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.


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.


III. PUBLICATIONS
SEE OBJECTIVE 4

I. APPENDIX.
Captures and VHF locations, 2015

- Green circles: Captures (all)
- Red squares: Latest VHF Locations (on air)
Table 1. Recent Percent survivorship adult collared female

<table>
<thead>
<tr>
<th></th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
<th>2015*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death, any cause</td>
<td>0.879</td>
<td>0.793</td>
<td>0.974</td>
<td>0.977</td>
</tr>
<tr>
<td>Death, human cause</td>
<td>0.906</td>
<td>0.793</td>
<td>1.00</td>
<td>1.00</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>Age of Cubs</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sum of Survived</td>
<td>105</td>
<td>92</td>
<td>85</td>
<td>21</td>
<td>303</td>
</tr>
<tr>
<td>Sum of Lost</td>
<td>70</td>
<td>28</td>
<td>0</td>
<td>0</td>
<td>98</td>
</tr>
<tr>
<td>Sum of Unknown</td>
<td>7</td>
<td>3</td>
<td>3</td>
<td>0</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>182</td>
<td>123</td>
<td>88</td>
<td>21</td>
<td>414</td>
</tr>
</tbody>
</table>

Maximum Survival

| Maximum Survival | 0.60 | 0.77 | 1.00 | To Weaning | 0.46 |
| Minimum Survival | 0.58 | 0.75 | 0.97 | 1.00 | 0.43 |

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

<table>
<thead>
<tr>
<th>Litter Size</th>
<th>Age of Cubs</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>25</td>
<td>26</td>
<td>17</td>
<td>3</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>39</td>
<td>22</td>
<td>20</td>
<td>3</td>
<td>84</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>17</td>
<td>11</td>
<td>4</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Grand Total</td>
<td>91</td>
<td>65</td>
<td>48</td>
<td>10</td>
<td>214</td>
<td></td>
</tr>
<tr>
<td>Mean litter size</td>
<td>2.02</td>
<td>1.86</td>
<td>1.88</td>
<td>2.1</td>
<td>1.94</td>
<td></td>
</tr>
</tbody>
</table>

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