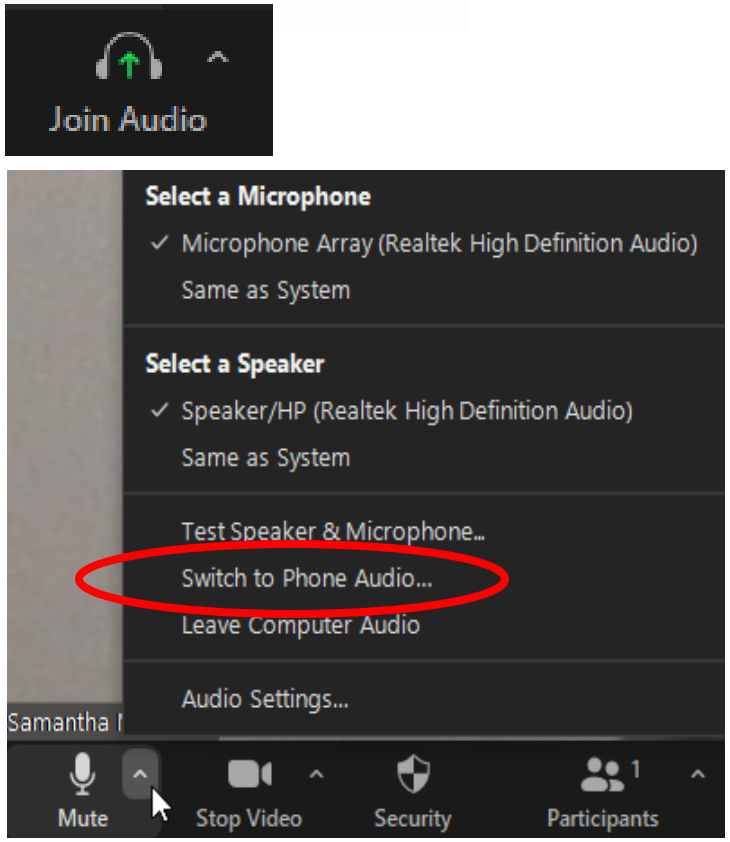
Columbia Basin Collaborative Hydropower/Blocked Areas Work Group

November 2nd, 2022
1:00 – 4:00pm PT

Zoom Webinar Features

- If you have not **connected your audio**, click on the "Join Audio" at the bottom left of your screen.
- To **switch to phone**, click the arrow next to the microphone icon and select "Switch to Phone Audio".
- If you have joined by browser, please click "Audio Settings"



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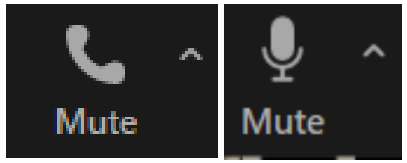
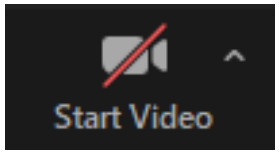
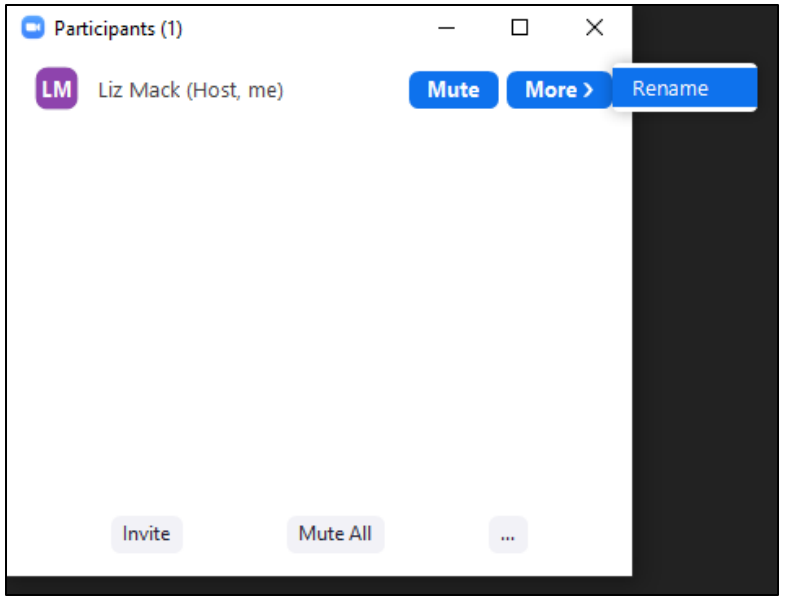
Zoom Webinar Features – Work Group Members

Keep yourself on mute when not speaking.

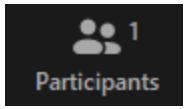


Use video, if possible, to promote face to face communication.

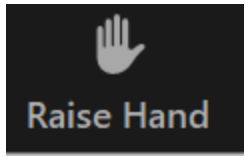




If needed **rename yourself** in the participant panel.



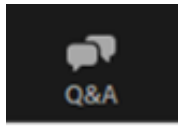
Find your **raise hand function** at the bottom of your screen

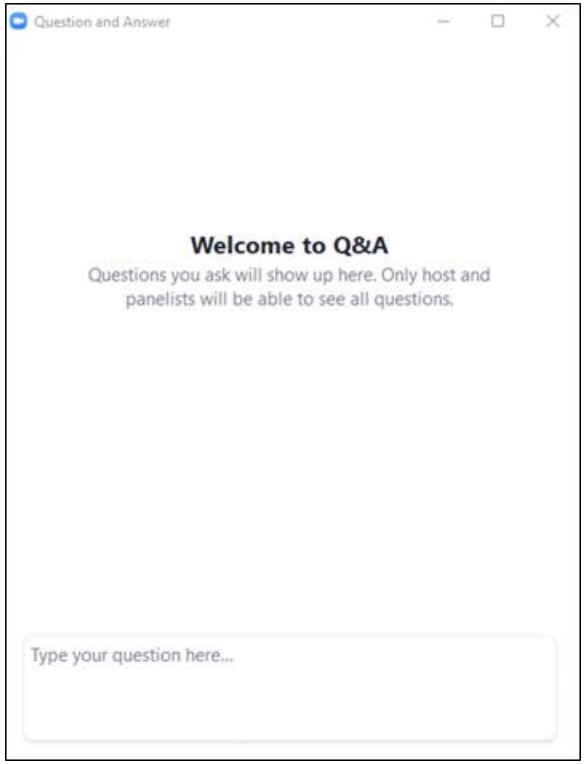


Zoom Webinar Features – Audience Members

Audience members will remain muted.

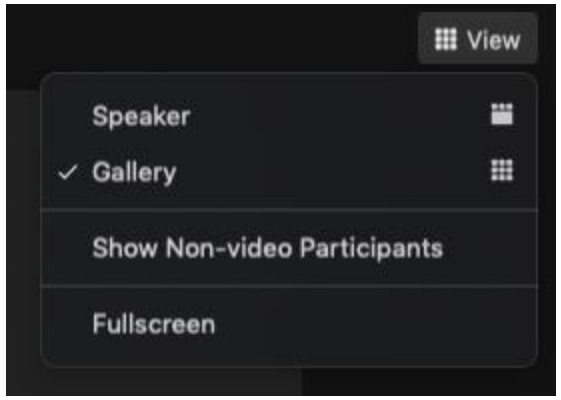
If you have technology issues, please use the Q&A feature to reach our team

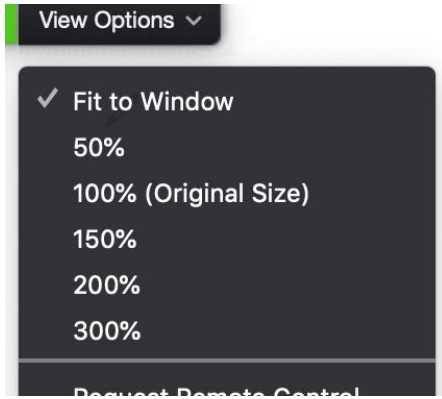


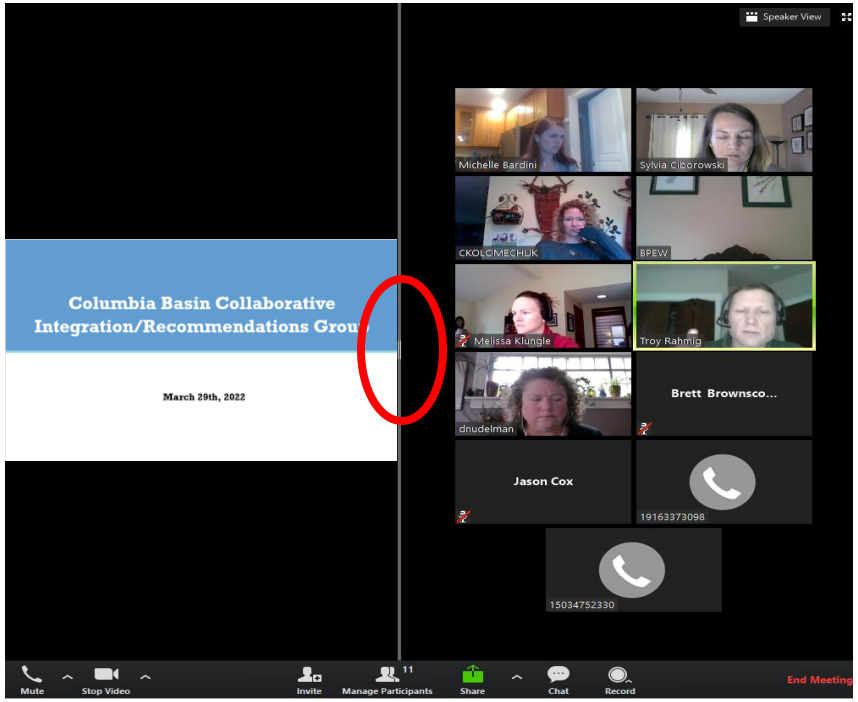


Zoom Webinar View Options

Adjust view options







For technical support, please contact Colin Johnson

Welcome, Agenda Review, and Updates

Meeting Guidelines

- Honor the agenda
- Listen to understand and ask questions to clarify
- Balance speaking time
- Don’t pile on
- Be hard on the problems, soft on the people
- Seek alignment and common ground wherever possible
- Be present

Agenda Review

Time (PT)	Topic
1:00 – 1:10 pm	Welcome, Agenda Review, and Updates
1:10 – 1:20 pm	Guidance from the Integration/Recommendations Group (I/RG)
1:20 – 1:50 pm	Hydropower Operations and Impacts to Salmon
1:50 – 2:15 pm	Presentation on USACE Fish Budget Needs at mainstem dams
2:15 – 2:45 pm	Hydropower Needs Sequencing Activity
2:45 – 2:55 pm	*Break*
2:55 – 3:20 pm	Presentation about the Upper Columbia fish passage and reintroduction efforts
3:20 – 3:50 pm	Blocked Areas Needs Sequencing Activity
3:50 – 4:00 pm	Confirm Next Steps, Upcoming Meeting Topics, and Summary

Guidance from the Integration/Recommendations Group (I/RG)

Objectives:

- Using CBPTF tools and data, identify priority restoration actions/programs that address impact reduction need for hydropower and blocked areas and collaborate with existing forums (for example, regional recovery organizations) and the IRG as needed
- Consider recommendations, actions, and shovel-ready projects from existing forums (for example the CBPTF P2 report)
- Consider actions that benefit multiple stocks and regions/watershed populations
- Estimate mortality magnitude, source, and location
- Acknowledge tribal and treaty rights and legal constraints

Recommended Action Form

1. Work Group developing the action:
2. Summary of action:
    a. Is this part of an existing program or new program?
3. Benefit: (link to matrices)
    a. What benefit will the action provide?
    b. What data support this?
4. Entities that would implement that action:
5. Timing:
    a. How long will it take to implement that action?
    b. How long until fish populations benefit from action?
6. Stock(s) benefited by the action and magnitude of benefit for each stock(s)
7. Estimated cost:
8. Uncertainties related to the action:
9. Regulatory processes or policies associated with the action:
10. Potential challenges:
11. Adaptive management (describe how this will be incorporated into to action):

Hydropower/Blocked Areas Work Group Workplan

Meeting	Key Topics
Kick off	• *Come to shared understanding of the assignment from the I/RG and information available from the CBPTF* • *Identify existing forums, gaps, and funding needs and sources* • *Agree on next steps*
Meeting 2	• Clarify the work group objectives and I/RG assignment • Further identify the hydropower operations needs and impacts to salmon • Presentation on USACE Fish Budget Needs at mainstem dams • Presentation about the Upper Columbia Blocked Areas efforts • Identify the most critical information gaps and need and opportunities
Meeting 3	• Start brainstorming actions to address the critical information gaps, needs, and opportunities • Crosswalk actions with recommendations from this group with other efforts • Evaluate recommendations and build consensus around round 1 recommendations to go to the Science Integration Work Group and the I/RG
Meeting 4	• Finalize round 1 recommendations to go to the Science Integration Work Group and the IRG
Meeting 5 and beyond	• Build consensus around round 2 recommendations to go to the Science Integration Work Group and the I/RG

Hydropower Operations and Impacts to Salmon

Mainstem Hydrosystem Past and Present

Presented by Thomas Lorz, Hydraulic Engineer/Fish Passage Columbia River Inter-Tribal Fish Commission


Columbia River Basin
Corps of Engineers Dams
Dams owned by Others
Bureau of Reclamation Dams
Mica
Revelstoke
Arrow Lakes
Duncan
Kootenay Lake
Keenleyside
Canada
U.S.
Grand Coulee
Chief Joseph
Wells
Rocky Reach
Rock Island
Wanapum
Priest Rapids
Albeni Falls
Libby
Hungry Horse
Noxon
Pend Oreille Lake
Flathead Lake
Kerr
Little Goose
Lower Monumental
Lower Granite
Dworshak
Ice Harbor
The Dalles
Bonneville
McNary
John Day
Hells Canyon
Oxbow
Brownlee
Boise Projects
Jackson Lake
Seattle
Portland
WA
OR
ID
MT
CA
NV
N
Columbia R.
Willamette R.
Snake R.

Authorized Purposes for Different Dams
(Dams can have multiple authorities)

- Flood Control
- Water supply (Irrigation, ect)
- Power Generation
- Navigation (Specific Projects – Lower Columbia and Snake River Projects)
- Environmental / Water Quality
- Fish and Wildlife
- Recreation

Governance at the Dams

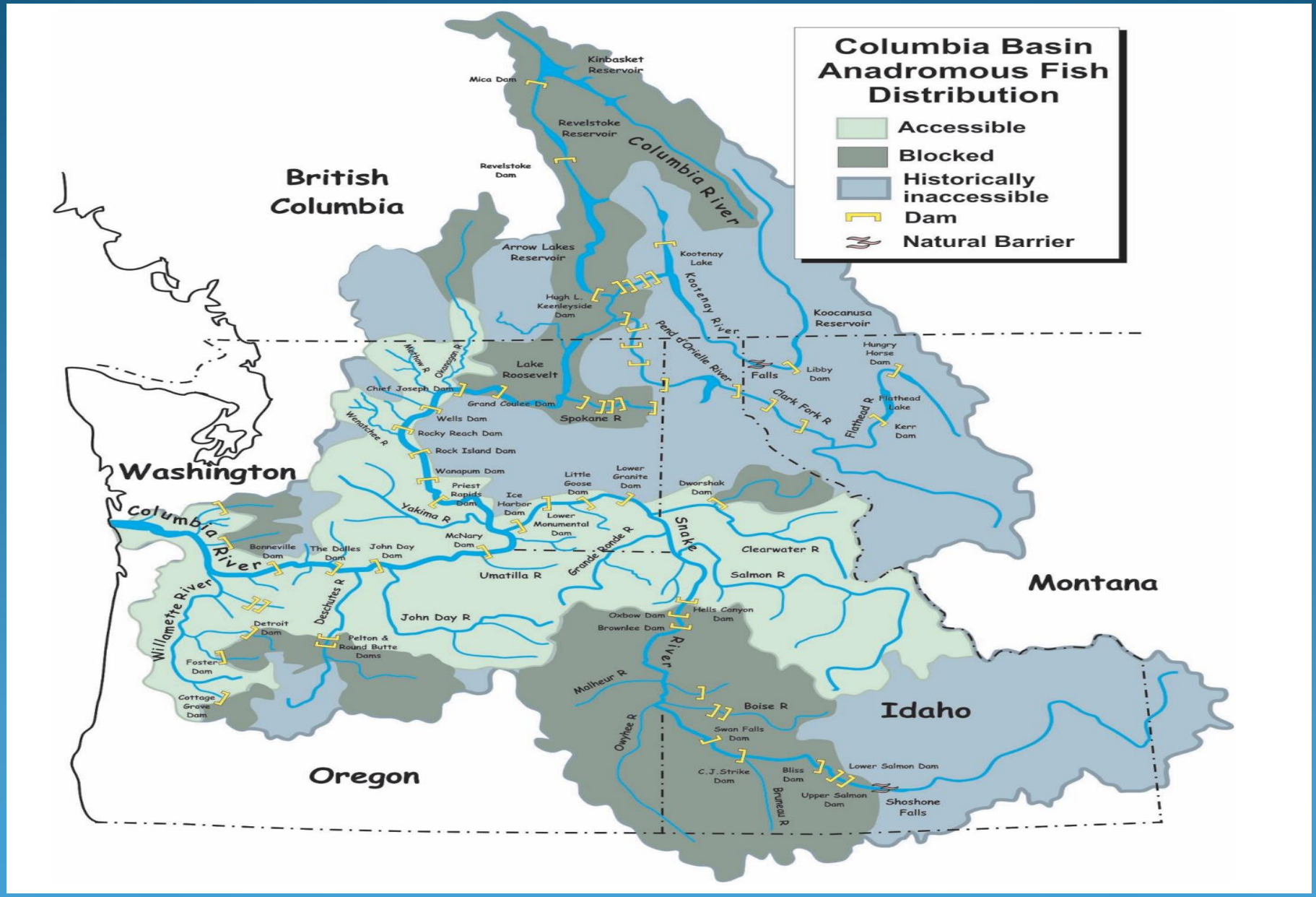
- Federal Dams are Operated by Army Corps and Bureau of Rec in Conjunction with BPA (Operate for Flood Control and Power Generation)
  - Biological Opinions from both NOAA and USFWS can impact operations
  - The NOAA Regional Process allows input from other Regional Fish Managers and Tribal Entities.

- Public Utility Projects (PUD) are operated by the individual PUD's. (Primarily for Power Generation)
  - These Projects are overseen by the Federal Energy Regulatory Commission (FERC Section 401 certification)
  - Biological Opinions from both NOAA and USFWS can impact operations. Habitat Conservation Plans are another governance document.
  - Steering Committees Provide for input from other Regional Fish Managers and Tribal Entities.

