SWCC Aquatic Monitoring
2017 – December Update

• Review Intent/Design of the Aquatic Monitoring Program
  ➢ Update/results
    o GRAIP
    o PIBO
    o Blackfoot Bull Trout Genetic Assignment
    o Nutrient/Citizen science

• Rice Ridge Fire
  • Fire perimeter, Intensity/Severity, Suppression Actions, Burned Area Emergency Response (BAER), and Fire Retardant
  • Monitoring opportunities
Forest roads
Landscape restoration: roads
CFLRP in the SW Crown of the Continent

- SWCC
  - 4,200 miles of road at a minimum
  - Effectiveness of restoration
Geomorphologic Road Analysis Inventory Process (GRAIP)
Road Sediment Plots

T. Black
Road Sediment Plot: Data

Open and Gated Plots

<table>
<thead>
<tr>
<th>Year</th>
<th>Annual Erosion (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>Open: 100, Closed: 5</td>
</tr>
<tr>
<td>2013</td>
<td>Open: 90, Closed: 5</td>
</tr>
<tr>
<td>2014</td>
<td>Open: 50, Closed: 5</td>
</tr>
<tr>
<td>2015</td>
<td>Open: 20, Closed: 5</td>
</tr>
<tr>
<td>2016</td>
<td>Open: 40, Closed: 10</td>
</tr>
</tbody>
</table>

T. Black
Road Sediment Plot: Data

Fire crews crossed plot 5 to access a fire on Richmond Ridge in 2015.
GRAIP Roads
GRAIP Lite Roads
Sampling 15 road sediment plots in anticipation of traffic increases
- Repaired road sediment plot damage after fire and freeze
- Testing of fine sediment sampling method in Cold Creek
- Collected GRAIP data on treated roads (Black Canyon)
STREAM BED SAMPLING TEST

- 2 high road sediment reaches, 1 control no road sediment reach
- 5 infiltration bags/reach paired with McNeil cores
- Sample and reinstall Spring and Fall
Potential Fire Effects

- 6 road sediment sites affected by fire, 3 Mod/High severity and 3 Low severity. 1 plot expected to show a sediment increase as is on a gated road accessed for the fire (similar to 2015 example).
- 7 additional plots not affected by fire but may have been influenced through increased traffic.
- Over 100 of miles of inventoried road impacted
- Several clusters of inventoried jammer roads burned
Pacfish/Infish Biological Opinion (PIBO) Monitoring
Study objectives

• Focus on roads and sediment—justification for restoration goals

• Support conceptual model of the effects of roads on sediment

• Identify restoration activities that will be effective
Landscape restoration: roads

- Conceptual model linking roads to stream networks
  - Previous work focused primarily on
    - Surface erosion, road runoff, mass wasting and sediment delivery
    - Linkages with stream bed sediment
PIBO Monitoring Sites
### Table 6. PIBO Data for the Project Area.

