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:** 10

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

REPORTING PERIOD: 1 July 2011 – 30 June 2012

REPORT DUE DATE: 1 September 2012

PRINCIPAL INVESTIGATOR: Richard Shideler, ADF&G

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

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

OBJECTIVE 1: <u>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</u>.

JOB/ACTIVITY 1A: <u>Develop a grizzly bear den habitat selection model</u>.
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) one-third 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 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.

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 inspected 22 dens of radiomarked bears to augment the existing database of 251 dens previously inspected. Data on habitat characteristics of these dens will be used to update the den habitat model in job 1a. We located 31 dens of radiomarked bears during fall 2011 radiotracking surveys. Because of poor ground visibility 7 of these were located by interpretation of the radio signal from ca. 1,000 m AGL; therefore, their precision is suspect. These dens will be inspected in FY13.

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

We flew an airborne FLIR survey in January 2012. We detected 3 putative dens before problems with the helicopter and FLIR unit required us to abort the survey. Subsequent weather conditions required cancellation of the remainder of the survey. Such problems appear to be endemic to operating at the extreme weather conditions (−30 to −40º) typical of the North Slope at this time of year and call into question the reliability of this method. In February we used a hand-held IR imager (FLIR Systems Inc. P660 ThermaCam™) transported in a Hagglunds tracked vehicle to survey the 3 dens surveyed with the airborne FLIR as well as 5 additional putative dens identified from the fall radiotelemetry survey. We obtained images on 5 of the 8 dens, but maximum detectable range was 20 m. Although this was the most success we have experienced with the handheld IR surveys in the past 3 years surveys, from an operational standpoint the short detection range would not be a feasible method to detect dens over large areas.

In April we surveyed 7 dens with 2 Karelian Bear Dogs. Both dogs detected all 7 dens. During FY13 we will ground-truth den locations, obtain aerial photos of the dens, and measure distance between the dog alert and true den location.

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

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 drillsite in the Kuparuk oilfield. Due to an early snowstorm that completely covered the den with 270 cm of dense snow in late fall, we were unable to install heaters in the den until after the airborne FLIR survey. We were unable to obtain imagery until April but the images were too washed out with residual solar radiation to be useful. We will continue this job in FY13.

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

JOB/ACTIVITY 2A: Prepare grizzly bear DNA specimens for analysis.

We collected 51 specimens from newly captured bears, barbed wire hair snares around the oilfield margin, carcasses from hunter kills or predator control programs in the area,

and from an unidentified subadult hit with a biopsy dart. These specimens are being analyzed and compared with the existing database on individual relationships to identify related individuals and groups.

JOB/ACTIVITY 2B: Capture bears and replace radio collars.
We recaptured 11 radiomarked bears and replaced their VHF radio collars, and captured 1 unmarked bear and fitted her with a VHF radio collar. We flew 9 radiotracking flights and relocated up to 40 bears on each flight. We also located 3 bears from the oil field road system. The newly captured bear appears to be the first recent case of a bear becoming conditioned to anthropogenic food sources in the oilfield region. Another previously identified food-conditioned female continues to periodically use anthropogenic food available in Deadhorse and at the North Slope Borough landfill. A second female that was originally food-conditioned has shifted to a natural food diet and has not obtained anthropogenic food in the past 4 years.

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 predator control program in or near the study area. Those samples are awaiting processing by the University of Alaska Fairbanks, Stable Isotope Facility.

OBJECTIVE 4: Prepare annual and final progress reports, interim and final technical reports, and give presentations at scientific forums.

JOB/ACTIVITY 4: Data analysis and reporting.
Data analysis was ongoing.
During this report period results were used to prepare an oral presentation and a poster at the 20th International Conference on Bear research and Management in Ottawa, Ontario, Canada in July 2011.
- o Poster: "Use of dogs to detect grizzly and polar bear dens on Alaska's North Slope" by R. Shideler.
- o Oral: "Is it ethical to capture brown bear offspring?" by H. Reynolds, A. Zedrosser, and R. Shideler.
Results from this project were used during discussions about human-bear conflicts at the 4th international Human-Bear Conflicts Workshop in Missoula, Montana in March 2012. In addition, a poster titled "Design and operation of Arctic oilfields to minimize conflicts with grizzly bears" was presented at the workshop.

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.

IV.   RECOMMENDATIONS FOR THIS PROJECT

Operational funding for this project has been provided by a grant from the National Fish & Wildlife Foundation, and will expire at the end of FY13. 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, identify areas that may be affected by industry winter activities and apply a feasible detection method to identify active dens.
3. 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.
4. Instrument and monitor the artificial den with the hand-held IR imager and 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.
5. Continue to conduct hand-held 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.
6. 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.

PREPARED BY: Richard T. Shideler

DATE: 13 August 2012