Can we have our cows and our Chinook too?

Re-introducing grazing after 14 years of riparian recovery on a Tribal conservation property

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Grazing vs wild salmon habitat is a contentious issue

But maybe cows vs. wild salmon isn’t a zero-sum game after all
State of the science:
Exclude cows = improve streams

Cows + streams?? THE HORROR!

Riparian grazing: Not an oxymoron.

Salmon bakes past (1967) and present (2012)

Dipnetting at Celilo Falls, 1909

images: Museum at Warm Springs; Brian Cochran;
boundaries of their ceded lands, which appear here in grey. The reservation is in pink.

Confederated Tribes of Warm Springs
Oregon
Ceded Land and Reservation
Goals for the conservation areas:

1. Restore habitat for wild anadromous fish—especially for juveniles

2. Work with the local way of life, not against it

3. Use #2 to accomplish #1

images: John McMillan, http://www.grantesd.k12.or.us
Result of decades of season-long grazing

- Channel 'dished out' and over-widened—mostly homogeneous habitat
- Bank erosion, slumping
- Lack of deep-rooted sedges, rushes to stabilize bank
- Little to no recruitment of cottonwood, willow
Exclosures work
Convincing >50 miles’ worth of private landowners to voluntarily give up access to productive riparian forage via fencing = Probably not going to happen

Instead– what about showing that riparian grazing can be done well?

Conservation areas as test case
Why graze the riparian?

- Control invasive species
- Increase nutrient cycling and decrease thatch → promote forage growth and quality
- Better utilization of whole landscape
- No lost access to valuable forage
Ungrazed soils in a nearby, similar river system could store 121,000 liters of water per hectare more than soils in grazed meadows (Kauffman et al. 2004).
Our goal: Point the way

The Tribes strive to have the conservation areas serve as models for land management in the Upper John Day Basin.
Questions

1. Will grazing change structure/function of soils in riparian pastures?

Can we....

2. maintain continued natural regeneration of woody species?

3. maintain natural regen. of deep-rooted, soil-stabilizing riparian plants?

4. use cows to help decrease invasive reed canarygrass?

5. maintain bank stability, channel narrowing?
The secret to a good riparian grazing plan: Timing
Soil Study

Select paired plots
(Riparian– Traditionally grazed, n pairs = 7)

Infiltration rate
What is the water storage capacity of the soil?

Bulk density
How compacted is the soil from hoof action?

Root biomass
Does management type mean differences in root growth?
Average infiltration rate:
Riparian pastures had much faster infiltration, even after two seasons of grazing

Prior to reintroduction of cattle in riparian 

After two seasons of grazing in riparian

- 'Traditional' pasture
- Riparian pasture
Bulk density: Riparian pastures have a greater range of compaction levels, but trend toward less compaction.

Prior to reintroduction of cattle: 'Traditional' pasture is more compacted than Riparian pasture.

After two seasons of grazing in riparian: More compacted, Riparian pasture is less compacted.
Root biomass: No significant difference between management types

Prior to reintroduction of cattle

More roots

Fewer roots

‘Traditional’ pasture

Riparian pasture

After two seasons of grazing in riparian

More roots

Fewer roots
Why do riparian areas show significantly faster infiltration rates.... but not significantly less compaction or more root biomass, which would explain the infiltration results?
What have we learned so far?

Cattle reintroduction has not catalyzed a departure from ‘restored’ conditions.....
but grazing management matters

Can we have our cows and our Chinook? Maybe!
What’s next?

• Repeat soil surveys annually
• Rigorous assessment of vegetation, bank stability trends to begin in 2016
• Re-assess project in 2019
• Share results with local community
Questions?

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Monitoring Plan

• Part I—Implementation Monitoring (Short-term)
  – Watch for triggers: Do cows need to move?
  – Is our current grazing plan working?
  – What do we need to change next year?
  – Isolate effects of cows

• Part II—Effectiveness Monitoring (Long-term)
  – A. Long-term vegetation and bank stability trends
  – B. Soil health and function
Multiple Indicator Monitoring (MIM)

Short term indicators = Inform adaptive management

Stubble height

(How much cover did cows leave @ end of season?)

Streambank alteration

(How much bank did cows trample?)

Woody species use

(How many willows, etc. did cows browse?)
Multiple Indicator Monitoring (MIM)

Long term indicators = Ecological trends over time

Streambank stability

(Bank recovering from erosive state?)

Woody species age class, height class

(Trees successfully recruiting, shading stream?)

Greenline-to-greenline width

(Stream channel recovering from overwidening, narrowing over time?)

Greenline composition

(Desirable native plants present? Invasives decreasing?)

Residual pool depth and frequency

(Stream channel deepening? Sufficient habitat structure for fish?)

Substrate

(Sedimentation occurring?)
Traditionally-grazed pasture

Riparian pasture, formerly exclosed, now lightly grazed
Channel simplification through time → less productive juvenile salmon habitat