluated to assess brodifacoum exposure and relative risk within the South Farallon Islands avian community, including seabirds, shorebirds, raptors, and landbirds.
>
> Residue monitoring for other species or species groups will require collections of live organisms but may also include any collected dead or moribund individuals suspected of brodifacoum exposure. Additional residue monitoring will likely be conducted on the following species or species groups, to be confirmed following consultation with other experts and applicable regulatory agencies: • Farallon arboreal salamanders • Farallon camel crickets • Other indicator terrestrial invertebrates, such as beetles (Family: Coleoptera) and Corm flies (Fucellia thinobia) • Indicator intertidal invertebrates, such as mussels (Mytilus californianus) and limpets (Lottia spp.) • Indicator subtidal invertebrates, including Dungeness crabs (Cancer magister) • Indicator intertidal and subtidal fish, including groundfish (rockfish Sebastes spp., lingcod (Ophiodon elongatus), chinook salmon (Oncorhynchus tshawytscha), Pacific halibut (Hippoglossus stenolepis) or other flatfish, sculpins (Leptocottus spp., Oligocottus spp., Artedius spp.), and others
>
> Because brodifacoum generally does not persist in invertebrate tissues, its presence would be indicative of recent exposure of brodifacoum cycling in non-target invertebrates, potentially signaling an exposure pathway of concern to predators.

Mitigation Measures
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 on the island, particularly seabirds and marine mammals, are at or near their annual minimums.
- GPS guidance of helicopter flight paths and use of a calibrated bait bucket to provide precise control of bait application and to help ensure bait is applied evenly and non-target areas (e.g., shoreline areas) are avoided.
- An intensive gull hazing program would be implemented beginning prior to the first bait application and continuing until the availability of palatable bait pellets has declined to a level where the risk of gull exposure is negligible. Based on the results of bait pellet degradation trials carried out on the Farallones in 2011 and 2012, this would be two to ten weeks following bait deployment. The objective of the hazing program 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, and caused only minimal disturbance to other bird species and marine mammals. 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, estimated to be approximately five weeks.
- 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 islands and released into suitable habitat on the mainland, consistent with successful efforts carried out in 2012. Capture techniques have been

implemented effectively for island rodent eradications elsewhere. Methods involving capture and translocation or temporary captivity would 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 (40 salamanders) was selected such that it retains sufficient genetic diversity in the population should an unexpected, large mortality event occur. Collection and holding of salamanders would follow established protocols and individuals would be returned to their location of capture when deemed appropriate.
- Scheduling the project in the late fall to avoid the breeding season for seabirds and pinnipeds. However, thousands of birds and a few thousand pinnipeds would still 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 would be implemented during the project and monitoring time periods.
- Close coordination with the Greater Farallones National Marine Sanctuary, including through its Beach Watch program and supplemental monitoring (up to daily during and immediately after bait application activities) of beaches demonstrated by existing long-term monitoring to have the highest likelihood of presenting beach-case bird carcasses. As described in the Draft Non-target Species Contingency Plan, data from this beach monitoring would be provided to USFWS' implementation team to aid in early identification and response to non-target species mortality (including western gulls).

As an additional measure to help ensure the individual measures described above are implemented effectively and anticipated adverse impacts do not exceed the low level that USFWS anticipates, **Condition 1** would require USFWS to develop, submit for Executive Director review and approval, and implement, a plan for third-party, independent monitoring and reporting.

Condition 1 would require this monitoring to apply to activities involving gull hazing and the application of rodenticide-laden bait on the South Farallon Islands and (1) be carried out by a qualified third party (non-USFWS and not the entity carrying out the eradication); (2) include reporting to the Executive Director as soon as practicable at the following the first aerial bait application event and prior to any subsequent aerial bait application event; (3) include a monitoring entity that does not have any financial interest in the outcome of the project; and (4) include methods of observing and reporting: (a) any spill or accidental dispersal of bait to non-target areas (such as intertidal areas, marine waters, etc.), including the locations and approximate sizes of such areas, the estimated amount of material spilled or placed in non-target areas, any necessary clean-up or response measures taken, and an assessment of the effectiveness of those measures; (b) any observed direct or indirect (e.g., through

consumption of effected mice) consumption of rodenticide by individuals of non-target species (such as marine mammals, raptors, and seabirds), including the approximate number of non-target individuals observed to consume bait or rodenticide, any observed reactions in those individuals following consumption and response measures taken; and (c) the results of gull hazing efforts, including the approximate number of gulls successfully and unsuccessfully flushed and the behavior of flushed and unflushed gulls during and immediately after bait application activities.