Changes/Impacts Due to Dam Construction

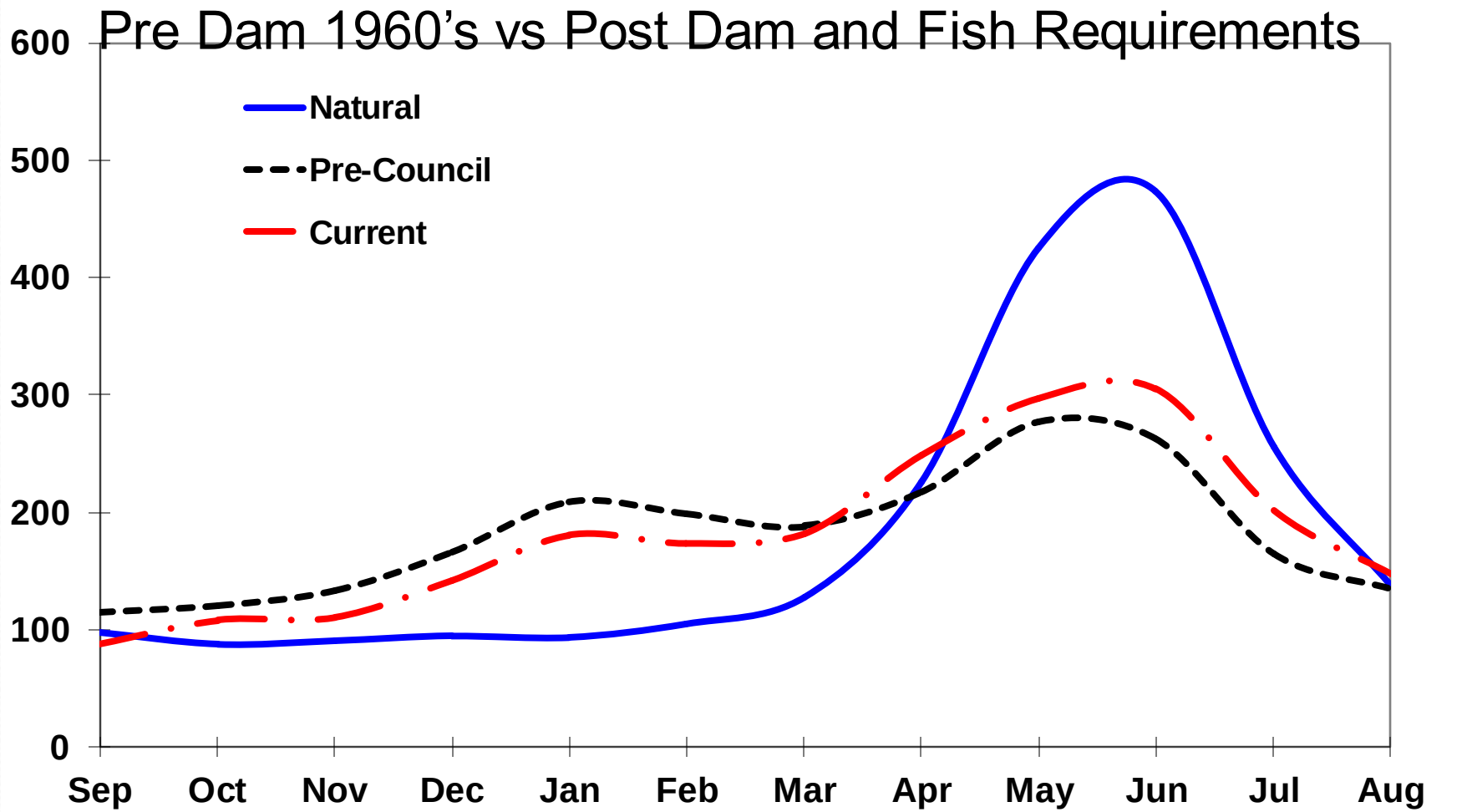
- Change Hydrograph, Habitat (Access and Inundation) Water Quality and Biological Communities
- Physical change and the biological response
  - Habitat (Access and Inundation)
  - Hydrology
  - Water Quality
  - **Biological Communities –**
    - **Longer migration times for juveniles**
    - **Impaired passage both upstream and downstream for juvenile and adult salmon, as well as lamprey and sturgeon**
    - **Facilitates predation and makes invasive and natural species more effective**
    - **Dams pose one of the largest single sources of mortalities for juvenile salmon migrants including lamprey**

Blocked Habitat

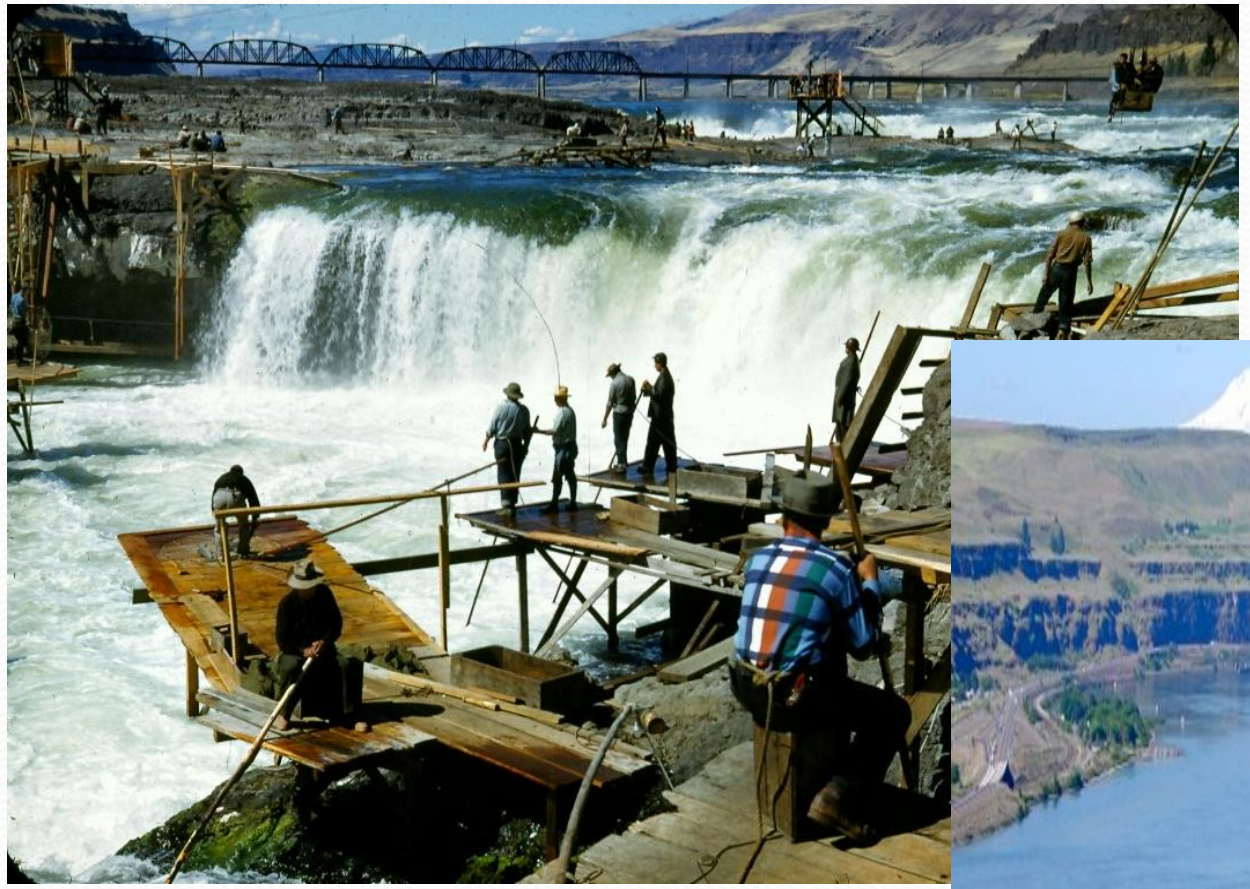


Changes in Hydro Graph

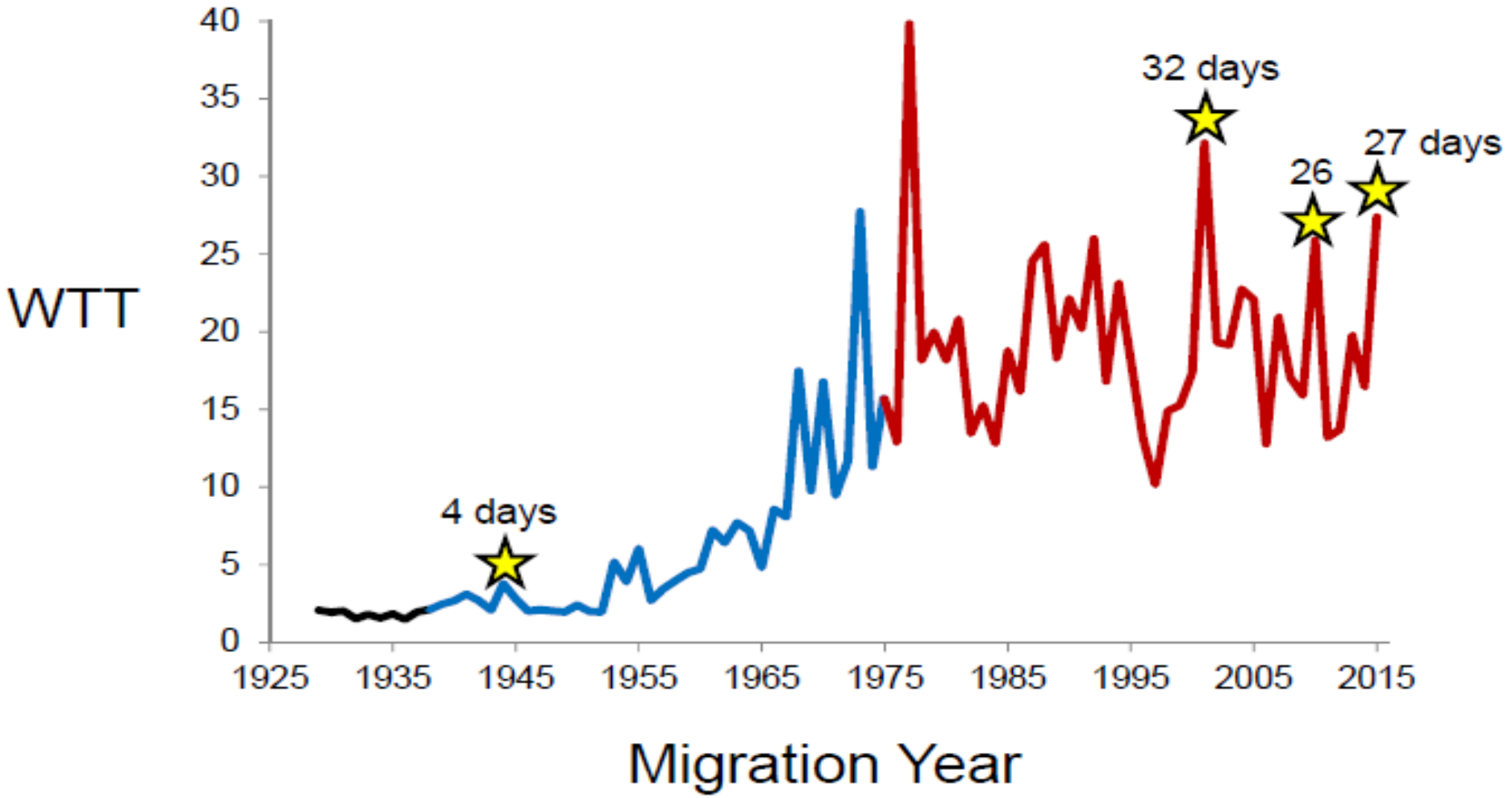
-Reduction in Spring Freshet



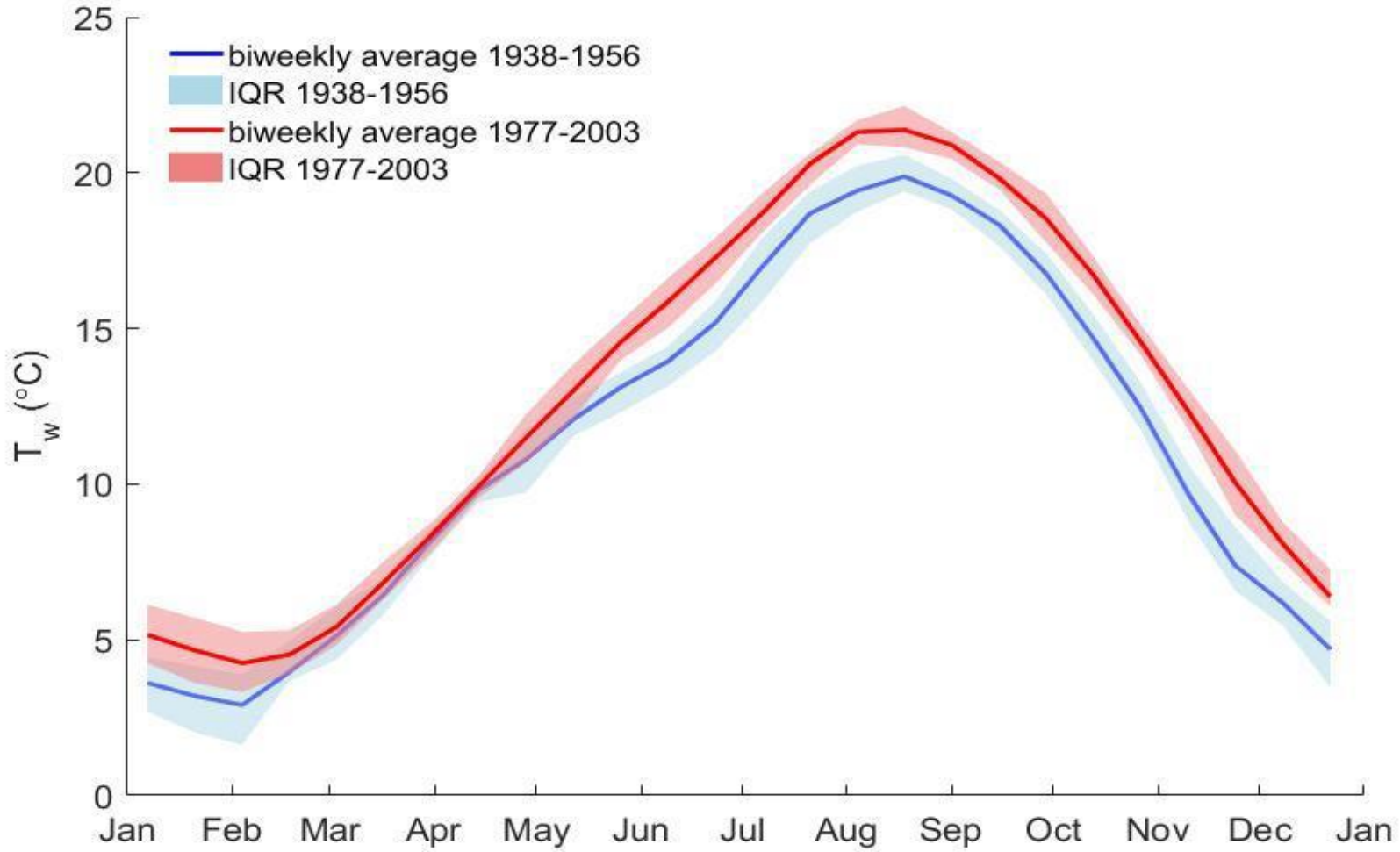
Free Flowing to Reservoirs



Changes in WTT From Lewiston to Bonneville



Modeled Bi-weekly Average Temps At Bonneville Dam

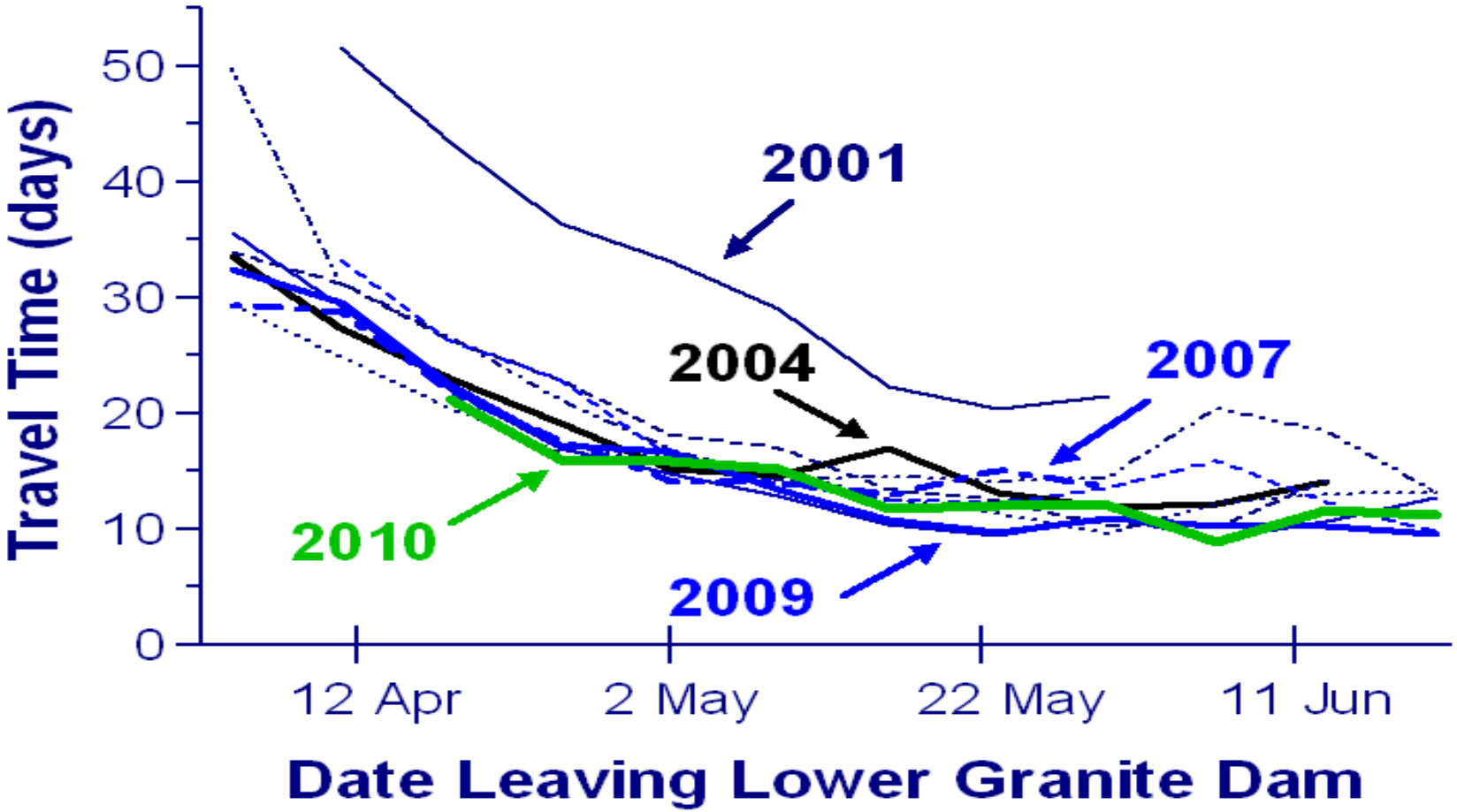


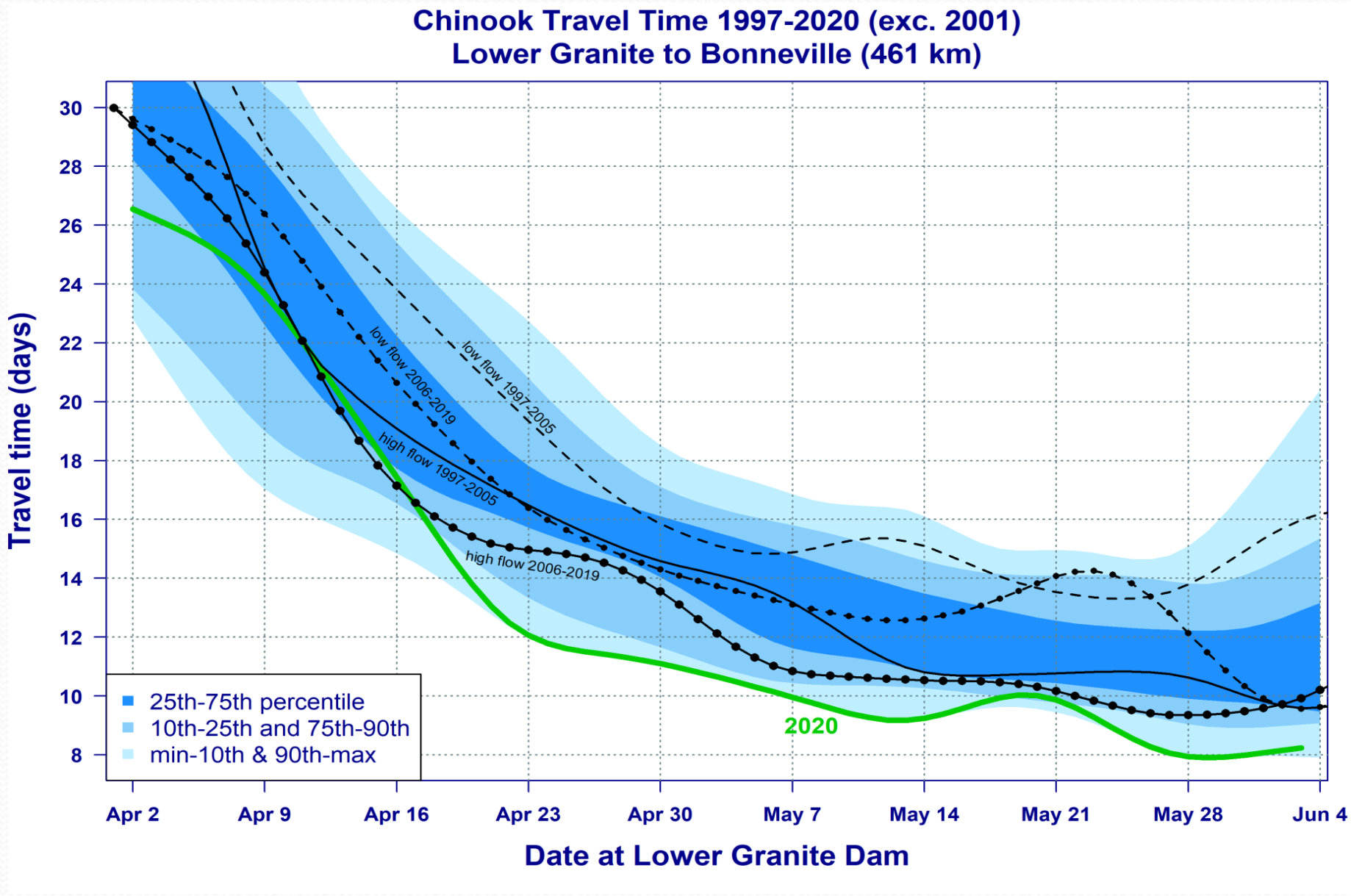
Impedes Both Juvenile and Adult Migrants

