Protecting and restoring... the sustainable ecosystems... upon which salmon depend

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Primary Sources

• Beechie et al 2010
• Roni and Beechie 2013
• Cluer and Thorne 2013
• Powers et al 2018
• RRNW Symposium 2019
• Personal conversations with scientists
1 What is Process-based Restoration?

2 Why focus on Oregon Coast coho salmon?

3 Observations, Suggestions, Questions
• Works with rather than against processes;
• Restores habitat-forming processes -- in proper locations;
• Addresses root causes of degradation -- not symptoms;
• Doesn't require repeated maintenance or intervention to achieve restoration objectives (self-sustaining processes).
**GOOD SALMON HABITAT**

Healthy Vegetation:
- Streams and overhanging branches block the sun and keep things cool.
- They also:
  - attract insects that salmon eat
  - stabilize the banks against erosion and filter run-off from rain
  - provide woody debris, roots, and fallen trees, to increase the complexity of the stream channel

Abundant Clean, Cool Water

**BAD SALMON HABITAT**

Limited Vegetation:
- No trees or overhanging plants mean:
  - no shade for salmon to eat
  - no cover for salmon to eat
  - no cover for salmon to eat
  - no cover for salmon to eat

No Stream Channel Complexity:
- No side channels or floodplains mean:
  - no refuge from high flows and predators
  - stream channel scouring during floods

Lack of Water:
- rivers, floods, and stop migration
- contributes to higher water temperatures

Geographic Complexity:
- Floodplains and side channels off of the main stream provide:
  - refuge from high, harmful flows
  - high-quality foraging and rearing areas

Invasive Species:
- invasive aquatic species eat juvenile fish and compete for food, breeding and rearing habitat
- invasive plants change stream flow and affect migration

Stream Channel Complexity:
- Good salmon streams have woody, rocks, pools, and riffles as well as clean gravel for spawning.
“River restoration efforts typically focus on the geometry of channels ...

...the regeneration of high-quality habitat remains limited ... and restoration of freshwater ecosystems remains elusive”
Status of ESA Listings & Critical Habitat Designations for West Coast Salmon & Steelhead

**PIGOT SOUND DOMAIN**
- Puget Sound Chinook (T) [FCH 9/2005]
- Hood Canal Summer Chinook (T) [FCH 9/2005]
- Olympic Coast Salmon (T) [FCH 9/2005]
- Olympic Coast Steelhead (T) [FCH 1/2011]

**WILLAMETTE-LOWER COLUMBIA DOMAIN**
- Columbia River Chinook (T) [FCH 9/2005]
- Lower Columbia River Coho (T) [FCH 9/2005]
- Upper Columbia River Coho (T) [FCH 9/2005]
- Lower Columbia River Steelhead (T) [FCH 9/2005]
- Upper Willamette River Steelhead (T) [FCH 9/2005]

**OREGON COAST DOMAIN**
- Oregon Coast Coho (T) [FCH 2/2006]

**SOUTHERN OREGON/NORTHERN CALIFORNIA COAST DOMAIN**
- Southern Oregon/Northern California Coast Coho (T) [FCH 5/2006]

**NORTH-CENTRAL CALIFORNIA COAST DOMAIN**
- Central California Coast Coho (E) [FCH 1/2006]
- Central California Coastal Chinook (T) [FCH 9/2005]
- Northern California Steelhead (T) [FCH 9/2005]
- Central California Coast Steelhead (T) [FCH 9/2005]

**SOUTH-CENTRAL/SOUTHERN CALIFORNIA COAST DOMAIN**
- South-Central California Coast Steelhead (T) [FCH 9/2005]
- Southern California Coastal Chinook (T) [FCH 9/2005]
- Southern California Coastal Steelhead (T) [FCH 9/2005]

**CENTRAL VALLEY DOMAIN**
- Sacramento River Winter Chinook (E) [FCH 9/2005]
- Lower Sacramento River Steelhead (T) [FCH 9/2005]
- Central Valley Steelhead (T) [FCH 9/2005]

**INTERIOR COLUMBIA DOMAIN**
- Snake River Salmon (T) [FCH 1/2006]
- Snake River Pacific Salmon (T) [FCH 1/2006]
- Snake River Spring/Summer Chinook (T) [FCH 9/2005]
- Snake River Steelhead (T) [FCH 9/2005]
- Upper Columbia River Spring Chinook (E) [FCH 9/2005]
- Upper Columbia River Steelhead (T) [FCH 9/2005]
- Middle Columbia River Spring Chinook (E) [FCH 9/2005]

**CRITICAL HABITAT RULES CITED**
- NMFS (50 FR 33212) Final CHD for Sacramento River
  Spring/Summer Chinook (E)
- NMFS (50 FR 40543) Final CHD for Snake River
  Salmon and Sockeye
- NMFS (50 FR 34549) Final CHD for Central CA Coast
  Salmon and Sockeye
- NMFS (50 FR 34549) Final CHD for Snake River
  Coho and Sockeye
- NMFS (50 FR 34549) Final CHD for Snake River
  Winter/Summer Chinook
- NMFS (50 FR 34549) Final CHD for Snake River
  Salmon and Steelhead
- NMFS (50 FR 34549) Final CHD for Oregon Coast
  Salmon and Steelhead
- NMFS (50 FR 34549) Final CHD for Central CA Coast
  Salmon and Steelhead
- NMFS (50 FR 34549) Final CHD for Central CA Coast
  Steelhead
- NMFS (50 FR 34549) Final CHD for Central CA Coast
  Coho
- NMFS (50 FR 34549) Final CHD for Central CA Coast
  Winter/Summer Chinook
- NMFS (50 FR 34549) Final CHD for Central CA Coast
  Chinook
- NMFS (50 FR 34549) Final CHD for Central CA Coast
  Coho and Steelhead

**LEGEND**
- (E) Endangered
- (T) Threatened
- (FCH) Final Critical Habitat Designated
- Domain Overlap

*Updated 10-31-12*
Observations

1. Cutting edge of evolving river restoration science
2. This isn’t rocket science.
3. The work you’re doing is key to successful recovery of listed aquatic species.
4. In general, the public and politicians are pretty ignorant of the themes we’re working on.
Salmon Without Rivers
A History of the Pacific Salmon Crisis
Jim Lichatowich
ORS 610.002: “… ’predatory animal’… includes...rodents... that are or may be destructive to agricultural crops, products and activities...”
Nehalem River high quality rearing habitat