

# Vulnerability and adaptation of freshwater ecosystems to climate change in the Cariboo-Chilcotin, British Columbia

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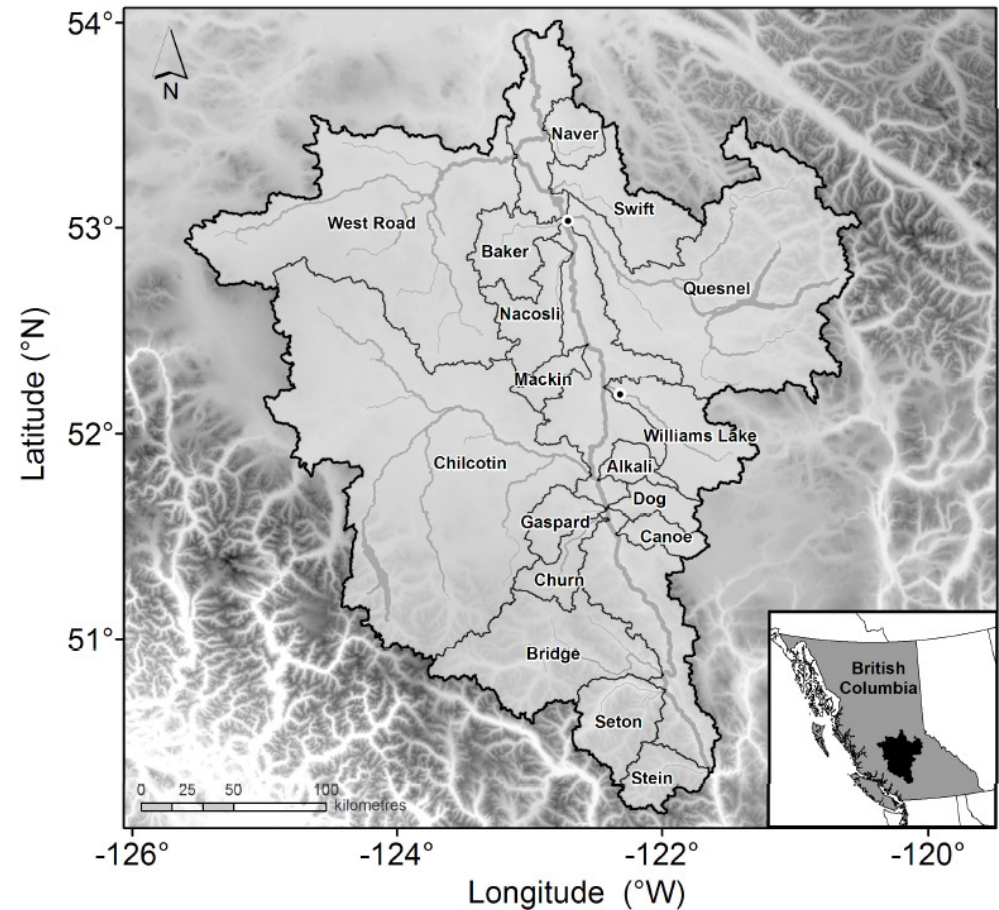
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November 23, 2011  
Regional Climate Services Workshop  
Victoria, BC

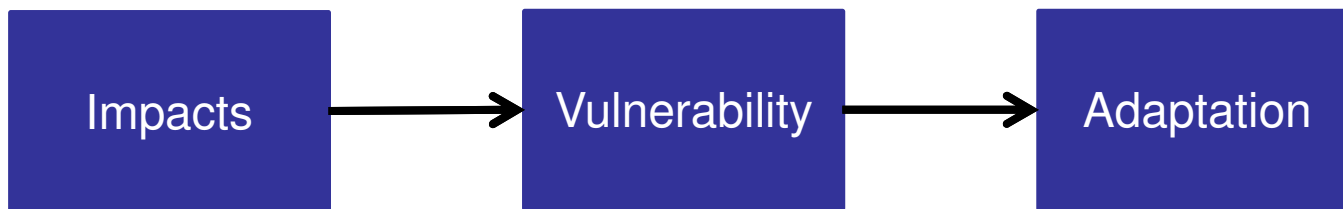
# Human communities and ecosystems

- Resource dependent communities (forestry, mining, agriculture)
- Land and water use decisions influenced by conservation values: chinook and coho salmon, bull trout, etc.