Biological Impacts/Measures

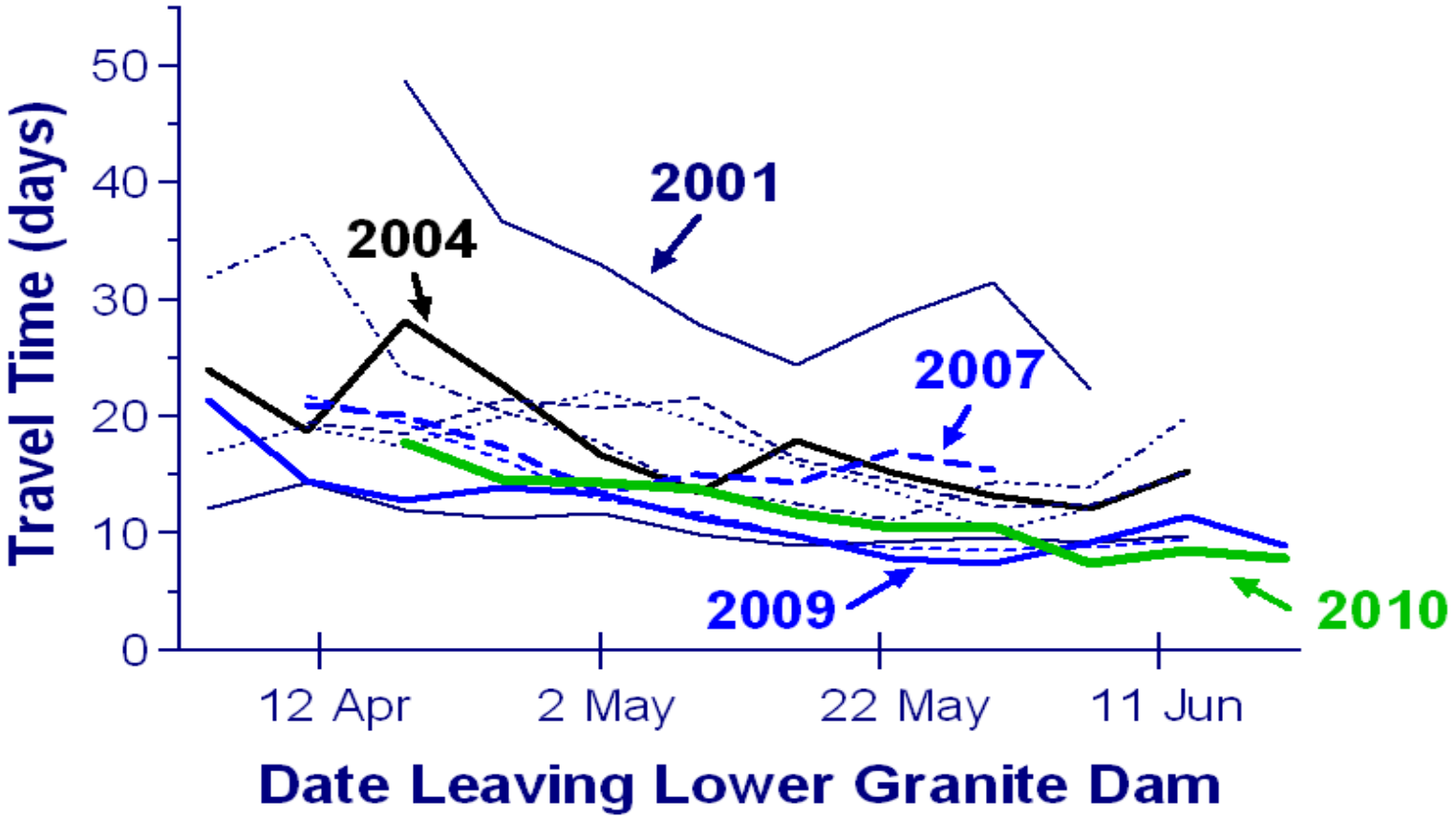
- Travel Times
- Impacts Due to Construction of Dam System
  - Estimates of Losses due to Predation (Juveniles)
  - Adult Impacts
  - Production (Loss of Habitat Access & Inundation)
  - Latent/In Direct Mortalty
- Reach Survivals

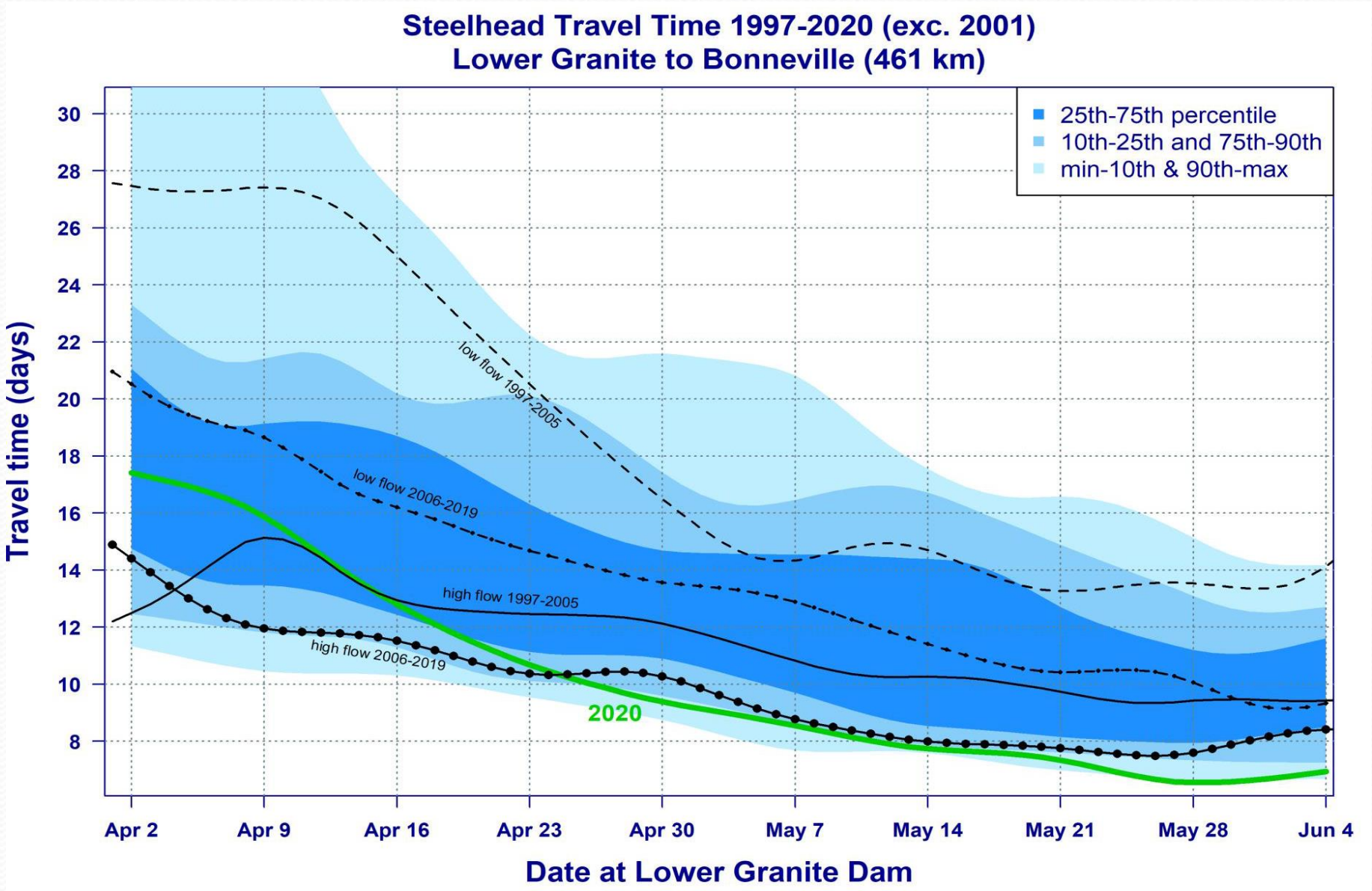
Yearling Chinook Median Travel Time
Lower Granite to Bonneville (461 km)




Chinook Travel Time 1997-2020 (exc. 2001)
Lower Granite to Bonneville (461 km)
Travel time (days)
30
28
26
24
22
20
18
16
14
12
10
8
low flow 1997-2005
low flow 2006-2019
high flow 1997-2005
high flow 2006-2019
2020
25th-75th percentile
10th-25th and 75th-90th
min-10th & 90th-max
Apr 2
Apr 9
Apr 16
Apr 23
Apr 30
May 7
May 14
May 21
May 28
Jun 4
Date at Lower Granite Dam

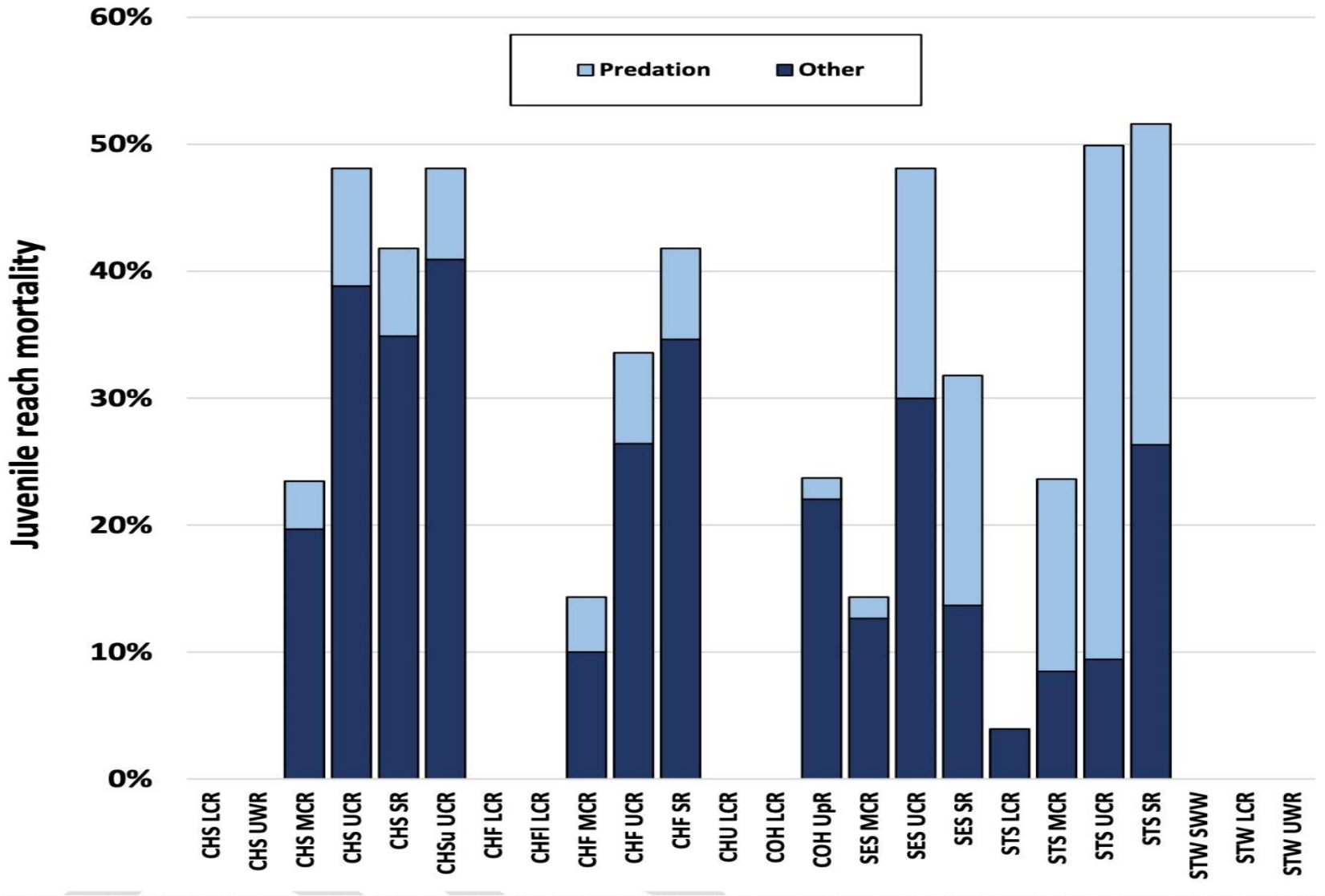
Steelhead Median Travel Time
Lower Granite to Bonneville (461 km)




Steelhead Travel Time 1997-2020 (exc. 2001)
Lower Granite to Bonneville (461 km)
25th-75th percentile
10th-25th and 75th-90th
min-10th & 90th-max
low flow 1997-2005
low flow 2006-2019
high flow 1997-2005
high flow 2006-2019
2020
Travel time (days)
30
28
26
24
22
20
18
16
14
12
10
8
Apr 2
Apr 9
Apr 16
Apr 23
Apr 30
May 7
May 14
May 21
May 28
Jun 4
Date at Lower Granite Dam

