

Introduction

The U.S. Fish and Wildlife Service (Service) released a Revised Draft Environmental Impact Statement (DEIS) for the South Farallon Islands Invasive House Mouse Eradication Project, Farallon National Wildlife Refuge, California, in August, 2013, for public review and comment pursuant to the National Environmental Policy Act. In the EIS, the Service proposed to eradicate invasive, introduced house mice (*Mus musculus*) from the South Farallon Islands and eliminate their negative impacts to ash storm-petrels (*Oceanodroma homochroa*), other native species, and the ecosystem of the Farallon National Wildlife Refuge. Since receiving public comments on the Revised Draft EIS, the Service has been unable to acquire sufficient funds to address public comments, including identified data gaps, and issue a Final EIS and Record of Decision. Completion of the EIS and lodging the Record of Decision will serve as a catalyst to completing this restoration project and releasing approximately xxxx funds from the NRDA Restoration Fund.

Commented [IJP1]: How much will it cost to implement the project?

The Service has identified two funding needs to support completion of the EIS. Funds will be used to 1) complete a study titled *Preliminary Assessment of the Potential Hazards of the Anticoagulants Diphacinone and Brodifacoum to Arboreal Salamanders* and 2) support a contractor who has played an essential role in developing the Draft EIS and is needed to assist in completing the Final EIS.

Component 1: Hazard Assessment of Anticoagulant Rodenticides to Salamanders

Study Title: Preliminary Assessment of the Potential Hazards of the Anticoagulants Diphacinone and Brodifacoum to Arboreal Salamanders.

USFWS Project Leader: Gerry McChesney, Manager, Farallon National Wildlife Refuge and Common Murre Restoration Project, Fremont, CA

Principal Investigator: Gary Witmer, Ph.D., USDA National Wildlife Research Center, Ft. Collins, CO (professional [profile](#))

Potential co-investigators: Vance Vredenburg, Associate Professor, San Francisco State University (responsible for salamander capture and maintenance prior to exposure study)

Rationale for study: During the scoping period and following release of the Draft EIS, the public expressed a concern for exposure of the native South Farallon arboreal salamander to anti-coagulant rodenticide. The proposed study would determine potential effects of rodenticides to arboreal salamanders, therefore reducing hazard uncertainty and providing for a more robust impact analysis in the Final EIS. In addition, findings from the proposed study would benefit similar NRDA restoration projects where non-target amphibian impact analyses are required as part of environmental compliance (e.g., EIS). Currently, there are no data in the literature regarding the potential toxicity of anti-coagulant rodenticides to salamanders.

Funding Partner: National Fish and Wildlife Foundation (NFWF); guaranteed funds in the amount of \$35,000 (can be used through December, 2016)

Study Description: Invasive rodents cause much damage to island ecosystems and anticoagulant rodenticides are an essential tool for the eradication of invasive rodents on islands. However, anticoagulant rodenticides may pose hazards to non-target animals. This can occur through the direct

consumption of the rodenticide material or from indirect exposure in which case the non –target animal consumes prey (rodents or insects) or scavenges on dead rodents that have previously consumed the anticoagulant bait. We propose a study, using live-captured arboreal salamanders (*Aneides lugubris*) and/or a surrogate species, such as *Ensatina* (*Ensatina eschscholtzii*) or California slender salamander (*Batrachoseps attenuatus*)¹, to do a preliminary assessment of the potential hazards of two anticoagulants to those animals. Three routes of exposure would be examined: 1) allowing salamanders to feed on crushed anticoagulant pellets (direct internal exposure), 2) allow the salamanders to consume insects that have fed upon anticoagulant pellets (indirect internal exposure, and 3) spraying salamanders with water that has been used to soak anticoagulant pellets (direct external exposure). Following exposures, salamanders may be provided a recovery period to determine occurrence of any latent effects, such as changes in body mass or potential susceptibility to pathogens. These studies would be conducted at the USDA National Wildlife Research Center in Fort Collins, Colorado, under an IACUC-approved study protocol. The budget needed for the study would be approximately \$70,000 to fund staff, provide supplies, support animal care staff and needs, and the required indirect costs (28% of total budget). The study could be completed within a 6-month timeframe after funds are received.

Component 2: EIS Contractor Support

USFWS Project Leader: Gerry McChesney, Manager, Farallon National Wildlife Refuge and Common Murre Restoration Project, Fremont, CA

Contractor Name and Previous Project Involvement:

Contractor Qualifications:

Funding Request: \$15,000

In-Kind Support: ORDA's Restoration Support Unit will provide in-kind support in the form of technical and administrative assistance to the project leader and EIS contractor and travel to meetings.

Use of Funds: [describe how the funds will be used]

¹ Note that species such as tiger salamander (*Ambystoma* genus), which are commercially available, have an aquatic life cycle; whereas, *Aneides* salamanders are solely terrestrial. Tiger salamander are not the first choice for a surrogate species.