Through receipt of the independent monitor's report, the Executive Director would have an opportunity to assess the progress of the project at an initial point between the first and second bait deployment events, including key features such as accuracy of bait deployment, consumption of bait by non-target species, and efficacy of gull hazing. If the results of the report indicate that project operations or effects are not consistent with those described in USFWS' consistency determination and FEIS, the Executive Director would coordinate with USFWS regarding implementation of adaptive management measures and the potential need to re-initiate consistency review.

Further, **Condition 2** would help minimize the risk of adverse impacts to the native species and habitats on the South Farallon Islands by requiring revisions to the Draft Bait Spill Contingency Plan. The focus of these revisions would be on ensuring that the final plan includes adequate planning, training, equipment and methods to respond to worst case spill events, including those on terrestrial, intertidal and marine environments. Ensuring that preparations are in place to respond to such worst case events would not only facilitate a more effective response to them but also to more moderate spills as well.

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 [Draft 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 would also 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. For the staff report prepared for the July 10, 2019 hearing, Dr. Garske-Garcia drafted 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 4**. The following are the significant conclusions from this memorandum, which Dr. Garske-Garcia has reviewed for the current consistency determination and found to continue to be applicable:

- 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. Subsequent to the July 10, 2019 Commission hearing, USFWS prepared a second consistency determination for the project and included within it four draft plans: operations, mitigation and monitoring, bail spill contingencies, and non-target species contingencies. These plans are included as **Appendices D-G**.

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 and monitoring that would be carried out during the project which suggests that the Service will be able to keep western gull mortality substantially below the threshold level (1,050 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 likely not generate as much non-target species mortality, at least directly, but also would not successfully eradicate the last remaining non-native mammal from the Islands.

Likewise, as described above in the section on alternatives, many of those alternatives would also cause direct or indirect harm to Island species because they would require, for example, significant, repeated trampling of the Islands by project workers; introduction of non-native mammals (e.g., cats) that could harm species other than mice; or much greater disturbance of non-target species (e.g., birds) because they would require repeated helicopter flights, including during nesting and breeding season.

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 decision on the consistency certifications under the remedial action provisions of the federal consistency regulations at 15 CFR Sections 930.45 and 930.46. 15 CFR Section 930.45(a) states, in relevant part:

> (a) Federal and State agencies shall cooperate in their efforts to monitor federally approved activities in order to make certain that such activities continue to be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of the management program.
>
> (b) The State agency may request that the Federal agency take appropriate remedial action following a serious disagreement resulting from a Federal agency activity,…which was:
>
> (1) Previously determined to be consistent to the maximum extent practicable 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 to the maximum extent practicable with the enforceable policies of the management program;

Condition 1, requiring the preparation and implementation of a plan for independent monitoring and reporting to the Executive Director of project progress after the first bait deployment effort and prior to the second effort, would provide an opportunity for the Executive Director to assess if the project is proceeding consistent with its project description and anticipated effects. If it is not, additional coordination with USFWS would be carried out, adaptive management measures implemented, and, if necessary, the consistency determination would be "re-opened," as established above. The draft Non-target Species Contingency Plan, provided as **Appendix G**, describes the suite of adaptive management measures that would be considered for implementation and the various triggers and thresholds for them.

Additionally, **Condition 2**, requiring the addition of more robust planning and response capability to the Draft Bait Spill Contingency Plan, would also help protect rare and sensitive habitats and species on the South Farallon Islands by increasing the efficacy of spill response and clean-up efforts.

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 that, although there will be short term impacts to individual animals of various native species, these will not cause population level effects, and that overall, proposed restoration efforts would result in significant long-term benefits to native seabirds, amphibians, terrestrial invertebrates, and plants and would 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. **Condition 1** would help ensure these plans are implemented as proposed and anticipated and that adverse impacts do not exceed those expected and described in USFWS' consistency determination and FEIS. Through **Condition 3**, the Service would be required to provide final versions of these plans and programs to the Executive Director for review and comment back to the Service prior to project implementation. This would help ensure that any changes made would not result in effects to environmentally sensitive habitats that are different than or additional to those understood and evaluated by the Commission. Therefore, with the inclusion of **Conditions 1, 2 and 3**, 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

Section 30230 of the Coastal Act 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.

Section 30231 of the Coastal Act 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 water flow, 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. These are both state designated and managed marine protected areas. 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. [7] In addition, the FEIS documents the intertidal invertebrates, nearshore fish, and marine mammals found in the waters surrounding the Islands. Intertidal and subtidal habitat around the South Farallon Islands was designated in 2011 as critical habitat for the federally endangered black abalone. The last sighting of black abalone at the South Farallon Islands was in 2012 but individuals of the species area considered likely to be present. There is also 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 SMR that surrounds the Islands but 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

[7] Although impacts to those species were considered in the context of the habitat section of this report, above, that analysis is also relevant to understanding the project's consistency with the Coastal Act's marine resources provisions. As the above analysis demonstrates, the project's effects on avian marine resources is consistent with the Coastal Act's requirements to maintain, enhance, and where feasible, restore healthy populations of marine resources.

