

Do we need to manage for iteroparity in steelhead trout?



Zachary L. Penney

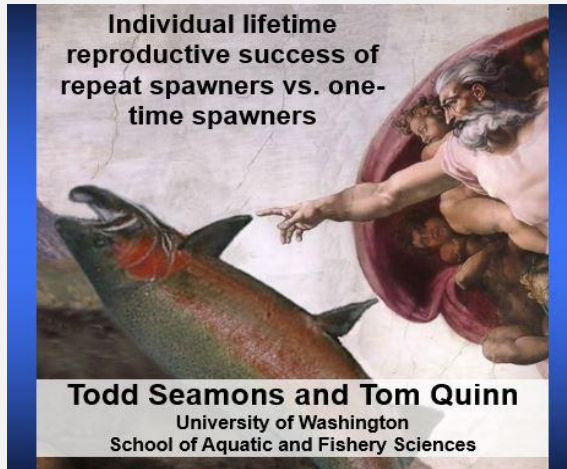
Columbia River Inter-Tribal Fish Commission



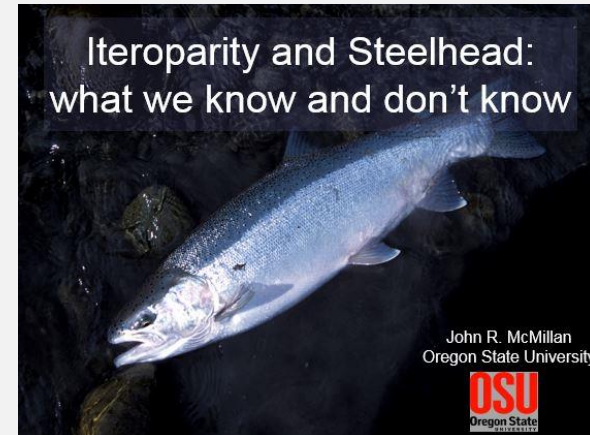
2016 Pacific Coast Steelhead Management Meeting
Pacific Grove, California

Not a new topic at PCSMM

2006



2008



2014

Energetics and Physiology of Columbia/Snake Steelhead Provide Insight to Likely Iteroparity

Christine M. Moffitt
USGS Idaho Cooperative Fish and Wildlife Research Unit

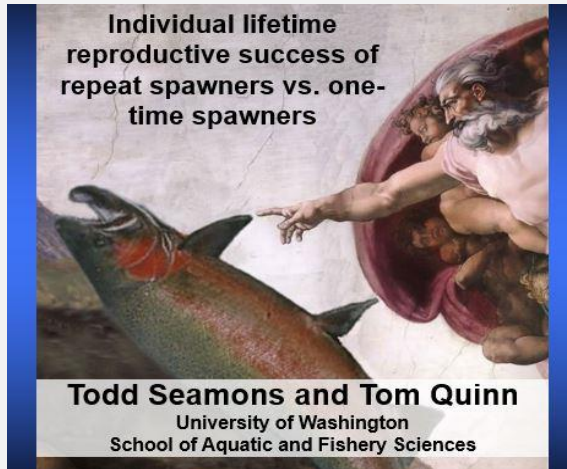
Zachary L. Penney
Bryan Jones
Jessica Buelow
ICFRU, Department of Fish and Wildlife Sciences
and
Brian Marston
Alaska Department of Fish and Game

– How does this factor into our management regimes?

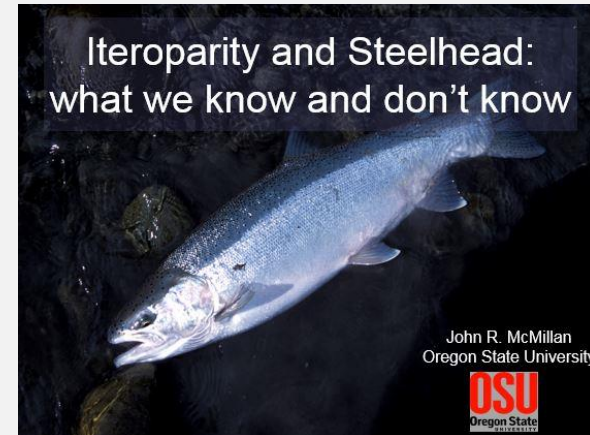
- Abundance v. diversity

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– How does this factor into our management regimes?