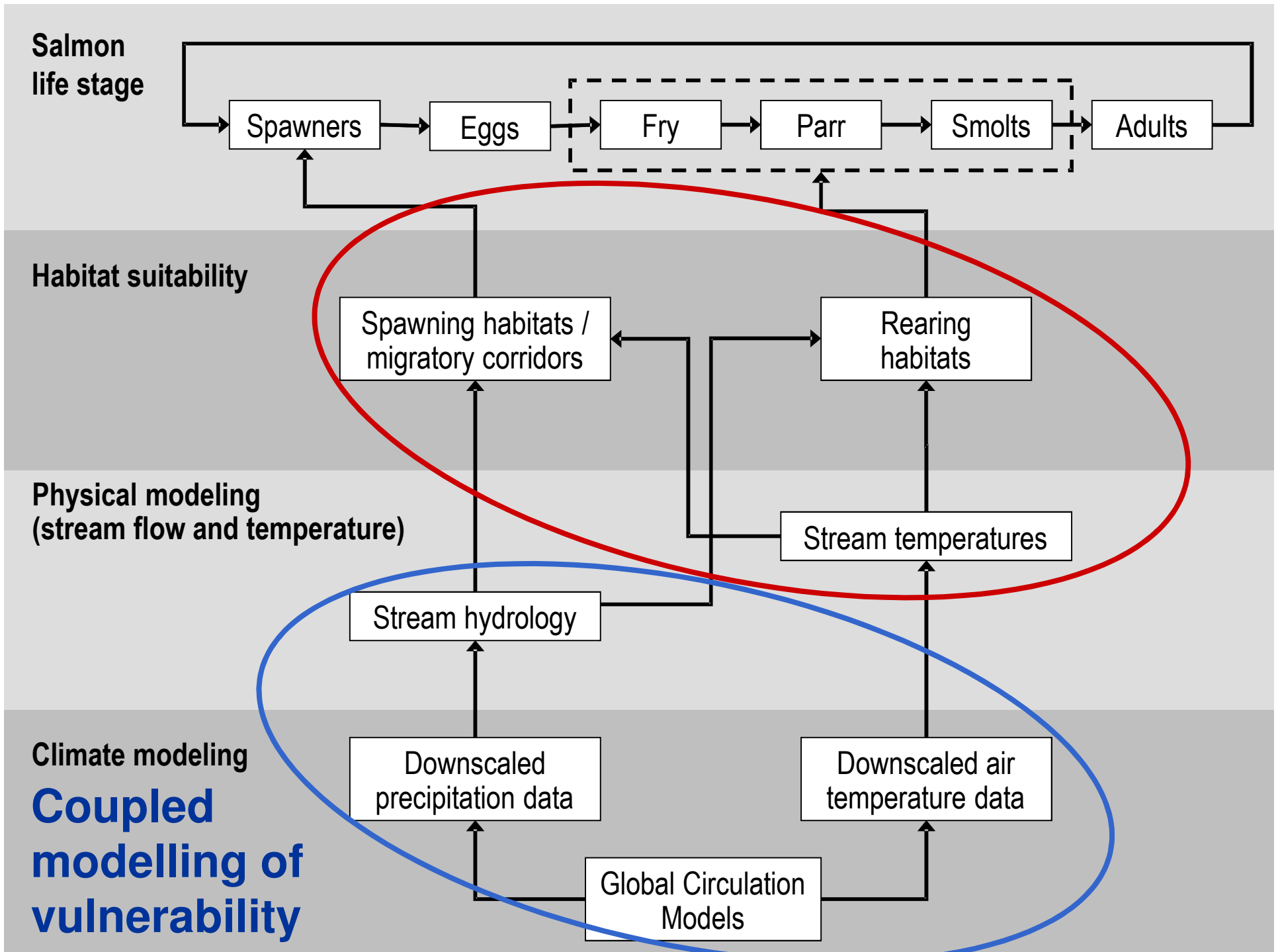


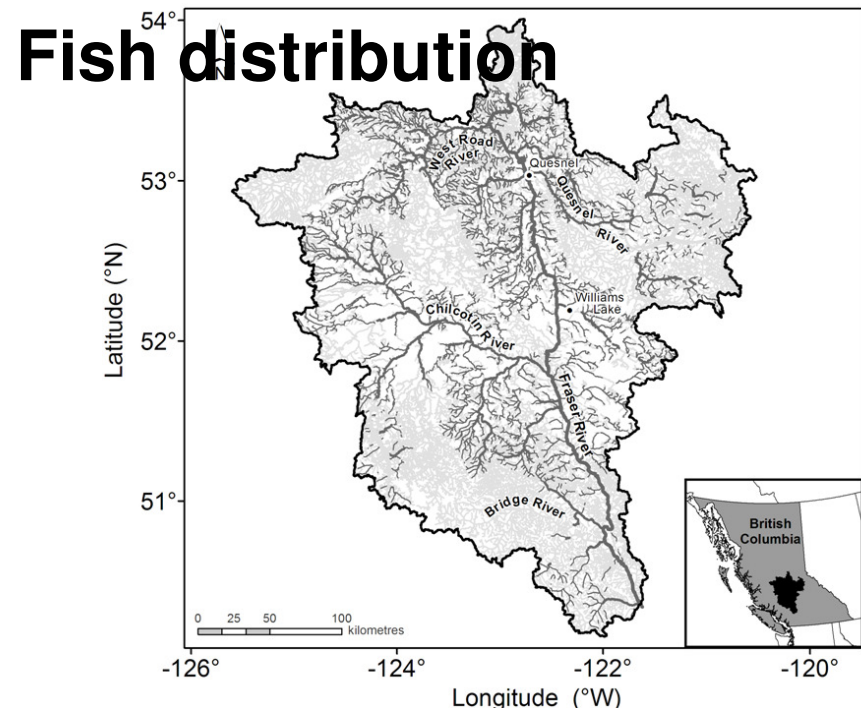