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 accidently 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.

These conclusions are supported by the descriptions of monitoring efforts carried out during the Anacapa Island rat eradication project included in Howald et al. (2005 and 2010). These reports note that despite the steep, rocky topography of the islands, bait drift into the marine environment was minimal and those pellets that did fall into the ocean degraded within hours:

> Island-based observers reported a small amount of bait entering the water indirectly from bounce off the cliff sides. The divers counted a mean of 72 bait pellets (range: 69–75) over 500 m, at a 1–4 m depth on the ocean floor. The pellets were starting to degrade at 1.5-hours post bait-drop, and at five hours post bait-drop, there were just a few scattered crumbs. No fish or other animals were observed feeding on the bait on either dive.

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 (that which would have the potential to result in injury) 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 during the initial flight lines indicates more precise 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…

Through the requirement in **Condition 1** for independent monitoring (including bait dispersal into non-target areas such as intertidal and marine environments) and reporting to the Executive Director between the first and second bait application events, the minimization of bait drift into the marine environment would be further ensured. For example, if this interim monitoring report indicated that bait application into non-target areas had occurred or the accuracy of bait application failed to meet expectations, the Executive Director would have the opportunity to discuss the situation with USFWS, consider adaptive management measures to be implemented in response, and evaluate if the project was potentially being carried out in a manner that was no longer consistent with California's Coastal Management Program and may need additional review by the Commission.

As discussed previously in this report, the Service has also prepared a Draft Bait Spill Contingency Plan (provided as **Appendix F**) to address the risks associated with the storage, transport, and use of rodenticide bait and identify appropriate water quality protection and response actions in the event of a spill (see page 14, above). This Draft Bait Spill Contingency Plan was provided to Commission staff for review and input along with the USFWS' April 2021 consistency determination. During that staff review, which included the Commission's oil spill program coordinator and one of the Commission's staff ecologists, several necessary revisions and additions were identified to increase the thoroughness and effectiveness of the plan and spill response measures. These revisions and additions are described in **Condition 2**, which would require USFWS to prepare and submit, for Executive Director review and approval, a revised version of the Bait Spill Contingency Plan that incorporates the revisions and additions it identifies. The primary focus of these additions and revisions is on increasing the scope and level of detail regarding preparations and response efforts that would be taken for worst-case spill scenarios, including those involving spills of bait pellets into marine waters. Specifically, Condition 2, would require USFWS to incorporate the following into the Bait Spill Contingency Plan: (1) a description of worst-case spill situations, including those involving accidental discharge of a full bait deployment bucket into marine waters or intertidal habitat; (2) the response that would be triggered in the event of these worst-case spill scenarios to minimize adverse impacts to the terrestrial and marine environments, minimize spread or dispersal of spilled bait pellets into adjacent areas, and provide notification to appropriate response and resource protection agencies; (3) a list of equipment that would be maintained in immediately accessible locations and would be capable of adequately addressing and responding to a worst-case spill volume, location and situation; (4) a description of logistical challenges raised in different spill scenarios (access, points, ocean conditions, equipment needs) and how each would be addressed; (5) a description of how bait pellets behave in marine waters (level and duration of buoyancy, typical time to sink, typical breakdown time); and (6) a description of the qualifications, training and protective gear needed for spill response personnel.

Although the project FEIS and consistency determination rely on the best available science to conclude that the proposed project would pose negligible risks to water quality or the biological productivity of the marine waters surrounding the South Farallon Islands, given the extremely high level of protection designated for those marine waters (some of the most highly protected in California), and abundance and diversity of biologically and economically significant species they support, the highest level of caution and adverse impact avoidance and minimization planning is warranted to protect them. While USFWS' Draft Bait Spill Contingency Plan and the project's various spill avoidance measures provide an excellent foundation, the specific additions and revisions described in **Condition 2** would build on that foundation and provide a greater level of protection.

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 detectible 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.

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, 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. This harassment would be minimized through the proposed timing of the project outside of the breeding season for marine mammals on the islands and before their populations reach their annual peak. In addition, and as discussed previously in this report on page 16, the Service has developed a Draft 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. This draft plan is provided as **Appendix G** and identifies specific thresholds and triggers for adaptive

management and response actions as well as lists of the actions (including cessation of bait deployment activities, hand collection and recovery of bait for all accessible areas, modification to gull hazing activities based on their effectiveness and disturbance to marine mammals, delays to bait application activities and the collection and treatment of non-target species exposed to bait pellets). As part of its final planning stage for the proposed project, USFWS would further refine this plan, including through input provided by interested parties, contractors, project partners and resource agencies. Through Condition 3, USFWS would be required to provide this plan to the Executive Director for review, comment and comparison with the draft version included with its consistency determination once it is fully developed and prior to finalization.

