

Science, Service, Stewardship



NOAA Fisheries Data Needs and Activities: A Synopsis

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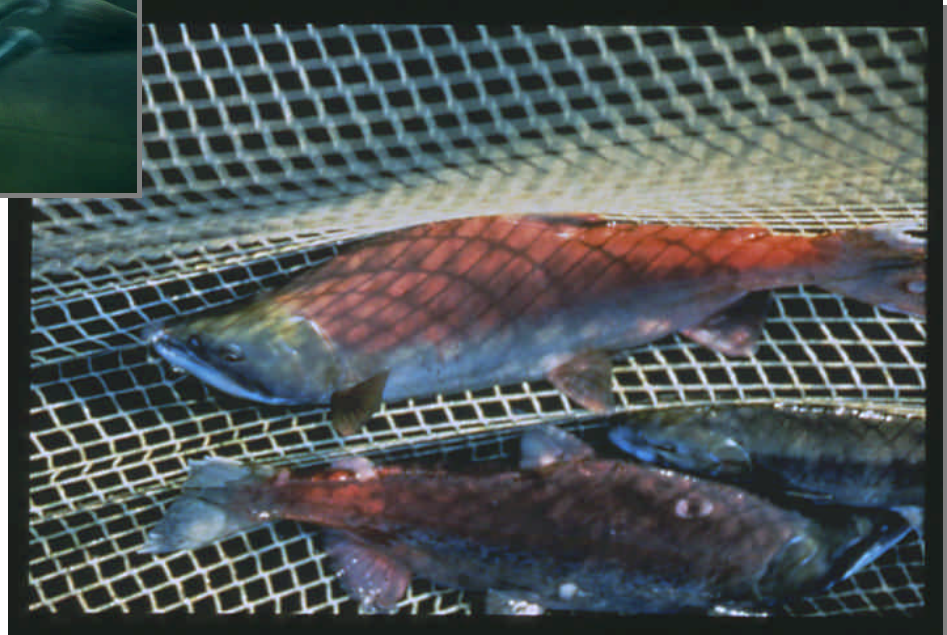
The West's Water Future: Water
Information Needs and Strategies
Salt Lake City, Utah
November 17, 2008



Challenges

- **Framing the tradeoffs decision makers will face in balancing conservation of ecosystems and human demands for use**
- **Forecasting climate change and climate variability effects on freshwater-coastal ecosystem and availability of water for human uses**
- **Breaking down current view of freshwater –vs.- coastal ecosystems**
- **Understanding the linkage between water quality and quantity**
- **Delivering relevant science and information for effective decision making**

