# 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:** AKW-4 WILDLIFE RESTORATION FY2015

**PROJECT NO.** 4.38

**PROJECT TITLE:** Kenai Peninsula brown bear population demographics

**PRINCIPAL INVESTIGATOR:** Sean Farley

**FEDERAL AID GRANT PROGRAM:** Wildlife Restoration

**PROJECT DURATION:** 1 July 2008 – 30 June 2020

**PERIOD:** July 1, 2014 – June 30, 2015

**STATE:** Alaska

## I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION

**OBJECTIVE 1:** Determine the finite rate of change (lambda) for the Kenai brown bear population.
Job/activity: collect demographic data
Data will be collected by collaring a subset of peninsula bears with vhf radio collars and following them for several years to collect data cub production, litter size, cub survival, adult survival, age of weaning, estimated age of first reproduction (where possible), inter birth interval, and annual natural mortality rate.

**OBJECTIVE 2:** Complete data analysis on differential reproductive fitness of Kenai brown bears.
Job/activity: data analysis
Collaborate with Dr. Sandy Talbot of the USGS Molecular Ecology laboratory in Anchorage, Alaska to look for individual maternal lineages of Kenai Peninsula brown bears. The data to be used will include recent genotypes determined for Jackson et al. (2008) as well as any additional bears handled. Where possible, perform a genealogical reconstruction of maternal lineages for the past 10 years. Relate that information with reproductive success from past radio-collared work.

**OBJECTIVE 3:** Develop a model predicting demographic vigor of Kenai Peninsula brown bears.
Job/activity: model development
Explore analysis of data from jobs 1 and 2 to construct predictive model(s) combining biological covariates (genetic relatedness, differential reproductive fitness, demographic data) of Kenai brown bears.

**Objective 4:** Attend conferences and training, write and present papers.

## II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

OBJECTIVE 1:

JOB/ACTIVITY __1: There are 41 collars being monitored and 4 that are either missing or potential drops. There were several VHF collars that had considerable frequency drift rendering radio tracking difficult. Figure 1 shows locations of fall 2014 and spring 2015 captures, as well as initial summer 2015 VHF locations of collared bears.

JOB/ACTIVITY _2_: Animal Captures… Fall 2014 7 bears were captured (all adult females). During spring of 2015 we captured 9 bears (7 adult females, 2 subadults of which there one male and one female, possibly siblings). The subadult male was not collared.

JOB/ACTIVITY _3_: Data Analysis….Demographic data are being updated and the 2014 calculations will be updated later in the fall. The information current through Fall 2013 is listed below.

1) Mean collared female survivorship (deaths from any causes) from 1995-2015* was 0.930 (s.d. =0.059). The mean collared female survivorship (deaths human caused) from 1995 – 2015* was 0.946 (s.d. =.054). Mean collared female survivorship (deaths from any causes) from 2010-2015* was 0.925 (s.d.=0.078). The mean collared female survivorship (deaths human caused) from 2010 – 2015* was 0.937 (s.d. =.082). Season bag limits and methods of take for brown bears were liberalized in 2012, which resulted in an initial decrease in survivorship of collared adult females (Table 1). Unreported mortality from 1995-2013 was 4.09 (s.d.=0.77) with a range of 3.03 – 4.76. Unreported mortality can not be calculated for every year. Data exist for years 1996, 1998, 2002, 2008, 2010, and 2013.

2) Mean age of captured female bears is 12 years (s.d. 6) while the mean age of all collared adult female is 13.9 years (s.d. 6.4). The oldest female has been 26 years.

3) Annual cub survival and litter size has been calculated for the duration of the project (see Tables 2 & 3).

4) No additional work has been reported on this activity.

*data in report have been collected only to early summer 2015

**OBJECTIVE 2:**

JOB/ACTIVITY_1: No additional work has been reported on this activity.

**OBJECTIVE 3:**

JOB/ACTIVITY: No additional work has been reported on this activity

**Objective 4:**

JOB/ACTIVITY: The following manuscripts were completed, submitted, accepted or provide supporting data under this grant.

