Alaska Department of Fish and Game
Division of Wildlife Conservation
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Ecological Studies of the Kenai Peninsula Brown Bear

Sean Farley

Research Performance Report
1 July 2001–30 June 2002
Federal Aid in Wildlife Restoration
Grant W-27-5, **Project** 4.29

This is a progress report on continuing research. Information may be refined at a later date.

FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
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PROJECT TITLE: Ecological studies of the Kenai Peninsula brown bear

PRINCIPAL INVESTIGATOR: Sean Farley

COOPERATORS: Kenai National Wildlife Refuge, United States Fish and Wildlife Service, U.S. Department of the Interior; Chugach National Forest, U. S. Forest Service, U.S. Department of Agriculture; Kenai Fjords National Park, National Park Service, U.S. Department of Interior

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR.: W-27-5

PROJECT NR.: 4.29

WORK LOCATION: Kenai Peninsula

STATE: Alaska

PERIOD: 1 July 2001–30 June 2002

I. PROGRESS ON PROJECT OBJECTIVES

OBJECTIVE 1: Assess survivorship and recruitment to evaluate perceived population trends seen in recapture data.

Two new female bears were added to the Kenai database, and multiple telemetry flights were conducted to track overall cub production and survivorship for all collared bears. Data analyses are not complete at this time.

OBJECTIVE 2: Determine if Kenai brown bears represent a population exhibiting large litter sizes and early weaning.

Data analyses are not complete.

OBJECTIVE 3: Measure the degree of heterozygosity seen in the Kenai brown bears, and calculate an "effective population size" (N_e)

A graduate Master's student in genetics is 3/4 finished with his analysis. Preliminary results show the nuclear genetic variation of the Kenai brown bear population comparable to other Alaskan peninsular populations with nuclear microsatellite levels of heterozygosity of ($H_O = 0.67$), ($H_E = 0.69$). Calculations for effective population size are not complete.
OBJECTIVE 4: Assess habitat use, identify key travel corridors, and quantify the nutritional resource needs of adult male brown bears.

An additional 3 adult males were handled this year. One resulted in a capture mortality, one dropped his collar, and one has gone off the air. Technical difficulties remain.

OBJECTIVE 5: Experimentally evaluate if the management concept of "buffers" has biological relevance to Kenai brown bears.

No work has been accomplished on this objective.

OBJECTIVE 6: Continue to evaluate and refine the cumulative effects model.

The USFS GIS expert working on this project moved to other duties, and his replacement was not hired for a year. No additional work has been completed.

OBJECTIVE 7: Develop and apply new technologies (e.g., video collars, triaxial accelerometers) to ecological studies of bears.

The field test for Timed Data Recorder (TDR) use was complete. Graphical analyses allow the researcher to visually score bouts of feeding by bears, but an analytical approach is still required. We are currently exploring the use of wavelets as an analysis tool. Regardless, the TDR appear to show a bear's entry into water, and possibly it's subsequent capture of fish.

OBJECTIVE 8: Determine if the geographic range of Kenai Peninsula brown bears extends into Prince William Sound.

No work was conducted on this objective this year.

OBJECTIVE 9: Continue publication and report writing.

A poster presentation of TDR use was made at the International Meeting on Bear research and management in May 2001, as were oral presentations on DLP analysis and probability-use maps. The results of the genetics work are in draft form and will be submitted for publication this fall.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD (related objectives indicated in parentheses)

JOB 1: Assess population trend from additional data on population age structure, adult and offspring survival and offspring recruitment.

Information will be collected in the course of radiocollaring across the peninsula (1,2). A total of 28 tracking flights were conducted this year, resulting in 240 radio-relocations. Data on cub production, survivability, and litter sizes were collected for 29 bear family groups and analyses continue.

JOB 2: Use biological samples (blood and tissue) collected from radiocollared and sealed bears for mitochondrial and microsatellite analyses (3).

Additional genetics work did not detect a significant inbreeding coefficient (mean inbreeding coefficient ($F = .000128$; $p>0.05$, $\chi^2 < 3.84$). Hierarchical analysis of molecular variance suggests that <99% of the Kenai Peninsula brown bear microsatellite variation occurs within brown bears north and south of Lake Tustumena, and that no north-south division exists. A demographic bottleneck was not detected.

JOB 3: Specifically capture adult male brown bears for radiocollaring and biological sample collection. Employ new technology (remote release Global Positioning System (GPS), video, tri-axial accelerometer collars, stable isotope and fatty acid signatures, and total body water dilution to better assess the nutritional ecology (e.g. seasonal diet and changes in body composition) of adult male brown bears (1,3,4,7).

The collaring of large adult male brown bears continues to be problematic. A large adult male was captured during Fall 2001, but died the next day. A second captured male dropped his collar after wearing it for only 2 weeks, and a third male was not located after den emergence. Results were similar to last year. No additional work has been conducted.

JOB 4: Conduct snaring in areas critical to management, but impossible to work by air (5).

Snaring was conducted during August on Glacier Creek. Three brown bear were captured (2 male, 1 female), 10 black bear, and 1 wolf.

JOB 5: Develop algorithms to simulate the assumed biological basis of "buffers," utilizing extensive location data collected by GPS collars. Attempt to conduct controlled field experiment to test assumptions, using radiocollared animals in areas with known timber (5).

No work was accomplished on this job this year.

JOB 6: Continue to map brown bear locations collected via aerial telemetry and GPS collars for identification of habitat use, peninsula-wide species range and discrete travel corridors (6).

Nine bears were handled (helicopter darting and snaring) for a total of 11 captures. Three bears (1 female; 2 males) wore GPS-SOB collars from mid August until late fall, and the collars recorded a total of 3,546 locations.

JOB 7: Incorporate the soon-to-be-released Peninsula vegetation map for testing and refinement of the cumulative effects model (6).

The vegetation map has been incorporated into a resource-selection function database, and a probability use map was created. It is included in the recently printed conservation assessment (see below), and has been presented at various scientific meetings during 2001-2002.

JOB 8: Collect scat samples from select salmon streams on the Peninsula's east coast; use DNA-based techniques to determine if the samples are black or brown bear in origin (8).

No work was conducted.

JOB 9: Preparation of reports and technical publications (9).

The conservation assessment was peer reviewed and published by the ADF&G. Multiple public presentations of the conservation assessment, DLP analyses, probability use maps and general Kenai Peninsula brown bear ecology were made.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

IV. PUBLICATIONS

V. RECOMMENDATIONS FOR THIS PROJECT

VI. APPENDIX

VII. PROJECT Costs for this segment period

FEDERAL AID SHARE $ 92,319 + STATE SHARE $ 30,773 = TOTAL $123,092

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