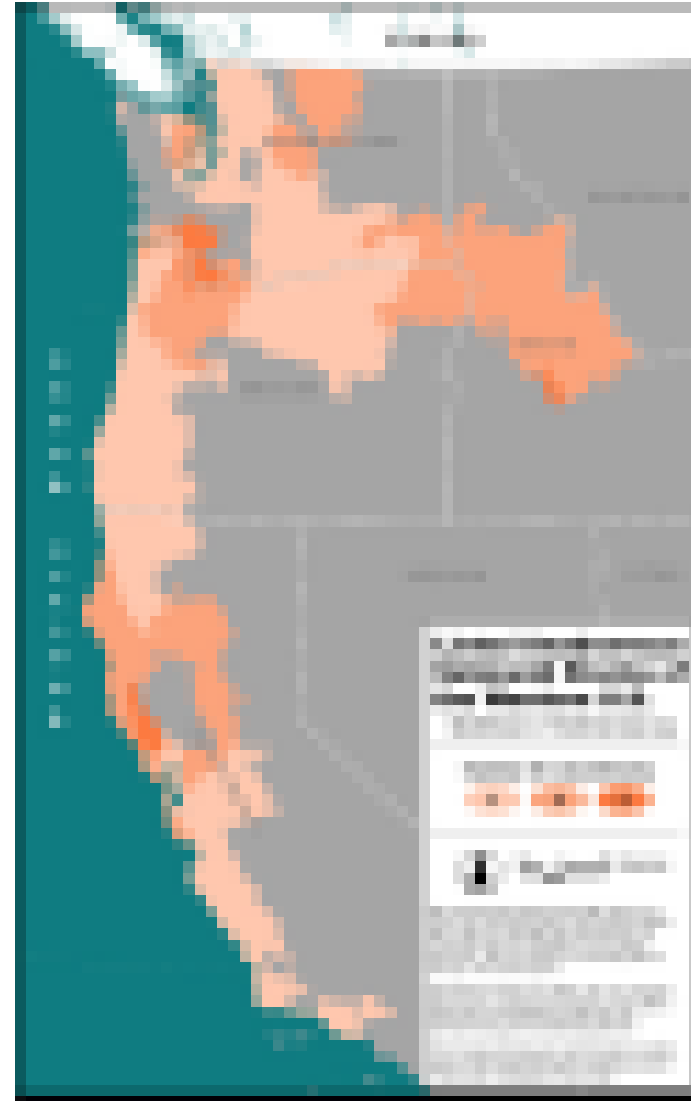
NOAA
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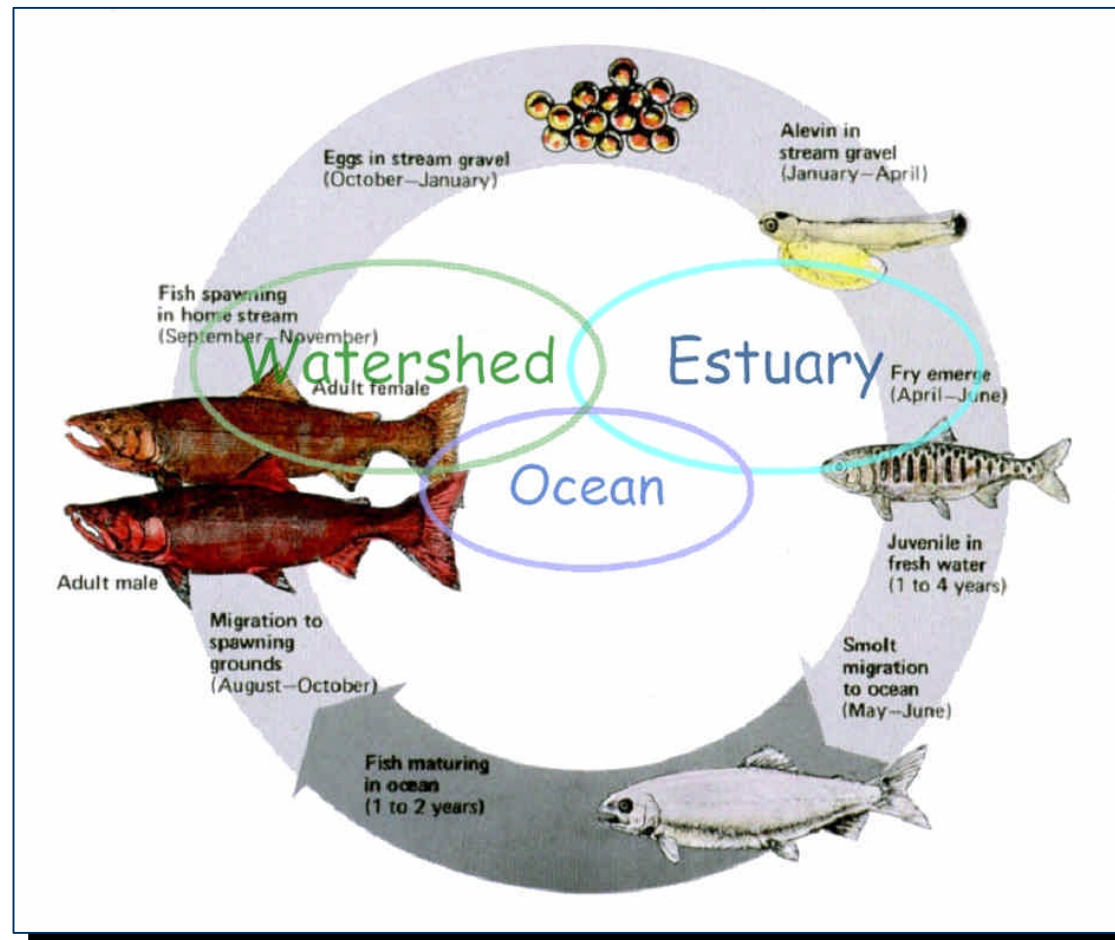
West Coast Salmonid ESUs