<table>
<thead>
<tr>
<th>Stream</th>
<th>Yr</th>
<th>R = Reference M = Managed</th>
<th>Total Index</th>
<th>Pool Depth (M)</th>
<th>Pool Rct (%)</th>
<th>Wetted Width/Depth</th>
<th>D50 (mm)</th>
<th>Pet Fines (2mm)</th>
<th>Pet Fines (6mm)</th>
<th>Pet Stable Bank</th>
<th>Pet Undercut Bank (df)</th>
<th>Large Wood Freq.</th>
<th>Large Wood Vol. (M^3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Falls</td>
<td>2005</td>
<td>R</td>
<td>42</td>
<td>0.26</td>
<td>14</td>
<td>16</td>
<td>29</td>
<td>2</td>
<td>5</td>
<td>95</td>
<td>40</td>
<td>37</td>
<td>5</td>
</tr>
<tr>
<td>Falls</td>
<td>2010</td>
<td>R</td>
<td>45</td>
<td>0.26</td>
<td>16</td>
<td>13</td>
<td>21</td>
<td>3</td>
<td>7</td>
<td>100</td>
<td>38</td>
<td>110</td>
<td>11</td>
</tr>
<tr>
<td>Monture</td>
<td>2005</td>
<td>R</td>
<td>39</td>
<td>0.52</td>
<td>26</td>
<td>35</td>
<td>57</td>
<td>4</td>
<td>9</td>
<td>100</td>
<td>29</td>
<td>193</td>
<td>40</td>
</tr>
<tr>
<td>Monture</td>
<td>2010</td>
<td>R</td>
<td>43</td>
<td>0.76</td>
<td>8</td>
<td>25</td>
<td>40</td>
<td>26</td>
<td>29</td>
<td>100</td>
<td>34</td>
<td>272</td>
<td>211</td>
</tr>
<tr>
<td>Dunham</td>
<td>2005</td>
<td>M</td>
<td>46</td>
<td>0.43</td>
<td>42</td>
<td>30</td>
<td>92</td>
<td>38</td>
<td>5</td>
<td>90</td>
<td>34</td>
<td>364</td>
<td>103</td>
</tr>
<tr>
<td>Dunham</td>
<td>2010</td>
<td>M</td>
<td>55</td>
<td>0.48</td>
<td>47</td>
<td>31</td>
<td>46</td>
<td>48</td>
<td>9</td>
<td>98</td>
<td>38</td>
<td>524</td>
<td>339</td>
</tr>
<tr>
<td>McCabe</td>
<td>2005</td>
<td>M</td>
<td>56</td>
<td>0.19</td>
<td>19</td>
<td>15</td>
<td>30</td>
<td>41</td>
<td>6</td>
<td>110</td>
<td>54</td>
<td>186</td>
<td>38</td>
</tr>
<tr>
<td>McCabe</td>
<td>2010</td>
<td>M</td>
<td>66</td>
<td>0.20</td>
<td>40</td>
<td>18</td>
<td>23</td>
<td>52</td>
<td>23</td>
<td>100</td>
<td>54</td>
<td>367</td>
<td>113</td>
</tr>
<tr>
<td>Shanley</td>
<td>2013</td>
<td>M</td>
<td>Null</td>
<td>0.00</td>
<td>0</td>
<td>16</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>100</td>
<td>18</td>
<td>125</td>
<td>17</td>
</tr>
<tr>
<td>Black Canyon</td>
<td>2012</td>
<td>M</td>
<td>59</td>
<td>0.14</td>
<td>25</td>
<td>13</td>
<td>21</td>
<td>31</td>
<td>20</td>
<td>34</td>
<td>95</td>
<td>32</td>
<td>163</td>
</tr>
<tr>
<td>Cottonwood</td>
<td>2012</td>
<td>M</td>
<td>Null</td>
<td>0.00</td>
<td>0</td>
<td>11</td>
<td>Null</td>
<td>Null</td>
<td>Null</td>
<td>88</td>
<td>31</td>
<td>76</td>
<td>9</td>
</tr>
<tr>
<td>Cottonwood 1</td>
<td>2012</td>
<td>M</td>
<td>57</td>
<td>0.53</td>
<td>8</td>
<td>13</td>
<td>37</td>
<td>53</td>
<td>16</td>
<td>100</td>
<td>59</td>
<td>354</td>
<td>66</td>
</tr>
<tr>
<td>Cottonwood 2</td>
<td>2013</td>
<td>M</td>
<td>76</td>
<td>0.30</td>
<td>55</td>
<td>10</td>
<td>25</td>
<td>42</td>
<td>8</td>
<td>13</td>
<td>98</td>
<td>52</td>
<td>80</td>
</tr>
<tr>
<td>Cottonwood 3</td>
<td>2013</td>
<td>M</td>
<td>57</td>
<td>0.31</td>
<td>60</td>
<td>14</td>
<td>24</td>
<td>20</td>
<td>7</td>
<td>15</td>
<td>98</td>
<td>21</td>
<td>62</td>
</tr>
</tbody>
</table>
Blackfoot Watershed – PIBO Substrate Index
Blackfoot Watershed – PIBO Cumulative Index

![Graph showing the distribution of managed and reference conditions in the Blackfoot Watershed.](image)
2017 USGS-USFS plans

• Graduate student at Montana State University
  • Kyle Crapster

• Focus on sediment linkages between roads and instream habitat
  • Sediment delivery
  • Turbidity
  • Streambed sediment
Bull Trout Genetic Assessment Monitoring

Knotek et. al. - Draft
Bull Trout Redd Counts in Index Sections
Morrell Creek

YEAR

# REDDS


Knotek 2017
Bull Trout Redd Counts in Index Sections
West Fork Clearwater River

# REDDS

YEAR


Pre-Project  Interim Passage  Post-Project

Knotek 2017
Rice Ridge Fire

- Fire Perimeter
- Burned Area Reflective Composite (BARC)
  - Soil Burn Severity
- Suppression Actions
- Burned Area Emergency Response (BAER) Actions
- Retardant Application
  - Aerial/Ground
Rice Ridge Fire Perimeter

160,000 Ac

107,068 on Lolo NF
Rice Ridge
Soil Burn
Severity
Rice Ridge suppression Actions
Rice Ridge Suppression Actions – Rice/Morrell

- 138 mi. Road used
- 54 mi. Mechanical Line
- 13 mi. Hand Line
- 30 Stream Xings
- 10 Retardant hits on surface water
Fire Retardant:
10 Misapplications into surface water:

- Florence Lake (1),
- Seeley Creek (1),
- Trail Creek (2),
- Blind Canyon (1),
- N. FK. Mountain Cr. (1),
- S. Fk. Mountain (1),
- Swamp (1),
- Black Canyon (1),
- Dry Cottonwood (1)
Rice Ridge – Retardant Misapplications
Rice Ridge – Retardant Misapplications

Lolo NF & MFWP Monitoring - five sites
- Inside hit stream segment
- Above hit steam segment (in black)

- High Intensity fire = ~90 - 100% Mortality
- Moderate/Low Intensity fire = 0% Mortality
- High Intensity Retardant = ~90-100% Mortality
- Moderate/Low Retardant = 0% Mortality
Rice Ridge - Burned Area Emergency Response (BAER)

• Culvert Removal
• Culvert Upgrades
• Storm Proofing Road (Drainage)

• Approximately $1,000,000 to complete this work by next year
Questions