

Fisheries and Oceans Canada / Pêches et Océans Canada

Low Flows and Impacts to Fish and Fish Habitat

Okanagan Basin Water Board
Drought Planning Workshop
July 23, 2009 - Kelowna, B.C.

Outline

- Some Flow Related Impacts to Fish/Fish Habitat
- How much water does a River or a Fish Need?
 - Instream Flow Guidelines
- Tools - Reduce the Risk for Instream Demand
 - Drought Planning
 - Water Use Plans
 - Regulatory - F.A. Pertaining to Water Use -Sec. 35, 32, 30, and 22

1. Direct impacts of Low Flows on Fish


- Impeded migration and passage
- Stranding
- Exposure of incubating eggs & alevins
- Water temperature change
- Reduction in available habitat (reduced quality, quantity & hence carrying capacity)

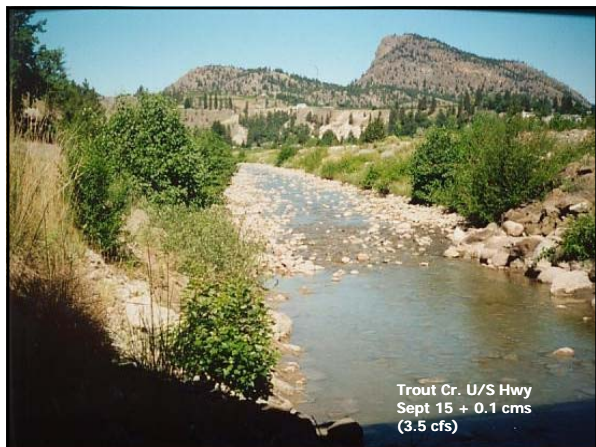
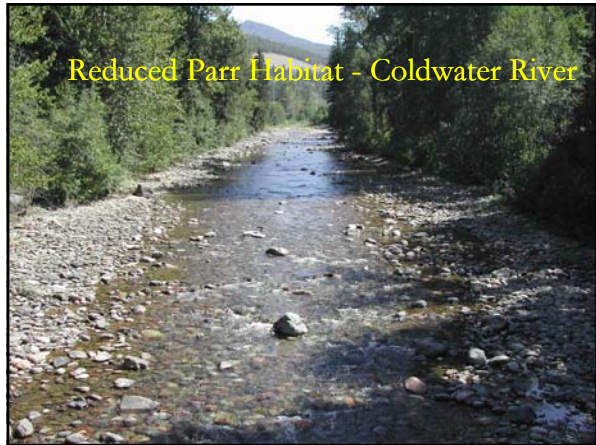
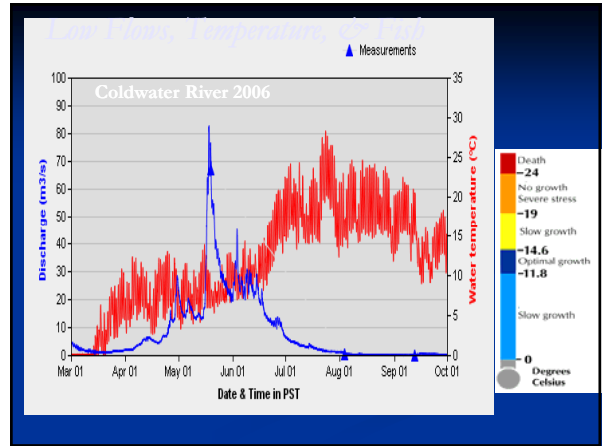
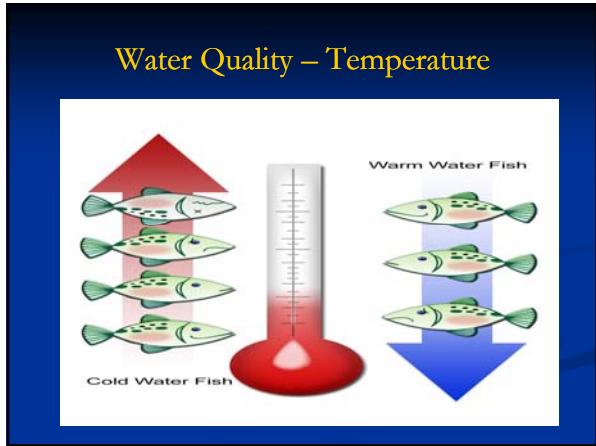
Combined effects (cumulative small effects), subtle, progressive and time/spatial variable