- **28 salmon and steelhead ESUs listed as endangered or threatened**
- **Over 150,000 square miles of ocean and freshwater habitat**



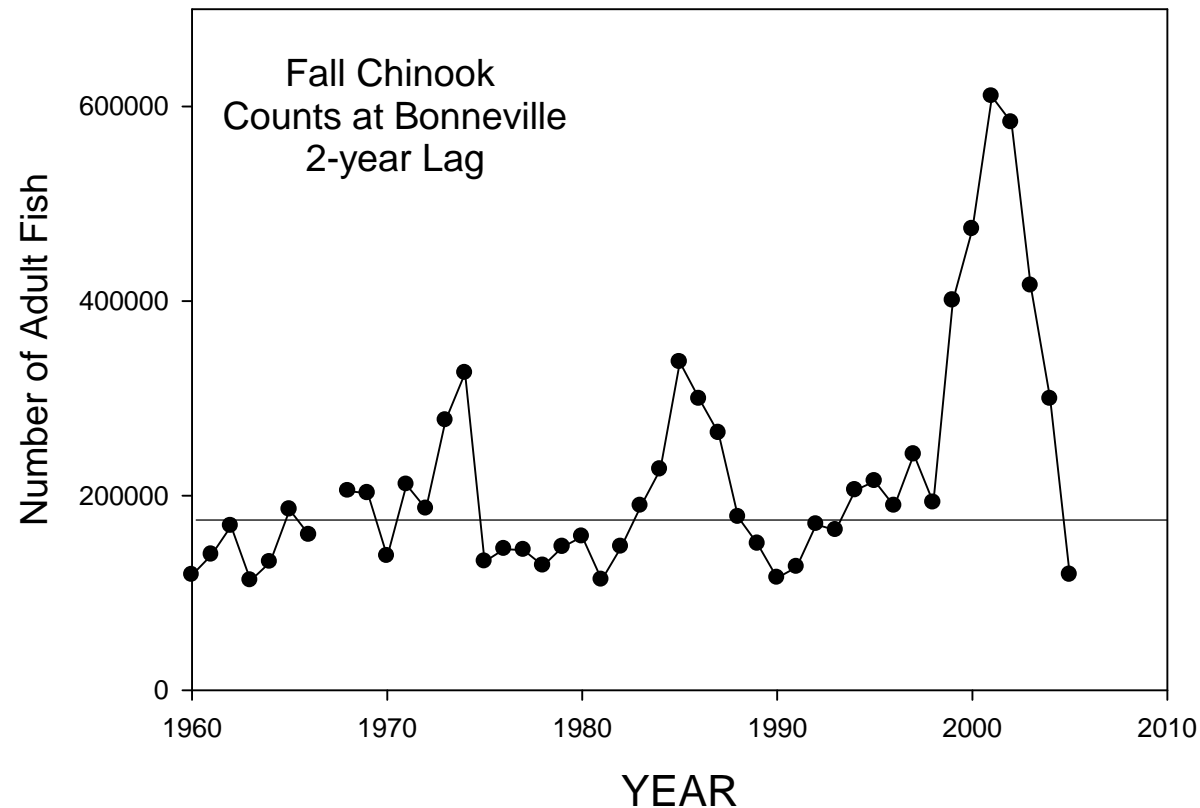


Salmon Life Cycle





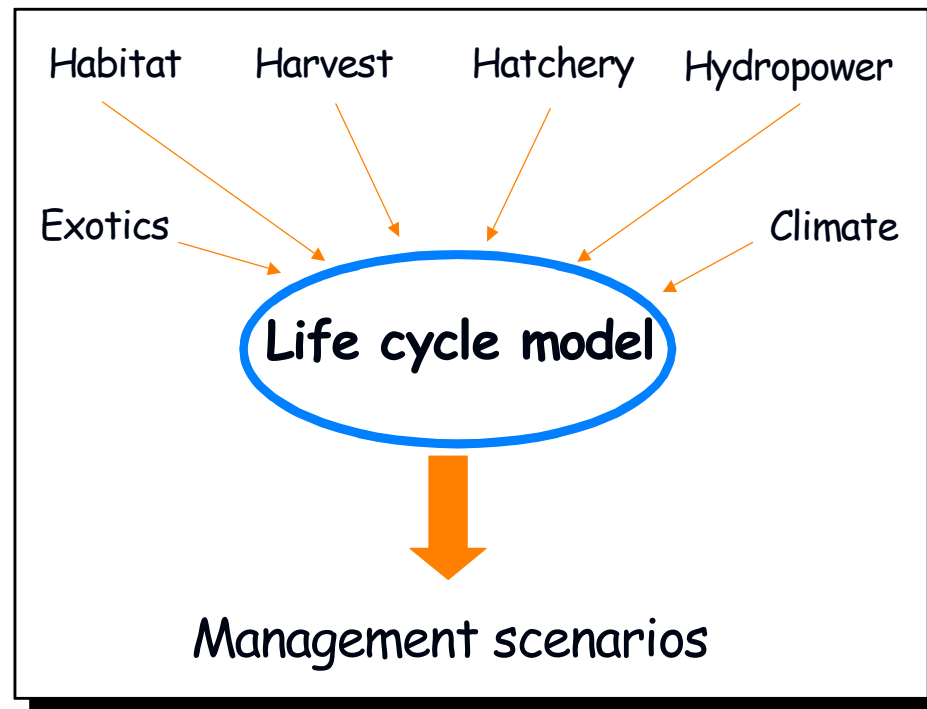
Salmon are responsive to environmental conditions



Fall Chinook at Bonneville Dam plotted against ocean entry year (two-year lag).



Multifactor Issue: an Ecosystem approach is needed





"Summit to the Sea" Life Cycle Modeling



Freshwater Spawning/Rearing

- ◆ **Snowpack**
- ◆ **Air Temperature**
- ◆ **Nutrients**

Downstream Migration

- ◆ **River Flow**
- ◆ **Water Temperature**
- ◆ **Dam Operations**



Estuary/Early Ocean

- ◆ **Water temperature and turbidity**
- ◆ **Nutrient Availability and Quality**
- ◆ **Predator Composition and Abundance**



Model Outputs:

- ◆ **Probability of Population Extinction**
- ◆ **Annual Population Growth Rate**

