

Science and Restoration Planning in the Chehalis

Mara Zimmerman
Coast Salmon Partnership

Salmon Recovery Conference 2019

Chehalis Basin: Historical

- **Limited funding** – minimal restoration and scientific studies
- **Data poor** – limited understanding of biological and ecological systems
- **Urban development** - ecologically sensitive areas still being developed



Chehalis Basin: Current

- Large state investment to understand ecological and biological systems and to plan restoration
- Rapid time frame, multiple approaches
- Develop scientific framework for decision making:
 1. Identify existing studies
 2. Expert opinion
 3. On-the-ground studies
 4. Modelled outcomes

Informing ASRP Development: Existing Studies

- Process-based restoration

An Approach to Restoring Salmonid Habitat-forming Processes in Pacific Northwest Watersheds

By Tim Beechie and Susan Bolton

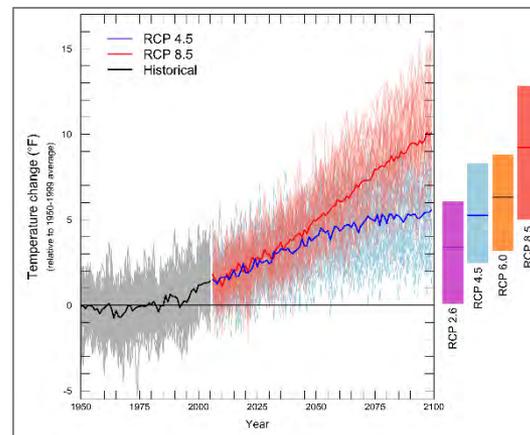
ABSTRACT

We present an approach to diagnosing salmonid habitat degradation and restoring habitat form.

Process-based Principles for Restoring River Ecosystems

TIMOTHY J. BEECHIE, DAVID A. SEAR, JULIAN D. OLDEN, GEORGE R. PESS, JOHN M. BUFFINGTON, HAMISH MOIR, PHILIP RONI, AND MICHAEL M. POLLOCK

- Future stream temperatures and flows will change (no status quo)



Source: Univ.
Washington Climate
Impacts Group

Informing ASRP Development: Expert Opinion

- **Ecological Diversity Regions** – represent large-scale habitat diversity, anticipate different restoration needs and responses





Informing ASRP Development: On-the-Ground Studies

TAKE HOME – Overall, the Chehalis River ecosystem is supported by diversity

- Temperature
- Flow
- Species
- Life histories
- Genetics





Informing ASRP Development: On-the-Ground Studies

Summer Rearing Habitat

- Tracked movements of juvenile salmonids during summer months
- Juveniles move farther and more often than previously thought
- **TAKE HOME** – Restoration of large-scale reaches is important

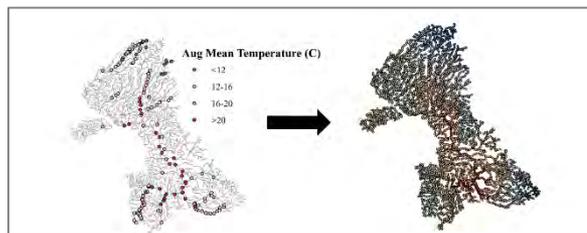


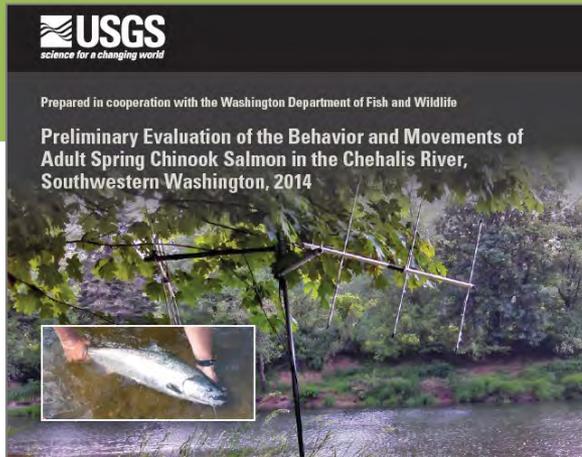


Informing ASRP Development: On-the-Ground Studies

Stream Temperatures

- Additional 100+ locations used to develop updated temperature model for entire basin
- Summer temperatures warmer and summer habitat more limited than previously thought
- **TAKE HOME** – Update restoration planning model with accurate temperature information





Informing ASRP Development: On-the-Ground Studies

Spring Chinook Tagging Study

- Two 'pulses' of adult movement – river entry and spawning
- Limited summer holding areas and warm temperature exposure
- Few in number with extremely limited habitat for over-summer holding
- **TAKE HOME** – Localized protection and restoration of identified areas is critical

ASRP Science Framework

What is working?

- Predominant land use is rural agriculture and working forest lands
- Forest practices have improved
- Important cold-water springs and tributaries
- Significant runs of wild and hatchery salmon; high amphibian diversity
- Opportunity for restoration is one of the most significant in the state



ASRP Science Framework

What is
NOT
working?

- Significantly reduced riparian areas outside managed forests
- Recruitment and retention of large wood
- Floodplain habitat connectivity
- Abundant exotic species



ASRP Science Framework

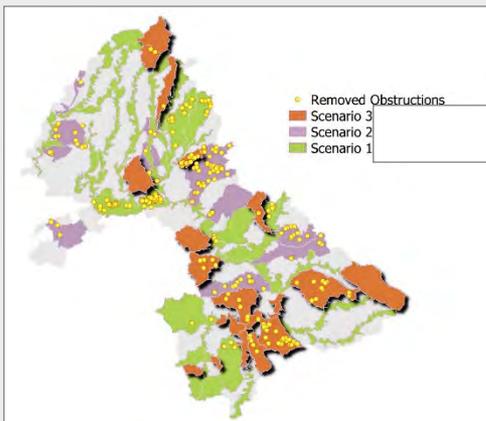
Effects of a broken system



- 90% floodplain wetlands have been degraded, lost
- Summer temperatures not suitable for cold-water species
- Unnatural channel migration, channel incision, bed instability
- Spring Chinook at low numbers
- Salmon harvest opportunities increasingly limited

ASRP Science Framework

Restoration Outcomes



- Individual projects will treat several consecutive miles of river
- Several hundred miles of restoration are necessary to combat effects of climate change and human stressors
- Projects will aim to restore river processes
- Implementation will be sequenced, considering monitoring and landowner needs

ASRP: Top 3 Takeaways

1. Climate change and development threaten all populations.
 - 'No action' is a significant threat
 - Longer we wait to act means less certainty that the ecosystem will recover
2. Investment in freshwater environment provides resilience to uncertainties from external factors such as ocean conditions.
3. A significant investment in large-scale restoration is needed over the next couple decades to make the difference.



Photo credit: J. Winkowski, WDFW