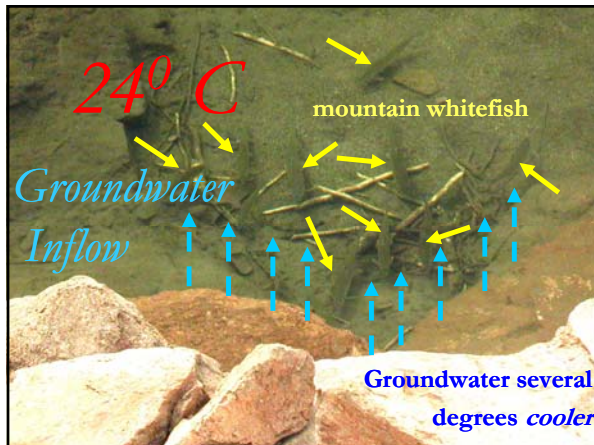
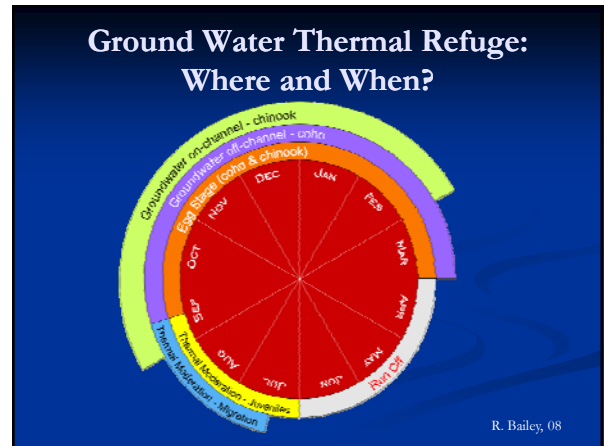
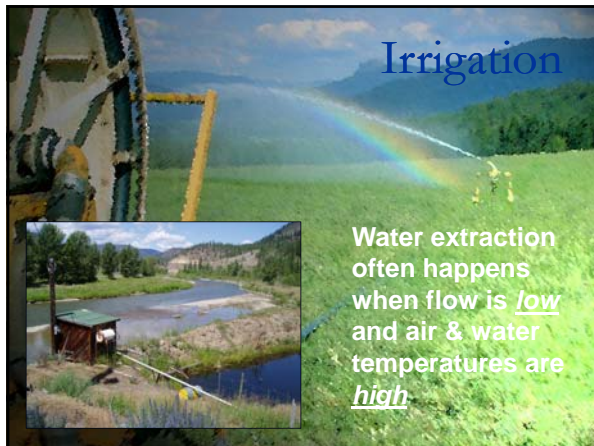
Spawning Migration Flows




Exposure of incubating eggs & alevins







2. How much water does a Fish or a Stream Need?

Aquatic Habitat

Instream Flow Requirements

Setting Instream Flows: everyone responds differently

B.C. Instream Flow Guidelines

- http://www.env.gov.bc.ca/wld/BMP/instreamflow_wkgdrft.html
- Coarse filter method

Range of Variability Approach (RVA)

- Richter et al. 1997, "How Much Water Does a River Need?" (*Freshwater Biology*)
- "The full range of natural intra- and inter-annual variation of hydrologic regimes, along with associated characteristics of **timing, magnitude, frequency, duration, and rates of change**, is necessary to sustain native biodiversity and evolutionary potential of freshwater ecosystems" (the "*natural flow paradigm*")