Salmon Columbia River



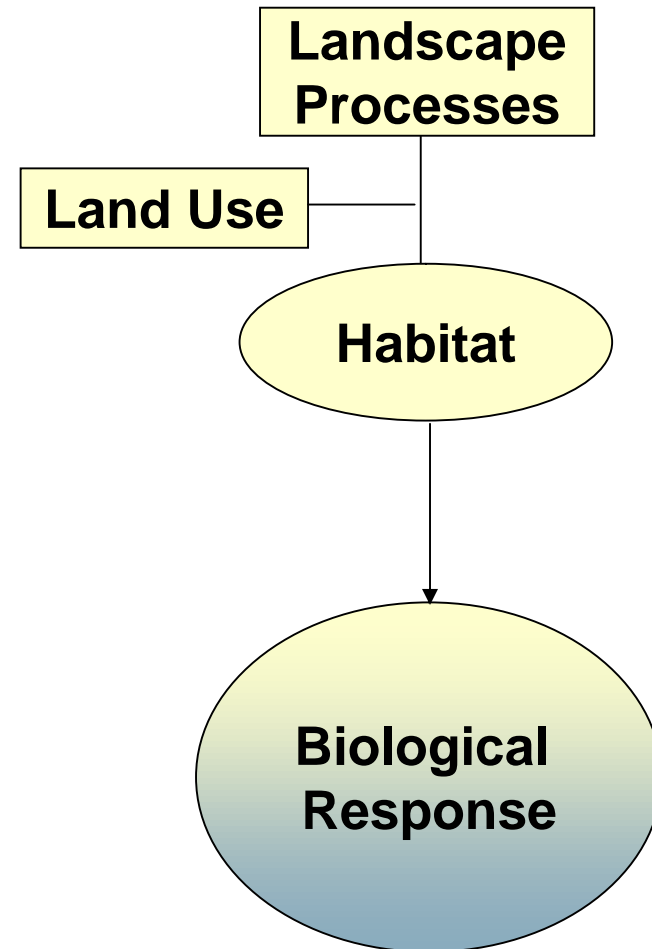


Comprehensive Passage (COMPASS) Model





Salmon—Habitat Conceptual Model





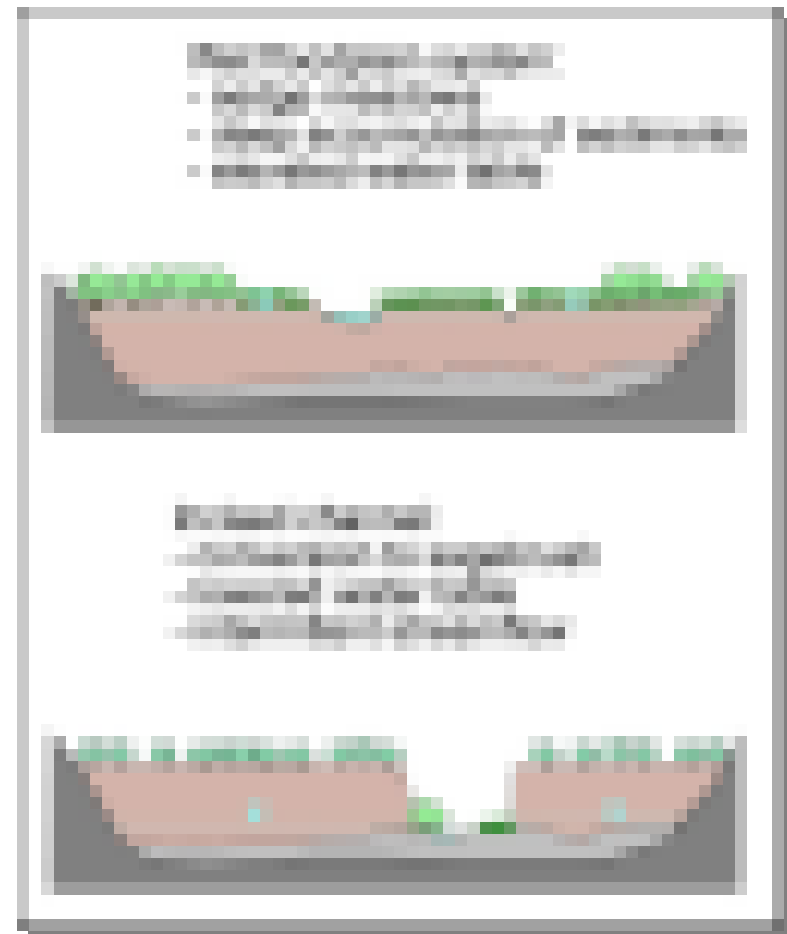
Restoration for Species Recovery and Adaptation to Climate Change? - Channel Incision

