FEDERAL AID ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 115526
Juneau, AK 99811-5526

Alaska Department of Fish and Game
Wildlife Restoration Grant

GRANT NUMBER: W-33 **SEGMENT NUMBER:** 11

PROJECT NUMBER: 4.40

PROJECT TITLE: Grizzly bear use of the North Slope oil fields and surrounding region

PROJECT DURATION: 1 July 2008–30 June 2014[1]

REPORT DUE DATE: 1 September 2013

PARTNER: National Fish and Wildlife Foundation

PRINCIPAL INVESTIGATOR: Richard T. Shideler, ADF&G

COOPERATORS: None

WORK LOCATION: Game Management Units 26B and 26C, oil field region

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

OBJECTIVE 1: Develop a grizzly bear den habitat selection model that can be applied at the landscape level to remote sensing imagery to predict high, medium, and low probability denning habitat.

JOB/ACTIVITY 1A: Develop a grizzly bear den habitat selection model.

Problems with the scale of available Digital Terrain Maps (DTM) continue to thwart our objective to develop a habitat selection model and map. From the University of Alaska Fairbanks-Geographic Information Network of Alaska (GINA) we obtained a DTM derived from the National Elevation Dataset (NED) 1/3 arc-second imagery that had been upgraded by incorporating Interferometric Synthetic Aperture Radar (IfSAR) imagery of the North Slope. Horizontal resolution of this imagery was ca. 10 m; however, vertical resolution was ±7 m. This limited its usefulness because this magnitude of elevation error on the coastal plain of the North Slope could make the difference between well-drained and wetland habitat (i.e., suitable vs. unsuitable denning habitat). As an initial test we compared slope and aspect measured at 120 dens of the 273 dens inspected since 1992

[1] Federal Aid in Wildlife Restoration funds the principal investigator's salary. Operating funds from the National Fish and Wildlife Foundation grant have been extended until the end of December 2013, so final results won't be available until 2014.

with slope and aspect derived from the DTM. Resolution scale errors were apparent. In some cases, aspect differed 180º between the den and the map. Clearly mapping at a finer scale will be necessary to accurately delineate suitable denning habitat. We are awaiting public availability of Alaska Statewide Mapping Initiative DTM's which were acquired from orthoimagery at 2.5 m resolution. Initial schedule for release of this imagery was May 2011 but they have yet to become available for the study area. No further progress on this model was made in FY13 due to the delay in release of the higher resolution DTM.

JOB/ACTIVITY 1B: Collect data on habitat characteristics of radiomarked bears, and field verify areas of high, medium and low probability denning habitat based on the predictive model generated in job 1a.

We restricted our fall 2012 den location radiotracking flights to the immediate oil field area. We located 14 dens of radiomarked bears by interpretation of their radio signals. These dens will be inspected in FY14.

We inspected 7 dens of radiomarked bears to augment the existing database of 297 dens previously inspected. These dens were also included as part of the den detection evaluation in job 1c. Data on habitat characteristics of these dens will also be used to update the den habitat model in job 1a.

No progress was made on field verification of the den habitat selection model pending release of the higher resolution DTM (see job 1a).

JOB/ACTIVITY 1C: Evaluate the efficacy of den detection methods (e.g., hand-held and airborne Forward Looking infrared "FLIR" imagers, trained scent dogs).

Due to decreased operational funding in 2012–2013 from our National Fish and Wildlife Foundation grant, we did not conduct airborne or handheld FLIR surveys of grizzly bear dens in FY13.

In March 2013 we surveyed 3 dens with 2 Karelian Bear Dogs. Both dogs detected all 3 dens. Two dens were located >400 m from their initial location identified by radiotracking survey in fall 2012. One den was located <400 m from the trans-Alaska pipeline right-of-way. During FY14 we will ground-truth both the preliminary and final den locations, obtain aerial photos, and measure distance between the dog alert and true den location. We expect that the discrepancy in the 2 den locations was due to radio reception characteristics during the initial survey rather than bears moving to different dens after the survey.

JOB/ACTIVITY 1D: Construct and instrument an artificial den to test the accuracy of FLIR under varying snow conditions.

In fall 2011, following deliberate or accidental interference with our artificial den experiments the previous 2 seasons, we excavated and instrumented a new den in a stream bank near an isolated drill site in the Kuparuk oil field. This location provided a bank that mimics a naturally occurring den site and was located within a reasonable distance to permanent electricity for maintaining our heater during the winter. On

26 October 2012 we excavated a new den adjacent to the 2011 den, instrumented it with thermistors inside the den and on the ground surface adjacent to it, and installed the den heaters. We obtained only 2 imagery sessions during the winter. On 28 December there was no FLIR image available. On 9 March, there was a dim image at 10 m and 20 m, respectively and no images beyond 20 m. These data will be incorporated into the final project report in 2014.

