FWS Agreement #_F16PG00033_____
FWS Requisition # _____
USDA Agreement No: _____

SCOPE OF WORK/BUDGET
BETWEEN
UNITED STATES DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE
at
FARALLON NATIONAL WILDLIFE REFUGE
and
UNITED STATES DEPARTMENT OF AGRICULTURE
ANIMAL AND PLANT HEALTH INSPECTION SERVICE
NATIONAL WILDLIFE RESEARCH CENTER
9/1/2016 – 6/30/2017

Commented [GJM1]: Hope we're done much sooner than this but just in case residue analyses or reports get held up.

PROJECT TITLE: An assessment of the potential hazards of the anticoagulants diphacinone and brodificoum to arboreal salamanders

Commented [GJM2]: With chemical analyses, is it still "preliminary"?

OBJECTIVE

The objective of this project is to determine if exposure to the anticoagulants diphacinone and brodifacoum is lethal to Farallon arboreal salamanders (*Aneides lugubris farallonensis*). This information will be used in analyses of potential impacts to arboreal salamanders in the Environmental Impact Statement (EIS) for the South Farallon Islands House Mouse Eradication Project.

SCOPE OF WORK

Invasive rodents cause much damage to island ecosystems and anticoagulant rodenticides are an essential tool for the eradication of invasive rodents on islands. The anticoagulants brodificoum and diphacinone have been proposed as alternatives in a draft EIS by the U.S. Fish and Wildlife Service (USFWS) to eradicate invasive house mice from the Farallon National Wildlife Refuge. 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.

For this study, the U.S. Department of Agriculture (USDA) will use live-captured or purchased salamanders to do an assessment of the potential hazards of the anticoagulants brodificoum and

diphacinone to those animals. Three routes of exposure will 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). After exposure, animals that die or are euthanized will be tested for rodenticide residue levels in the whole body using high performance liquid chromatography or mass spectrometry. These studies will be conducted at the USDA National Wildlife Research Center in Fort Collins, Colorado, under an IACUC-approved study protocol.

Commented [GJM3]: Gary, please add a paragraph describing the chemical analyses for residues that will now be done.

Currently, this study is planned to be conducted mainly with wild-caught Ensatina salamanders (*Ensatina eschscholtzii*) as a surrogate species for the less common arboreal salamander, with a smaller sample of wild-caught arboreal salamanders for comparison, all captured on the central California mainland. Salamanders will be captured and shipped to USDA by a separate USFWS contractor. However, if wild-caught salamanders cannot be provided in a timely manner, the study may be conducted with purchased or provided, captive-reared salamanders (species to be determined) after consultation and agreement between USFWS and USDA.

Reporting: USDA will provide to USFWS a preliminary report detailing the study and findings, due December 15, 2016 with a final report to follow by June 30, 2017. The report will include the names and affiliations of all authors, introduction, description of methods, results, discussion, literature cited, acknowledgements, and suggested citation. The USFWS Interagency Agreement Number will be included on the cover page.

Commented [GJM4]: Gary, we might want to have one report with initial findings for the NFWF funds (due sooner) and another after the followup chemical analyses for residues that pulls it all together. But I'd like to avoid too much additional work. What's your thoughts?

Budget

The budget needed for the study would be $108,274 to fund staff, provide equipment and supplies, support animal care staff and needs, perform residue analyses, and indirect costs. Additional funds will be necessary if chemical analyses for rodenticide residues are required.

Commented [GJM5]: We'll have $108,274.58