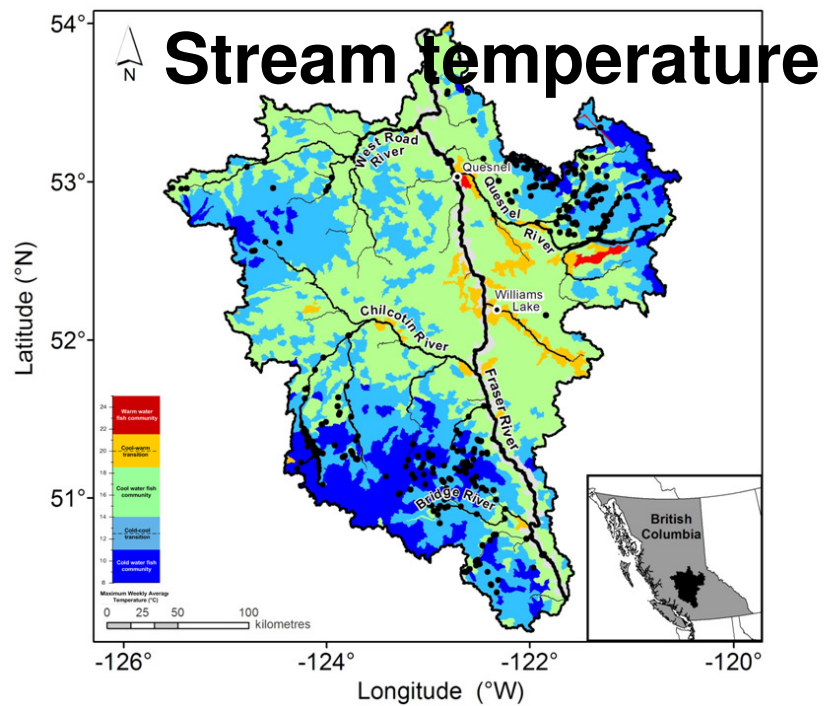
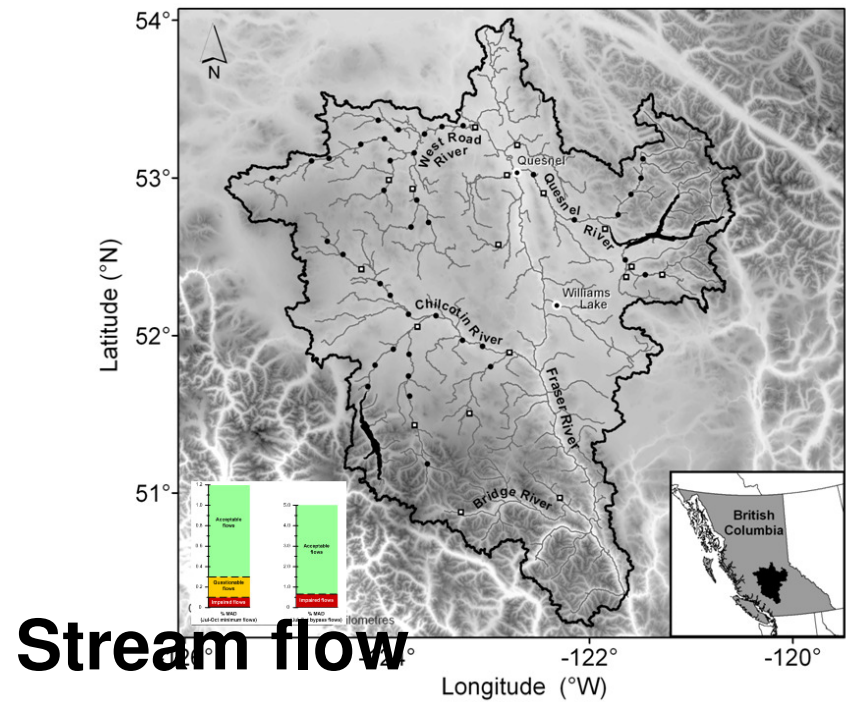
