

**Alaska Department of Fish and Game
Wildlife Restoration Grant**

GRANT NUMBER: AKW-10 Wildlife Restoration FY2016

PROJECT NUMBER: 34.0

PROJECT TITLE: Forest management and wildlife-habitat relationships in Interior Alaska

PROJECT DURATION: 1 July 2014–30 June 2017 (extended to FY 2017)

REPORT DUE DATE: 1 September 2016

PRINCIPAL INVESTIGATORS: Thomas F. Paragi, Julie C. Hagelin, and Scott M. Brainerd

COOPERATORS: James D. Durst (ADF&G-Division of Habitat), Martha Freeman (Alaska Department of Natural Resources-Division of Forestry)

WORK LOCATION: Region III, Fairbanks

I. SUMMARY OF WORK COMPLETED THIS SEGMENT ON JOBS IDENTIFIED IN ANNUAL WORK PLAN

OBJECTIVE 1: Conduct a literature review that summarizes existing information about boreal wildlife and habitat that is applicable to forest management in Interior Alaska.

JOB/ACTIVITY 1A: Conduct literature review.

In the second year we continued the literature review to assemble the state of information from the circumpolar boreal region on forest-wildlife interactions and wildlife response to forest practices. Hagelin's contributions for non-game species were supported under State Wildlife Grants T-32 and 32-1, Project# 11. We also worked with the cooperators to draft an outline of the technical bulletin intended as the final report so findings and recommendations target the intended audience of forest and wildlife managers.

OBJECTIVE 2: Design a framework for monitoring and adaptively managing forests and wildlife in the Tanana Valley, Alaska.

JOB/ACTIVITY 2A: Identify habitat gradients that may describe the relationship between wildlife species richness metrics and forest structure or composition within timber harvest areas of the Tanana Valley.

We obtained a modeled 1-km raster of forest diversity based on Shannon's index for the Tanana Valley (Young 2012; tree species and size) and classified polygons of stand-level inventory for the Tanana Valley State Forest (TVSF) from the Alaska Division of

Forestry (2013; dominant or codominant species, size class, canopy closure) for preliminary evaluation of habitat gradients. Paragi used ArcGIS10 and Excel to produce histograms of tree diversity scores and Jenks' natural breaks (Jenks 1967) of a stand shape metric (perimeter:area) for administrative regions of the TVSF to begin work on job/activity 2B.

JOB/ACTIVITY 2 B: Design a pilot study aimed at describing patterns in wildlife conditions (e.g., songbird diversity) or effects (e.g., herbivory on trees) at extremes of habitat gradients to discern the range of existing conditions or effects correlated to habitat patterns in managed forests.

We contracted a biometrician (Dr. Joshua Schmidt) to evaluate sampling design for detecting differences in species occupancy and possibly relative abundance of land birds relative to the two habitat gradients in job 2B to predict effects of timber harvest. Initial options were provided, with a caution that the scale of audible detection of bird songs could include multiple habitat types or timber sale units.

II. SIGNIFICANT DEVIATIONS AND/OR ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

Hagelin and Paragi continued invited participation in the final 2 meetings of a science and technical committee convened by the Alaska Board of Forestry to review reforestation standards for the boreal region. The committee evaluated regulations that govern regeneration of harvested forest and recommended practices, including minimum stocking levels that must exist after timber harvest and recommendations for post-logging site preparation (scarification, control of competing vegetation, planting of seedlings, etc.). Our contributions highlighted the positive and negative relationships between reforestation practices, habitat, and wildlife populations.

Paragi was invited to serve on a separate implementation committee composed of forest land managers and representatives from industry and environmental interests that are charged with drafting modifications to existing regulatory language and recommended practices. This committee was asked to balance the recommendations of the science and technical committee with pragmatic considerations of economics and feasibility of operations, including in rural Alaska. The implementation committee met 3 times in spring 2016. Our research recommendations were endorsed by the implementation committee as high priority (adaptive management on wildlife interactions with reforestation) and moderate priority (interactions of post-logging debris, rodent abundance, and mycorrhizal fungi dispersal). Committee recommendations were submitted to the Alaska Board of Forestry for consideration.

III. PUBLICATIONS

Paragi, T.P., Hagelin, J.C. and Brainerd, S. M. 2016. Habitat Guidelines for Boreal Forest Management. *The Alaskan Wildlifer*: Fall 2015, p. 9-10.

Accessible online only at:

http://wildlife.org/wp-content/uploads/2015/12/TWS_AK_Newsletter_Fall_2015.pdf

Literature cited:

Jenks, G.F. 1967. The data model concept in statistical mapping. *International Yearbook of Cartography* 7:186–190.

Young, B.D. 2012. Diversity in the boreal forest of Alaska: distribution and impacts on ecosystem services. Ph.D. Dissertation, University of Alaska Fairbanks.

IV. RECOMMENDATIONS FOR THIS PROJECT

In the final year we will complete the bibliography and EndNote database, with further annotation limited to selected citations as time permits. Synthesis of the literature will occur to describe forest-wildlife interactions and wildlife response to forest practices germane to Interior Alaska.

We will identify 2-3 landscape metrics from the literature that have demonstrated relationship to bird species diversity in forests to inform a 1 km² moving window analysis for characterizing gradients in the metrics based on the forest inventory data.

We will use the synthesis plus patterns we identified in existing spatial data on forest vegetation and disturbance patterns from fire and logging to recommend a framework for monitoring and adaptively managing forests and wildlife in areas where trees are commercially harvested in the Tanana Valley. Hagelin's future contributions to this project will be funded under State Wildlife Grant T-32-1, Project# 11.0.

PREPARED BY: Thomas F. Paragi

DATE: 18 August 2016