Coltrane, J.A., S. Farley, D. Saafeld, D. Battle, and T. Carnahan. (2015) Evaluation of Dexmedetomidine, Tiletamine, and Zolazepam for the immobilization of black bears. Wild. Soc. Bull. 39(2):378-382.

Farley, S. D., S. L. Talbot, G. K. Sage, R. Sinnott, and J. Coltrane. 2014. Use of DNA from bite marks to determine species and individuals animals that attack humans. Wildlife Society Bulletin 38(2):370-376. doi:10.1002/wsb.391

Farley, S. D., S. Talbot, and J. Jackson. (*in prep*). Differential reproductive success in a small brown bear population: comparison of genetics and telemetry data.

Fortin, J. K., K. D. Rode, G. V. Hilderbrand, J. Wilder, S. Farley, C. Jorgensen, and B. Marcot. (*In Review, Plos One*). Impacts of human recreation on brown bears (*Ursus arctos*): a review and new management tool.

Jackson, J., Talbot, S., & Farley, S. (2008). Genetic characterization of Kenai brown bears (Ursus arctos): microsatellite and mitochondrial DNA control region variation in brown bears of the Kenai Peninsula, south central Alaska. Canadian Journal of Zoology, 86(7): 756-764

Talbot, S.L. G. K. Sage, S. D. Farley. (*in prep*) Brown bears of the Kenai Peninsula are genetically isolated from mainland south central and southwestern Alaskan populations.

Talbot, S. L., S. A. Sonsthagen, G.K. Sage, S. D. Farley, N. G. Dawson, R. E. Wilson, and J. A. Cook (submitted). Are Island Brown Bears Isolated? Insularity and Gene Flow among Coastal Populations in Southeast Alaska. J. Mammalogy**.**

Teisberg, J. E., S. D. Farley, O. L. Nelson, G. V. Hilderbrand, M. J. Madel. P. A. Owen, C. T. Robbins 2014. Immobilization of Grizzly Bears with Dexmedetomidine, Tiletamine, and Zolazepam. J. Wild. Diseases. 50(1):74-83.