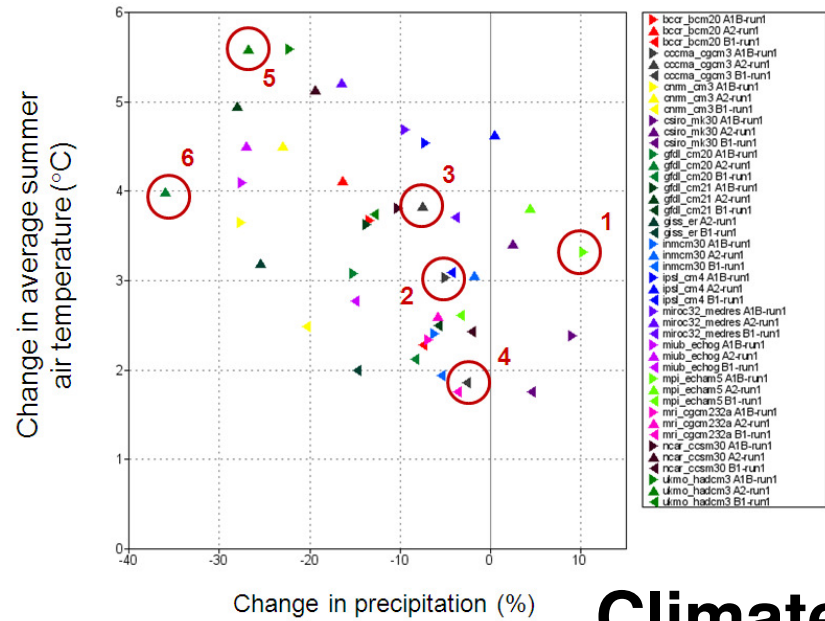
## Context for planning / decision making

