

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

GRANT NUMBER: W-33-8

PROJECT NUMBER: 17.80

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

PROJECT DURATION: 1 July 2009–30 June 2011

REPORT PERIOD: 1 July 2009–30 June 2010

REPORT DUE TO HQ: 1 September 2010

PRINCIPAL INVESTIGATOR: Craig L. Gardner

WORK LOCATION: Tanana Flats in Interior Alaska

COOPERATOR: John Haddix (U.S. Army)

I. PROBLEM OR NEED THAT PROMPTED THIS RESEARCH

The U.S. Army was interested in conducting a joint study with the Alaska Department of Fish and Game (ADF&G) in evaluating the status of black (*Ursus americanus*) and grizzly bear (*Ursus arctos*) populations in the northcentral Tanana Flats in Interior Alaska (includes the Tanana Flats Training Area). Study results will be used by the U.S. Army for planning military training exercises and to meet the data requirements of the *Integrated Natural Resource Management* and the *Integrated Cultural Resource Management Plans*. For ADF&G, unbiased and precise estimates of bear densities and distribution in the Tanana Flats was lacking and would help evaluate the effects of bear predation on moose as part of an ongoing intensive management program (AS 16.05.255[e]-[g]) and assist area managers in developing seasons and bag limits for bears in Unit 20A.

II. REVIEW OF PRIOR RESEARCH AND STUDIES IN PROGRESS ON THE PROBLEM OR NEED

During 1988–1991, Hechtel (1991) monitored black bear movements and distribution and summer and autumn range use within the study area by radiocollaring 29 and eartagging an additional 15 black bears. Mean home range sizes were 59.3 km² for adult females, 82.1 km² for subadult females, 595.9 km² for adult males, and 240.2 km² for subadult males. Females accompanied by cubs had the smallest home ranges (9–39.6 km²). Hechtel estimated the black bear density to be 46–67 bears/1000 km² based on home range size and juxtaposition, and adjusted for unmarked and harvested bears. He realized this estimate was based on assumptions that could not be verified. During the 1980s, grizzly bear distribution, demographics, and population size and trends were studied in

the Alaska Range, 32 km south (Reynolds et al. 1987). Until now, no population survey of black or grizzly bears has been made in the Tanana Flats.

Probably due to a combination of habitat features and bear density, black and grizzly bears are difficult to observe. Thus, aerial survey methods have not been considered appropriate for counting bears on the Tanana Flats. A noninvasive method using DNA-based mark–recapture to estimate bear population numbers was developed to be used where aerial surveys were not appropriate. DNA-based mark–recapture population estimate studies have been conducted for both black and grizzly bears across North America, including Interior Alaska. Through these previous studies, much was learned about study design on how best to minimize bias and maximize precision by choosing the optimal study area and sample unit sizes, trapping period length, trap sites, and addressing closure issues.

Boulanger (2003) estimated both black and grizzly bear numbers using the same DNA-based mark–recapture sampling protocol. He found that interspecific differences in movement patterns and behavior affected population and variance estimates, which disallowed a protocol for simultaneous sampling of both species. The Unit 20A study design for black bear population estimation is based upon Boulanger (2003) and daily movement and seasonal home range data collected on black bears in Unit 19D (M. Keech, ADF&G, unpublished data) and grizzly bears in Unit 20E (C. Gardner, ADF&G, unpublished data).

III. APPROACHES USED AND FINDINGS RELATED TO THE OBJECTIVES AND TO PROBLEM OR NEED

Fieldwork was initiated in June 2010 and continued into July 2010. Thus, the results presented here are preliminary.

OBJECTIVE 1: Obtain an unbiased and precise estimate of black bear numbers in a portion of Tanana Flats including the U.S. Army’s Tanana Flats Training Area.