Altered floodplain vegetation

Loss of flood refugia

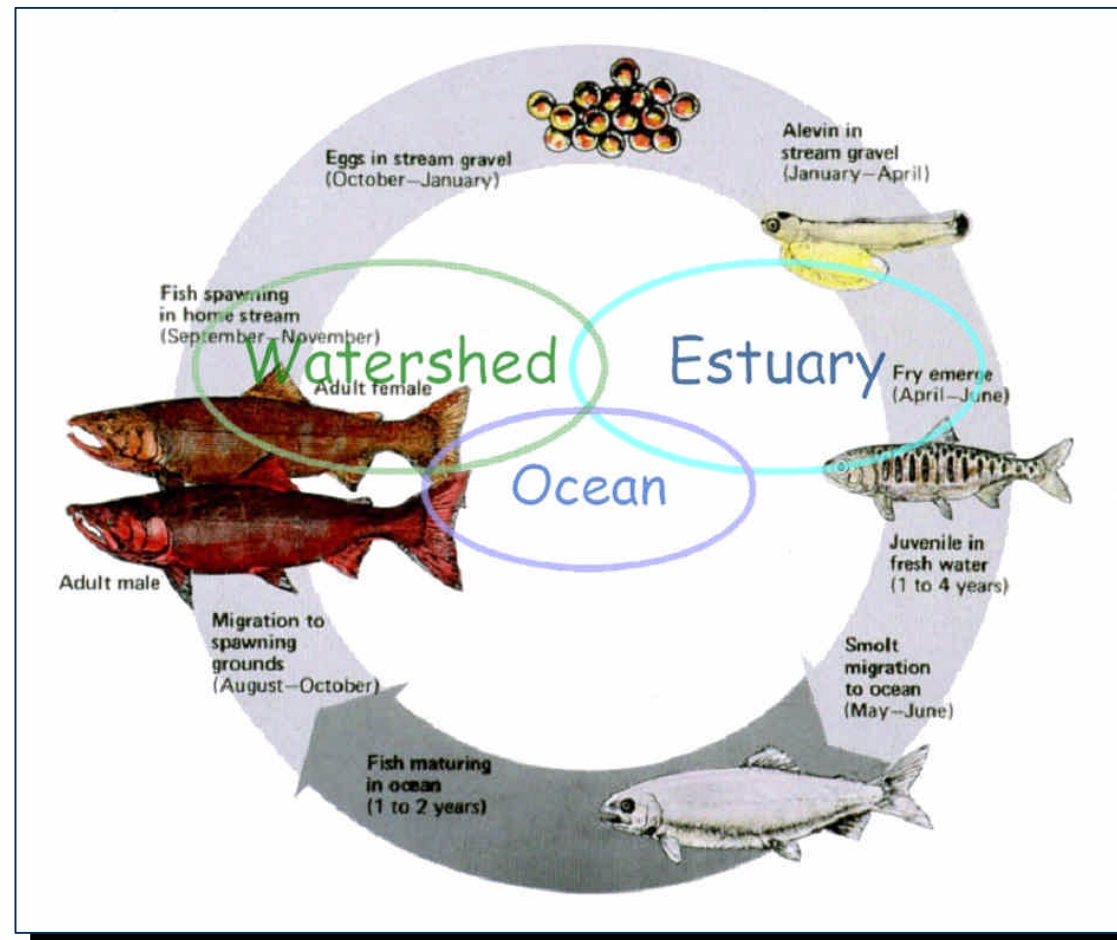
Streams dry in late summer

Increased s





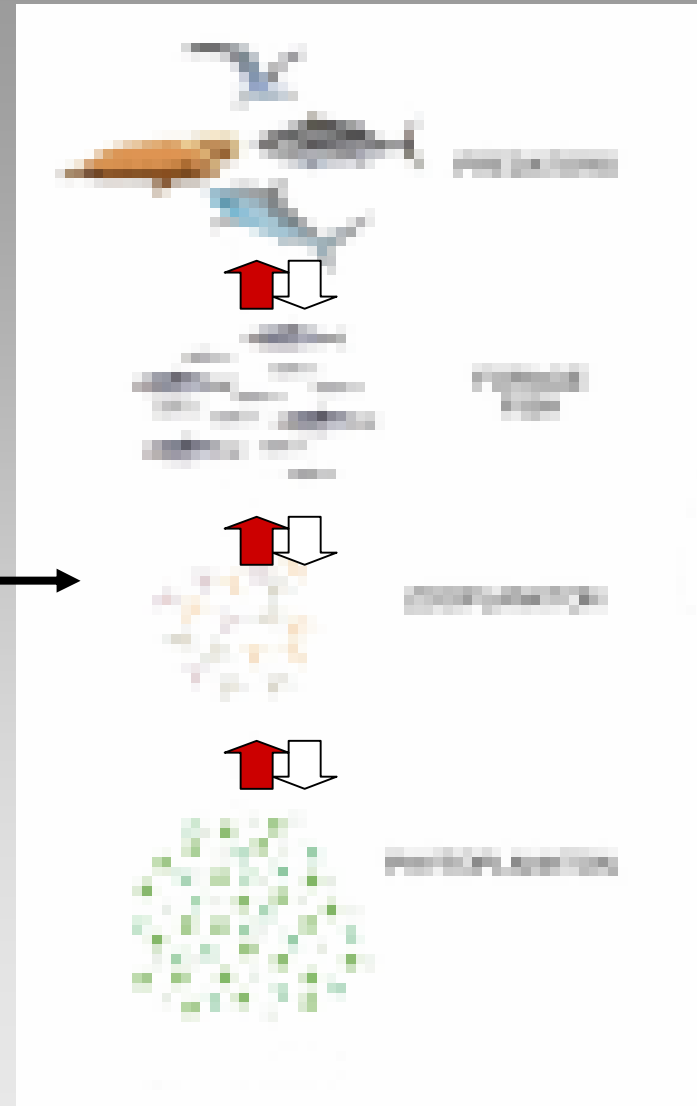
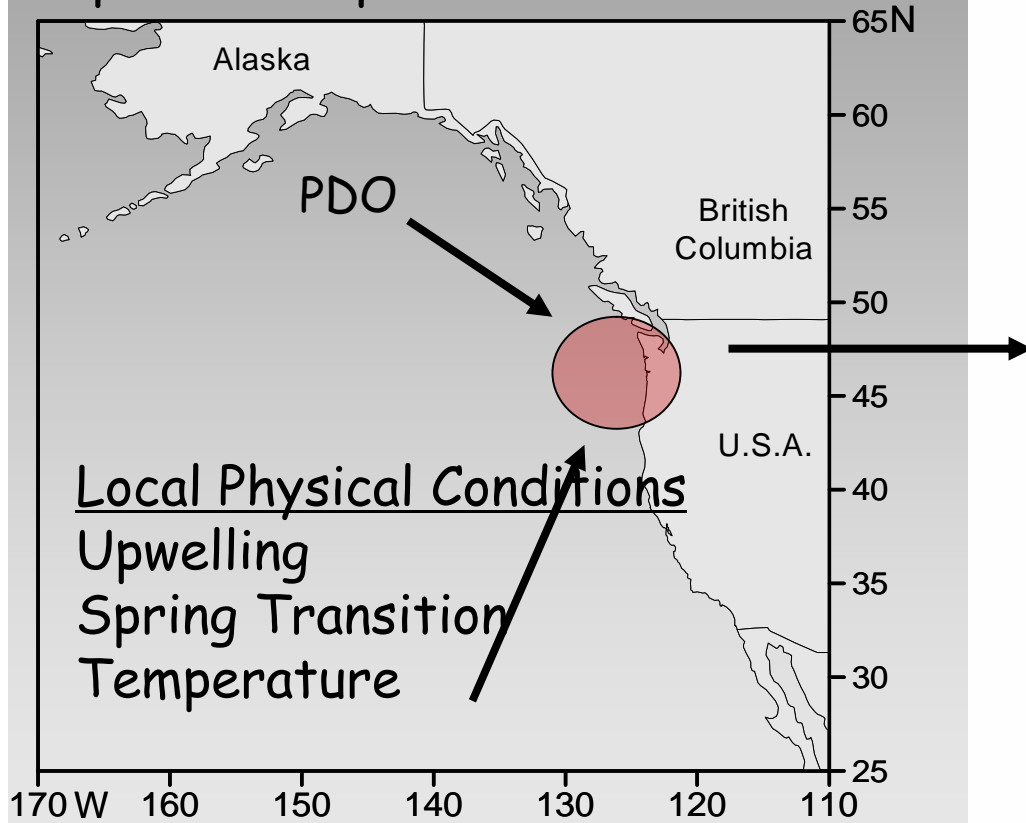
FW to Marine Transition



Example 4

Leaving the Watershed and into a Dynamic Ocean

Large scale forces acting at the local scale influence biological process important for salmon



November 20, 2008

Local Biological Conditions

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Summary - Data Needs

- **Fish response to changes in FW habitat at multiple spatial scales, biggest gap is at watershed scale**
- **Watershed and coastal interface—estuarine habitat, flow, river plume conditions and juvenile survival**
- **Partition mortality – FW vs. marine**
- **Monitoring and evaluation of adaptability/resilience to change – role of life history diversity in resilience**
- **Tools, technology, data synthesis (and management) to address all of the above**