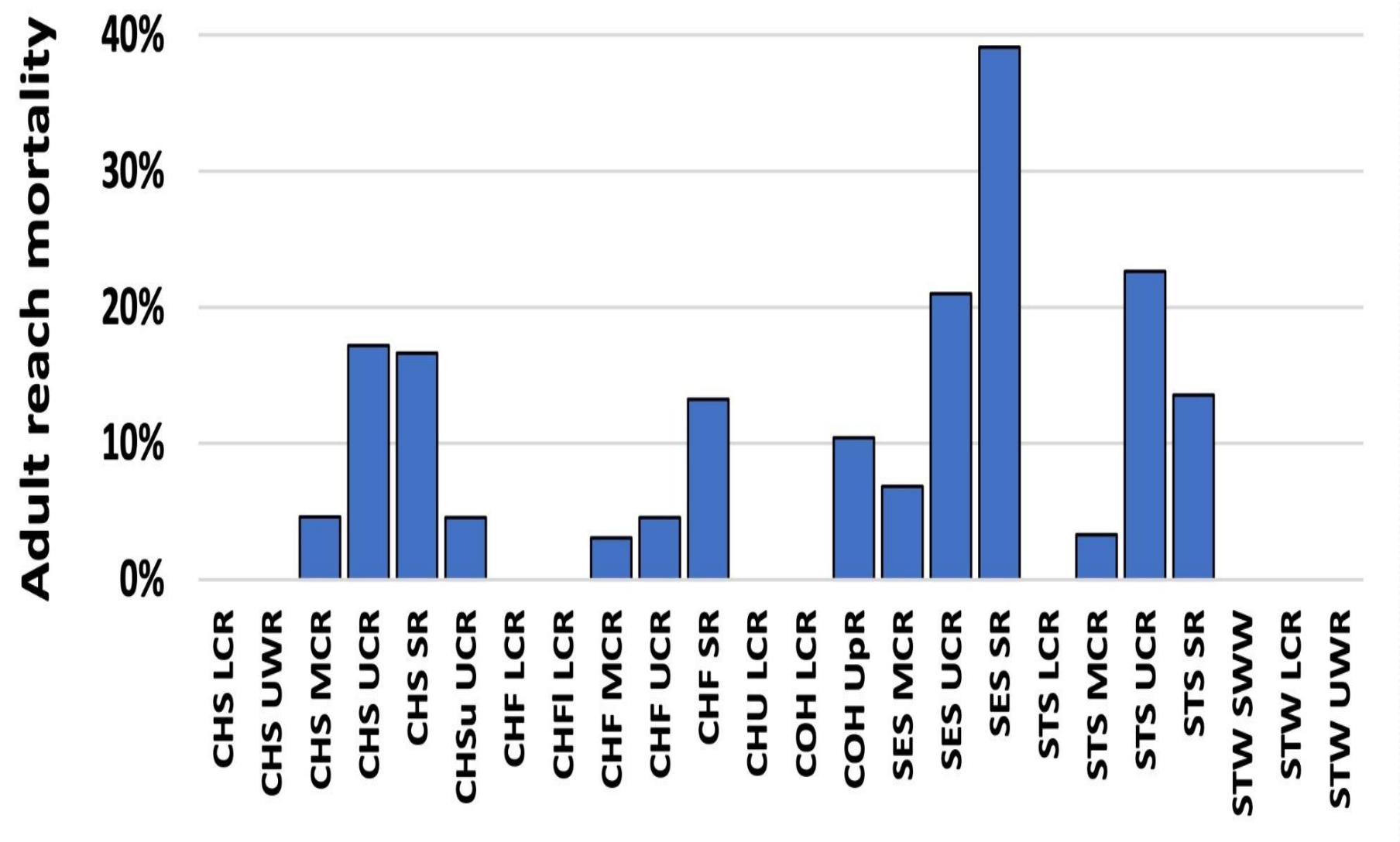
Juvenile Estimate Reach Impacts

*CBP estimates

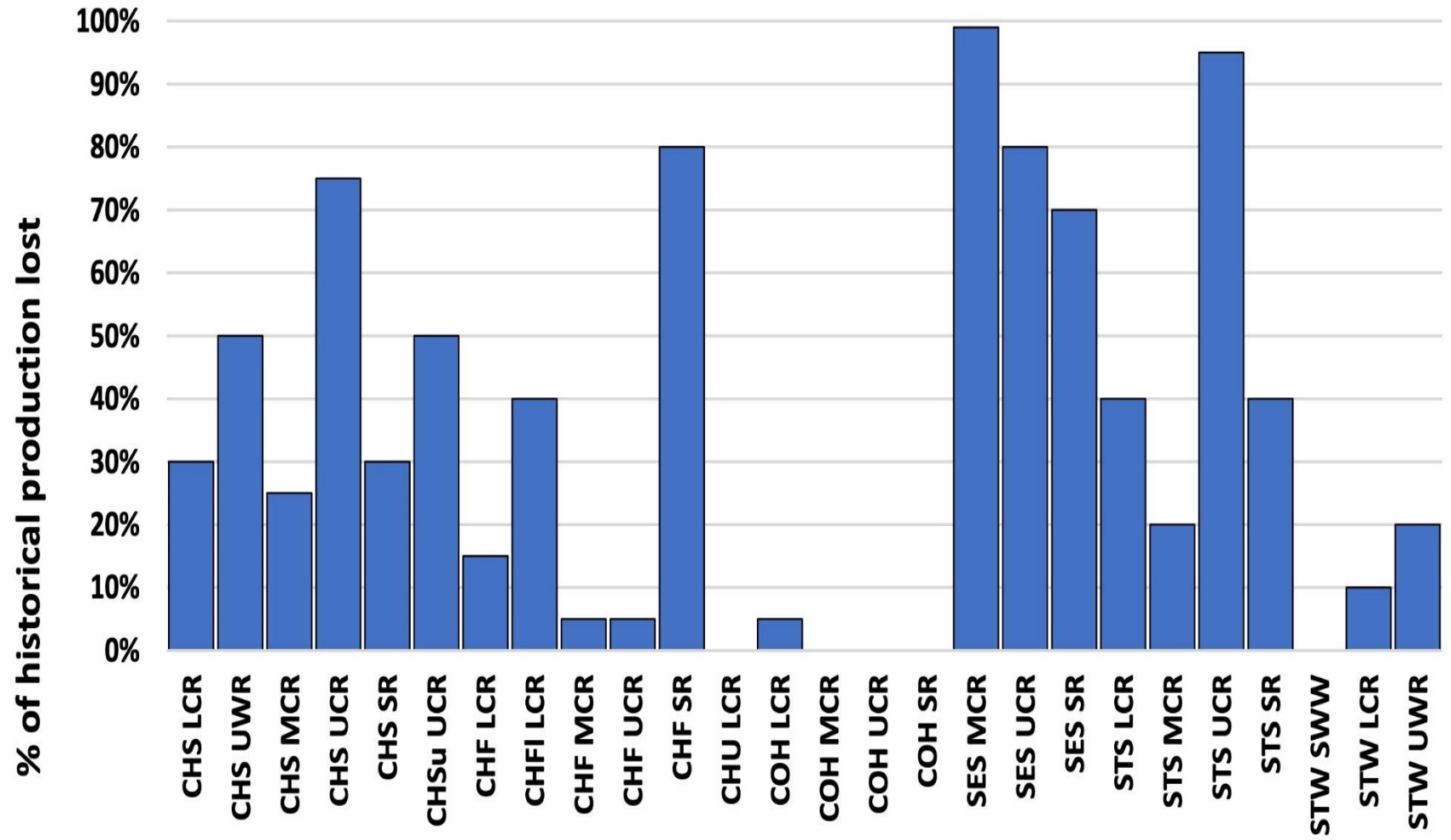


Adult Estimated Reach Impacts

*CBP estimates

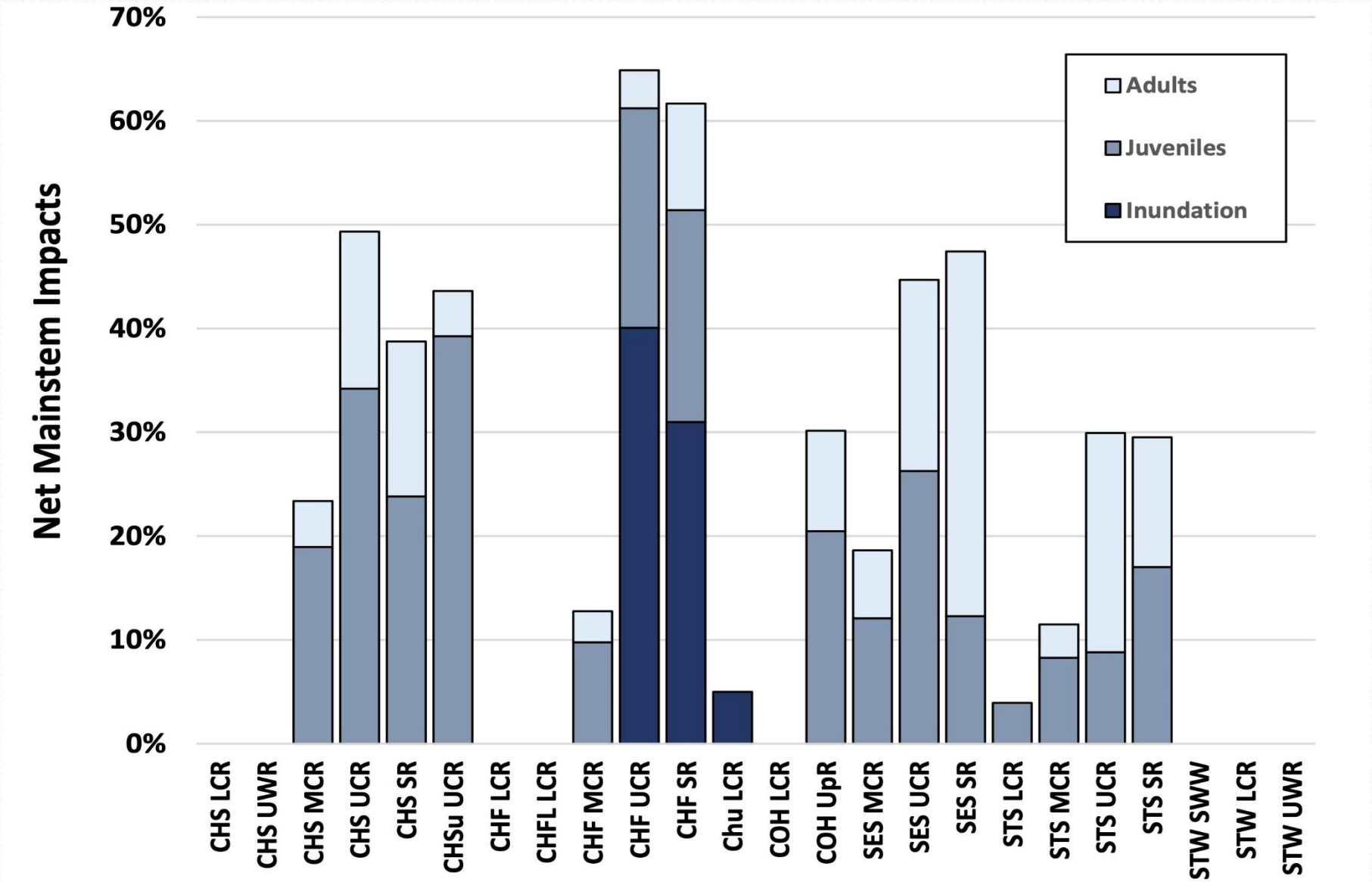


Production Impacts *CBP estimates

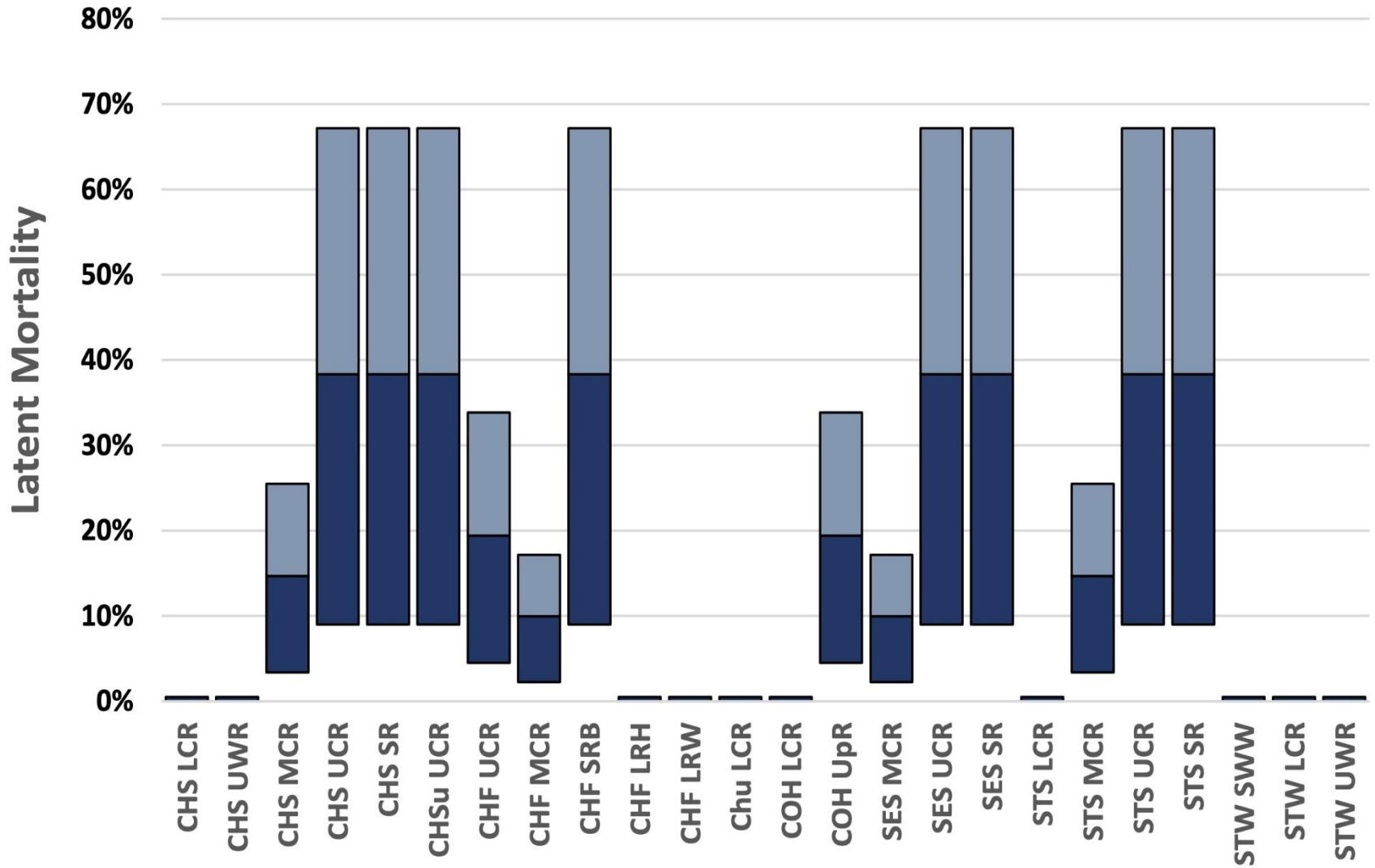


Combined Estimate Impacts

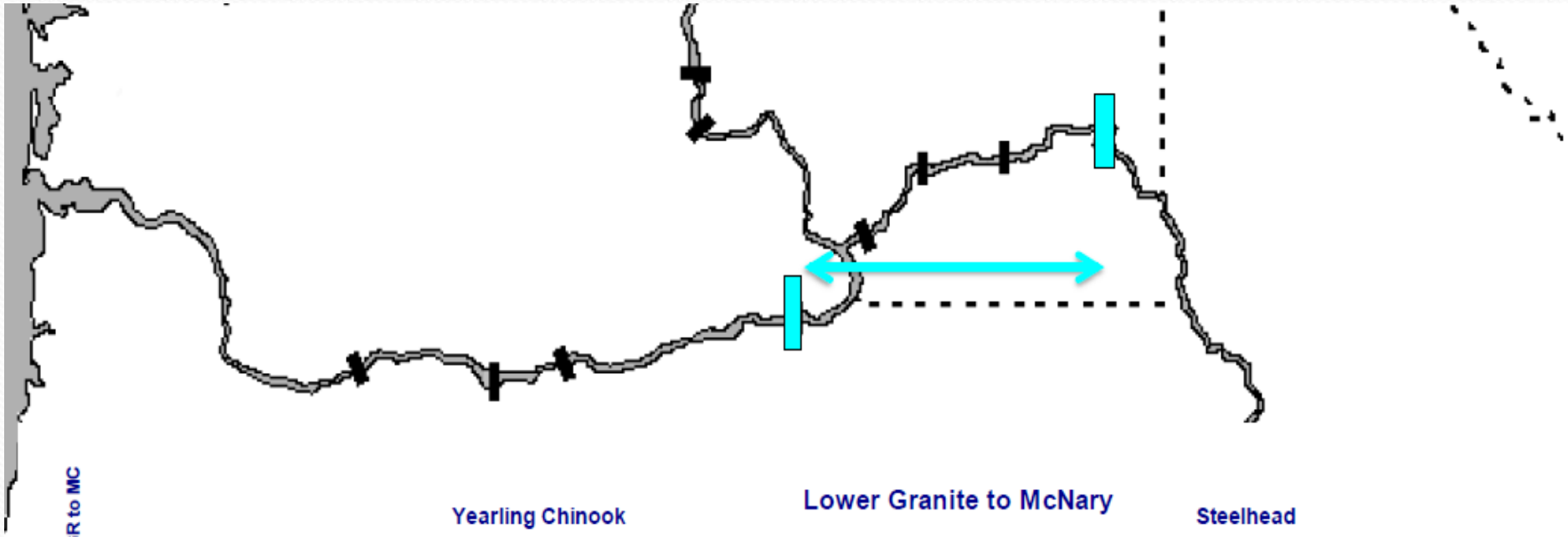
*CBP estimates

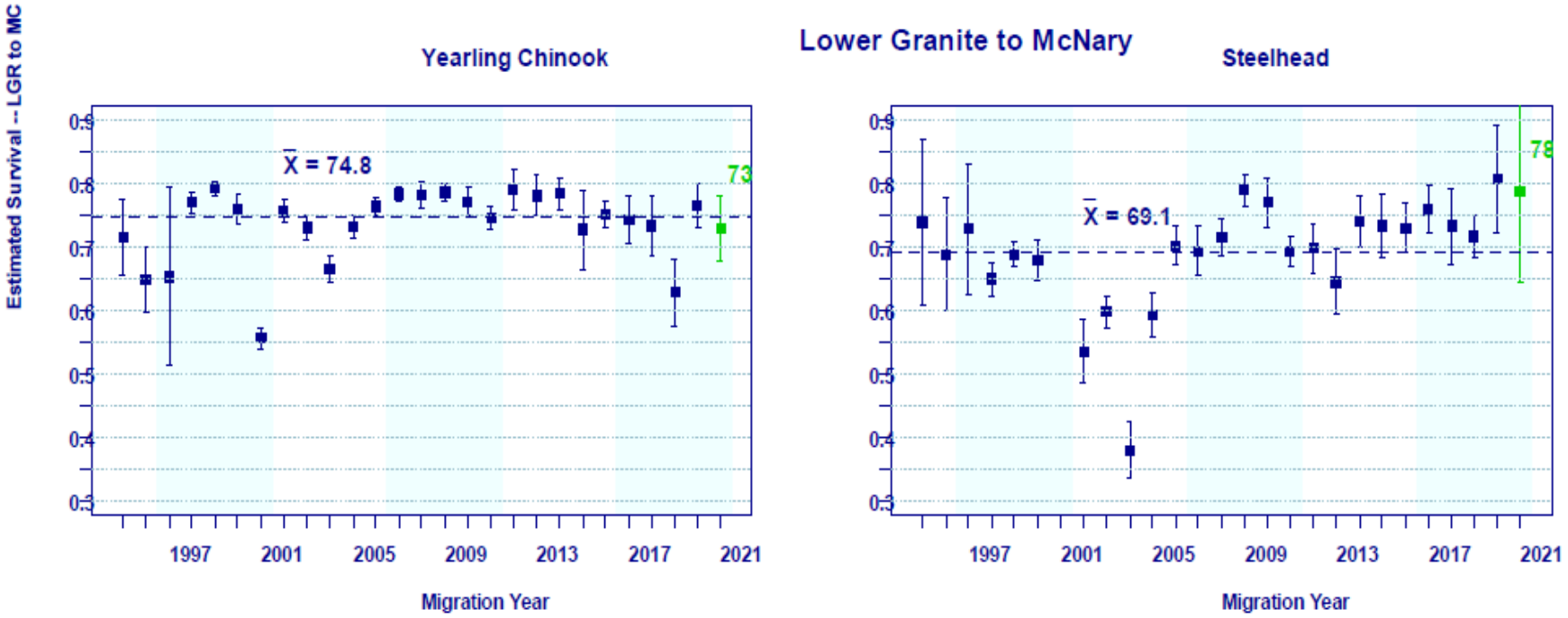


Estimated Latent Mortality *CBP



Survival From Lower Granite to McNary





Fish Passage Stragies at Dams

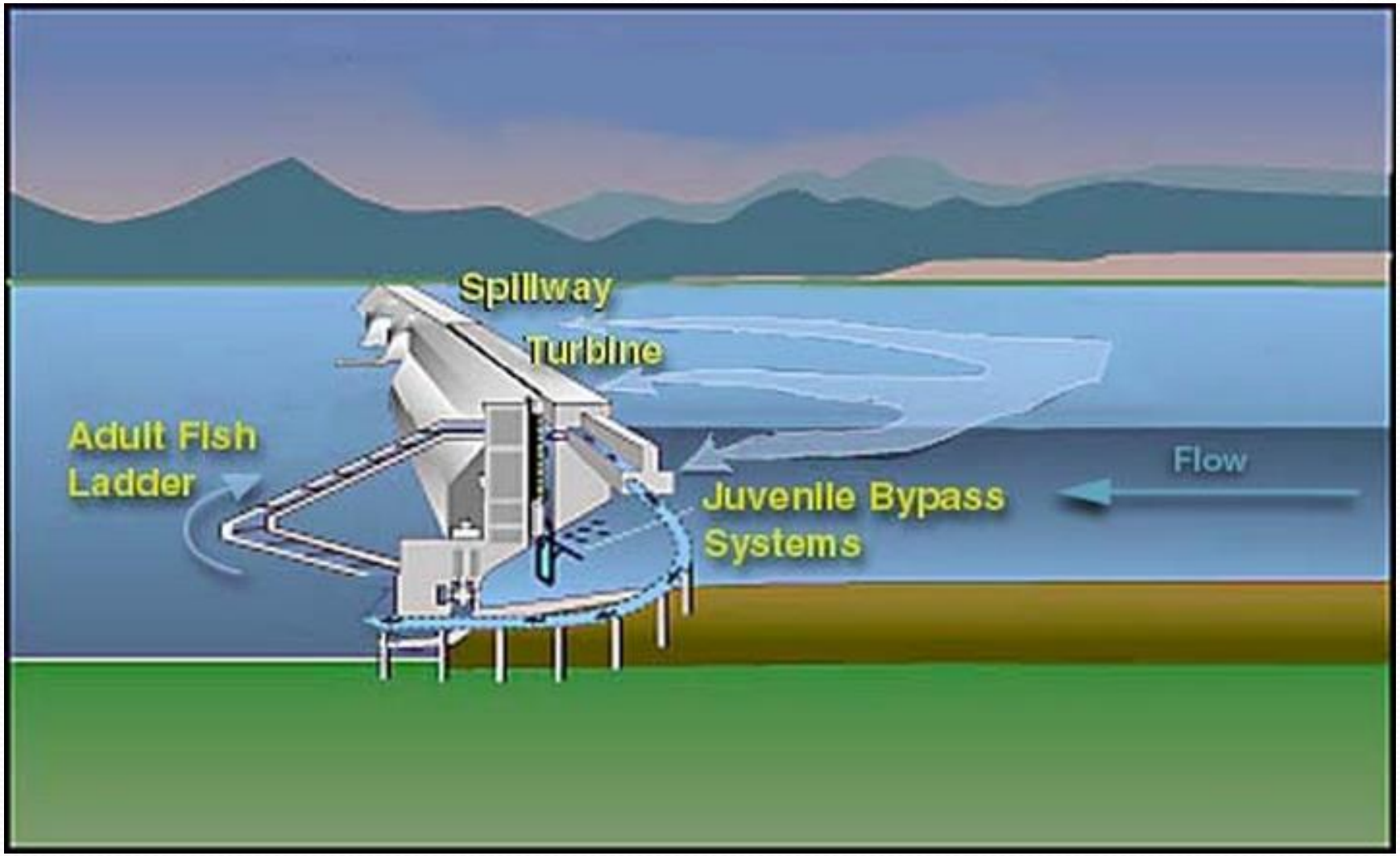
Existing Juvenile Passage Routes Prior to 2001

- Screen Bypasses (Transportation at Specific Projects)
- Turbine
- Spill

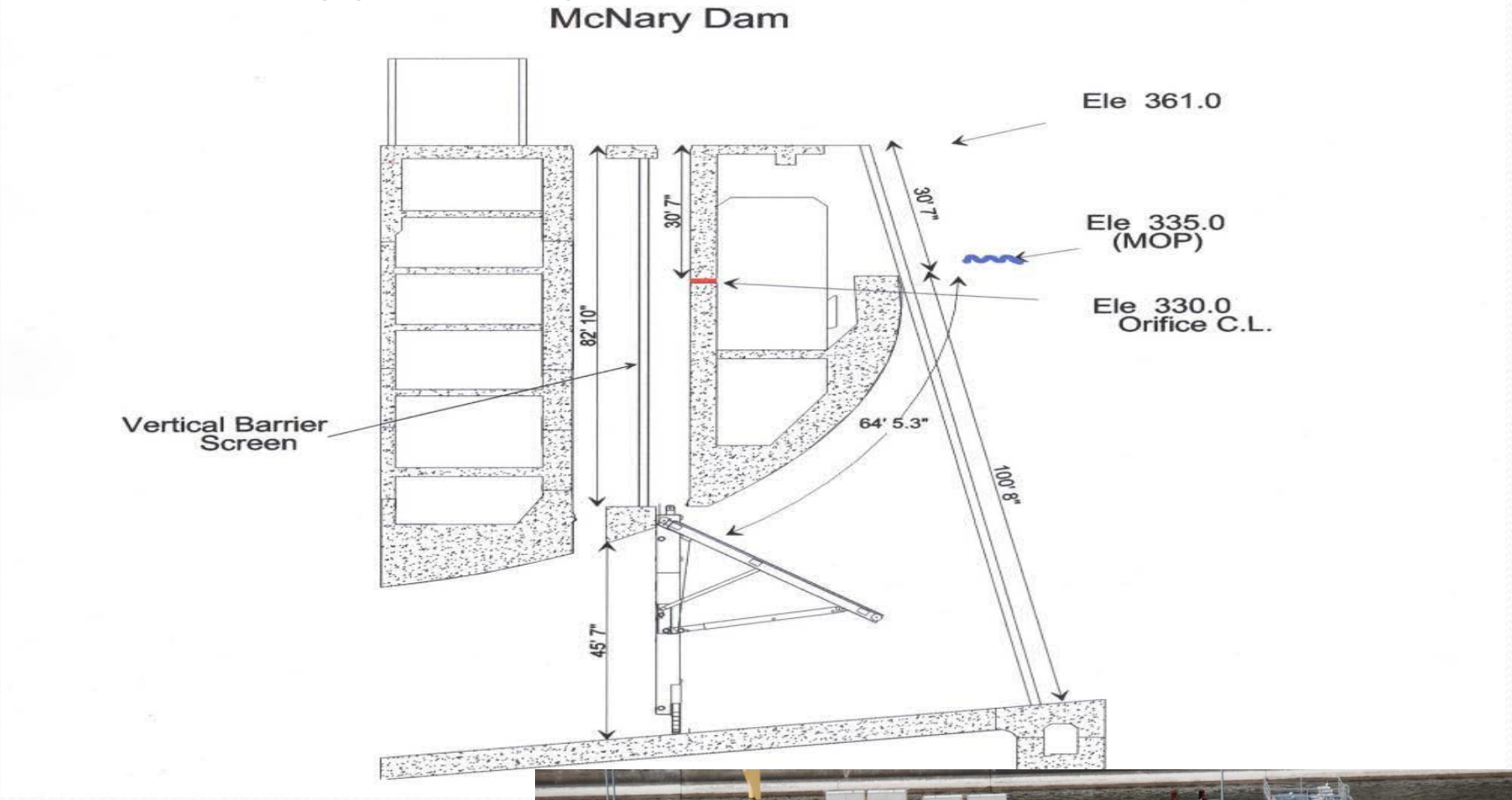
New Passage Structures Added since 2001

- Removable SpillwayWeirs (RSW) TSW & ASW (similar)
- Surface Bypass Structures at:
  - Rocky Reach
  - Wanapum
  - Bonneville Corner Collector