After completing an exhaustive literature search, I and the DWC Biometrician B. Taras designed the study with the following considerations: study area location; sample unit size; and sample period timing, length, and number. We had funding and personnel to sample a 981-km² study area (157 sample units). We positioned the study area to maximize coverage of the U.S. Army’s Tanana Flats Training Area, to encompass important moose calving areas (R. Boertje and K. Kellie, ADF&G, personal communication), and to use geographical boundaries that would limit bear movements across. Sample unit size (2.5 km × 2.5 km) was determined using black bear movement data collected near McGrath, Alaska during 2007 and 2010 (M. Keech, ADF&G, unpublished data) and the Tanana Flats during the late 1980s (Hechtel 1991). In an attempt to maximize capture and recapture rates of black bears, we initiated sampling on 10 June (timed to increased movements) and conducted 5 sampling episodes that lasted 8 days each. During each sampling period, we re-baited and added a novel scent to minimize bear habituation.

We collected 1867 hair samples (240–438/sample period). The percent traps that caught hair ranged from 35% to 48%. The DNA analysis necessary to obtain population and distribution estimates was not completed prior to this report.

OBJECTIVE 2: Delineate black bear distribution in a portion of Tanana Flats including the U.S. Army's Tanana Flats Training Area

We conducted equal sampling intensity throughout the study area by placing one trap at the center of each sample unit. We initiated sampling on 10 June to coincide with increased bear movements.

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

We did not work on this objective prior to this report.

OBJECTIVE 4: Compare black bear distribution with moose calving areas

The DNA analysis will be completed in FY11. Once this is completed, we will be able to objectively compare black bear and moose calving distribution.

OBJECTIVE 5: Estimate prevalence of grizzly bears in the study area

The DNA analysis necessary to detect grizzly bear prevalence will be completed in FY11.

IV. MANAGEMENT IMPLICATIONS

Once completed, this study will be used by the U.S. Army for planning military training exercises and to meet the data requirements of the *Integrated Natural Resource Management* and the *Integrated Cultural Resource Management Plans*. For ADF&G, having unbiased and precise estimates of bear densities and distribution in the Tanana Flats will help evaluate the effects of bear predation on moose, especially calves on the calving grounds, and assist area managers in developing seasons and bag limits for bears in Unit 20A.

V. SUMMARY OF WORK COMPLETED ON JOBS FOR LAST SEGMENT PERIOD ONLY

JOB/ACTIVITY 1: Literature review

Accomplishments: Completed an exhaustive literature search. Used federal aid funds to support project personnel.

JOB/ACTIVITY 2: Study design

Accomplishments: Completed developing the study design. Used federal aid funds to support project personnel.

JOB/ACTIVITY 3: Conduct DNA Moose Research Center study

Accomplishments: Completed fieldwork portion of the study. Used federal funds to support project personnel and field logistics and to purchase field equipment.

VI. PUBLICATIONS

None.

Literature Cited:

BOULANGER, J. 2003. Estimates of black bear (*Ursus americanus*) population size using DNA based mark-recapture, upper Columbia River, British Columbia, Canada 1996–1998. Upper Columbia River Bear Research Project c/o Mount Revelstoke and Glacier National Parks of Canada, Box 350, Revelstoke, British Columbia, Canada.

HECHTEL, J. L. 1991. Population dynamics of black bear populations, Fort Wainwright, Alaska. Final report to the U.S. Army. Alaska Department of Fish and Game. U.S. Army 6th Infantry Division (Light). Natural Resources Report 91-2. Fairbanks, Alaska, USA.

REYNOLDS, H. V., J. L. HECHTEL, AND D. J. REED. 1987. Population dynamics of a hunted grizzly bear population in the northcentral Alaska Range. Alaska Department of Fish and Game. Federal Aid in Wildlife Restoration. Research Progress Report. Job 4.19R. Project W-22-5. Juneau, Alaska.

VII. RECOMMENDATIONS FOR THIS PROJECT

None.

Prepared by: Craig L. Gardner

Date: 11 August 2010