- Broad scale changes associated with Mountain Pine Beetle
- Out of date land use plan; recent conservation strategy outlining adaptation priorities
- Lack of fine scale understanding of physical and biological changes related to climate change and implications on planning and natural resource decisions

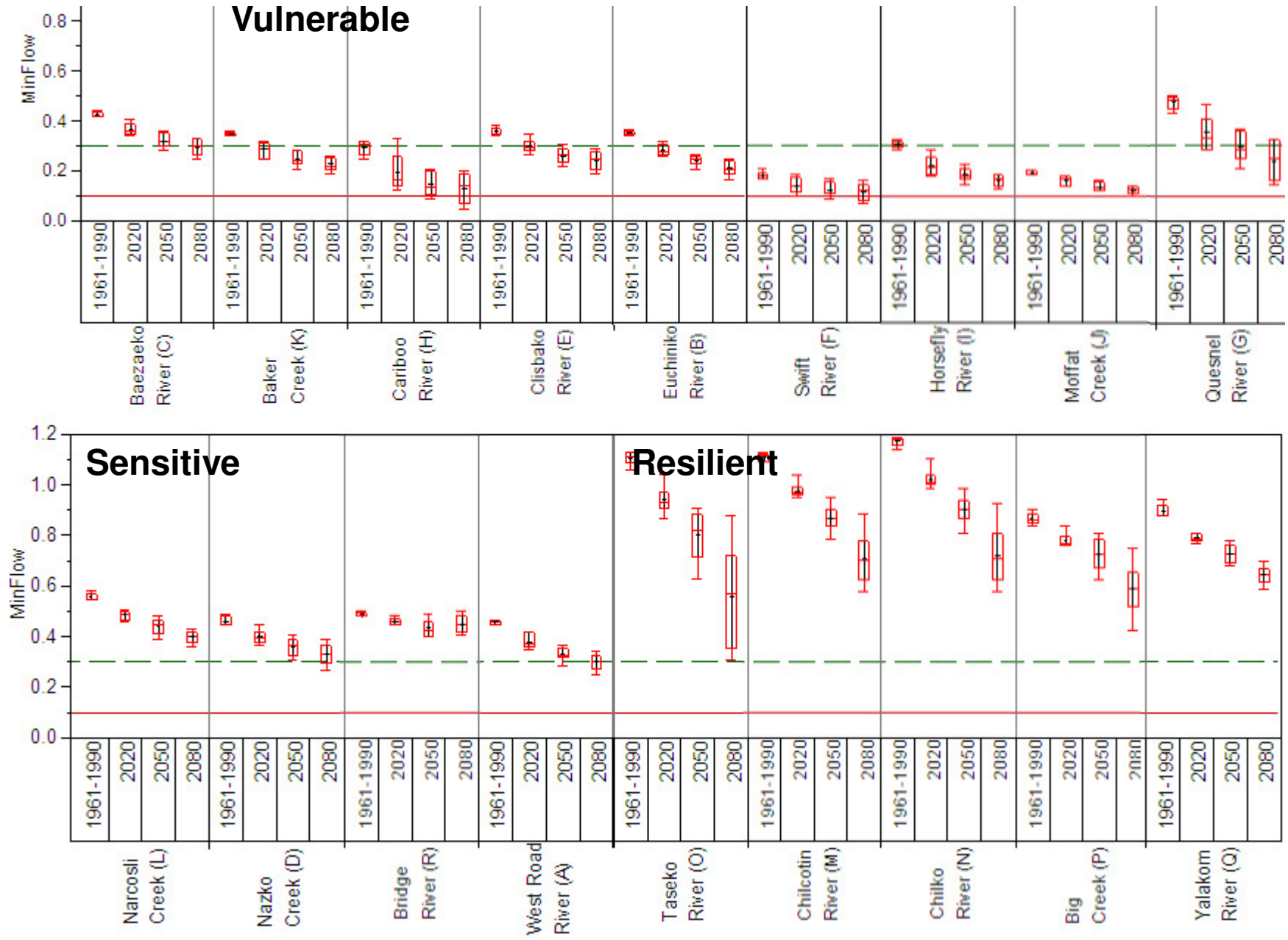


# Vulnerability

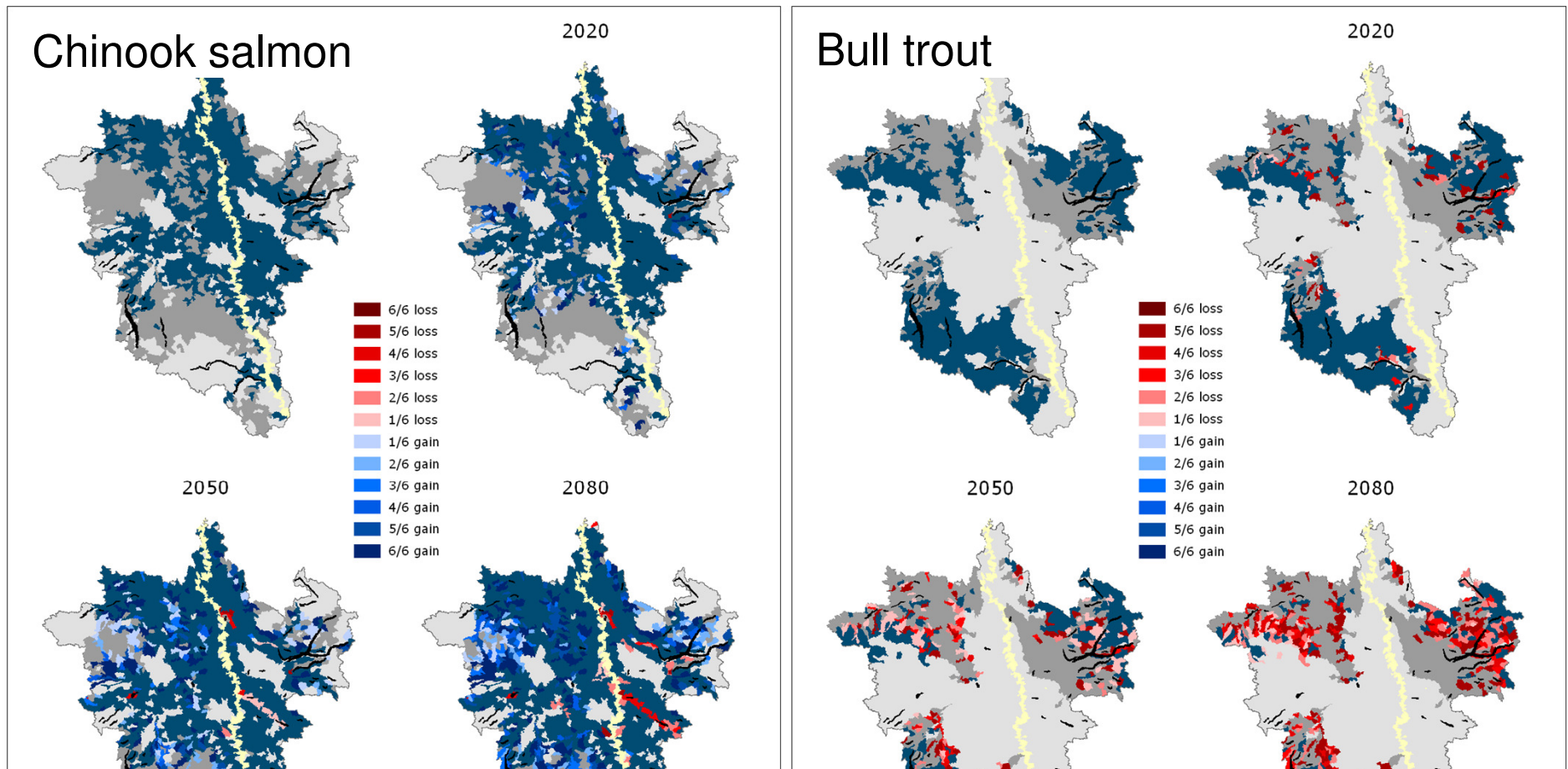




# Changes in stream flow suitability



# Changes in stream temperature suitability



- Expect winners, losers, or no changes for some species / habitats; those at margins most vulnerable