OBJECTIVE 2: Investigate the response of bears feeding on naturally-available foods to the removal of food-conditioned bears.

JOB/ACTIVITY 2A: Capture bears and replace radio collars.

We recaptured 17 radiomarked bears and replaced their VHF radio collars. We flew 6 radiotracking flights and relocated up to 35 bears on each flight. In fall 2011 we captured a subadult female that was the first recent case of a bear becoming conditioned to anthropogenic food sources in the oil-field region. In spring 2012, at age 5 she appeared in the oil field with a new cub, making her one of the youngest females to breed successfully. Unfortunately, she shed her collar in July 2012 and we were unable to keep track of her or confirm her cub's fate. Another previously identified and long-time food-conditioned female continued to periodically use anthropogenic food available in Deadhorse and at the North Slope Borough landfill.

JOB/ACTIVITY 2B: Analyze grizzly bear DNA specimens for individual relationships.

We collected 51 specimens from newly captured bears, barbed wire hair snares around the oil-field margin, carcasses from hunter kills or predator control programs in the area, and from an unidentified subadult hit with a biopsy dart. These specimens were sent to Wildlife Genetics International, Nelson, British Columbia, Canada, to be analyzed and compared with the existing database on individual relationships. We have completed only a preliminary analysis of the results but we found that only 2 of 13 hair snares successfully yielded DNA, and neither had bears from the capture sample. This indicated there are non-marked bears using the oil fields. Of 13 newly captured bears from 2011 and 2012, both parents of 7 were from the marked bear sample. Four bears from the harvest sample were marked adult males that had shed their collars >5 years ago and whose fate had been unknown. Two other bears from the harvest sample had both parents confirmed as being previously captured and marked in the study area. A subadult male shot with a biopsy dart just outside the eastern part of the oil field in fall 2012 turned out to be unrelated to any of the previously marked bears in our study population.

JOB/ACTIVITY 2C: Analyze grizzly bear tissue for stable isotopes.

We collected hair and blood samples from the bears we captured and from bears that were killed by hunters or the department-conducted predator control program in or near the study area. Those samples processed by the University of Alaska Fairbanks-Stable Isotope Facility. Results are still being analyzed and will be included in the final report.

OBJECTIVE 3: Prepare annual and final progress reports, interim and final technical reports, and give presentations at scientific forums.

JOB/ACTIVITY 3A: Data analysis and reporting.

Data analysis was ongoing.

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

None.

III. PUBLICATIONS

- A manuscript entitled "Effects of food-conditioning on grizzly bears in the North Slope oil fields, Alaska" was previously submitted to the journal *Ursus* and returned with suggested revisions. The journal is currently undergoing a change of editorial leadership and when the new editorial board is selected the revised manuscript will be resubmitted.

- A manuscript entitled "Stable isotope analysis of grizzly bears on Alaska's North Slope" was submitted to the journal *Ursus,* and was returned for revision. We are currently revising the manuscript for resubmission in fall 2014.

IV. RECOMMENDATIONS FOR THIS PROJECT

Operational funding for this project has been provided by a grant from the National Fish and Wildlife Foundation, and will expire at the end of December 2013. The following recommendations apply to future research and monitoring.

1. Maintain a sample of ca. 30 radiomarked bears within the oil field region and monitor demographic characteristics and oil field use.

2. Conduct radiotracking surveys of dens within the oil-field region and provide locations to industry to meet their permitting requirements to avoid occupied dens. Upon completion of a den habitat suitability map, ground-truth locations to evaluate the precision of the map.

3. Once an accurate den habitat map becomes available, identify areas that may be affected by industry winter activities and apply a feasible detection method to identify active dens.

4. Continue to collect and analyze genetic data from newly captured bears, from hair collected at snares around the oil field, and from hunter harvest or department predator control projects.

5. Instrument the artificial den and survey with the handheld IR imager to evaluate the effects of weather (e.g., wind velocity, temperature differential between surface and den) and snow conditions (e.g., depth, density, presence/absence of ice layers) that may affect the IR signal.

6. Continue to conduct handheld IR imager surveys of dens within reasonable access of the oil field permanent or ice road system until there is sufficient data to evaluate feasibility of this method under a variety of weather (e.g., surface wind velocity) and snow (e.g., depth, density, presence/absence of ice layers) conditions .

7. Continue to evaluate the feasibility of using dogs to detect denning bears, especially focusing on the weather and snow conditions (e.g. snow depth, snow density, presence of ice layers) when dogs fail to locate the den or require an unacceptably long time (e.g., >0.5 hr) to detect the den.

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DATE: 5 August 2013