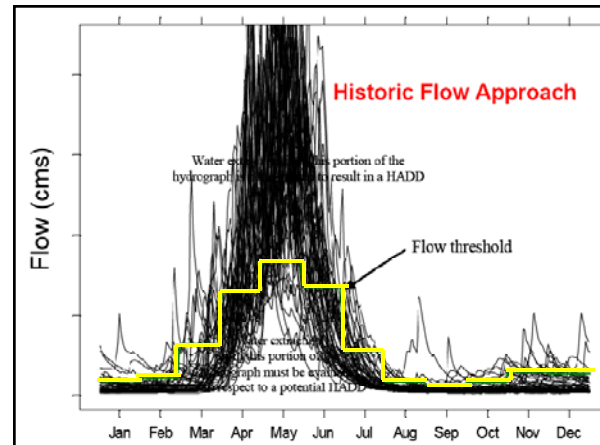
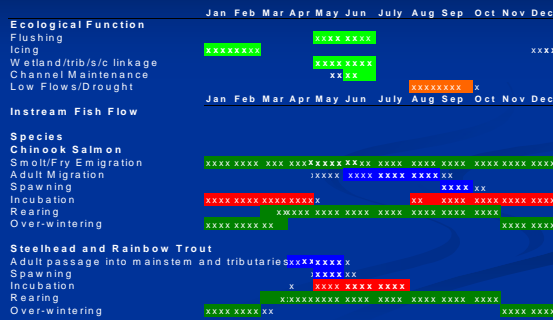
Ecologically-Relevant Flow Regime Characteristics

- Magnitude (how much flow or what level?)
- Duration (how long do certain flows or levels last?)
- Timing (when do certain flows or levels occur?)
- Frequency (how often do certain flows or levels occur?)
- Rate of change (how fast do flows or levels change from one condition to another?)

Richter et al. 1996, "A Method for Assessing Hydrologic Alteration Within Ecosystems." (*Conservation Biology*)

Nicola R. Fish Life History

Fish periodicity chart for Nicola River



3. TOOLS -

Goal: Reduce Impacts/Risks to Fish/Fish Habitat

- Water Use Planning (e.g. Trout, Mission, Fortune, Duteau?)
- Drought Planning (Prov. of B.C. - RFC, Water Advisory and Conservation Notices)
- Regulatory Actions
- Enforcement

Fisheries Act

- **Fish Habitat** includes:
 - spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes
 - fish do not necessarily need to be present
 - fish habitat may be dry during part of the year
 - fish habitat includes **water**, water quality and non-aquatic areas (e.g. streamside vegetation)



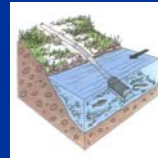
Section 35 (1):

- No person shall carry out any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat.
- **Who** is responsible for the harm?
 - removal of water
- **Harm must be proven**
 - **Evidence** of harm to fish habitat



Legislative Requirements of the Fisheries Act

- | | |
|--|---|
| <p>Section</p> <ul style="list-style-type: none"> ■ 30: requires installation and maintenance of fish guards/screens on water intakes or diversions where the Minister deems it necessary | <p>Section</p> <ul style="list-style-type: none"> ■ 32: prohibits the destruction of fish by means other than fishing unless authorized by the Minister or Governor in Council |
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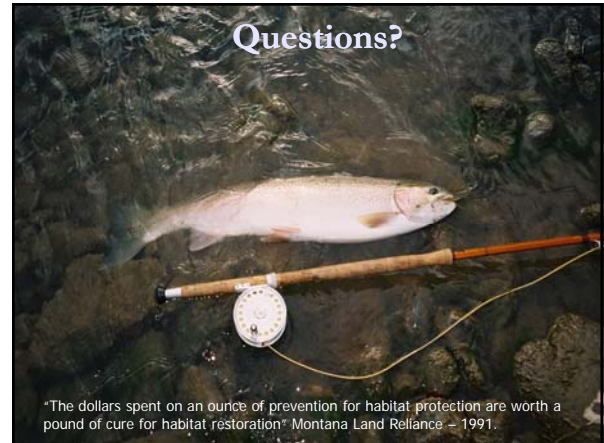


Legislative Requirements of the Fisheries Act

- Section**
- **22:** requires **sufficient flow** of water for the descent of fish **past obstructions**, for the free movement of migratory fish during construction and for the safety of fish and fish eggs downstream, where the Minister deems it necessary
 - **22(3):** Flow orders d/s of dams



Questions?



"The dollars spent on an ounce of prevention for habitat protection are worth a pound of cure for habitat restoration" Montana Land Reliance - 1991.