Alaska Department of Fish and Game Wildlife Restoration Grant

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SEGMENT NUMBER: 9

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PROJECT TITLE: Black bear and grizzly bear abundance and distribution in the Tanana Flats in Interior Alaska

PROJECT DURATION: 1 July 2009–30 June 2012

REPORT DUE DATE: 1 September 2011

PRINCIPAL INVESTIGATOR: Craig L. Gardner, ADF&G

COOPERATORS: John A. Haddix II and Amal Ajmi (U.S. Army)

WORK LOCATION: Tanana Flats, Game Management Unit 20A

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

OBJECTIVE 1: Obtain an unbiased and precise estimate of black bear numbers in the U.S Army's Tanana Flats Training Area located in northcentral Unit 20A.

During January–March 2010, we completed the DNA-based mark/recapture black bear population estimate study design following an extensive literature review and consultation with other researchers. The 379-mi² study area maximized coverage of the U.S. Army's Tanana Flats Training Area as well as one of the most important moose calving areas in Unit 20A. We initiated the study on 10 June 2010. We established a systematic grid design by dividing the study area into 157 1.5 mi × 1.5 mi sample units. In the center of each sample unit, 1 hair trap was constructed. The hair trap consisted of a single strand of barbed wire about 90 feet in length wrapped around 3–6 trees, 18 inches above the ground. Each trap was baited with 3 quarts of liquid consisting of rotted-down fish (2 quarts) and cow blood (1 quart). We checked and rebaited each trap once every 8 days. All hair samples were collected for DNA analysis. Traps were not moved between sessions. To minimize bear habituation, we added a novel scent in addition to fish/blood bait during sessions 2–5. We also placed motion detection cameras at 7 trap sites. We completed 5 sampling sessions. We began developing likelihood-based spatially explicit models to estimate population size and expect completion by December 2011.

JOB/ACTIVITY 1: Literature review.

No federal funds were used to pay for this activity. On a monthly basis, I conducted a literature search for information on bear DNA-based mark/recapture population estimate techniques and analyses, seasonal movements, and habitat use. I have acquired numerous publications that helped with study design and population and distribution model development.

OBJECTIVE 2: Delineate black bear distribution in the Army's Tanana Flats Training Area located in northcentral Unit 20A.

We made progress on this objective by initiating development of a spatially-explicit model that incorporates individual heterogeneity in capture probability and home range size. We expect completion of this analysis by December 2011.

OBJECTIVE 3: Further develop and evaluate DNA-based mark/recapture sampling in forested areas of Interior Alaska.

We did not work on this objective during this report period. We will be able to evaluate our sampling design and how well we met design assumptions once we complete our models and derive our estimate. Our estimated completion date is December 2011.

JOB/ACTIVITY 3: Conduct the DNA MRC study in the Tanana Flats in Unit 20A.

Federal funds were used for logistical support and equipment. We monitored 157 hair traps in a 379-mi² study area. We checked each trap 5 times on an 8-day schedule. We collected 1,867 total hair samples.

OBJECTIVE 4: Compare black bear distribution with moose calving areas.

We have not completed all the analyses necessary for this objective. We did plot out black bear capture locations relative to moose calving sites during 1996–2002 in Figure 1 below. These data indicate that moose calved during this period in areas where black bear capture success was lowest however more thorough analyses are necessary before any conclusions can be made.

JOB/ACTIVITY 4: Analyze DNA samples.

Federal funds were used to pay for the laboratory costs to perform the genetic analyses on 1,867 hair samples. The lab completed the first analysis identifying 81 individual black bears (28 males, 53 females) from 825 black bear samples and 10 individual grizzly bears (9 males, 1 female) from 71 grizzly bear samples. The remainder of the hair samples were either not adequate for analysis or did not come from either a black or grizzly bear. Each individual black bear was caught on average 3.5 times over the course of the study. The lab is currently completing analyses determining relationships between the 81 black bears.



FIGURE 1. Plot of calving sites during 1996–2002 relative to where black bears were detected by hair traps during 10 June–25 July 2010 in the Tanana Flats, Unit 20A.

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