Regarding sea turtles, recent research indicates that green sea turtles may be particularly sensitive to warfarin, a first-generation anticoagulant rodenticide (Yamamura et al. 2021). However, the observed effects primarily resulted from intravenous injections of the rodenticide at high concentrations and the research was limited to the green sea turtle and several species of freshwater turtle. No freshwater turtles are present on the South Farallon Islands and green sea turtles are primarily a tropical and subtropical species that is rarely observed offshore of northern or central California. Other sea turtle species such as the leatherback are more commonly sighted in the waters of the Greater Farallones National Marine Sanctuary but are primarily found in the open ocean. Given the rarity of sea turtles in the waters immediately surrounding the South Farallon Islands and the low likelihood they would ingest or encounter bait accidentally spilled into marine waters, risks of adverse impacts from the project would be negligible. Those risks would be further minimized through USFWS' proposed measures to reduce the risk of bait entering the marine environment and the requirements in **Conditions 1, 2 and 3** that would further protect against bait drift.

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 but has identified additions and revisions to the Draft Bait Spill Contingency Plan through **Condition 2** that would make it more thorough, effective and applicable for worst-case spill scenarios. 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 with implementation of **Condition 2**, 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.

For the staff report prepared for the July 2019 hearing on USWS' prior consistency determination, Commission Ecologist Dr. Lauren Garske-Garcia prepared a memorandum summarizing her analysis and conclusions regarding the proposed project. Dr. Garske-Garcia has reviewed this memorandum and found that it continues to be applicable for the proposed project. The memorandum is therefore attached to this report as **Exhibit 4**. 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 and implementation of **Conditions 1 and 2**, 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. Cultural Resources

Section 30244 of the Coastal Act states:

> Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.

As part of its review of USFWS' consistency determination, Commission staff coordinated with the California Native American Heritage Commission to obtain a contact list of Native American Tribes with potential cultural connections to the Farallon Islands. These Tribes include the Amah Mutsun Tribal Band of Mission San Juan Bautista, the Costanoan Rumsen Carmel Tribe, Indian Canyon Mutsun Band of Costanoan, Muwekma Ohlone Indian Tribe of the San Francisco Bay Area, the Ohlone Indian Tribe, and the Wuksache Indian Tribe/Eshom Valley Band. Commission staff reached out to each of these Tribes in September and November, 2021 via email and letter to provide copies of USFWS' consistency determination and FEIS, share scheduling information regarding the Commission's hearing on the project and to invite questions, feedback and further coordination. No responses to these invitations have been received.

However, Commission staff did receive correspondence from Lou-Anne Fauteck Makes-Marks, Ph.D. (included on p. 48 of the **Correspondence** for this report), noting that the Farallon Islands have cultural significance for the Ohlone and encouraging that they be included in outreach efforts by Commission staff. That outreach was carried out, as described above, and Commission staff is not aware of cultural resource concerns related to the proposed project that have been raised by representatives of the Ohlone Tribe.

USFWS is also required to carry out Tribal consultations through Section 106 of the National Historic Preservation Act of 1966. Those requirements are limited to federally recognized Tribes. USFWS determined that no consultation with federally recognized Tribes was required for the proposed project, as discussed in the FEIS:

> The majority of the threats to cultural and historical resources [on the Farallon Islands] are from past projects to remove structures. No impacts to cultural resources are expected as a result of implementing Alternative B [the proposed project]. The incremental effect from Alternative B and cumulative impacts to cultural and economic resources is likely to be imperceptible.

For these reasons, the Commission concludes that the proposed project is consistent with Coastal Act Section 30244.

H. Coastal Access and Recreation

Section 30210 of the Coastal Act states:

> In carrying out the requirement 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.

Section 30211 of the Coastal Act states:

> Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.

Section 30212 (a) of the Coastal Act states:

> a) Public access from the nearest public roadway to the shoreline and along the coast shall be provided in new development projects except where:
>
> > (1) It is inconsistent with public safety, military security needs, or the protection of fragile coastal resources, ….

Section 30213 of the Coastal Act states:

> Lower cost visitor and recreational facilities shall be protected, encouraged, and, where feasible, provided.

Section 30220 of the Coastal Act states:

> Coastal areas suited for water-oriented recreational activities that cannot readily be 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. USFWS' 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 California 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 resources 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 time period during which project will occur.

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.