- Spatial arrangement matters; implications on planning and decision making (protect what is under threat vs. protect strongholds)

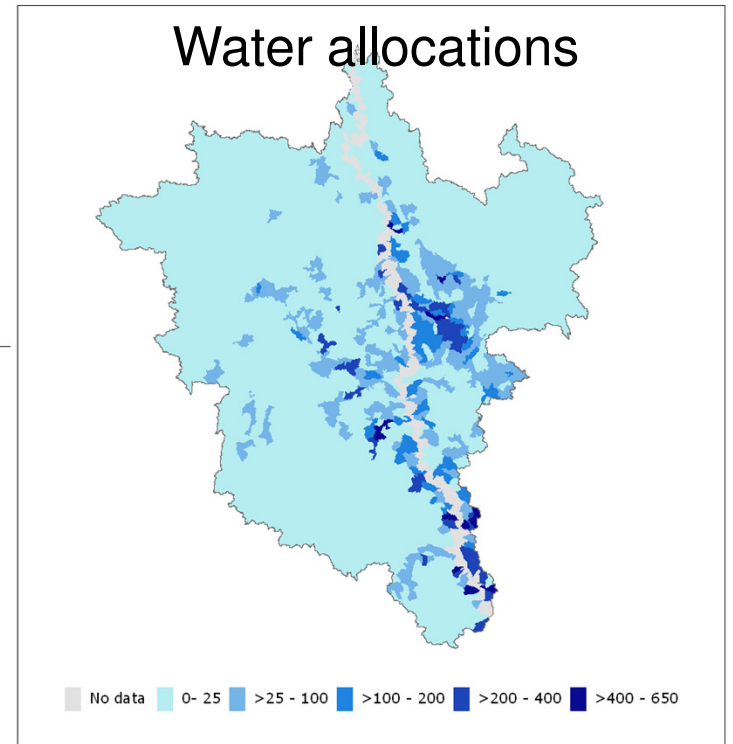
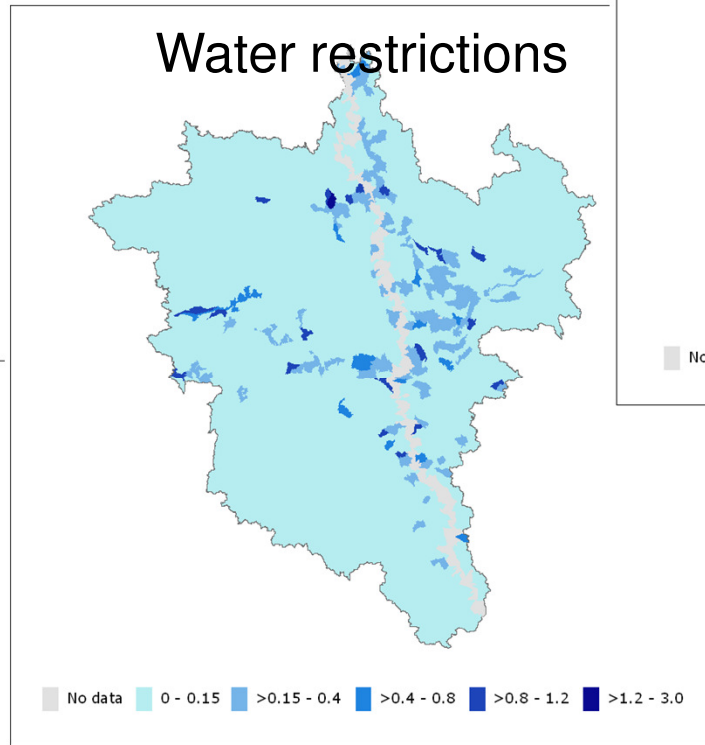
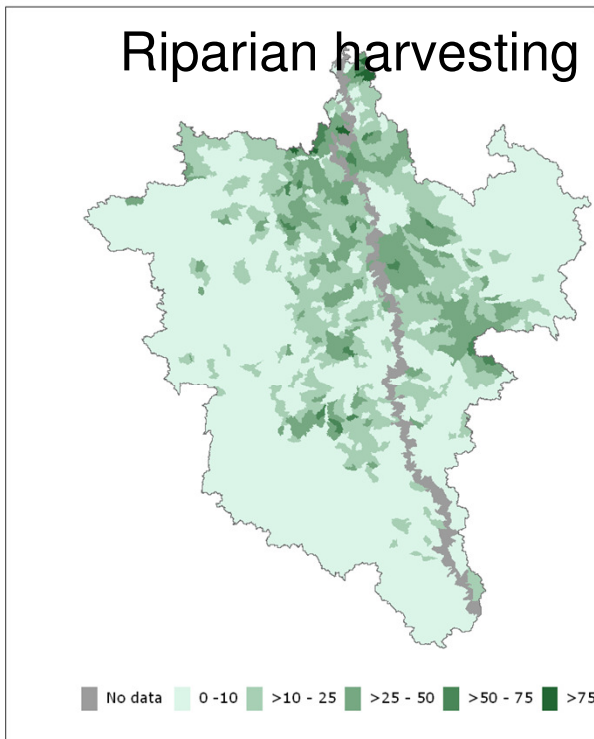