- Abundance v. diversity

Carry on this conversation

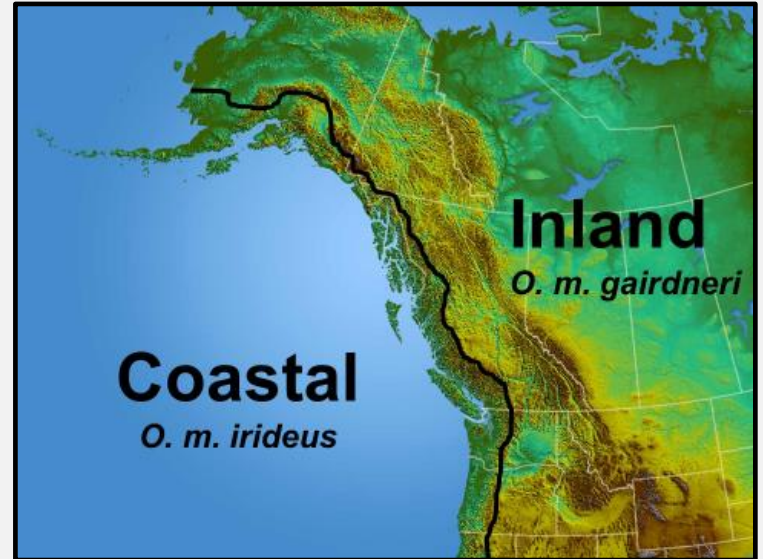
Repeat-spawning

- **Variable (<1% to >70%)**
- **Geographic group**
 - Inland
 - Coastal
- **Stream-maturing**
(Summer/Fall)
- **Ocean-maturing**
(Winter/Spring)



Factors influencing kelt survival

- Sex
- Migration distance
- Migration difficulty
- Fish size
- Time spent fasting
- Inter-annual variation
- Angling?



Sort of iteroparous

- “Steelhead are iteroparous but sampling indicates most (sometimes nearly all) spawn only once.”
Quinn and Meyers 2004
- Inland stream-maturing Snake River steelhead
“effectively semelparous.” *Burgner et al. 1992*
 - 2-4% (*Long & Griffin 1937*)
 - 1.6% (*Whitt 1954*)
 - 0.5-1.2% (*Keefer et al. 2008*)
- Why bother?



Benefits

- Improve genetic diversity
- Recruitment
- Individual life-time fitness
- Safe guard against brood year failures
- Conservation tool



They Try



Kelt at Potlatch River, ID



Kelt at Lower Granite Dam, WA



Kelt at Fish Creek, ID



Kelt at Lower Granite Dam, WA

Should we manage for iteroparity?



Short answer: Yes

- All phases of steelhead life history should be promoted/maintained in the wild
- “Life history diversity can dampen fluctuations in population abundances and biomass via portfolio effects”
Moore et al. 2014

When & how do you manage for iteroparity?



Depends on the situation...



