Middle Fork Willamette River
Bull Trout Spawning Gravel Augmentation Project

Presented to the
Restoration and Enhancement Board
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Roseburg, Oregon

By: Jeff Ziller
Oregon Department of Fish and Wildlife
South Willamette Watershed District
Project Goal

Attain population health and long term sustainability of bull trout and their habitat in the Upper Willamette Basin.
Bull Trout - Background

- Native to the Pacific Northwest, British Columbia and Alberta Canada.
- Historically occurred from the McCloud River in Northern CA and the Jarbidge River in Nevada to the headwaters of the Yukon River in the Northwest Territories of Canada.
- Oregon’s only native char.
- “Threatened” on Federal ESA list (1999)
Bull Trout - Life History

- Do not migrate to salt water (reach a size of over 20 lbs)
- Migrate long distances to feed and spawn
  - increase over winter survival
  - access a larger prey base
  - larger individuals with higher fecundity
Bull Trout - Life History

- Require cold water temperatures for successful spawning, egg incubation, and juvenile rearing
- Can spawn in multiple years
- Live to be 10-20 years old, generally mature at 5-6 years
Status of Bull Trout in the Upper Willamette
(Buchanan, Hanson and Hooton 1997)
Middle Fork Willamette Bull Trout

- Last known bull trout in basin
- Captured October 1990 by Norm Coyer
- Middle Fork Willamette River above Hills Creek Reservoir
Upper Willamette Bull Trout Working Group
Willamette Bull Trout
Recovery Actions

- Reduce angler harvest
- Increase prey base
- Increase access to habitat
- Increase habitat effectiveness
- Re-establishment of populations
<table>
<thead>
<tr>
<th>Year</th>
<th>Location</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1991</td>
<td>Willamette Basin</td>
<td>Taking bull trout prohibited</td>
</tr>
<tr>
<td>1997</td>
<td>Middle Fork Willamette (above Hills Creek Res)</td>
<td>Ad fin-clipped harvest only, Artificial flies and lures only, All wild trout must be released</td>
</tr>
<tr>
<td>2004</td>
<td>Hills Creek Reservoir</td>
<td>Ad fin-clipped harvest only, All wild trout must be released</td>
</tr>
</tbody>
</table>
Reducing Angler Harvest
Hills Creek Reservoir Rainbow Trout Fin Marking
Reducing Angler Harvest
Increasing Angler Awareness

- Informational posters since 1992
- High quality signs at key access points
- R&E funds
Increase Prey Base

- 1,000’s of spring chinook released into bull trout rearing areas above dams
- Nutrients from carcasses
- Juvenile chinook as prey
Re-establishing Bull Trout Populations
Re-establishment
Downstream Migrant Trap
Anderson Creek

• Sweetwater Creek
• Olallie Creek
Anderson Creek Downstream Migrant Trap

- Bull trout fry are sorted from debris
- Loaded into transport tank
MIDDLE FORK WILLAMETTE
BULL TROUT FRY RELEASE SITES

- Staley Cr
- Hills Creek Dam
- Hills Creek Reservoir
- Swift Cr

- Selected for egg incubation temperatures and juvenile rearing potential
Middle Fork Willamette
Bull Trout Releases for Rehabilitation

Number of Fry

- MF Willamette (n=10,266)

FRY TO JUVENILE SUCCESS IN IKO SPRINGS

• 938 fry were first released in 1998
• Snorkelers observed 45 age 1 bull trout in 1999
• Minimum of 5% survival in Iko
Middle Fork Willamette River
2000-04 Results

• 3 age classes found in release locations

• Adult and sub-adult bull trout in Hills Creek Reservoir

• Distribution in 20 miles of stream
Middle Fork Willamette and Hills Creek Reservoir Bull Trout 2003-04

- 4 ODFW captured - 17 to 20 inches
- 10 Angler caught - 13 to 23 inches
Mature fish will be returning to natal rearing areas in September 2005
Spawning Habitat Requirements

- Spring fed streams
- Water temperature 42F or below
- Velocity 1 ft/sec
- Average redd size about 3x4 ft
- Nearby resting pool
Gravel Augmentation Project Details

- Transported by helicopter
- 40 cubic yards of premixed gravel 1/4 to 3 inch diameter
- Iko, Indigo and Chuckle springs
- Final shaping by ODFW and volunteers
Benefits to Bull Trout from Gravel Augmentation

- More than adequate for anticipated spawning bull trout
  - Up to 120 fish
  - Up to 60 redds
- Will increase juvenile rearing potential by increasing macro-invertebrate production
- Successful reproduction will reduce or eliminate fry transfers
Willamette Bull Trout Recovery Actions

- Reduce angler harvest
- Increase prey base
- Increase access to habitat
- Increase habitat effectiveness
- Re-establishment of populations
Middle Fork Willamette Gravel Augmentation - Why?