# Adaptation

## Adaptation strategies

- **Restore riparian ecosystems**
  - Create deep pools
  - Enhance production with hatcheries
  - Transport fish manually
  - **Improve fish passage**
  - Implement low impact grazing practices
  - Zone water availability in space and/or time
  - **Adjust water allocations and licensing**
  - Implement low impact irrigation practices
  - Build additional storage capacity
  - Divert water from other locations
  - Manage water storage
  - Release cold water
  - Manipulate surface water / groundwater interactions
  - Use existing land designations to promote special management
  - Enhance forest retention at the landscape level
  - Adjust patterns of forest harvesting
  - Adjust management of forest roads
  - Enhance conservation of pristine habitats
- Priorities for adaptation driven by feasibility of implementation; informed by financial, technological, policy, institutional, scientific, and/or social barriers

# Opportunities for adaptation



## Key insights

- Hunger among end users for relevant information; limited ability / capacity to act on it.
- Regional climate data were necessary for understanding vulnerability of freshwater ecosystems to climate change.
- Vulnerability has implications on planning and decision making:
  - Targets of vulnerability and spatial arrangement matter;
  - Effectiveness of today's resource decisions and conservation actions could be compromised if forecasts are not explicitly considered.
- Tough choices: Protect what's under threat vs. protect the strongholds.

# Acknowledgements

## **Project funding**

- Fraser Salmon and Watersheds Program
- B.C. Ministry of Environment
- Pacific Fisheries Resource Conservation Council
- Various in-kind contributions of time

## **Technical support and guidance**

- Pacific Climate Impacts Consortium
- Fisheries and Oceans Canada
- B.C. Ministry of Environment
- University of British Columbia
- Nature Conservancy Canada
- Pacific Fisheries Resource Conservation Council