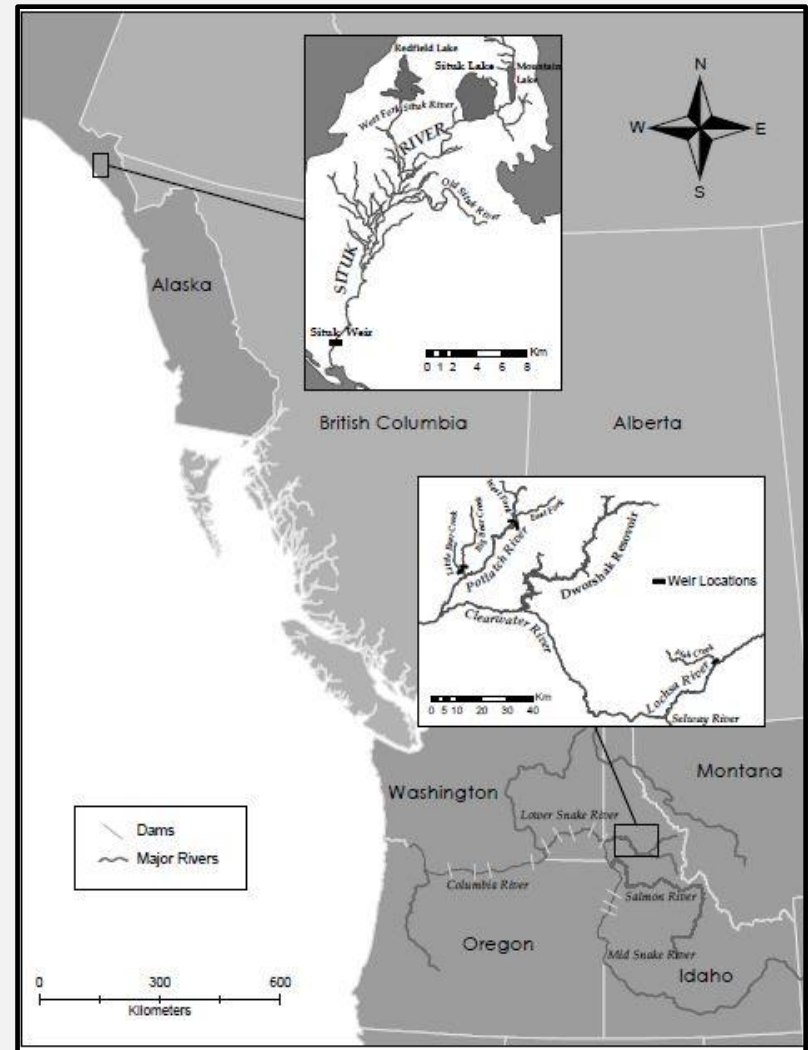
Factors to consider

- Watershed size & complexity
- Pristine vs. highly altered
- Stock status (e.g., threatened or endangered)



Watershed size & complexity

- Size of system
 - Spawning tributary
 - Subbasin
 - Basin
- Population size
- Can you actually enumerate kelts?



Pristine vs. Altered

- Barriers or impoundments
- Man-made modifications to flow or temperature
- No risk, leave them alone



Intervention?

- **Passive vs. Active**
- **Improving migration conditions up & down**
- **Active Intervention**
 - **Transport**
 - **Live spawning**



Artificial: Reconditioning

- Can work
- When to intervene?
- Release strategies
- Kelt selection (G, F, P)



Feasibility of long-term reconditioning

- How at risk is the population?
- Cost vs. benefit
- System improvements?
- Does captive restoration have a effect on steelhead fitness?
- “Use reconditioning as a stop-gap measure to maximize maintenance of repeat-spawners until we can address the true problem, which, as we all know is....”



No good deed goes unpunished

- Could management for iteroparity favor certain stocks?
- Can you select out iteroparity?
- Do dead kelts serve a purpose?
- A product of their environment
- “Can we reasonably expect to manage for any specific, let alone rare, life history trait given our struggles to manage for healthy and harvestable populations?”

Conclusion...for now

- Yes, we should manage for iteroparity

“Simply put, not even the eggs in the Easter bunny’s basket are all the same color. Some kids seek out pink, some blue, some don’t care what color, and others can’t find an egg. Therefore we should keep the basket colorful, after all, some *O. mykiss* are called rainbows.”





Questions & Discussion