- Release sites
  - Selected for egg incubation temperatures and juvenile rearing habitat
  - Critical limiting factors

- Will create spawning habitat in critical habitat areas

Chuckle Springs
Middle Fork Willamette Gravel Augmentation - Why?

- Spring locations not susceptible to high flow events
  - Gravel will not be flushed downstream

Iko Springs
Middle Fork Willamette Gravel Augmentation - Why?

- Gravel augmentation projects in Klamath and Deschutes very successful – increased redds
Gravel augmentation - Klamath Basin

Spring Creek Redd Counts 1972-2004

- Spawning gravel placements

Number of Redds

Year
Middle Fork Willamette Gravel Augmentation - Why?

- Known historical bull trout habitat sluiced by debris torrent (Swift/Bear)
  - Monitoring reveals few BuT fry rearing
  - Working on restoration
Angler Satisfaction

• Regardless if it is not legal to angle for bull trout, they provide excitement.
Potential Ecosystem Impacts

- Cutthroat are currently rearing in springs and are generally larger than juvenile bull trout (BuT may out-compete Ctt)
- Older age BuT (2-3+) will migrate to mainstem and Hills Cr Reservoir following juvenile chinook migration
- NEPA process (USFS) will evaluate impact to native organisms (plants, amphibians etc.)
- Helicopter will reduce impact to trail (USFS)
Potential for Cost Reduction

- Preliminary helicopter bids
  - $20,250 to $29,750
  - Larger bid = larger ship (more efficient, safer)
- Helicopter mobilization may be reduced
  - Another tentatively planned project in Umpqua basin
- Project size reduction
  - 40 yd$^3$ vs 20 yd$^3$
  - 1 yd$^3$ = 18 ft$^2$
  - 10 yd$^3$ = 15 redds
Other funding...

- **US Fish and Wildlife Service Section 6 funding**
  - Results in April
  - Many other ESA species competing

- **OWEB funding**
  - Application deadline in April
  - Confirmation in Sept too late for this critical spawning season
•Questions?
Upper Willamette River Recovery Criteria

- 4 or more local populations
- 600-1,000 adults
- Stable or increasing
- Connected populations

Image by Dave Bickford, USFS
Chuckle and Indigo Springs
### Middle Fork Willamette Subbasin

**Recent Angler Reports of Bull Trout**

<table>
<thead>
<tr>
<th>Location</th>
<th>Size</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hills Creek Res</td>
<td>15-23&quot;(6) Oct 2003</td>
<td></td>
</tr>
<tr>
<td>MFk Willamette above Res</td>
<td>21&quot;</td>
<td>Aug. 2004</td>
</tr>
<tr>
<td>Hills Creek Res</td>
<td>21&quot;</td>
<td>Sep 2004</td>
</tr>
<tr>
<td>Hills Creek Res</td>
<td>13&quot;</td>
<td>Sep 2004</td>
</tr>
<tr>
<td>Hills Creek Res</td>
<td>17&quot;</td>
<td>Oct 2004</td>
</tr>
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# Middle Fork Willamette Subbasin

PIT Tagged Adult and Sub-Adult Bull Trout

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<th>Location</th>
<th>Size</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hills Creek Res</td>
<td>17”</td>
<td>April 2003</td>
</tr>
<tr>
<td>MFk Willamette above Res</td>
<td>17”</td>
<td>July 2004</td>
</tr>
<tr>
<td>MFk Willamette above Res</td>
<td>19”</td>
<td>July 2004</td>
</tr>
<tr>
<td>MFk Willamette above Res</td>
<td>20”</td>
<td>July 2004</td>
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Bull Trout Study Area
FUTURE MONITORING METHODS

- Spawning ground surveys
- Day and night snorkeling
- 23 mm HDX Texas Instrument PIT tags
## POSSIBLE FRY TO AGE 1 SUCCESS

### IKO AND CHUCKLE SPRINGS

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Fry Released in Chuckle and Iko Springs</th>
<th>Estimated Age 1 At 5% Survival</th>
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<tbody>
<tr>
<td>1997</td>
<td>96</td>
<td>5</td>
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<tr>
<td>1998</td>
<td>1349</td>
<td>67</td>
</tr>
<tr>
<td>1999</td>
<td>1302</td>
<td>65</td>
</tr>
<tr>
<td>2000</td>
<td>1424</td>
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<tr>
<td>2001</td>
<td>687</td>
<td>34</td>
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<tr>
<td>2002</td>
<td>252</td>
<td>13</td>
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<tr>
<td>2003</td>
<td>804</td>
<td>40</td>
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</table>
Current Monitoring Methods

- Spawning ground surveys
- Day and night snorkeling
- We’re in a transition period