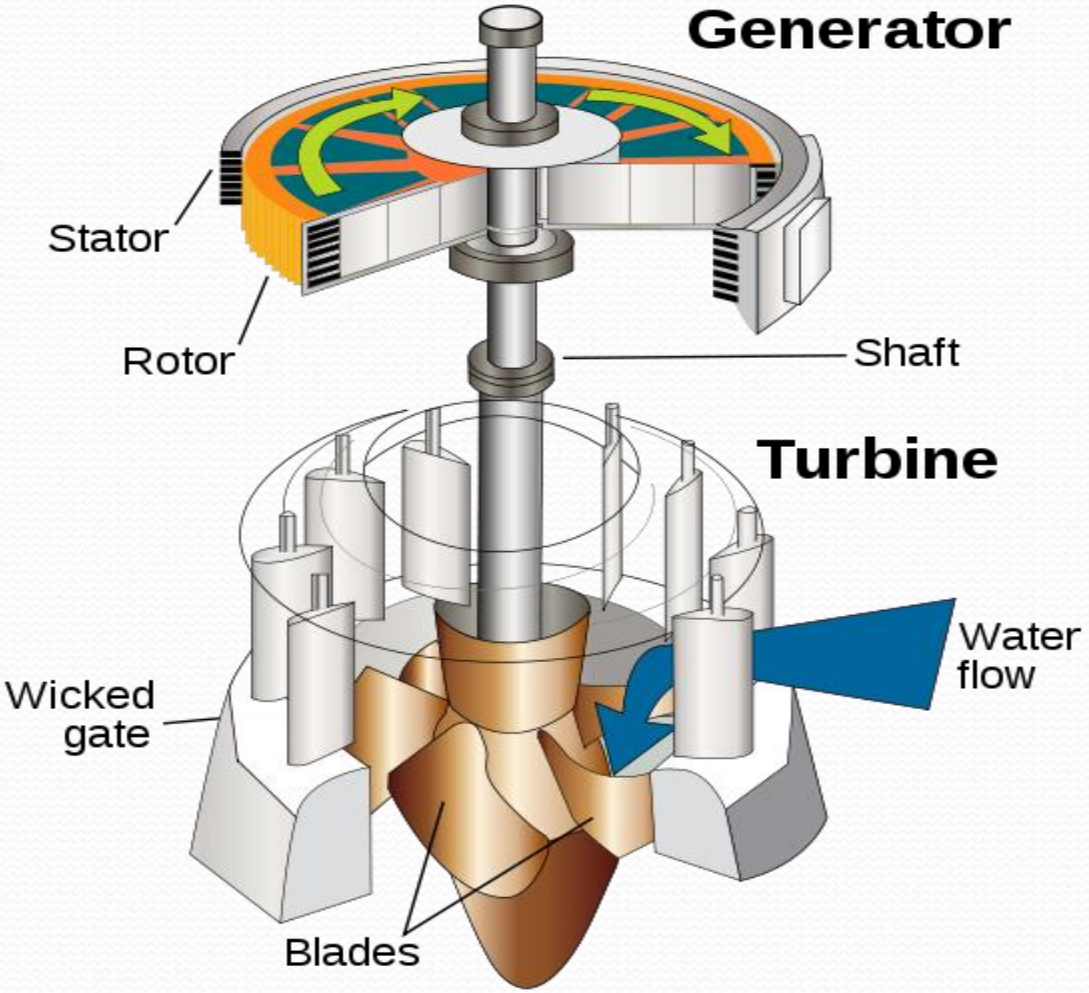
Screen Bypass System



Screen Bypass System (continued)

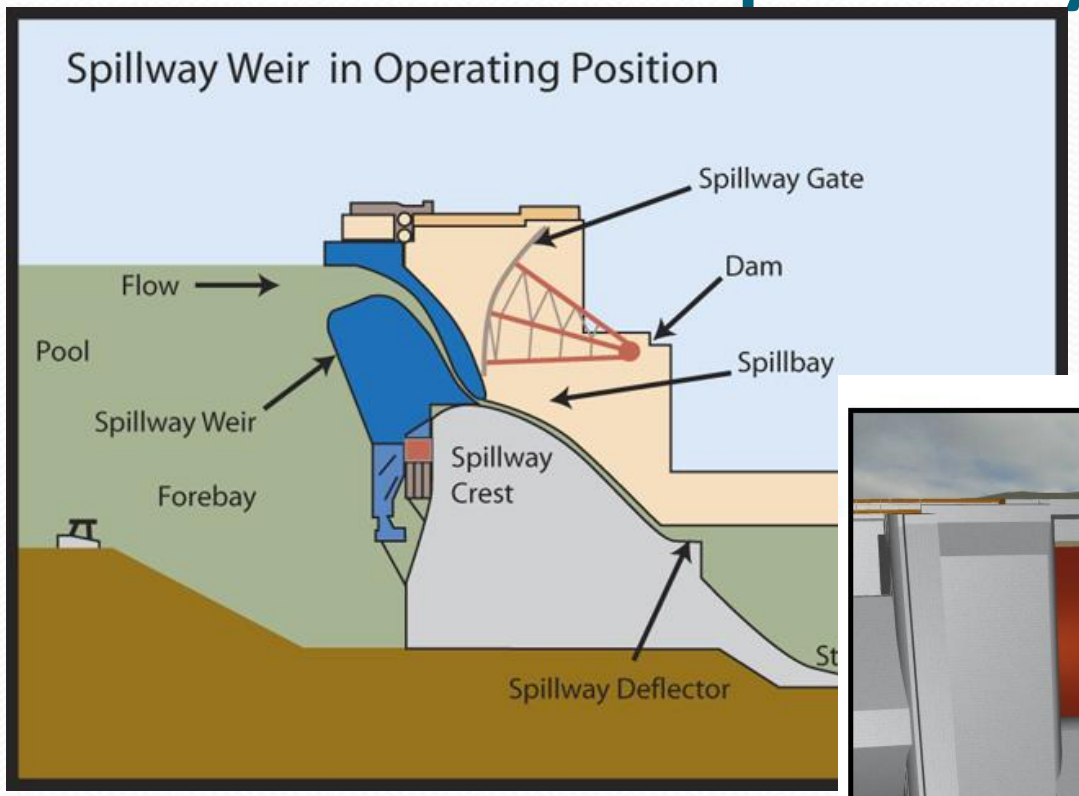


Turbine Envirnoment

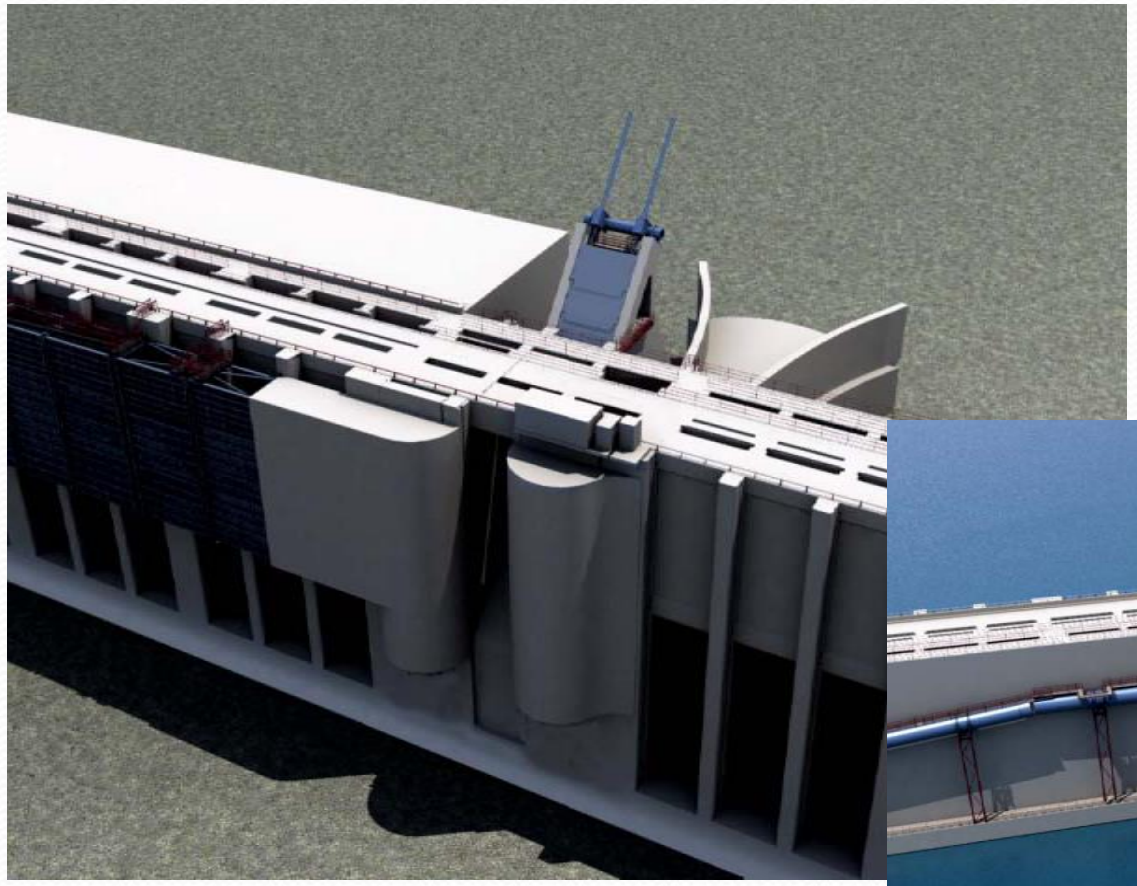


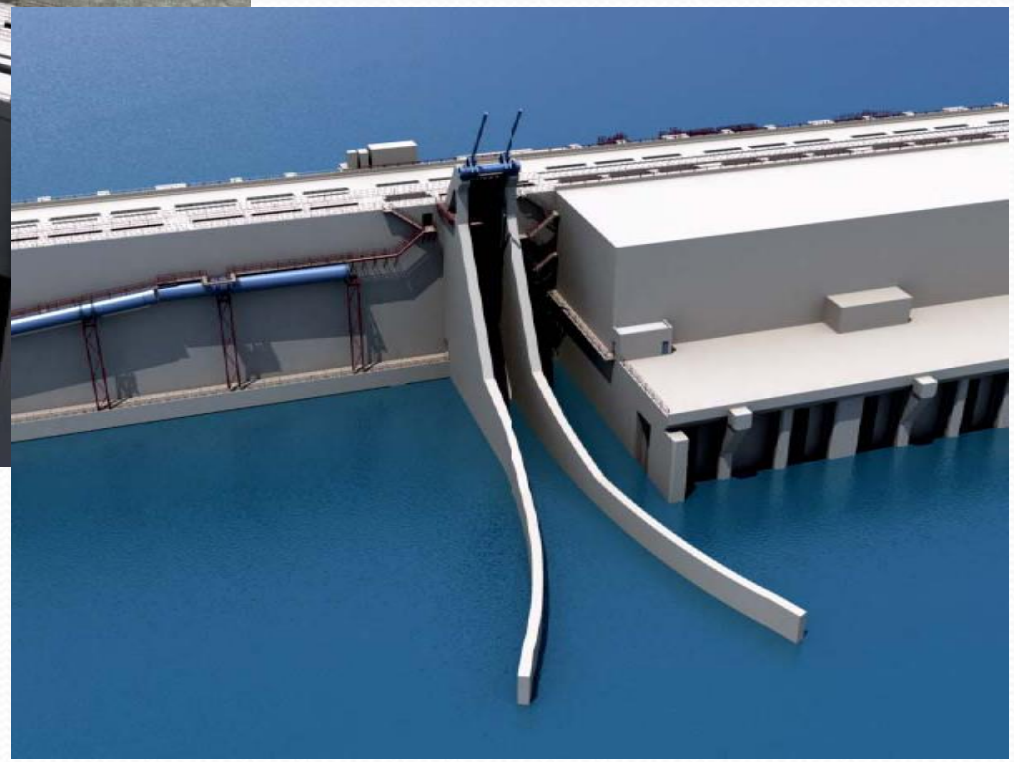
Spillway (Can you name the dam?)

Removable Spillway Weir (RSW)

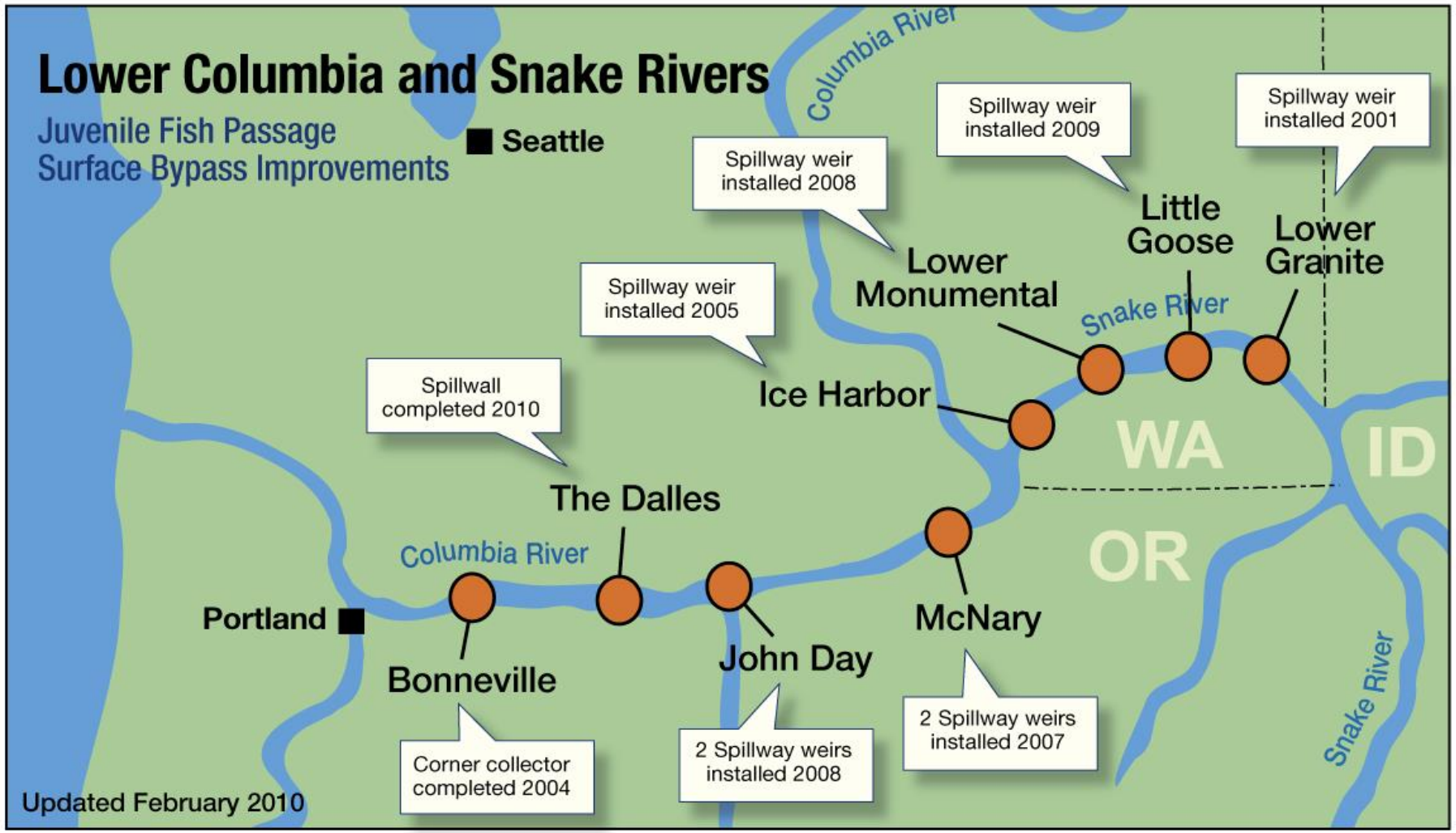


Wanapum Surface Spill Bypass (20 kcfs spill)





Notable Fish Passage Structural Improvements Related to Spillway Passage at the Federal Mainstem Dams (Final Surface Spill in 2009)



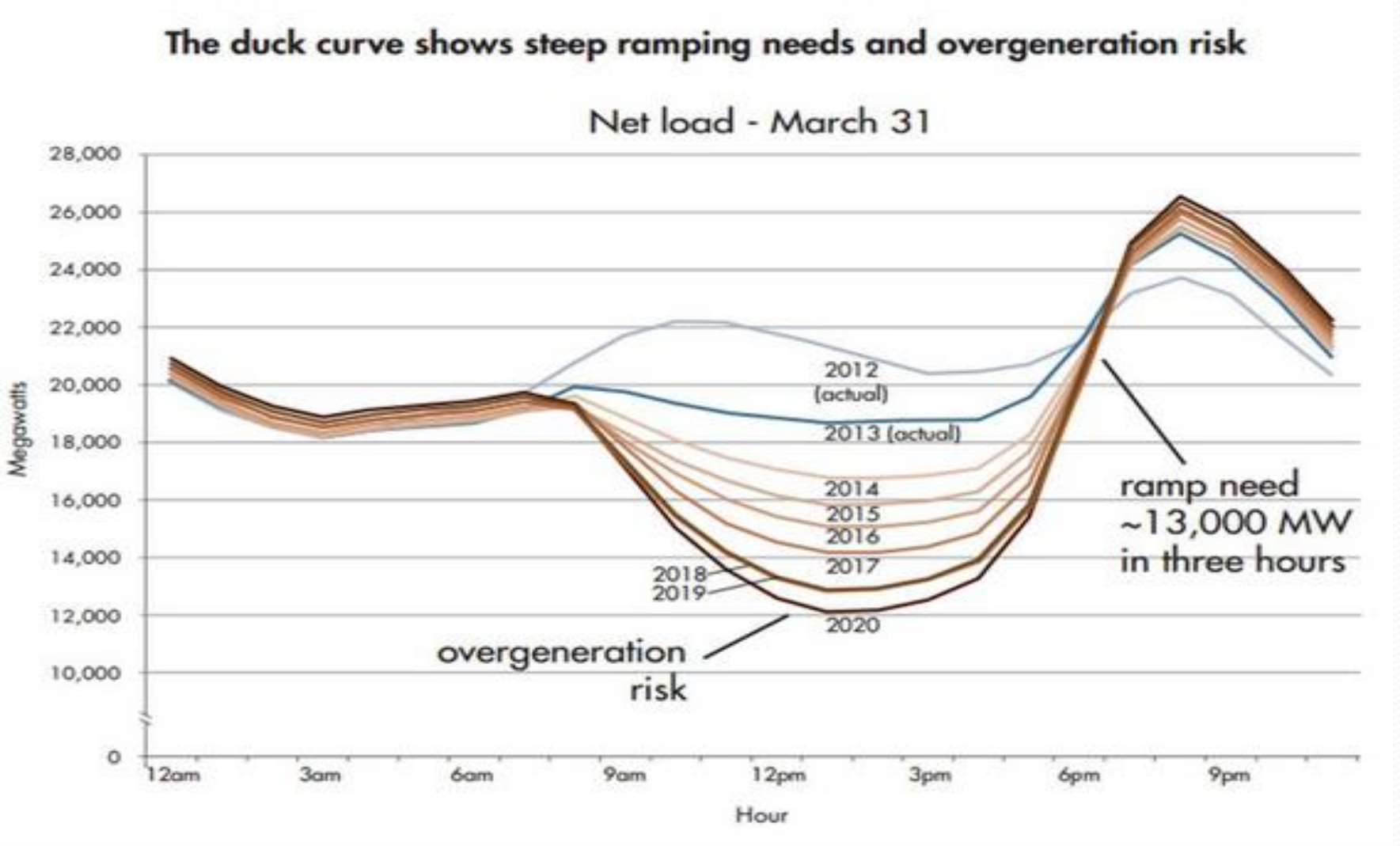
Recent Hydro Mitigation Strategies

- Spill Operations
- Additional Structural Modifications
- Reservoir Operations
  - Altered Flood Control
  - Flow
  - MOP operations

Recent Hydrosystem Changes

- Numerous changes over the last 20 years
- Both structural improvements and operational changes
- Last 15 years of spill changes stem primarily from:
  - Revised Biological Opinions for the FCRPS (2004 and 2008)
  - Court-ordered operations (spill) associated with litigation over those BiOps (2006) (10 years of Court Ordered Spill)
  - 2018 Injuction Spill (Spill to 120/115% Spring & Summer)
  - 2019 – 2020 Flex Spill Agreement
  - 2020 BiOp Operation/Proposed Action (based on Flex spill Spring Spill allowed up to 125% at specific dams)

What is Flex Spill



2022 Spring Spill Operation Federal Dams

Table 3.— Summary of 2022 spring target spill levels at lower Snake River (April 3 – June 20) and lower Columbia River (April 10 – June 15) projects.

