

Proposals must use at least 3/4" margins and 12-point single-spaced type. Sections 3-7 of proposals must not exceed two pages. Proposals not abiding by this limit will not be reviewed. Required sections include:

1) TITLE of PRE-PROPOSAL (< 100 characters): The title must clearly describe the project.

Assessing effectiveness of hazing techniques for western gulls and other bird species

2) APPLICANT(S) INFORMATION: Name, affiliation, mailing address, phone number, and e-mail address for principal investigator-

Dan Grout; add details.

name and affiliation only for all co-investigators-

Co-investigators:

Winston Vickers- OWCN,

Russ Bradley PRBO Conservation Science,

Gerry McChesney, U.S. Fish and Wildlife Service, Farallon National Wildlife Refuge Manager;

USGS UAV program

3) HYPOTHESES AND OBJECTIVES: Sections 3-7 are limited to 2 pages total.

- A. It is possible to haze a large percentage of migrant and wintering western gulls (*Larus occidentalis*) and other gull species off the South Farallon Islands for a specific period of time.
- B. We hypothesize that employing multiple established and some new innovative hazing techniques will be effective at maintaining designated areas free of western gulls for extended periods in a terrestrial, coastal habitat. These trials are designed to test capacity to maintain gulls off the Farallones for a specific period of time.
- C. We hypothesize that the use of specially equipped Unmanned Aerial Vehicles (UAVs) can be effective and more cost efficient than traditional hazing techniques at hazing gulls and other seabirds away from coastal areas.
- D. We hypothesize that UAVs will be effective at evaluating the efficacy of hazing techniques and also providing real time feedback on where birds are present to direct hazing efforts. Trialing UAVs to monitor hazing effectiveness will also provide valuable information on the ability of UAVs to monitor seabirds for other purposes.

The main objective of this proposal is twofold: determine if it is possible to haze a large percentage of gulls off the entire South Farallon Islands, and to determine what hazing techniques are most effective and most cost efficient at dispersing western gulls to maintain areas free of gulls. We aim to test different hazing techniques, including lasers, spot-lights, bio-sonics, pyrotechnics, effigies, kites, and possibly other techniques, to quantify the effective range of each technique, and to quantify how quickly gulls become accustomed and unresponsive to the different techniques. We propose to test new hazing tools, specifically UAVs, both for capacity to haze gulls and to monitor the effectiveness of hazing using camera equipped drones. Through being a part of the Farallon Island house mouse eradication planning project, this project leverages significant additional resources by utilizing in kind donations of UAVs and their pilots, loaned hazing equipment and the facilities on the Farallon Islands.

4) EXPERIMENTAL PLAN:

In November-December 2012, a team of at least 5-8 individuals from various cooperating agencies will attempt to monitor and haze roosting western gulls and selected other seabirds off the South Farallon Islands by employing a combination of established and innovative hazing methods.

Hypothesis A: We will use multiple techniques simultaneously across the South Farallon Islands and monitor gull response visually to see if they fly off the South Farallon Islands and whether hazed birds alight on the nearby waters, fly to other areas of the island, or fly away from the islands.

Hypothesis B: When employing the multiple established hazing techniques and some innovative hazing techniques, we will measure the percentage and total number of gulls effectively hazed from the exclusion area. We will also measure the time period gulls remain out of the area. We will randomly select from known gull roosting areas to test each technique.

Hypothesis C and D: Drones or UAVs will be fitted with cameras and other equipment and used to monitor and haze selected areas of the Farallones. A cost-benefit analysis will be done to compare the effectiveness of UAVs to helicopters for both monitoring for the presence of seabirds in the exclusion zone, as well as for hazing gulls away from it. Total monitoring and hazing costs per unit area will be provided for both unmanned and manned aerial techniques. For each bird hazing method the effective hazing area for gulls will be measured using range-finders, the duration of time after hazing until

habituation/return will be measured, and the suitable environmental conditions under which each method can be optimally deployed will be quantified.

We do not expect one hazing technique will prove to be totally effective for all birds in all conditions. Thus multiple techniques must be tested and their relative efficacy scored in different conditions. We have created a table listing all of the hazing techniques proposed for this trial and categorized them as low, medium and high for predicted efficacy (area and duration) and cost. We have also categorized them based on ambient conditions (day, night, limited visibility/fog, and high winds) to further identify which techniques can be used in which conditions. Due to space limitations this table has not been included in the pre-proposal.

5) SIGNIFICANCE TO OILED WILDLIFE HEALTH:

Improve Animal Care Determine and test methods for mitigating the effects of oil on wildlife

Oil spills pose significant risk to marine birds and an effective method at reducing this risk is to keep birds from coming into contact with the oil. Hazing is a proven tool to move birds and can be used to keep birds away from oil spills. However, most bird species can become accustomed to hazing techniques over time and therefore the hazing can become less effective. In addition, hazing is most effective at moving birds short distances and over relatively small areas. Developing hazing techniques to move large numbers of birds over extended time periods and over large areas will improve the capacity of oil spill response teams to protect wildlife. We propose to test these techniques on the Farallon Islands with a goal of evaluating hazing tools in general for use broadly. By testing on the Farallon Islands we also will be testing methods specific to these islands, which support the largest breeding colony of marine birds in the contiguous U.S. , including the world's largest breeding colony of western gulls, ash storm-petrels and Brandt's cormorants. In the event of a spill threatening the islands, this experience specific to the Farallones could prove valuable when developing a response plan.

The proposed project is part of a restoration project to offset bird mortalities associated with the *Luckenbach* oil spill. The eradication of the invasive house mouse from the Farallon Islands is being proposed to compensate for ash storm-petrel and other procellariiformes mortality from the spill. Additional benefits will be realized for other seabird species as well as the entire Farallon Islands ecosystem. The proposed hazing trial is designed to help develop mitigation strategies for several of the proposed action alternatives to reduce risk of western gulls and some other species (primarily other gulls and shorebirds) of coming into contact with rodenticide. The same methods to haze western gulls and other species would be effective during an oil spill response. Furthermore, as this project is part of a larger restoration effort the investment by OWCN will be significantly leveraged. OWCN funds for the proposed trial would be matched by NFWF funding from the Northern California Restoration Program. And, if the proposed mouse eradication is implemented using hazing as mitigation, the results of the hazing mitigation would be made available to OWCN.

6) PROJECT DURATION (1-3 years): November 2012- November 2013.

7) ESTIMATED BUDGET:

8) APPENDICES: Literature cited & letters of collaboration USFWS, PRBO, OWCN?, IWS-OSPR? USGS?

Will not be included in proposal for space reasons. Maybe included in full proposal?

Method	Predicted Efficacy Coverage	Predicted Efficacy Duration	Cost*	Day/Night/Fog	Sensory mechanism	
Helicopter	High	High	High			
UAV	Medium	Medium	Medium			
Human w/dog	Medium	High	Low			
Active human hazing	Low	Low	High			
Pyrotechnics	Medium	Low				
Lasers	High	Low				
Spotlight	Medium	Low				
Kites	Medium	Medium				
Biosonics	Low	Low				
Zon Gun (loud noises)	Low	Low				
Mylar tape	Low	Medium				
Effigies	Low	High				

*(includes estimate of area covered)