UC Science Team Updates: Fisher Team

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Major Fisher Research Objectives:

- Assess responses of fishers to fuel treatments
  *Develop biologically-appropriate integration metrics*
- Estimate population parameters, identify limiting factors
- Describe habitat use, occupancy, and population viability

Primary Methods:

- Capture & radio telemetry
- Monitoring survival and reproduction
- Remote camera surveys
Outline:

1. Update on 2013 research effort
   - camera surveys
   - reproduction
   - survival
   - dispersal

2. 2014 priorities

3. SNAMP final report – integration metrics
   - occupancy
   - intensity of use
   - reproductive habitat quality

2013 Project Update: camera surveys

- Year 6 camera surveys completed: 31 Aug 2013

<table>
<thead>
<tr>
<th>Survey year</th>
<th>Grids surveyed</th>
<th>Grids with detections</th>
<th>Percent active</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007-'08</td>
<td>117</td>
<td>70</td>
<td>60%</td>
</tr>
<tr>
<td>2008-'09</td>
<td>127</td>
<td>72</td>
<td>57%</td>
</tr>
<tr>
<td>2009-'10</td>
<td>125</td>
<td>74</td>
<td>59%</td>
</tr>
<tr>
<td>2010-'11</td>
<td>125</td>
<td>83</td>
<td>66%</td>
</tr>
<tr>
<td>2011-'12</td>
<td>128</td>
<td>97</td>
<td>76%</td>
</tr>
<tr>
<td>2012-'13</td>
<td>130</td>
<td>69</td>
<td>53%</td>
</tr>
</tbody>
</table>
2013 Project Update: reproduction

- 27 new dens trees identified (26% reuse)

<table>
<thead>
<tr>
<th>Year</th>
<th>% females reproductive</th>
<th># kits / female</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spring '08</td>
<td>0.89</td>
<td>1.50</td>
</tr>
<tr>
<td>Spring '09</td>
<td>0.76</td>
<td>1.36</td>
</tr>
<tr>
<td>Spring '10</td>
<td>0.81</td>
<td>1.73</td>
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<tr>
<td>Spring '11</td>
<td>0.85</td>
<td>1.80</td>
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<tr>
<td>Spring '12</td>
<td>0.82</td>
<td>1.45</td>
</tr>
<tr>
<td>Spring '13</td>
<td>0.80</td>
<td>1.25</td>
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</tbody>
</table>

2013 Project Update: survival

SNAMP annual fisher survival

<table>
<thead>
<tr>
<th>Year</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008-’09</td>
<td>0.83</td>
<td>0.80</td>
</tr>
<tr>
<td>2009-’10</td>
<td>0.71</td>
<td>0.86</td>
</tr>
<tr>
<td>2010-’11</td>
<td>0.76</td>
<td>0.57</td>
</tr>
<tr>
<td>2011-’12</td>
<td>0.42</td>
<td>0.91</td>
</tr>
<tr>
<td>2012-’13</td>
<td>0.72</td>
<td>0.81</td>
</tr>
</tbody>
</table>
2013 Project Update: survival - predation

![Graph showing survival rates by predation type for SNAMP and KRFP]

- Predation
- Infection disease
- Starvation
- Roadkill
- Rattlesnake bites
- Human structures
- Indeterminant

Wengert et al. in press

2013 Project Update: survival – roadkill

Anae Otto USFS, Lindsay Cline NPS, Pam Flick DoW

![Map showing roadkill locations in the Sierra Nevada]
2013 Project Update: dispersal

- Confirmed male dispersal between Kings River and SNAMP (>37 km)
- Longest female dispersal recorded (22.3 km)
2014 Priorities

1. Completion of SNAMP report / habitat models
2. Transition into USFS / PSW Sugar Pine project
3. Expand research into rodenticide / pesticide impacts
4. Expand research into carnivore community response to fuel treatments

More Questions?
Proposed integration metrics:

1. Occupancy
   - Based on annual camera surveys
   - Core watershed area only
   - SNAMP data only

2. Intensity of use
   - Based on telemetry locations (aerial and ground)
   - Combined SNAMP & Kings River data

3. Reproductive habitat quality
   - Based on a variety of datasets
   - Combined SNAMP & Kings River data

Integration metric #1. Camera-based occupancy
(SNAMP core watershed data only)

As of 1 January 2013:
- 948,412 images archived
- 98,160 fisher images

Survey year 6 completed as of 31 August 2013
Integration metric #1. Camera-based occupancy
(SNAMP core watershed data only)

<table>
<thead>
<tr>
<th>Grid</th>
<th>Yr1</th>
<th>Yr2</th>
<th>Yr3</th>
<th>Yr4</th>
<th>Yr5</th>
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<td>267-4148</td>
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<td>268-4147</td>
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<td>272-4148</td>
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<td>0.26</td>
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</tbody>
</table>

Key Watershed – pretreatment veg structure

Integration metric #2. Intensity of use
(SNAMP and KRFP data combined)

SNAMP
109 animals
>24,000 telemetry locations

KRFP
105 animals
~5,000 telemetry locations
Integration metric #2. Intensity of use (SNAMP and KRFP data combined)

Denning habitat model
2 vegetation variables

Structure2 (big, dense trees)
90% predictive power

Proportion hardwood
10% predictive power

98% dens in CWHR density class D
(> 60% canopy cover)

98% dens in CWHR size class 4 & 5
(>11” DBH)
Integration metric #3. Reproductive habitat quality (SNAMP and KRFP data combined)

In collaboration with Conservation Biology Institute

1. Primary input data
   - Model 1: Fine-scale denning structure
     - Den locations (SNAMP + KRFP)
     - Weight by reuse
   - Model 2: Female home range
     - 65% ADK home range for adult females
     - Forest structure: e.g., canopy, large tree density, % hardwood

2. Weighting factor
   - Forest composition
   - Forest configuration
   - Topography
   - Development

3. Variable types, screened for relevancy
   - SNMFire vegetation data (PMW 2005, 2014 update)

4. Base vegetation data
   - Final reproductive habitat model

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Final Questions?