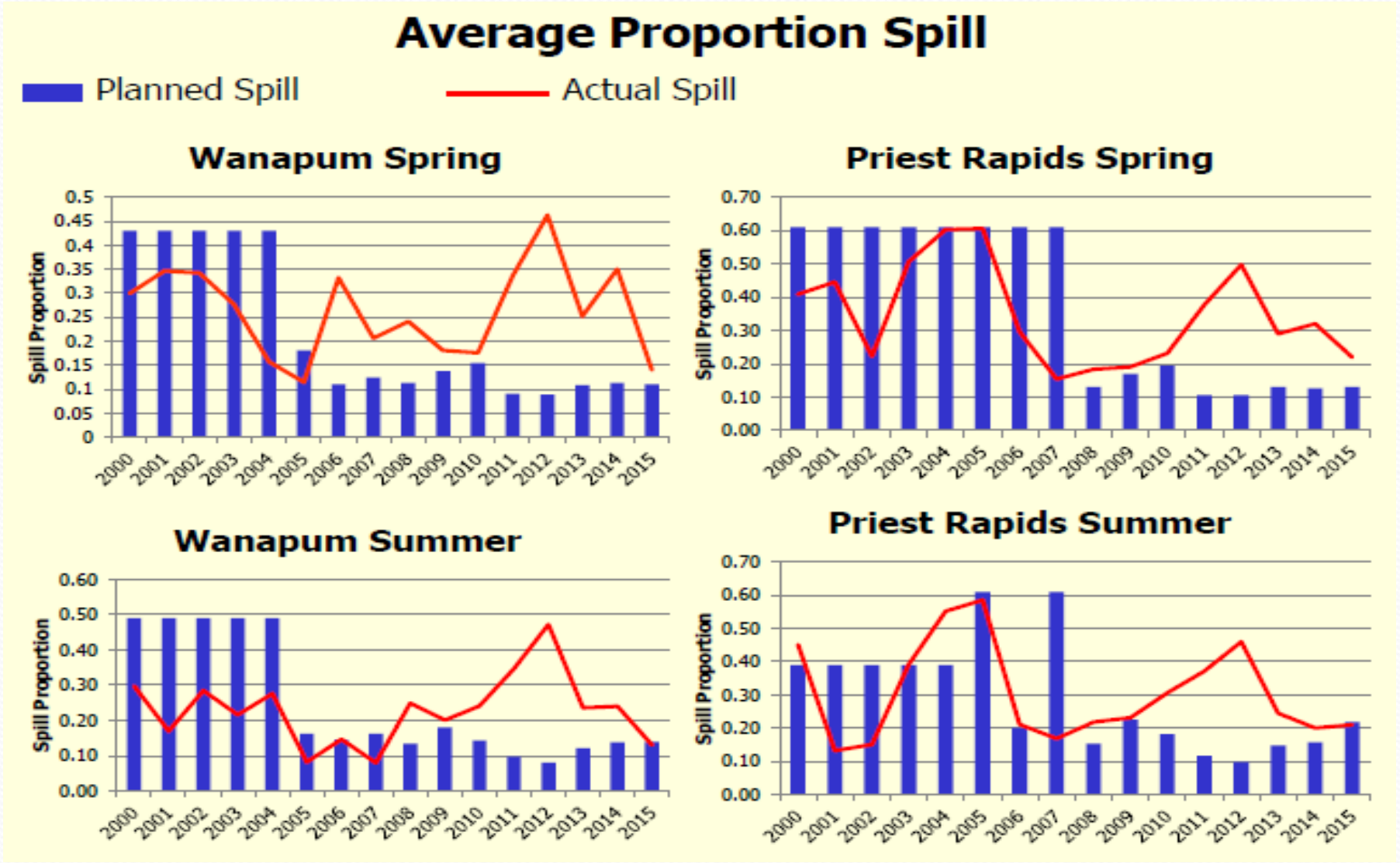
PROJECT	SPRING SPILL DATES	SPRING SPILL OPERATION
Lower Granite [A, C]	April 3 until adult criteria met (no later than April 24)	24 hours/day: 125% Gas Cap
	Adult criteria met (no later than April 24) – June 20	16 hours/day: 125% Gas Cap 8 hours/day: 20 kcfs Performance Standard
Little Goose [B, C]	April 3 – June 20	16 hours/day: 125% Gas Cap 8 hours/day: 30% Performance Standard
Lower Monumental [A, C]	April 3 until adult criteria met (no later than April 24)	24 hours/day: 125% Gas Cap
	Adult criteria met (no later than April 24) – June 20	16 hours/day: 125% Gas Cap 8 hours/day: 30 kcfs Performance Standard
Ice Harbor	April 3 – June 20	24 hours/day: 125% Gas Cap
McNary	April 10 – June 15	24 hours/day: 125% Gas Cap
John Day [D]	April 10 – June 15	16 hours/day: 125% Gas Cap 8 hours/day: 32% Performance Standard
The Dalles [E]	April 10 – June 15	24 hours/day: 40% Performance Standard
Bonneville [F]	April 10 – June 15	24 hours/day: 125% Gas Cap

2022 Summer Spill Spill Operation Federal Dams

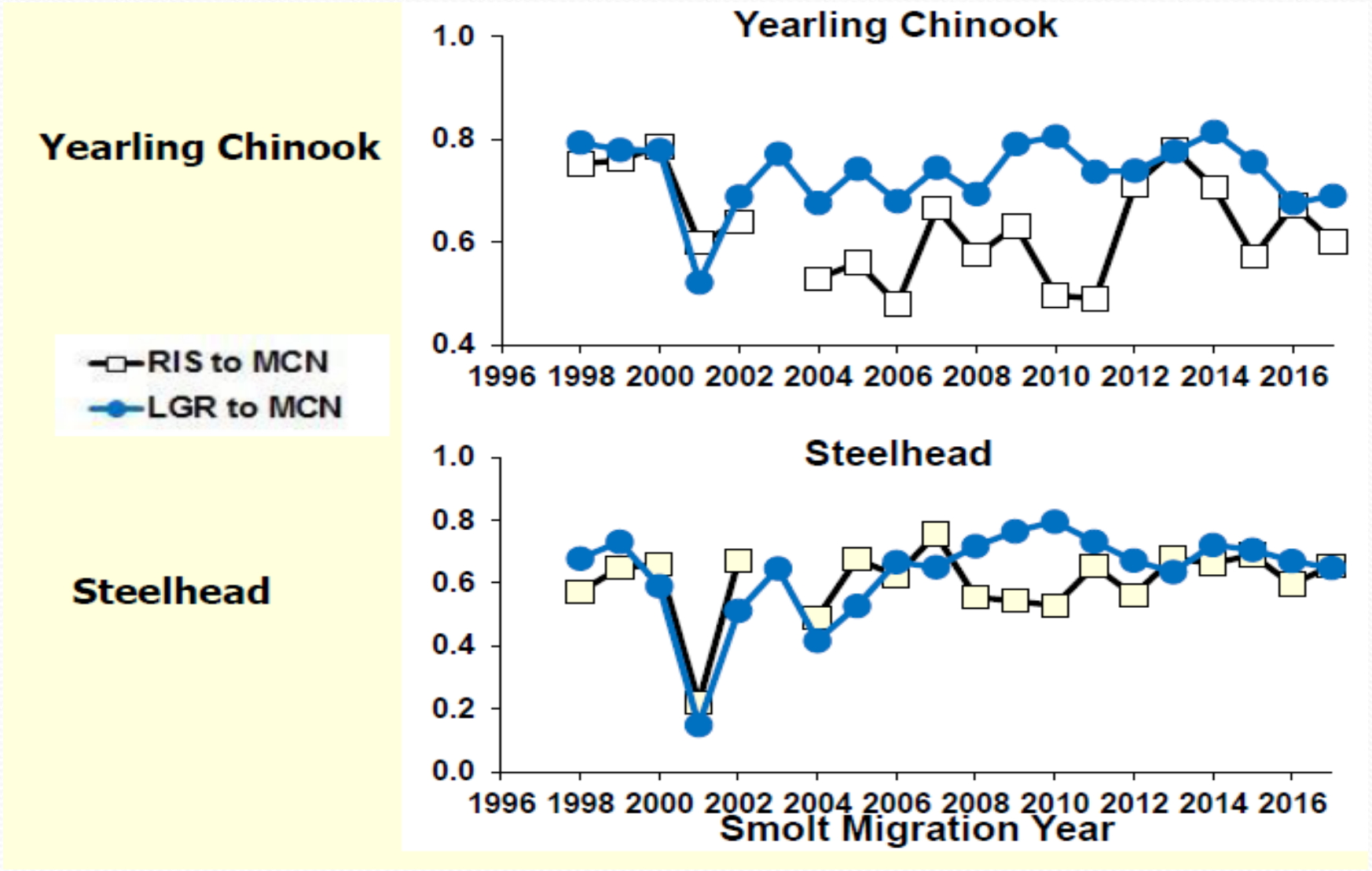
Table 4.– Summary of 2022 summer target spill levels at lower Snake River and lower Columbia River projects.

PROJECT	SUMMER SPILL[A] (June 21/16 – August 14) (24 hrs/day)	SUMMER SPILL[A] (August 15 – August 31) (24 hrs/day)
Lower Granite [B]	18 kcfs	SW flow (as river flow allows)
Little Goose [B, C]	30%	SW flow or 9 kcfs spill
Lower Monumental [B, D]	17 kcfs	SW flow or 8 kcfs spill
Ice Harbor [B, E]	30%	SW flow or 9 kcfs spill
McNary	57%	20 kcfs
John Day	35%	20 kcfs
The Dalles	40%	30%
Bonneville	95 kcfs	50 kcfs

Changes in Spill in Upper Columbia



Reach Survival Comparison of Juvenile Salmon: Snake River to UC Stocks



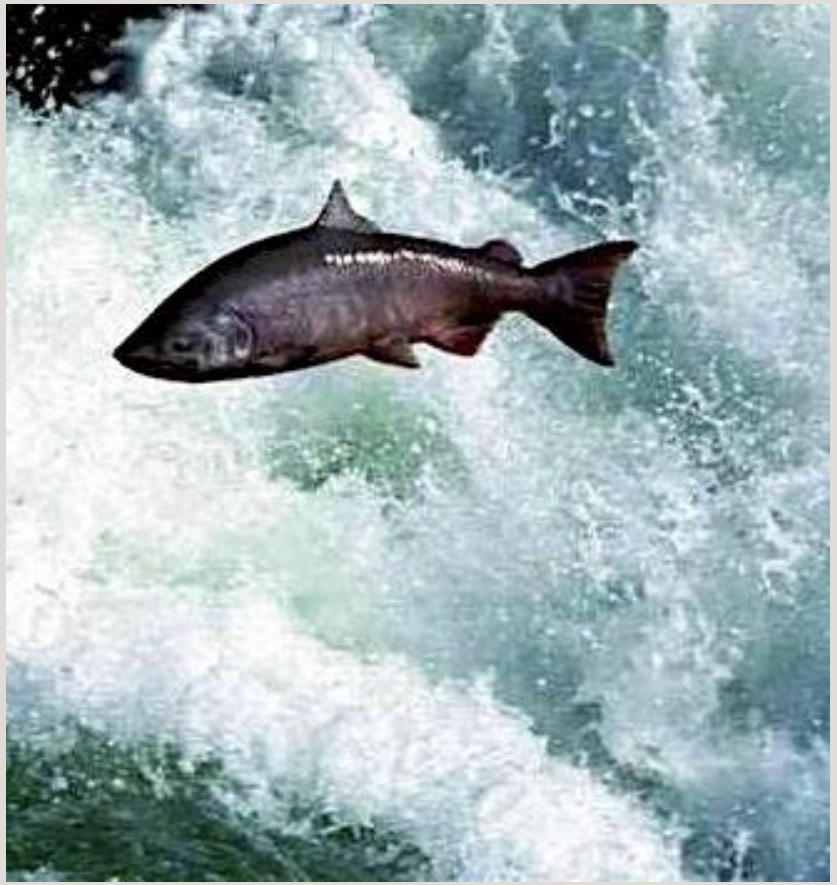
Questions?

(This is going somewhere, right?)

Presentation on USACE Fish Budget Needs at mainstem dams

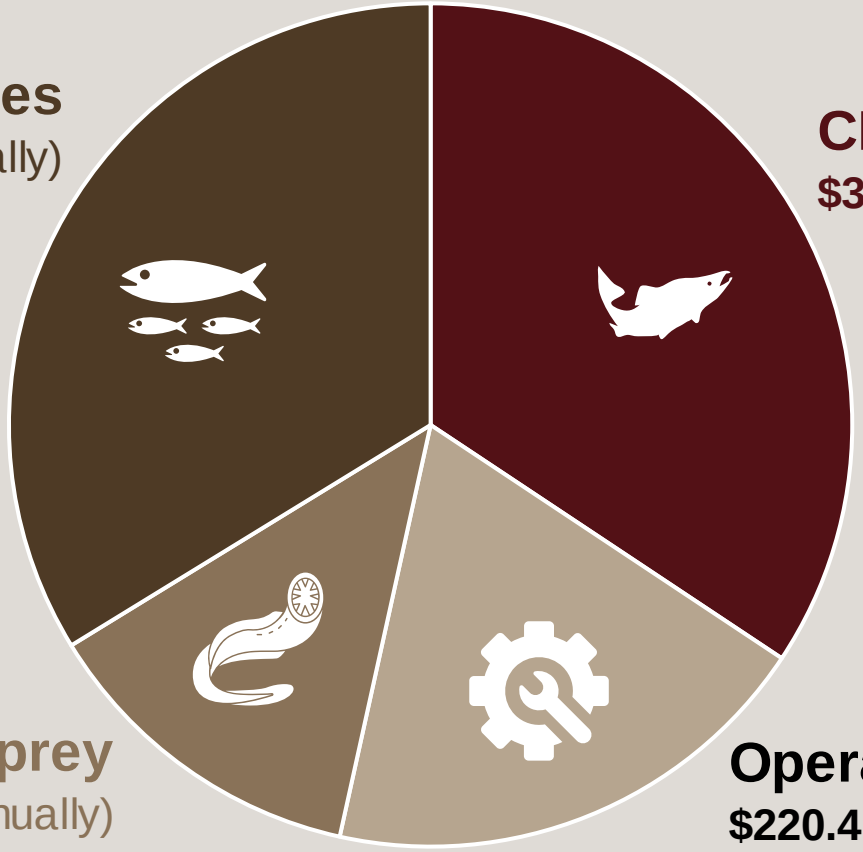
Funding the Future for Salmon

- How can we work together to ensure the actions needed for salmon and lamprey are made available?
- Where can we take our message to be most effective?
- Where are the bottlenecks in the funding stream?



Columbia Basin USACE 8-year Budget Estimates

Hatcheries
$389M ($48.6M annually)



CRFM est. add'l costs
$395.65M ($49.5M annually)

Lamprey
$147.3 ($18.4M annually)

Operations & Maint.
$220.4M ($27.6M annually)

Total $1,152.4M ($144.1M annually)

Projects by Type with 8-year Totals

Adult Fish Ladder Repairs and Improvements **$160.4M**

Spillway Repairs and Improvements **$201.2M**

Lamprey Passage
$165.1M

Fish Screen & Juvenile Bypass System maintenance **$132.7M**

Survival & Monitoring Studies (Spill operations, reach survivals & Pit Tag detection improvements) **$59.5M Avian Predation Deterrents (Predator Management)** **$31.2M**

River mouth Sediment and Coldwater Refugia Actions **$12.0M Estuary work (Outlined in BiOp)** **$6.5M**

Hatcheries **$240 to $360M**

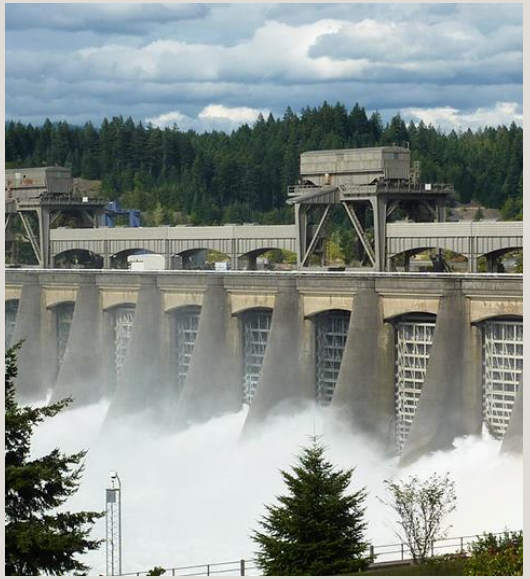
Flood Risk Management **TBD**

Fish Ladders

- Fish ladders allow adult salmon upstream past the hydroelectric dams on the Lower Columbia and Snake Rivers.
- Adult ladders at most of the dams are 50 to 80 years old and in need of major repairs to keep the ladders in service.
- Climate change will increase water temperatures that stress salmon and decreases their survival.
- Cooling water structures are needed at many of the ladders to help ensure adult salmon continue to migrate.

Spillway Repairs and Improvements

- Spillways are critical passage routes for juvenile salmon as they migrate to the oceans. Under the Proposed Action (PA) and Settlement Spill programs, most juveniles pass via the spillways.
- Spillways provide an important means for moving water during high flow events.
- Spillway modifications have been ongoing for 20 years to improve efficiency and safety of the route.
- At several projects, most notably Bonneville dam, spillway erosion has raised important dam safety concerns.



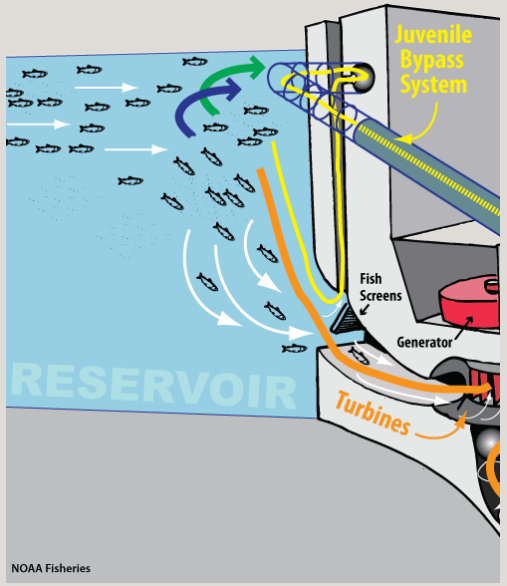
Lamprey

- Pacific lamprey hold great cultural and dietary significance to the tribes.
- Columbia Basin lamprey populations have declined drastically in the past half century.
- Dams have altered the system for lamprey in all life stages and throughout their range.
- Ladders constructed for salmon are not suitable for lamprey due to differences in swimming style and ability.
- Roughly only 50% of lamprey successfully pass each dam during the upstream migration compared to 90% for salmon.
- Downstream passage is also problematic.

A lamprey climbs the Bonneville Dam lamprey ladder

Juvenile Bypass

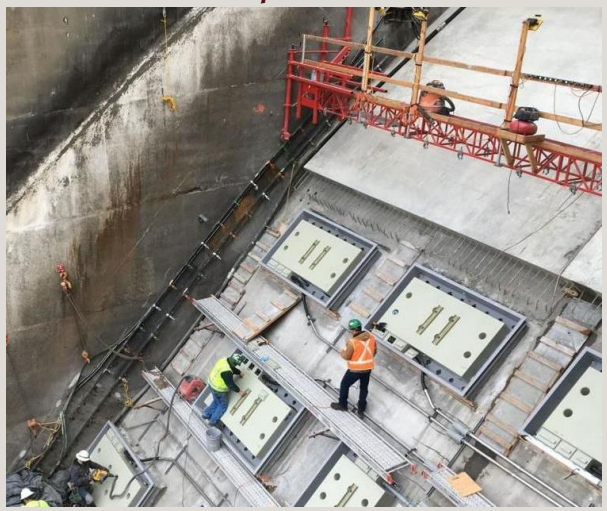
- Fish screens are part of Juvenile Bypass Systems (JBSs) that provide juvenile salmon and lamprey an alternative passage route to avoid the turbines.
- Many were retrofitted to the dams and built before there were guidelines and knowledge about what would be the best design for juvenile salmon and lamprey migrants.
- Many JBS screens are reaching the end of their life expectancy and will require replacement in the next 8-10 years.



