Date: 08/27/2018

Project # (to be assigned by EMC):

Principal Investigator(s): Dr. Michelle Reilly

Collaborator(s): Klamath National Forest

Critical Question Theme and Rules or regulations being tested: 7. Wildlife Habitat; species a

Project Title: Decision Support Tool- Northern Spotted Owl Us

1. **Summary of Project [In not more than 500 words, provide a Problem Statement, describe Methods and Monitoring Location(s).]**

   Please See Attachment.

2. **Estimate of Requested Funds:**

   - ☐ <$10,000
   - ☒ $10,000 - $50,000
   - ☐ $50,000-$100,000
   - ☐ $100,000-$150,000
   - ☐ >$150,000

3. **Project Duration (years, months)** 5 years

Spotted Owl Use of Post-fire Landscapes- Decision-Support Tool

The Northwest Forest Plan identifies timber harvests and wildfires as major threats to northern spotted owl (NSO) populations. Additionally, the NSO Recovery Plan (USDI 2011) identifies several Recovery Actions related to conservation of NSO in fire prone landscapes. Wildfires and forest management may change habitats in ways that can affect use and occupancy of previously-identified, high quality nesting and roosting sites; these effects are not well understood. Lindemayer et al. 2017 highlight the importance of retaining patches of unlogged forest in areas that are burned (and subject to salvage logging) for native bird species richness. Our proposed research will investigate temporal changes in spotted owl site use in a post-fire landscape. The goal of this study is to examine how fire and salvage harvesting under California Forest Practice Rules (1038 "Exemption" and 1052 "Emergency Notice" rules) affect spotted owl site fidelity in a post-fire setting. Understanding the temporal trend in spotted owl site fidelity in a post-fire landscape will lead to more informed and defensible forest management as wildfire size and total annual area burned continue to increase in the study area.

We propose to use passive acoustic monitoring via automated recording units (ARU's) to monitor presence and habitat use of northern spotted owls at sites that have 1) burned, 2) burned and subsequently been salvaged, and 3) control sites with no burn or salvage. ARUs are especially useful for surveys of rare, nocturnal, or difficult to detect species. Additionally, ARU's reduce the risk of disturbance and behavioral changes associated with historically used 'active' call-back surveys (Conway and Gibbs 2005). This proposal will utilize Wildlife Acoustics Song Meter 4s (SM4s; WildlifeAcoustics.com). SM4s are portable, weatherproof, and easily programmable with two built-in high quality microphones, large memory capacity, 350-400 hour battery life, and record sound between 20Hz and 48 KHz at decibel levels of ~-33.5db to 122db (Wildlife Acoustics Inc. 2017). Field sites will be identified on US Forest Service Lands on the Klamath National Forest. Klamath National Forest lands include lands already surveyed as part of the NSO Effectiveness Monitoring Program under the Northwest Forest Plan. ARU's will be placed near NSO activity centers based on recent nesting and activity center data at mid- to upper-slope locations within one of the three treatments (burned, burned and salvaged, no burn or salvage). ARU's will not be located within 500 meters of another ARU in order to reduce overlapping efforts and potentially recording a neighboring owl. ARUs will be set to record for eight hours during diel crepuscular periods (2 hours before-and-after sunrise, 1 hour before and 3 hours after sunset), which was identified as the peak in NSO calling activity (Lesmeister et al. 2018). ARUs will be checked every 4-6 weeks.

Sound files will be processed using Kaleidoscope Software available from Wildlife Acoustic Inc. (Wildlife Acoustics Inc. 2017). The basic clustering feature will be used to cluster similar sounds. Sound clips are displayed as spectrographs. Spectrographs containing NSO territorial calls are easily identifiable from barred owl calls due to the difference in notes per call (4-note versus 8-notes, respectively). Occupancy modeling is a statistical method for modeling the patterns and dynamics of species occurrence while accounting for potential biases associated with imperfectly detecting a species during sampling. Single or multi-season occupancy models will be used to assess occupancy or habitat use of the sites by

Northern spotted owls. If barred owls are identified in the sound clips, a co-occurrence model will be used to account for interspecific competition.

Item	Unit cost	Quantity	Total
SM4 (ARU)	$825	10	$8,250.00
Kaleidoscope Software (Yearly Subscription)	$399	1	$399.00
Batteries (4-pack)	$76	10	$760.00
128GB SD Card	$97	10	$970.00
Battery Charger	$110	1	$110.00
Shipping Cost			$158.00
			Total: $10,647.17

References

1. Conway, C. J., and J. P. Gibbs. 2005. Effectiveness of call-broadcast surveys for monitoring marsh birds. The Auk 122:26-35.
2. Lesmeister, D.B., Davis, R.J., Duggar, K.M., Duchac, L.S., Ruff, Z.J., 2018. Testing the efficacy of passive bioacoustics to survey for northern spotted owls in Washington and Oregon. US Department of Agriculture Forest Service Pacific Northwest Research Station- Northern Spotted Owl Bioacoustics 2017 Annual Report.
3. Lindenmayer, D.B., McBurney, L., Blair, D., Wood, J., and Banks, S.C., 2017. From burntto salvage logged: Quantifying bird responses to different levels of disturbance severity. Journal of Applied Ecology. DOI: 10.1111/1365-2664.13137
4. USDI FWS [U.S. Fish and Wildlife Service]. 2011. Revised recovery plan for the northern spotted owl, *Strix occidentalis caurina*. U.S. Fish and Wildlife Service, Portland, Oregon. xvi + 258 pp.
5. Wildlife Acoustics Inc. 2017. SM4 Bioacoustics Recorder User Guide, updated May 2017. https://www.wildlifeacoustics.com/images/documentation/SM4-USER-GUIDE.pdf. Maynard, MA