Timescales of response on streams treated with Artificial Beaver Dams, Silvies River, OR

River Restoration Northwest 2015

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Silvies River Basin

Malheur Lake Wildlife Refuge
Climate in the Silvies River Basin

2014 Water Year

From OWRD station 10393500, Near Burns, OR
Figure 5. The six stages of bank-slope development

Note: Scale is relative.

From Simon, 1989

Outside of Paulina, OR
Is this a “reversible” process?
1930s – Idaho City

Figure from Pollock et al 2014

2000s – John Day River

Image courtesy Carol Volk
- 1st and 2nd order tributaries
- Upland species encroachment
- Limited transport capacity
- Ephemeral – flow following snowmelt
  OR
- Year-round – small average flow (1 cfs)
Five years after project implementation...

- Perennially wet
- Reservoirs of water for subsurface flow
- Trap sediment
- Create conditions for growth of meadows and riparian trees

Max. water depth ~ 11.5 feet

Camp Creek
Silvies River Basin, OR
September 1, 2002

4 years prior to restoration

Camp Creek
Silvies River Basin, OR
Camp Creek
Silvies River Basin, OR
3.5 years after restoration

August 22, 2011
September 10, 2012

Camp Creek
Silvies River Basin, OR

4.5 years after restoration
Project Impacts

- Surface Water: +600%
- Av. riparian width: + ~100%
- Cumulative deposition: 1-14 cm *
- Late summer stream flow: ?
- Groundwater flux: ?
- Ecological Succession: ?
- Knickpoint propagation: ?
- Economic productivity: +10%**

*No ground-truthed before data from which to measure
**Improvement to entire ranch profitability from single creek’s restoration
Cottonwood Creek Watershed Observatory

Study reach

Control reach

Reference reach

Legend:

= v-notch weir

= meteorological station

= ground water wells

= veg./topo. cross section

Direction of flow

4 m
3.2 m
CCWO Research Questions

• **Mechanisms and timescales of incisional processes** through trends in channel planform, stratigraphy, sediment yields, and ecological succession;

• Evaluate the **hydrologic, geomorphic, and ecological impacts** of specific restoration projects intended to reduce or reverse channel incision;

• Predict **hydrologic sensitivity and resilience** of restored streams under a variety of **future climate scenarios**
Questions?

Referenced Materials:

