

U.S. Army Corps of Engineers' Willamette Project



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Oregon Water Round Table

Oct 21, 2008

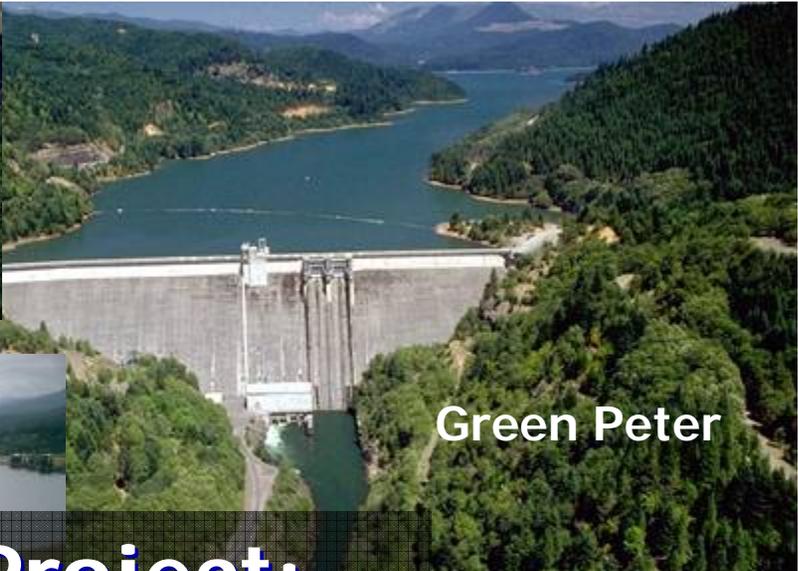




Detroit



Big Cliff



Green Peter



Foster

Willamette Project:

13 Multi-purpose Dams and Reservoirs



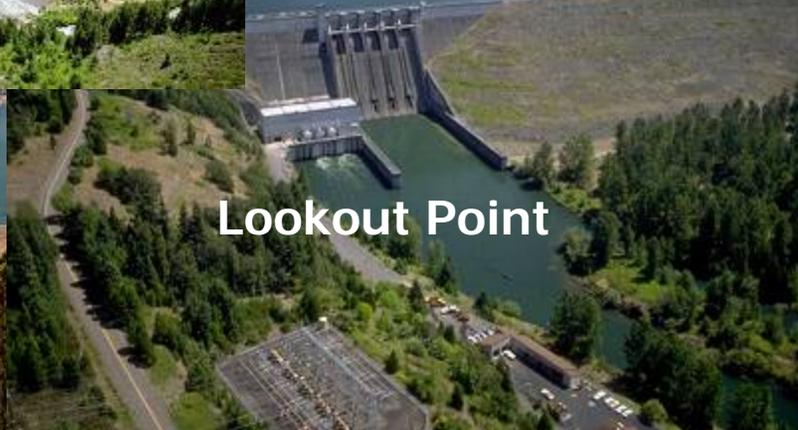
Cougar



Blue River



Dexter



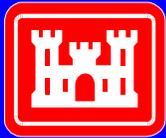
Lookout Point



Fall Creek



Hills Creek



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13 Multi-Purpose Dams and Reservoirs

- Located in tributaries, not on mainstem Willamette River
- Most are large, high-head dams

The Willamette Basin

LEGEND

- Re-regulating Dams
- Multi-purpose Projects
- Section 7 (non-Federal)





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Authorized Purposes

- Flood Control
- Hydropower
- Navigation
- Irrigation
- Fish & Wildlife
- Recreation
- Water Quality
- Municipal & Industrial





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Willamette Basin Project System Benefits

- Flood Damage Reduction
 - \$18.6 billion to date
 - \$920 million annual average damage reduction
- Hydropower –
 - more than \$90 million annually
- Navigation
 - Flows support water quality
- Irrigation –
 - minor use but supports high value crops





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Willamette Basin Project **System Benefits**

- Fish & Wildlife
 - Hatchery Program
- Recreation
 - Exceeding \$200 million regional impact annually (Detroit)
- Water Quality
 - Summer low flow augmentation
- Municipal and Industrial Water Supply
 - Future growth supplies (Salem)

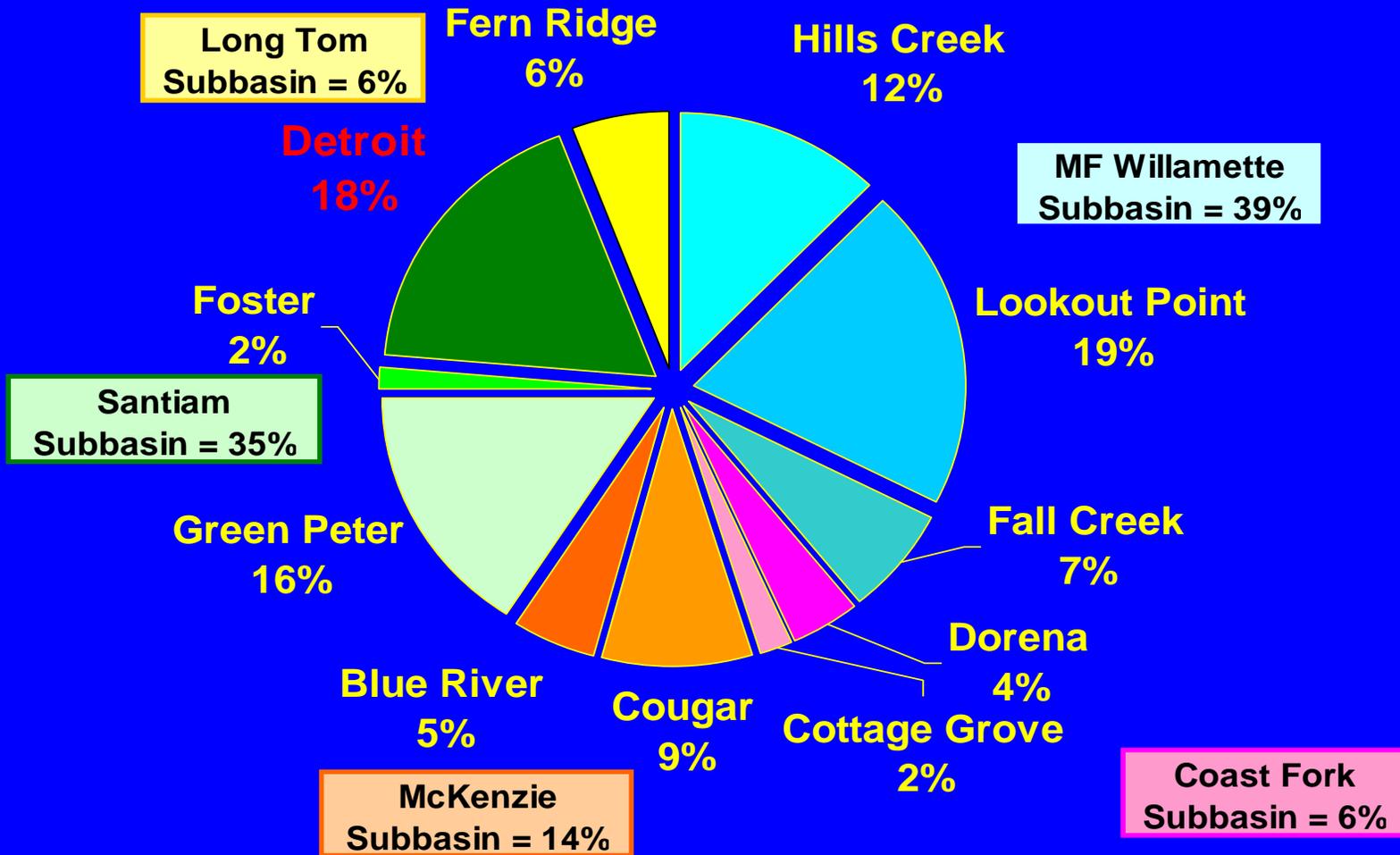


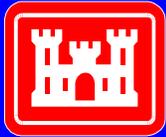


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Willamette Conservation Storage

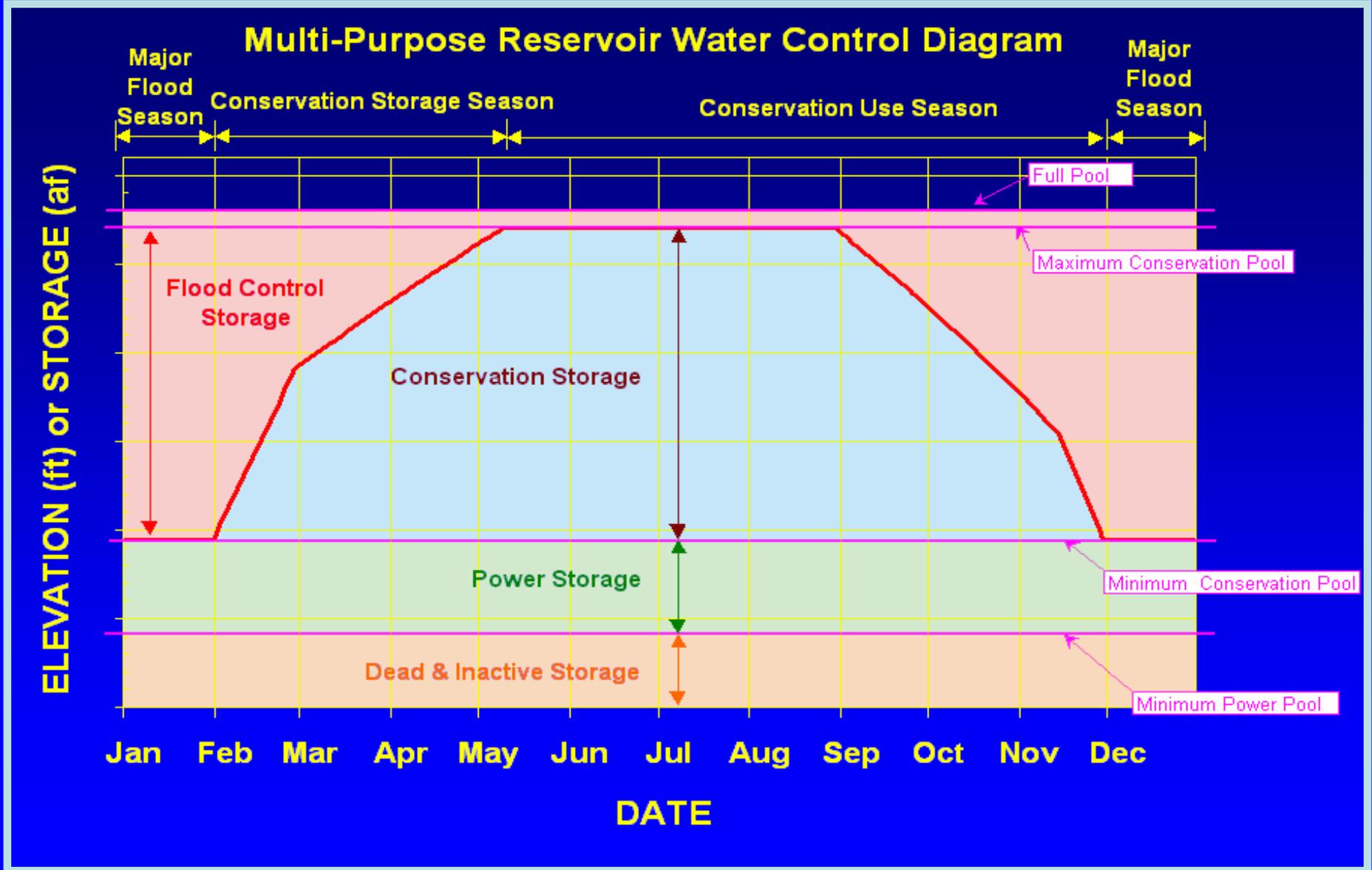
Total = 1.6 million Acre-feet





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Willamette Conservation Storage Total = 1.6 million Acre-feet





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Willamette Basin Review Study Goals

1. Authorize a full range of beneficial uses
2. Develop an operational agreement for low-flow years
3. Determine appropriate institutional arrangements
4. Investigate options to improve reservoir refill and reduce downstream erosion
5. Address municipal and industrial water demands and constraints



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Willamette Project Flow Operations

- Spring Reservoir Refill (Feb-May)
 - Inflow $>$ outflow
 - Lower than natural spring flow
- Summer Flow Augmentation (May-Aug)
 - Outflow $>$ inflow
 - Higher than natural summer flow



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Willamette Project Flow Operations

- Fall Evacuation (Sept-Nov)
 - Outflow > inflow
 - Higher than natural fall flows
- Winter Flood Control (Dec/Jan/Feb)
 - Capture peaks of flood events, slow release
 - Decreases magnitude, but increases duration of high flows



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Effects of Willamette Dams on Fish

- Blocked access to spawning habitat (i.e., no fish passage)
- Hatchery impacts
- Downstream effects on spawning and rearing habitat (flow availability and physical habitat)
- Water quality (temperature, dissolved gas)



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ESA-Listed Fish in the Willamette

US Fish and Wildlife Service jurisdiction

Oregon chub



Columbia River bull trout





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ESA-Listed Fish in the Willamette

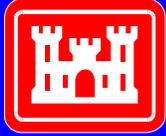
NOAA Fisheries/NMFS jurisdiction

Upper Willamette River Spring
Chinook salmon



Upper Willamette River
winter steelhead





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Willamette Projects and ESA Consultation

Consultation with NMFS and USFWS

- Action Agencies provide Biological Assessment
- Services Provide Biological Opinions
 - Biological Opinion tells the Corps how to operate projects for fish

View the Supplemental BA at:

https://www.nwp.usace.army.mil/pm/e/en_plan_ba.asp

View the NMFS Biological Opinion at:

<http://www.nwr.noaa.gov/Salmon-Hydropower/Willamette-Basin/Willamette-BO.cfm>



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Willamette ESA Consultation Action Agencies

- US Army Corps of Engineers (USACE)
 - Owns and operates projects
 - Congressional appropriations
- Bonneville Power Administration (BPA)
 - Markets power from the 8 power projects
 - Funds Power portion (business case)
- US Bureau of Reclamation (BOR)
 - Markets stored water through irrigation contracts



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Biological Opinion Actions

- Flow Management
 - Mainstem Willamette flow targets (spring)
 - Tributary flow targets (at each dam)
 - Ramp-down rate restrictions
 - Flows for downstream passage
- Water Contract Program (Bureau of Rec)
 - Limits new irrigation contracts
 - Screens on new and existing intakes



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Biological Opinion Actions

- Upstream Fish Passage
 - Upgrade adult collection and handling facilities
 - trap-and-haul
 - Improve release adult fish above at select locations
- Downstream Fish Passage
 - Test and develop prototypes for downstream passage
 - Assess permanent passage alternatives
 - Construct downstream passage

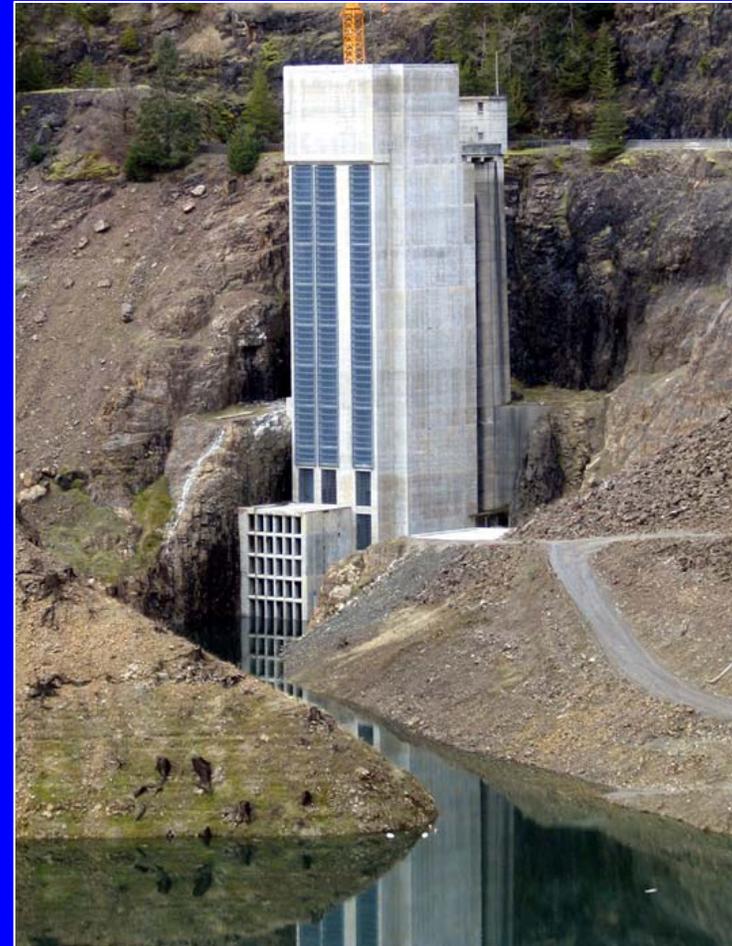




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Biological Opinion Actions

- Water Quality
 - Improve water temperatures
 - Operational (spillways)
 - temperature control towers (Cougar)
 - Water Quality mgmt Plan (TMDL)
 - Minimize total dissolved gas

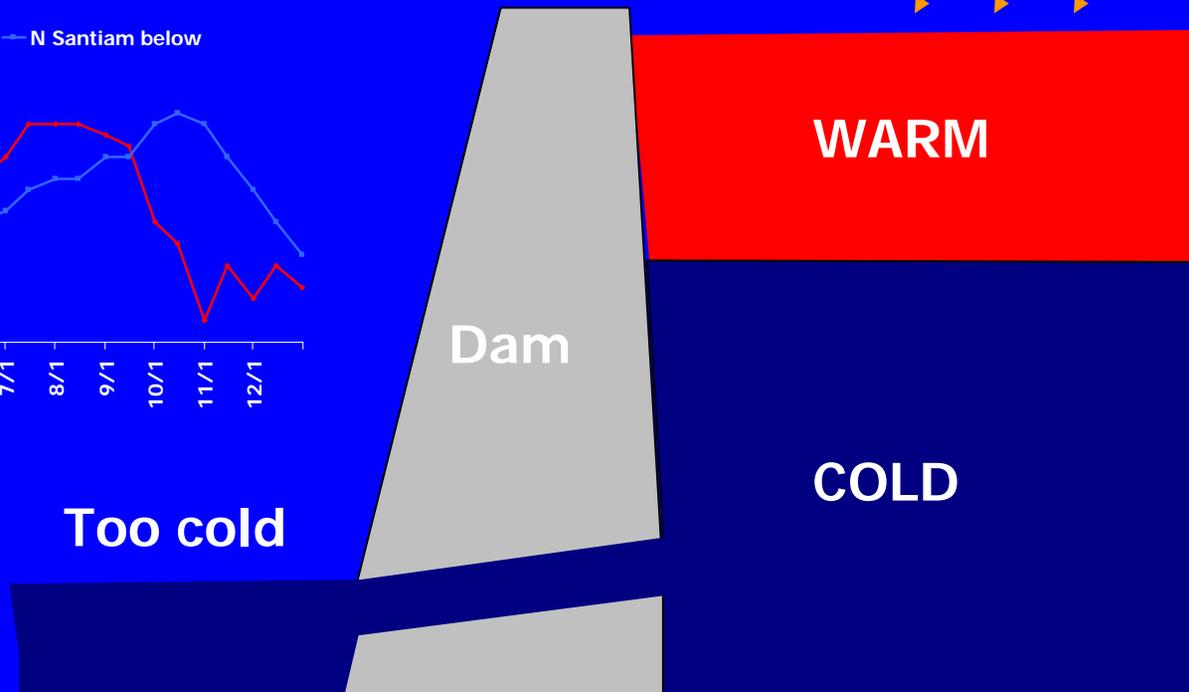
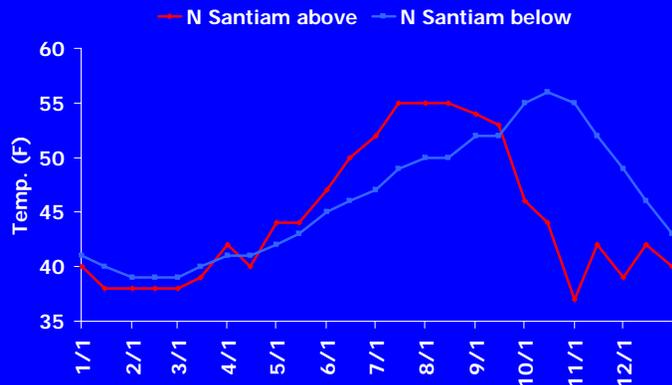
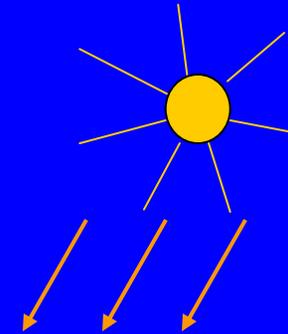




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Spring/Summer Temps - Cold

Spring and Summer
(adult salmon migration)

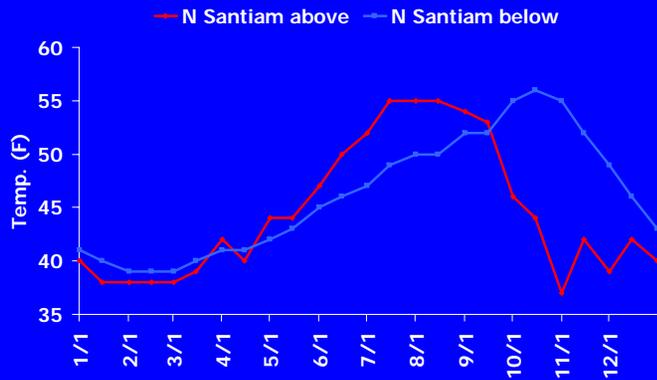




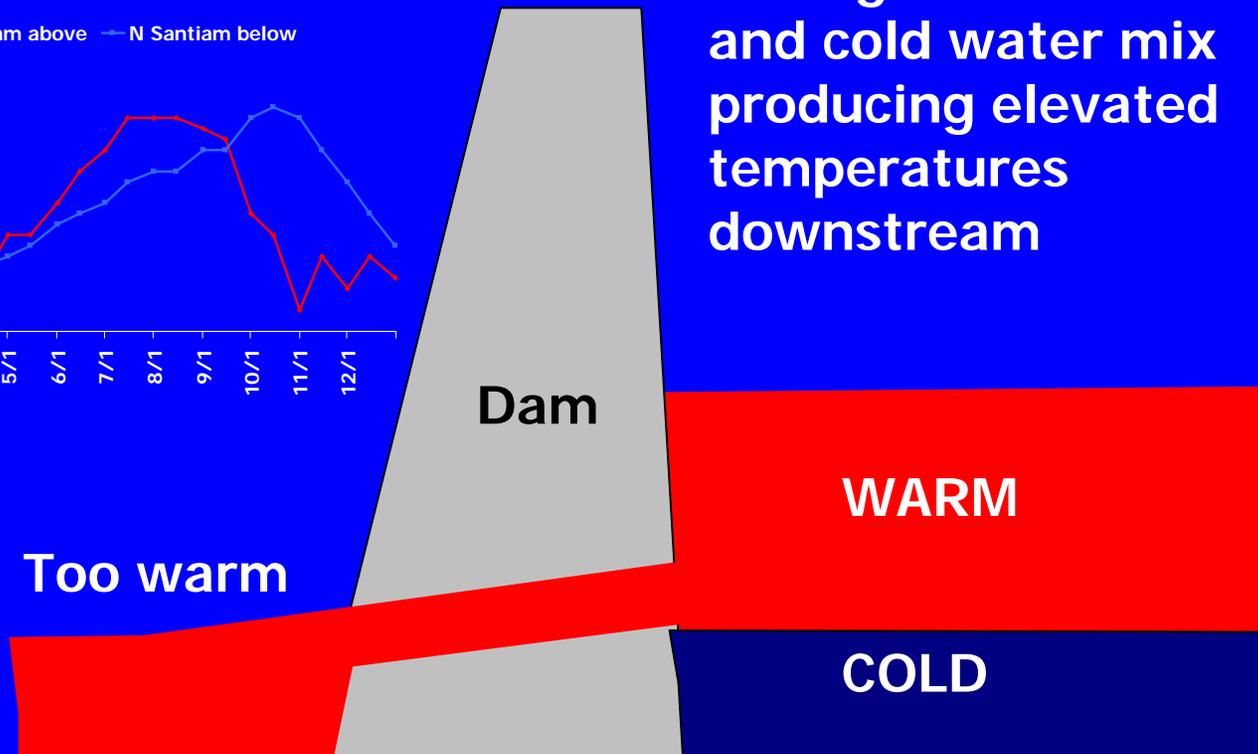
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Elevated Fall/Winter Temps

Fall and Early Winter
(salmon egg incubation)



During turnover warm and cold water mix producing elevated temperatures downstream

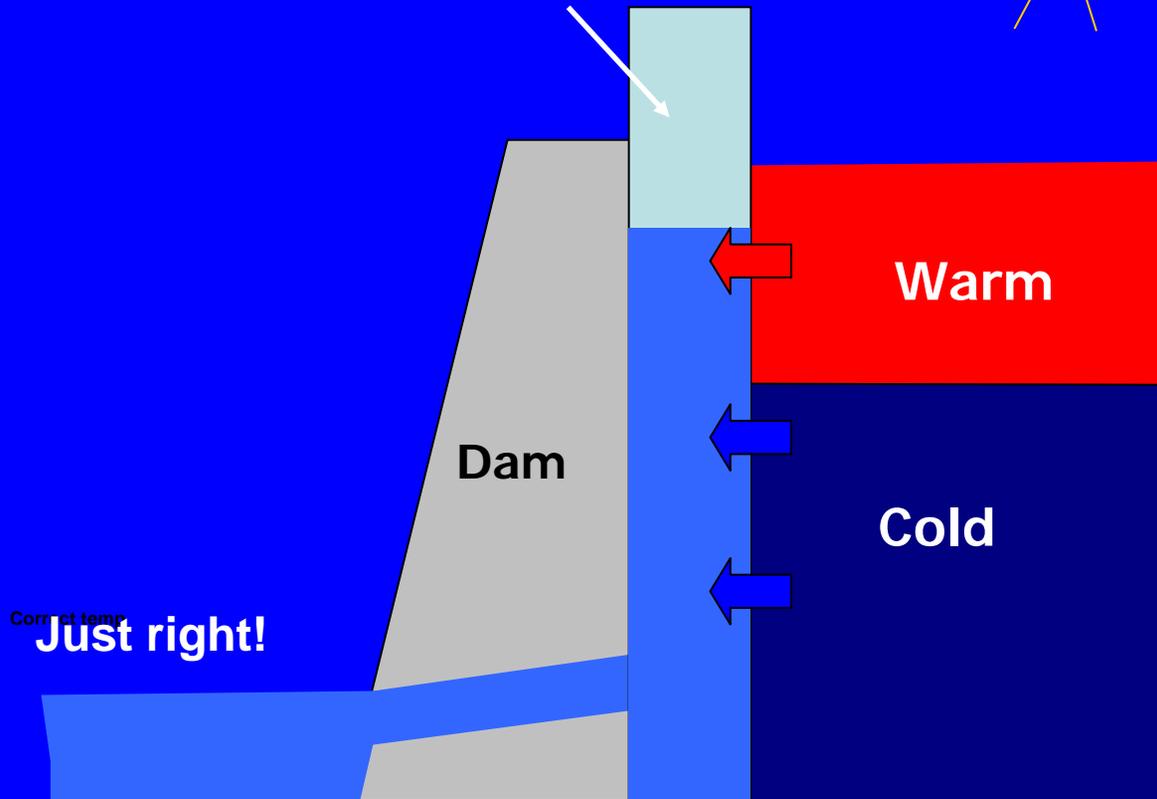
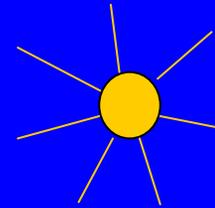