Survival Studies

- The Current monitoring system no longer provides adequate or usable information such as reach survivals. Additional means (similar to LGR RSW Pit Detector) to collect data must be pursued and advanced.
- Knowledge gained through studies and monitoring are needed to determine if fish mitigation measures are resulting in expected benefits and where more improvements and funding are needed.
- Our understanding for what is best for adult and juvenile salmon is continuing to progress.

New PIT arrays at Lower Granite increase and improve survival data



Avian and Other Predator Management

- Seagulls, cormorants, northern pike minnow, bass, and sealions are among the many predators consuming salmon near the dams.
- The USACE has historically funded extensive avian predator management programs in the mainstem and estuary.
- These programs have been vital to improving survival of juvenile migrants.
- Additional measures such as avian wires are needed at the projects as well as other actions throughout the basin to deal with predation.

Sediment Management and Coldwater Refuges

- In impounded rivers, sediments accumulate in larger volumes at mouths of tributaries
- Sediment management has been a problem since the construction of the dams.
- Tributary mouths can provide critical sources of cold-water refugia for salmon holding while on their migration route.
- Tributary mouths are becoming shallow, slow moving, and provide ideal conditions for warmwater piscivorous fish and avian predators.
- Tribes propose sustainable actions to restore key fish habitat in tributary mouths.

Hatcheries

Snake River

- Dworshak National Fish Hatchery $47.8M

John Day/The Dalles Mitigation

- Spring Creek $4.43M
- Bonneville Hatchery $2.9M
- Umatilla Hatchery (Ringold) $25M-$175M

Willamette System

- Marion Forks $100M
- Leaburg $9M
- Detroit Acclimation $50M

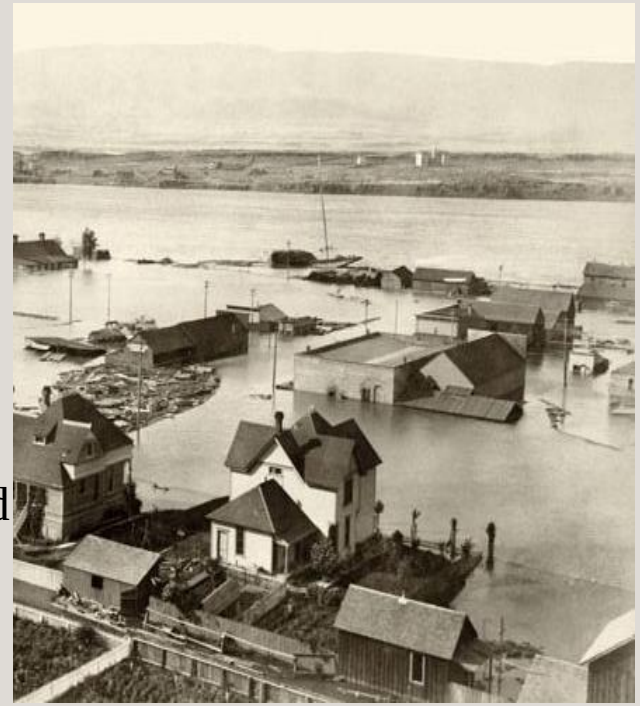
Total **$389M**

Tribal Salmon Camp youth at Dworshak Ntn'l Fish Hatchery

Flood Risk Management

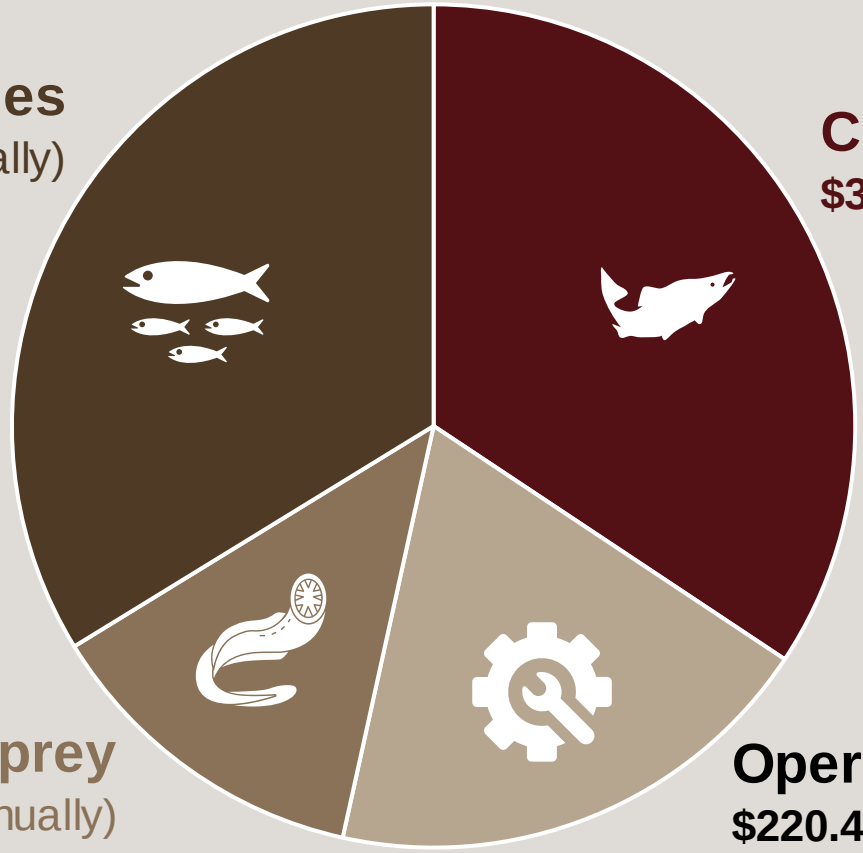
- Seek input from public and stakeholders.
- Address options to manage both medium- and high-flow events.
- Assess the full range of flood events.
- The review should address:
  - Infrastructure capacities and capabilities,
  - Floodplain management,
  - Columbia Basin reservoir operations and levees – both strategic improvements to existing levees and the potential need for additional levees.
  - Improvements in modeling and forecasting to improve real-time operations to insure a better balance between fish flows and flood control operations.

The Dalles during the 1894 Columbia River flood. oldoregonphotos.com



How can we work together to secure these needed actions?

Hatcheries
$389M ($48.6M annually)



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Total $1,152.4M ($144.1M annually)

Hydropower Needs Sequencing Activity

Hydropower Needs – Information

Monitoring, adaptive management, and evaluation

- Modernize and fully fund detection and monitoring in mainstem to address gaps and allow for more accurate data collection.
- Great need for a comprehensive Adaptive Management program (monitor and adjust).
- Need to establish base starting point that is at least adequate/sufficient for fish relative to CBPTF abundance goals and NPCC survival rate goals.
- Are Mid-Columbia dams doing their share to meet CBPTF goals?

Climate Change

- While improving, gaps in translating climate change science to local conditions impedes the collective ability to assess likely outcomes of many actions. There is uncertainty about how some species/life histories will respond to conditions brought on by climate change such as:
  - Warmer seasonal temperatures
  - Future water supply for habitats and flow augmentation
  - Altered seasonal flow dynamics
- Work was done to downscale climate change modeling for the basin, and that might be another resource to look at.

Delayed Mortality

- Is high spill at dams impacting survival? How would you differentiate between gas bubble trauma versus barging causing delayed mortality.
- Regarding latent mortality, there is a gap in understanding the efficacy of mainstem dam operations or breaching as a means to address it, and a disparity between Fish Passage Center CSS model and NOAA Life Cycle model for benefit of Lower Snake River dam removal.
- Cumulative (juvenile, latent, and adult) survival impacts from hydro operations by population including pre-spawn mortality and marine survival.

Understanding of possible breach effects

- There is a lack of data on post-breach benefits to free-flowing reach survival.
- When do alternate transportation industries get involved? How will trucks/rail be able to fill the gap if barging isn't available?

Techniques for passage

- Ways (methods, infrastructure) to improve downstream passage for juveniles and kelts.

Hydropower – Actions and Resources

Coordination

- Dams are managed for ESA goals (at best), not Partnership goals.
- Need transparency and input to the negotiations on the Columbia River Treaty and understanding of impacts from new operations.
- Gaps are created by fragmentation of authorities through several agencies, states, and working groups. There is little cohesion, and it is very difficult to create common programs.

How hydropower impacts are addressed

- Energy producers should not be managing restoration work; put fish recovery in the hands of Fish & Wildlife managers.
- Dams are managed for ESA goals (at best), not Partnership goals.
- Urgency is lacking for actions to achieve success that include fish goals.

Work Group coordination needs

- *Habitat:* Estuary restoration below Bonneville Dam.
- *Predation:*
  - Predator abatement/issues on the Lower Columbia, Lower Snake, and Clearwater River;
  - The effect of shad on adult salmon passage success;
  - Hydrosystem related amplification of smolt predation by fish and colonial nesting waterbirds.
- *Harvest/Hatchery*:
  - Better data on where highly migratory Columbia-origin fish are harvested (Southeast Alaska to Central California).
  - Effects of ocean conditions on adult return, as well as recreational fishing at the mouth.

Mitigation and Funding

- Lack of understanding on the availability of funding and failure to find efficiencies in existing efforts.
- Additional funding for more robust service/benefit replacement infrastructure, costs.
- Significant non-recurring fish hatchery operation and maintenance needs at almost all Columbia River hatcheries. Hatcheries are not meeting mitigation goals that were agreed to when they were constructed.
- Significant outstanding fish operation and maintenance needs for USACE of Engineers mainstem hydro fish passage.
- Begin funding infrastructure to support services currently provided by lower Snake River dams.
- There are significant issues with BPA flat funding policy for Fish & Wildlife mitigation program.
- BPA funding decisions on monitoring programs (like CSS) result in ineffective monitoring at critical time for species survival.
- Is tributary mitigation relied on too much to offset hydro impacts?
- There needs to be equality in resources and funding for mitigation, all mitigation flows downstream.

Break

10 minutes

Upper Columbia Fish Passage and Reintroduction efforts

Fish Passage and Reintroduction: The Phase 2 Implementation Plan "P2IP"

Casey Baldwin, Confederated Tribes of the Colville Reservation*
Conor Giorgi, Spokane Tribe of Indians*
Tom Biladeau, Coeur d' Alene Tribe
Laura Robinson, Upper Columbia United Tribes
**Presenters*

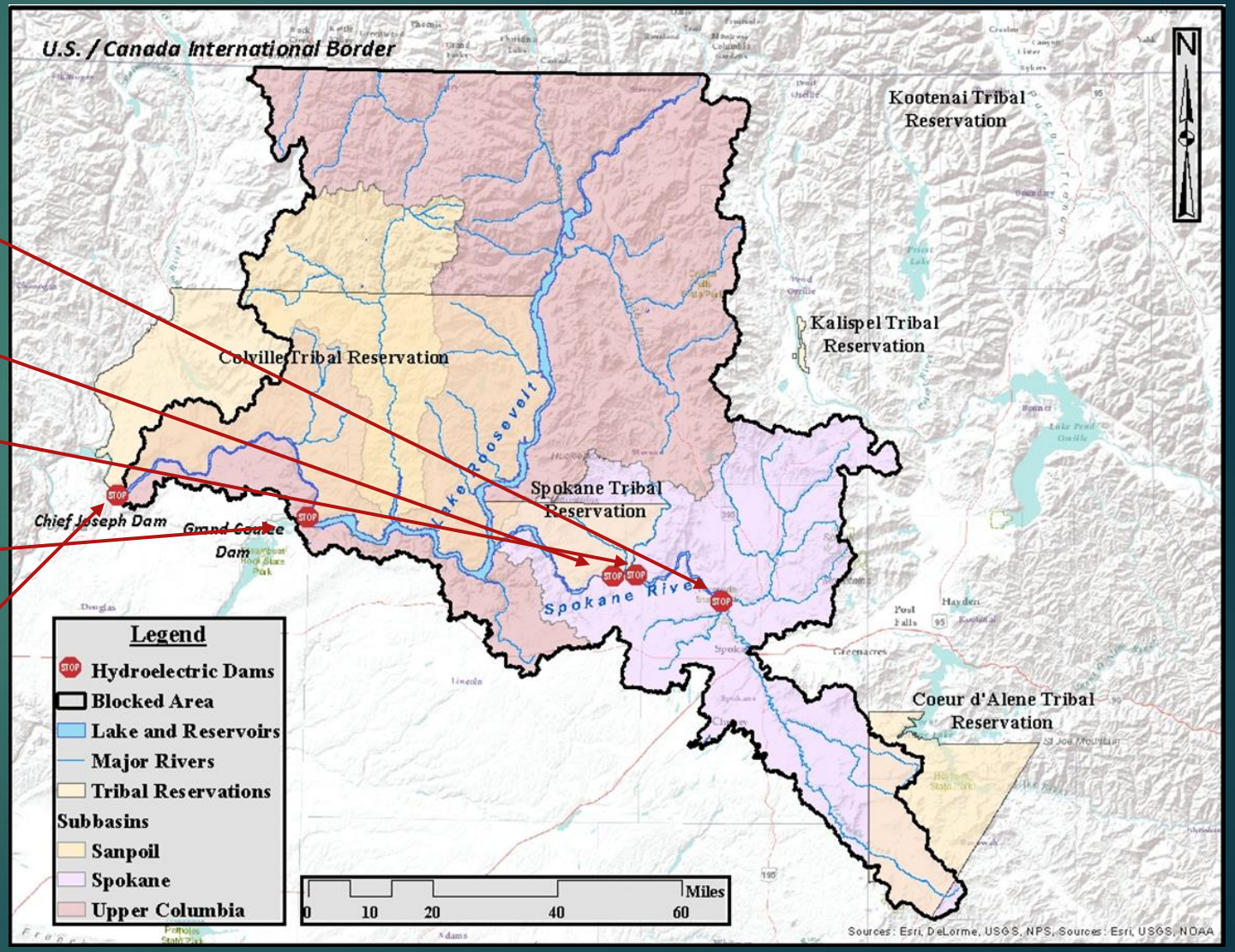
With contributions from Kevin Malone Consulting, USGS Columbia River Research Lab, Pacific Northwest National Lab, and many others

COLUMBIA BASIN COLLABORATIVE – HYDRO/BLOCKED AREAS GROUP

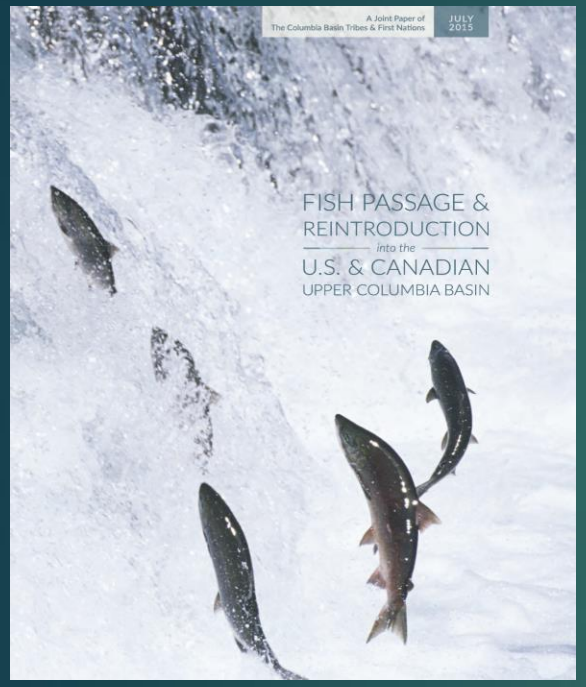
NOVEMBER 2, 2022

Upper Columbia United Tribes (UCUT)

1. Nine Mile Dam (1908)
2. Little Falls Dam (1910)
3. Long Lake Dam (1915)
4. Grand Coulee Dam (1941)
5. Chief Joseph Dam (1955)



Phased Approach to Reintroduction



Phase 1:

Evaluate passage studies at hydroelectric projects, including Chief Joseph & Grand Coulee Dams

Investigate possible cost of upstream and downstream passage options

Investigate habitat availability, suitability and salmon survival potential in habitats above GCD

Phase 2:

Design and test reintroduction strategies and fish passage facilities at CJD & GCD *(& Spokane River Projects)*

Reintroduction pilot projects

Monitoring, evaluation, and adaptive management

Phase 3:

Review results to determine implementation and permanent inclusion to the Program

Phase 1 Outline

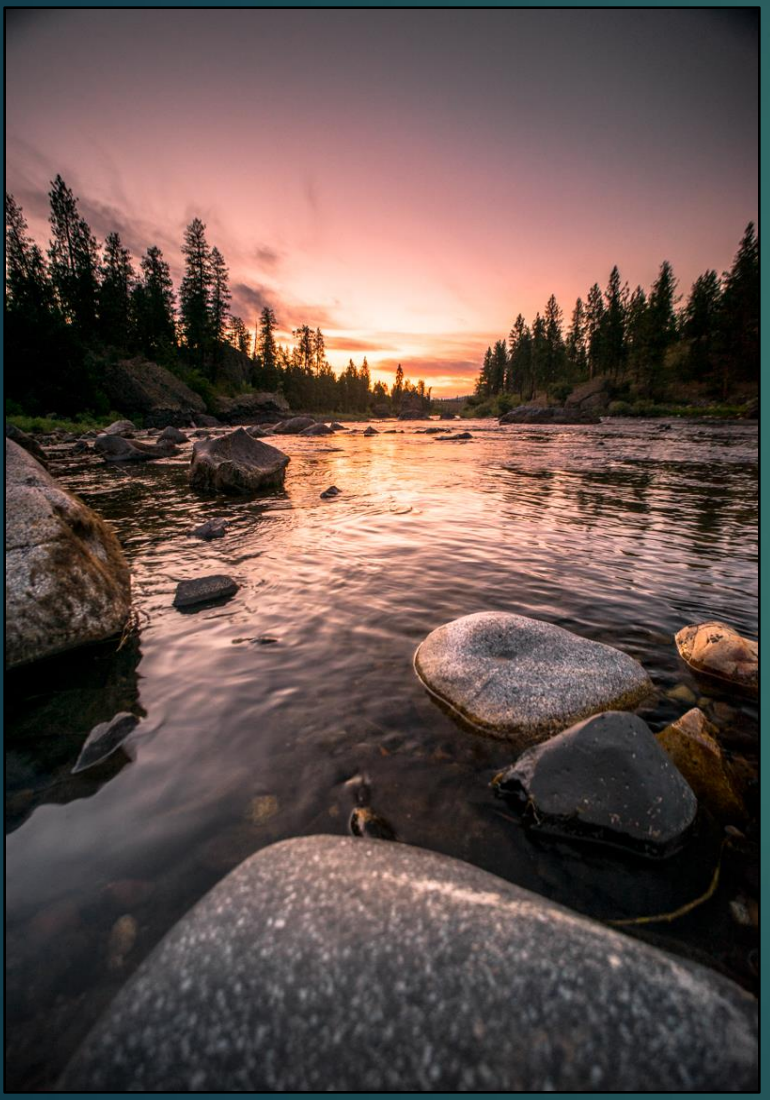


Photo Credit: Michael Visintainer, Silver Bow Fly Shop

Which species and stocks are most appropriate?

- **Donor Stock Assessment**

What are the risks to resident fish?

- **Risk Assessment**

Can the habitat support fish production?

- **Habitat Assessments**

Is it possible to pass fish above CJD & GCD?

