

**IDAHO DEPARTMENT OF FISH AND GAME**

**Ed Schriever, Director**

**Project F18AF01191**

**Northern Idaho Ground Squirrel Annual Population Monitoring  
Cooperative Endangered Species Conservation**

**Final Report**



**Performance Period**

August 13, 2018 to June 30, 2020

Compiled and edited by: Diane Evans Mack

September 2020  
Boise, Idaho

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**TRADITIONAL SECTION 6  
FINAL PERFORMANCE REPORT**

**1. State:** Idaho

**Grant number:** F18AF01191

**Grant name:** Northern Idaho Ground Squirrel Annual Population Monitoring

**2. Report Period:** October 1, 2019 to June 30, 2020

**Report due date:** September 28, 2020

**3. Location of work:** Adams and Valley counties

**4. Objectives**

- a) Compile and summarize data from 2018 surveys to prepare for abundance and occupancy analyses
- b) Conduct field surveys for long-term population monitoring in spring 2019 based on a sampling design developed in 2013
- c) Incorporate an additional stratum into the survey design to document Northern Idaho Ground Squirrel (NIDGS) activity beyond the current sampling frame
- d) Conduct additional focused surveys as needed to address site-specific questions, such as change in NIDGS distribution in response to habitat treatment, wildfire, or competition with Columbian ground squirrels
- e) Provide field support as needed to the collaborative study of the effectiveness of forest restoration treatments on NIDGS led by the Idaho Fish and Wildlife Cooperative Research Unit at the University of Idaho (UI) partnering with the Payette National Forest (PNF), Idaho Department of Fish and Game (IDFG), and the U. S. Fish and Wildlife Service (FWS).

**5. If the work in this grant was part of a larger undertaking with other components and funding, present a brief overview of the larger activity and the role of this project.**

This project is part of the overall recovery program for the northern Idaho ground squirrel (*Uroditellus brunneus*; NIDGS) and is conducted in collaboration with biologists and fuels specialists from the FWS, PNF, UI, species experts, and private landowners. IDFG implements the project. Data generated on surveys provide baseline information on population status to assess recovery (Wagner and Evans Mack 2019). Results are incorporated by the above-listed entities to meet objectives detailed in the Recovery Plan (U.S. Fish and Wildlife Service 2003), improve habitat for NIDGS (specifically the PNF), and evaluate NIDGS response to habitat (specifically the UI). In addition, these results allow continued collaboration with land managers, regulatory agencies, and research partners by providing a range-wide reference point from which to identify objectives or compare results

from other site- or topic-specific studies. Population monitoring data have been an important part of two 5-year status reviews (2010, 2016) conducted by the FWS.

Extant populations of NIDGS found on Federal land are managed by the PNF. In 2012 the PNF was selected to participate in the national Collaborative Forest Landscape Restoration Program. The PNF currently has three large-scale (>50,000 ac) projects underway which include a component to improve NIDGS habitat with thinning and prescribed fire. These actions aim to rejuvenate forage plants and create corridors to link populations. Habitat restoration by the PNF has had a positive effect on NIDGS populations. We have adjusted annual population monitoring to include portions of these projects in NIDGS surveys.

The OX Ranch, a private landholding in Bear, Idaho, supported this project by providing access to hundreds of acres for surveys. The OX Ranch entered into a Safe Harbor Agreement (SHA) with the FWS and IDFG in 2009 to help meet recovery goals for the NIDGS. The SHA covers 4,227 acres on the OX Ranch and encompasses a significant portion of the NIDGS population.

In addition to this Section 6 grant, 2019 field surveys were supported by the FWS Boise Field Office through a Cooperative Agreement Award. Data analysis and development of the 2019 final scientific report was partially supported by Section 6 Project F19AF00801.

## **6. Describe how the objectives were met.**

During this reporting period, Grant F18AF01191 supported the compilation, summary, and partial analysis of 2019 field survey data for the annual scientific report. In its entirety, this grant supported the 2019 field effort, including salaries of 5 technicians, equipment, supplies, and field housing, and a portion of the 2019 data summary and analysis.

### Population Estimates (Objectives *b* and *c*)

As documented in the Interim Report (Evans Mack 2019), we conducted at least 2 distance-based, line-transect surveys in each of 1,132 grid cells during April through July 2019. We detected 1,835 NIDGS at 669 of those grid cells. From these data, we used program DISTANCE to estimate a detection probability of 0.73, average group size of 1.02, a density of 0.85 squirrels/ha, and a population size of 2,193 squirrels. Applying a correction factor developed in 2016 to account for NIDGS below ground during surveys and not available to be detected (Wagner and Evans Mack 2016), we calculated an adjusted abundance of 2,960 squirrels. This estimate showed no change from 2018. Based on analysis of distance-based survey data common to both years, the population metrics were essentially the same in 2019 and 2018. Across the last 6 years, the most current 3 years (2017–2019) showed a downward trajectory compared with increases during 2014–2016. However, this was confounded somewhat by the shifting distribution of NIDGS on the landscape and the loss of access to key private lands for surveys. The dynamic nature of NIDGS occurrence on the landscape will always present a challenge to defining population trajectory.