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Completed Tower

New Intake Tower

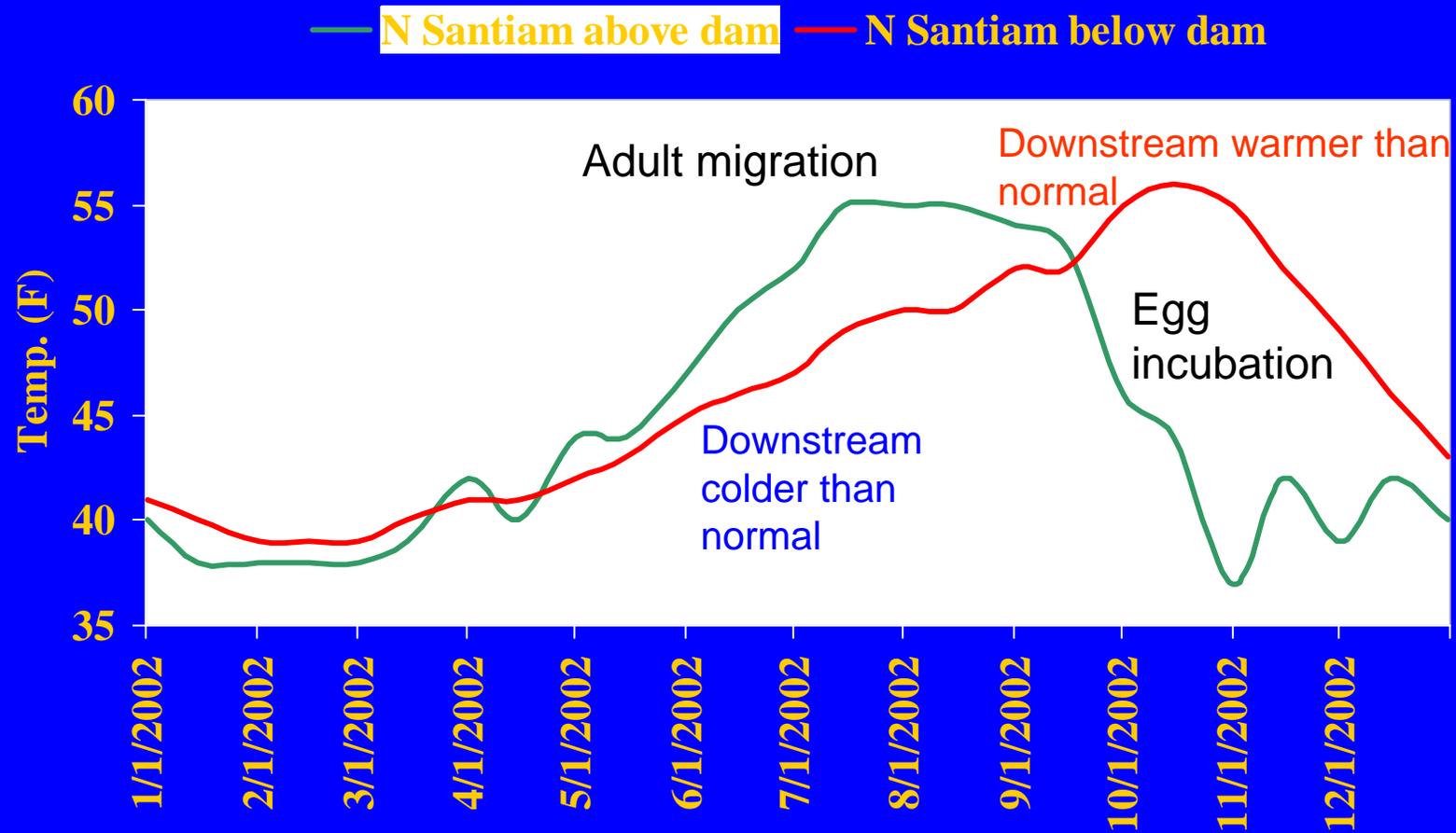




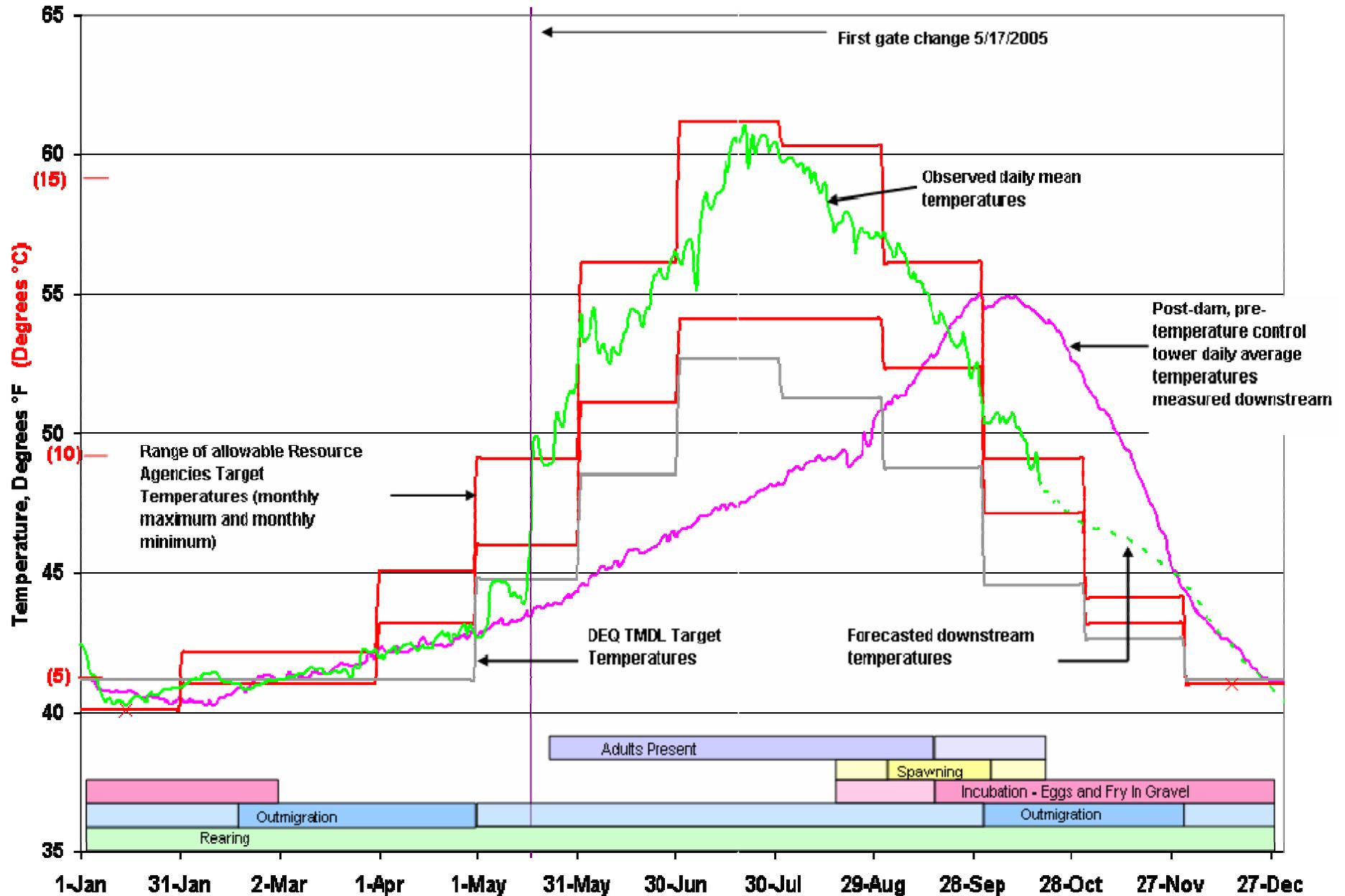
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Water Quality

Downstream temperature effects



Cougar Temperature Control Performance in 2005





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Biological Opinion Actions

- Hatcheries
 - Implement Hatchery Genetic Management Plans
 - Improve facilities
 - Modify fish releases
- Habitat
 - Restore habitat downstream of dams



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Biological Opinion Implementation

- Willamette Action Team for Ecosystem Restoration (WATER)
 - Technical Teams for each type of action
 - Informed by extensive research, monitoring, and evaluation



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Other Corps Programs

- Sustainable Rivers Project
 - Partnership with The Nature Conservancy
 - Restore ecological flows
- Floodplain Restoration Study
 - Evaluate floodplain habitat improvements
- CAP, General Investigation
- New Ecosystem Restoration authorities
- Generally need a non-federal sponsor



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