## III. PUBLICATIONS

SEE OBJECTIVE 4

## I. APPENDIX.

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

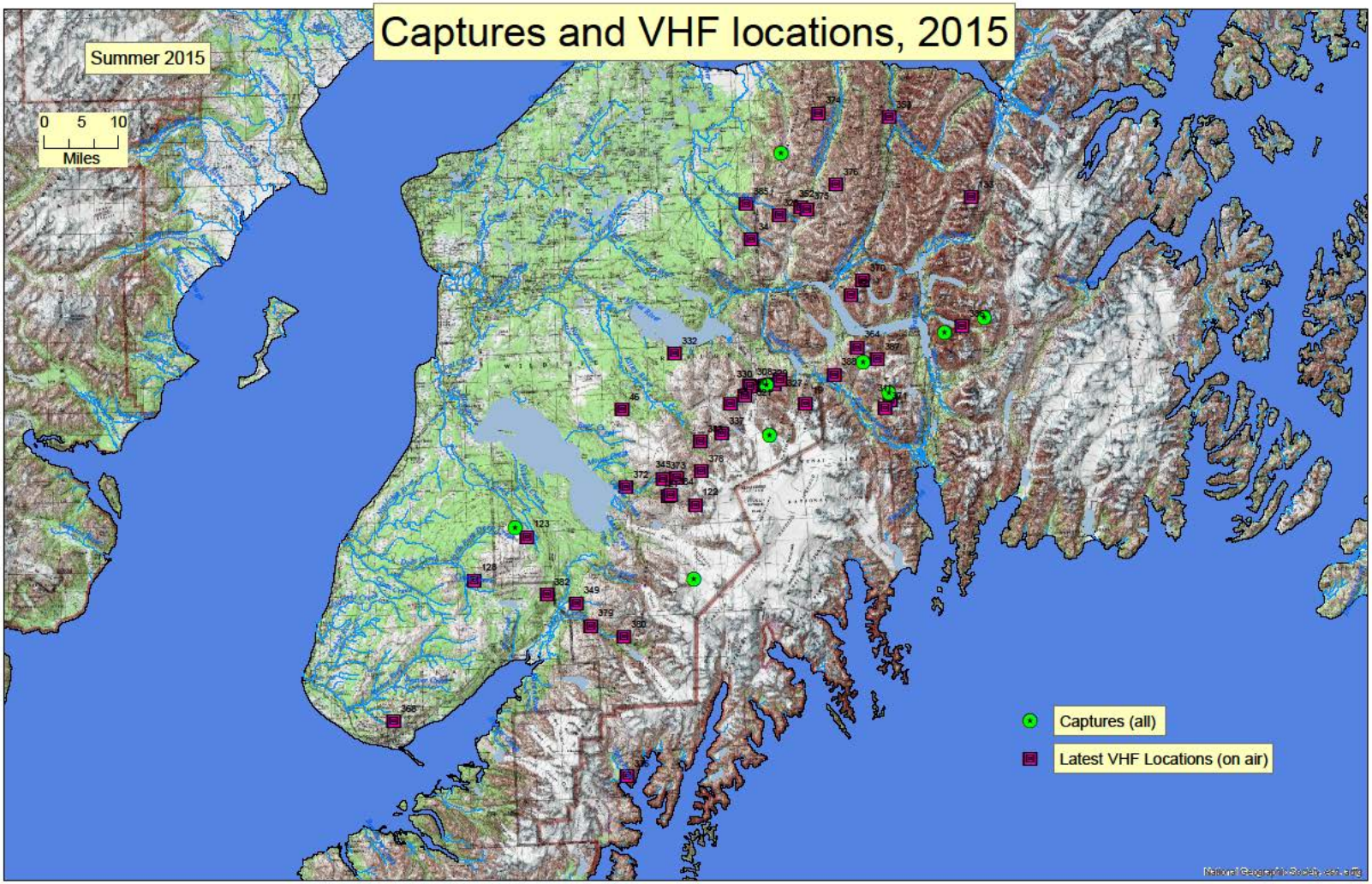

Table 1. Recent Percent survivorship adult collared female

| | 2012 | 2013 | 2014 | 2015* |
|---|---|---|---|---|
| Death, any cause | 0.879 | 0.793 | 0.974 | 0.977 |
| Death, human cause | 0.906 | 0.793 | 1.00 | 1.00 |

Tables 2 & 3: Cub survivorship and litter size for Kenai Peninsula brown bears.

Number of Cubs by Fate and Age: 2006 to 2015*

| | Age of Cubs | | | | | | |
|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | Grand Total | | |
| Sum of Survived | 105 | 92 | 85 | 21 | 303 | | |
| Sum of Lost | 70 | 28 | 0 | 0 | 98 | | |
| Sum of Unknown | 7 | 3 | 3 | 0 | 13 | | |
| | | | | | | | |
| Total | 182 | 123 | 88 | 21 | 414 | | |
| Maximum Survival | 0.60 | 0.77 | 1.00 | 1.00 | To Weaning | 0.46 | Assumes Lost Cubs Died |
| Minimum Survival | 0.58 | 0.75 | 0.97 | 1.00 | | 0.43 | Assumes Lost and Unknown Cubs Died |

Number of litters by Litter Size and Cub Age: 2006-2015*

| | Age of Cubs | | | | |
|---|---|---|---|---|---|
| Litter Size | 0 | 1 | 2 | 3 | Grand Total |
| 1 | 25 | 26 | 17 | 3 | 71 |
| 2 | 39 | 22 | 20 | 3 | 84 |
| 3 | 27 | 17 | 11 | 4 | 59 |
| 4 | 0 | 0 | 0 | 0 | 0 |
| Grand Total | 91 | 65 | 48 | 10 | 214 |
| Mean litter size | 2.02 | 1.86 | 1.88 | 2.1 | 1.94 |
| | | | | | |

*data in tables have been collected only to early summer 2015