We used occupancy modeling to estimate the proportion of cells occupied and each grid cell's probability of being occupied as metrics for NIDGS distribution. Using program PRESENCE we explored a number of environmental variables that potentially influence

NIDGS occupancy. Of the 10 models compared with program PRESENCE, proximity to recent known squirrel locations, tree canopy cover, and proportion of a grid cell with southerly aspects contributed to the 3 most supported models. The other 3 site covariates we considered (heat load index, soil bulk density, soil depth) had little explanatory power. We applied the highest ranked model to predict probability of occupancy across the entire sampling frame, including the cells we did not survey this year. With this model, almost half (45%) of the cells in our expanded sampling frame had >75% probability of being occupied.

#### Additional Surveys (Objective d)

Nine discrete geographic locations within our sampling frame had no grid cells selected for surveys this year. To maintain continuity of our understanding of the status of these sites (i.e., occupied or not), we visited each site at least once to document NIDGS presence. We detected 23 NIDGS at 5 of these sites. While these data will not be included in estimates of annual abundance or occupancy, they establish, as a reference, that sites remain extant in 2019.

We also invested substantial effort looking for NIDGS beyond where we routinely survey, particularly at gaps between known occupied sites that squirrels could have expanded into. We also assisted the PNF in conducting clearance surveys throughout a large area scheduled for prescribed burning. We covered roughly 1,500 ha and documented NIDGS occurrence at half (22 of 44) of the locations we explored. We detected 236 NIDGS, ranging from 1 to 35 animals per location. These surveys demonstrated the importance of actively looking for an expanding footprint.

#### Support to Collaborative Studies (Objective e)

Data collected during long-term population monitoring surveys continued to inform the UI's study of NIDGS population response to habitat treatments and plague. Specifically, our surveys established the overall population status as a reference point for the University's stepped-down work at a subset of NIDGS sites (Goldberg et al. 2017, Allison et al. 2019). For example, if NIDGS numbers were lower at individual research plots, our survey results from the entire suite of NIDGS sites provided a perspective as to whether overall numbers were trending up or down. Because long-term monitoring surveys occur at research study sites, we maintained a high level of coordination with the University crew to minimize disturbance to NIDGS.

### **7. Discuss differences between work anticipated in grant proposal and grant agreement, and that actually carried out with Federal Aid grant funds.**

Objective *a* was completed during fall 2018 with remaining funds from other sources, specifically a previous Section 6 grant (F17AF01082) and the above-mentioned cooperative agreement with the Boise Field Office. All other objectives were completed as anticipated.

### **8. List any publications or in-house reports resulting from this work.**

Wagner, B., and D. Evans Mack. 2020. Long-term population monitoring of northern Idaho ground squirrel: 2019 implementation and population estimates. Endangered Species

Section 6 Grant F18AF01191 and Cooperative Agreement No. F18AC00387. January 29, 2020. Idaho Department of Fish and Game, Boise, Idaho, USA.

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**Literature Cited**

- Allison, A. Z. T., A. M. Toumpas, A. R. Goldberg, and C. J. Conway. 2019. Effects of forest encroachment on demography of the northern Idaho ground squirrel: annual progress report 2019. Wildlife Research Report #2019-02. Idaho Cooperative Fish and Wildlife Research Unit, Moscow, Idaho, USA.
- Evans Mack. 2019. Northern Idaho ground squirrel annual population monitoring. Section 6 Project F18AF01191 Interim Report. Prepared for the U.S. Fish and Wildlife Service, December 2019. Idaho Department of Fish and Game, Boise, Idaho, USA.
- Goldberg, A. R., A. Z. Allison, and C. J. Conway. 2017. Effects of forest encroachment and plague on demography of the northern Idaho ground squirrel: annual progress report 2017. Wildlife Research Report #2017-01. Idaho Cooperative Fish and Wildlife Research Unit, Moscow, Idaho, USA.
- Wagner, B., and D. Evans Mack. 2016. Long-term population monitoring of northern Idaho ground squirrel: 2016 implementation and population estimates. Unpublished report to the U.S. Fish and Wildlife Service, threatened and endangered species project F15AF00965 and cooperative agreement no. F11AC00175. December 19, 2016. Idaho Department of Fish and Game, Boise, Idaho, USA.
- Wagner, B., and D. Evans Mack. 2019. Long-term population monitoring of northern Idaho ground squirrel: 2018 implementation and population estimates. Endangered Species Section 6 Grant F17AF01082 and Cooperative Agreement No. F17AC00437. January 15, 2019. Idaho Department of Fish and Game, Boise, Idaho, USA.
- U.S. Fish and Wildlife Service. 2003. Recovery plan for the northern Idaho ground squirrel (*Spermophilus brunneus brunneus*). U.S. Fish and Wildlife Service, Portland, Oregon, USA.

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