- **Review Fish Passage Technology**

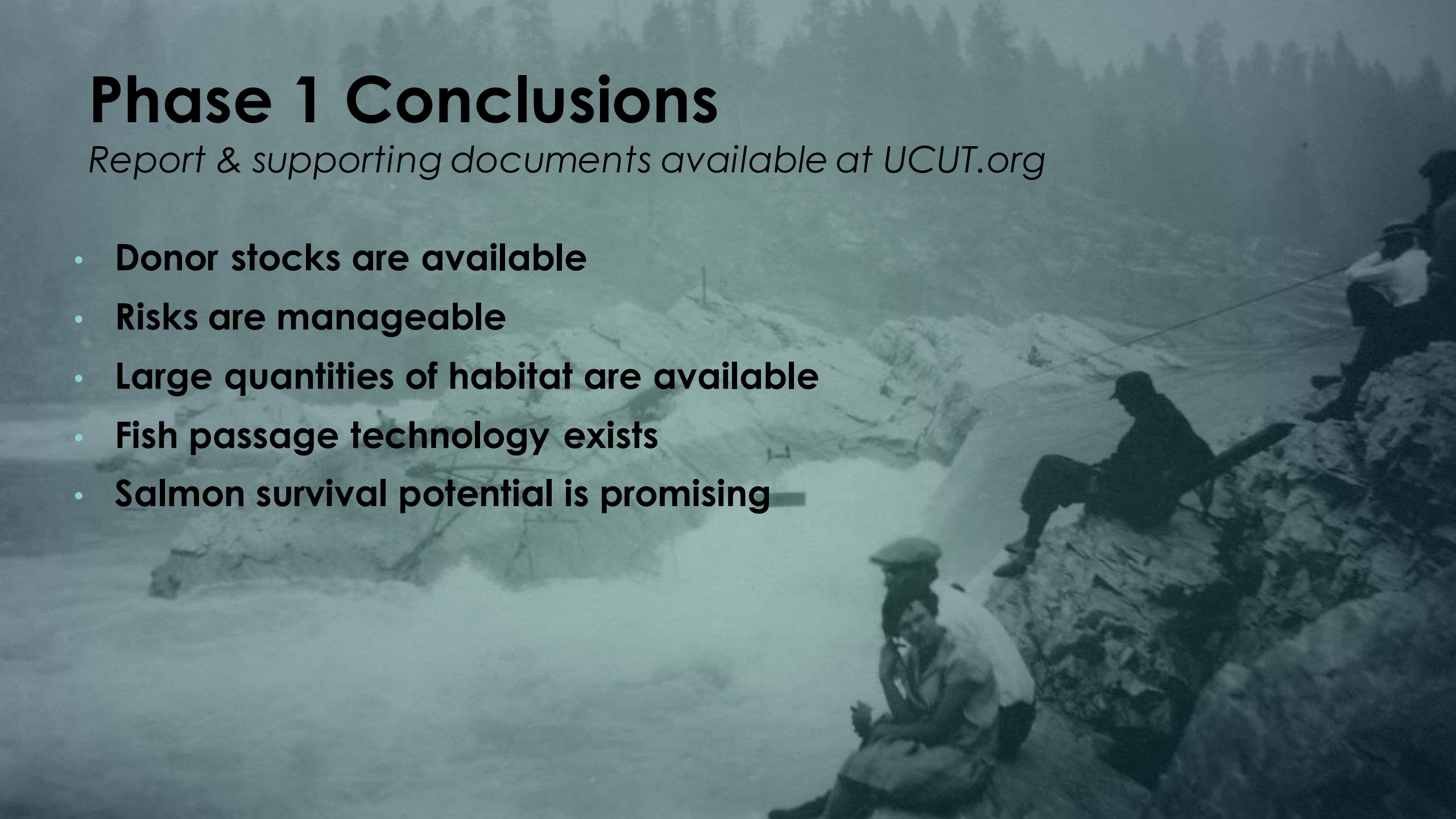
What are possible outcomes?

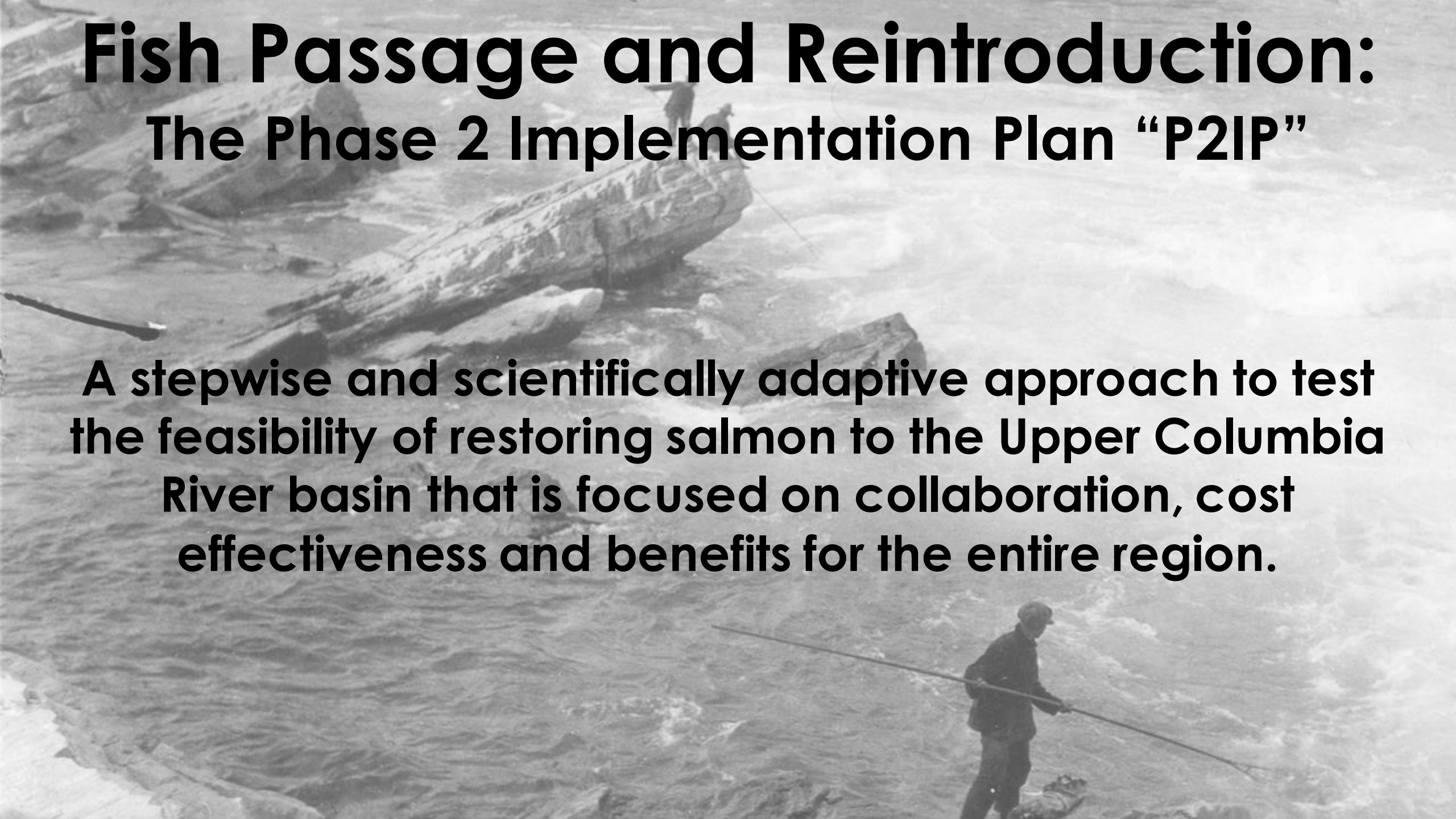
- **Life Cycle Modeling**

Phase 1 Conclusions

Report & supporting documents available at UCUT.org

- **Donor stocks are available**
- **Risks are manageable**
- **Large quantities of habitat are available**
- **Fish passage technology exists**
- **Salmon survival potential is promising**





Fish Passage and Reintroduction:

The Phase 2 Implementation Plan "P2IP"

A stepwise and scientifically adaptive approach to test the feasibility of restoring salmon to the Upper Columbia River basin that is focused on collaboration, cost effectiveness and benefits for the entire region.

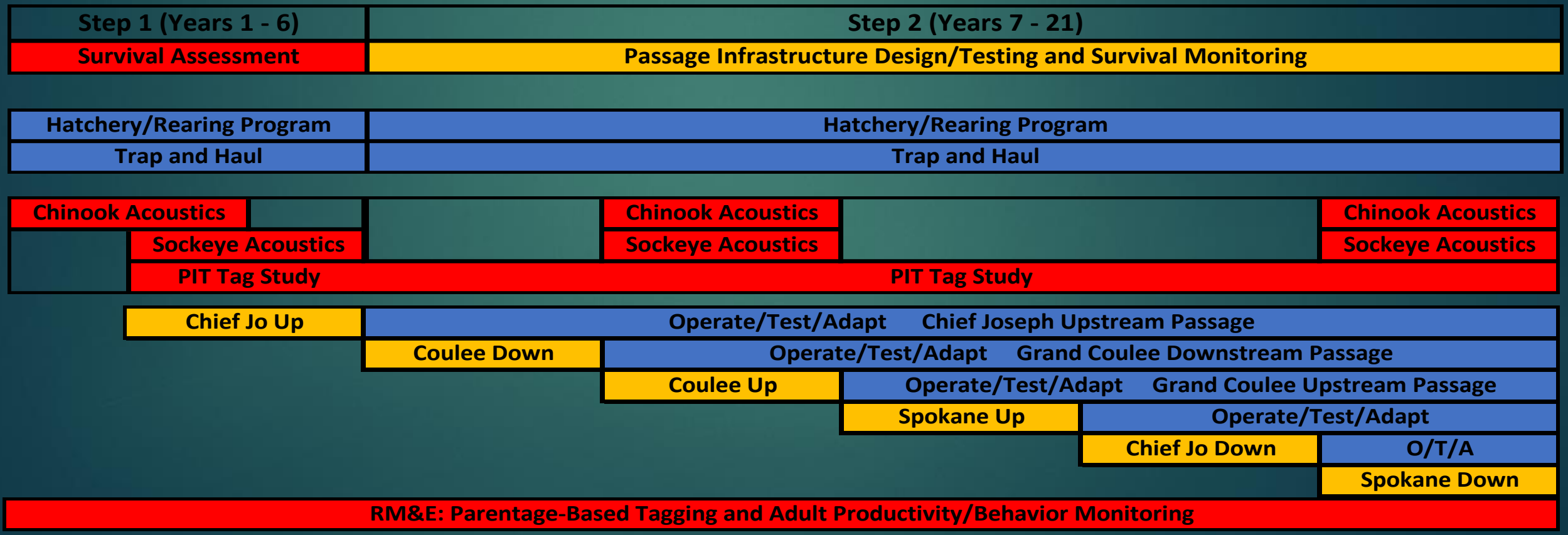
P2IP: Test the Feasibility of Passage and Salmon Persistence

- Test the key assumptions used in the Phase 1 Life Cycle Model
  - Migratory survival, passage survival, behavior and productivity
- Establish sources of Chinook and Sockeye donor stocks
- Develop interim hatchery facilities to produce fish for feasibility studies
- Develop and test upstream and downstream interim passage facilities
- Provide the data necessary for full-scale reintroduction and permanent passage

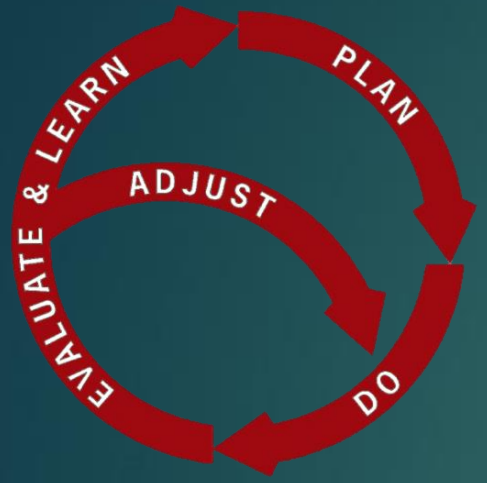
P2IP: Timeline and Structure

20+ Years, 2 Major Steps

- Step 1: Years 1 - 6
  - Donor Stock Access
  - Rearing Facility Development
  - Initial Survival Studies
  - Adult Trap and Haul Program
- Step 2: Years 7 – 20+
  - Design and Testing of Fish Passage Systems
  - Continuation of Survival and Behavior Studies



Informing the Adaptive Management Approach: Life Cycle Modeling (LCM)



Empirical data

LCM

Model input w/assumptions

- Passage Survival
- Collection Efficiency of Passage Options
- Migration Survival
- Spawning Capacity
- Incubation and Juvenile Life Stages
- Reservoir Rearing
- Ocean Survival
- Juvenile to Adult Survival (CJD to CJD)
- Harvest rates

Then re-run the LCM to re-assess feasibility
&
adaptively manage the approach

Step 1 – Baseline Data & Infrastructure

Interim Fish Production Facilities

- Review current facilities & programs
- New or expanded early rearing facilities, net pens, acclimation sites

Downstream Behavior & Survival Studies

- Acoustic behavior and survival, yearling Chinook and Sockeye (P2IP App. B, C)
- PIT tag releases, yearling Chinook and Sockeye (P2IP App. D)

Upstream Survival & Behavior Studies

- Upstream survival using adults from PIT releases (P2IP App. D)
- Tailrace behavior (P2IP App. D)

Interim Upstream Passage at Chief Joseph Dam

- Trap-and-haul from Chief Joseph Hatchery ladder and additional interim facilities
- Selective passage into Rufus Woods reservoir (P2IP App. E)

Step 2 – Interim Passage & Testing

Step 1 Continued Activities:

- Operation of interim rearing facilities
- Moderate-sized PIT tag releases of Chinook and Sockeye
- Trap-and-Haul from CJD to upstream reservoirs

Incremental Installation of Interim Passage Facilities

Sequence will be informed by Step 1 survival studies

- Design & Installation
- Effectiveness Testing
- Operation

Research, Monitoring, & Evaluation

- Parentage-based Tagging (PBT), Adult Recruits per Spawner (AR/S), limiting factors & adaptive management

P2IP Budget Estimates

P2IP Stepwise Implementation (in millions $)	Step Total	Cumulative Total
1) Year 1-6 (Studies, Hatcheries, Chief Joseph Up)	$38.8	
2.1) Year 7-9 (Ongoing Studies, Grand Coulee Down)	$31.2	$70
2.2) Year 10-12 (Ongoing Studies, Grand Coulee Up)	$29.8	$99.8
2.3) Year 13-15 (Ongoing Studies, Spokane Up)	$29.4	$129.2
2.4) Year 16-21 (Ongoing Studies, CJD Down, Spokane Down)	$78.9	**$208**

P2IP Totals by Activity	Estimated Cost
Interim Facility Design and Construction	$85.3 million
Research, Monitoring, and Evaluation	$79.5 million
Operation and Maintenance	$43.2 million
Total Estimated Cost	**$208 million**

** Previous estimates were updated to 2022 USD*

P2IP Highlights

- A feasibility assessment for full reintroduction
- Does not request major operational changes to power, flood risk management, or irrigation
- Increased natural and hatchery-origin salmon throughout the Columbia River system
- A clear path for implementation already developed
- A collaborative framework with action agencies already in place
- A step toward restoring the cultural and spiritual heritage for the UCR tribes

Phase 2 Progress & Plans

Juvenile Acoustic Study

- Year 1 complete (spring 2022)
- Funding secured for years 2 and 3

PIT Tag Survival Study

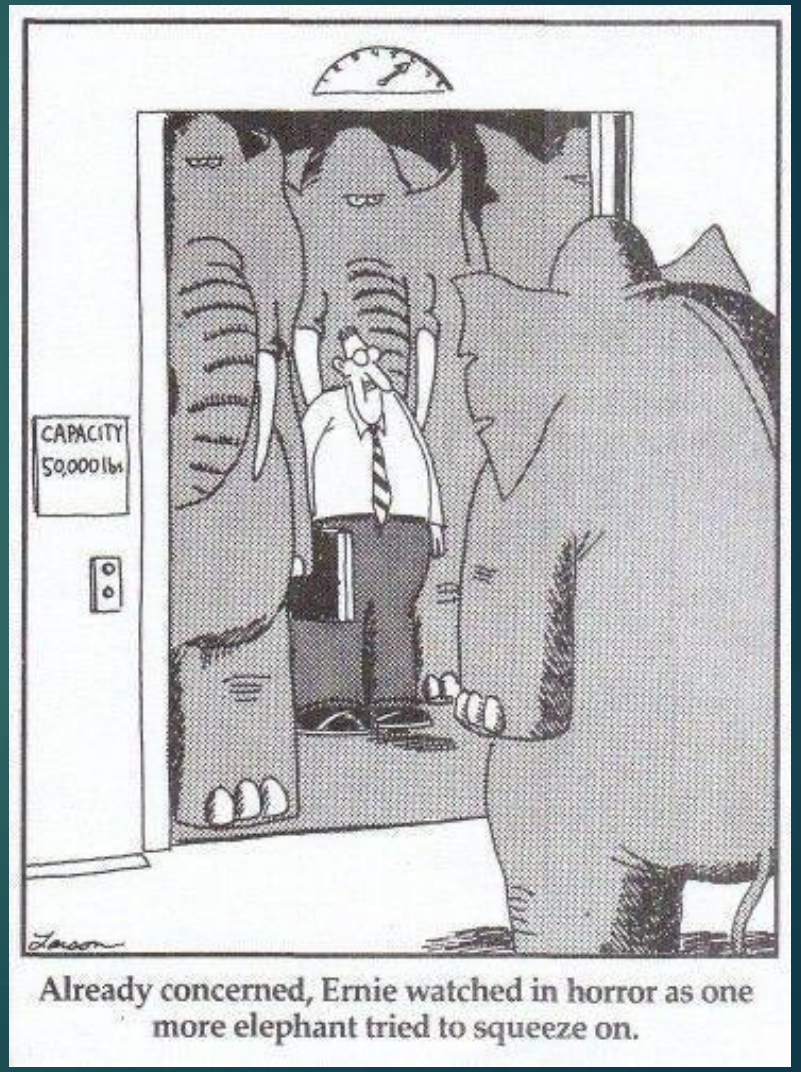
- Prepared for year 1 (spring 2023)
  - ~53,000 subyearling Chinook PIT tagged
  - Transferring to net pens in October
- Positioned for year 2 (spring 2024)
  - 160k summer Chinook eggs in November

Future Rearing

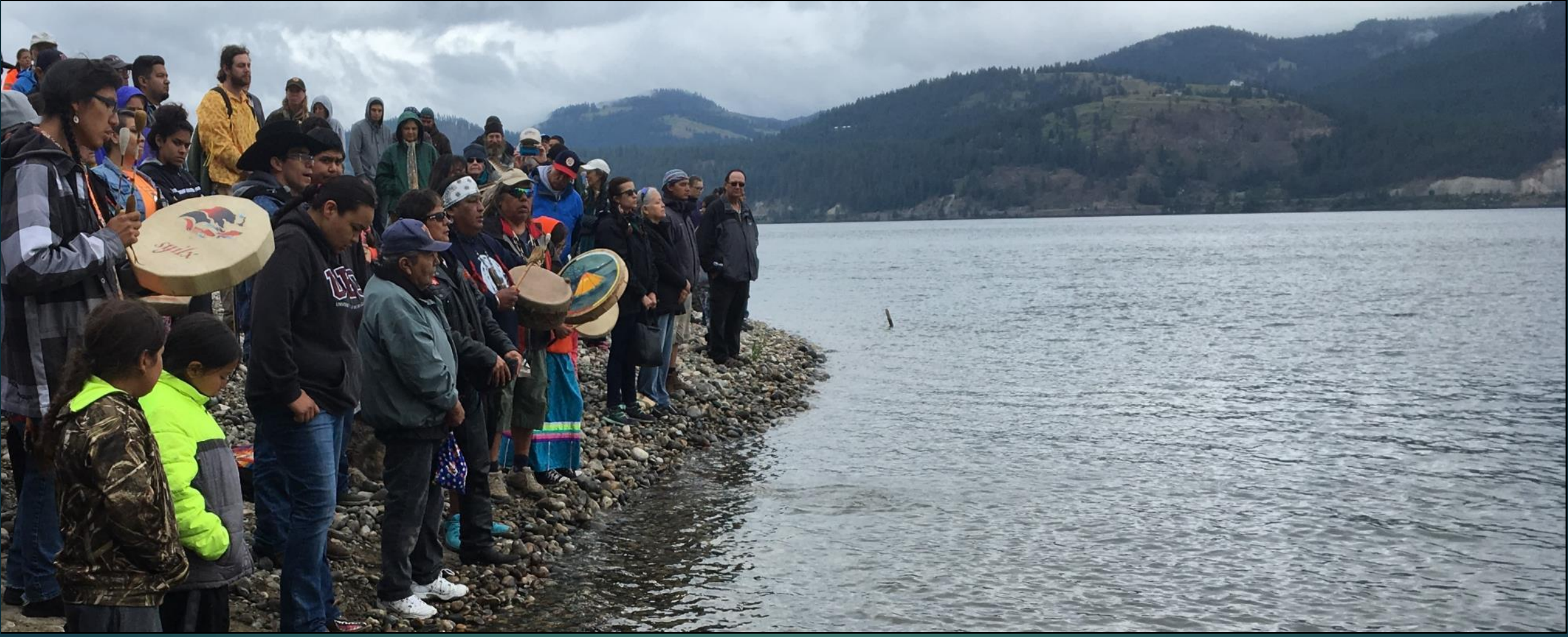
- Expansion of net pens
- Rearing/Acclimation facilities planning

Regulatory Considerations & Constraints

- Lack of Dedicated Programmatic Funding
- Access to Preferred Donor Stocks
  - *USFWS, PUDs & BPA Coordination*
- Developing Rearing and Adult Collection Facilities
  - *WDFW, USFWS, DPUD & BPA Coordination*
- Fish Health and Disease Management
  - *WDFW, USFWS, USGS, & UC BAAF Coordination*
- Consultation & ESA Impacts
  - *USFWS, NOAA, BOR & ACOE Coordination*



Already concerned, Ernie watched in horror as one more elephant tried to squeeze on.



Questions?

The Phase 1 Report, its supporting documents, and the P2IP can be found at UCUT.org.

Blocked Areas Needs Sequencing Activity

Blocked Areas Needs – Information

Context and feasibility

- There is a gap in understanding the feasibility of achieving self-sustaining populations in some blocked areas.
- Wild salmon and steelhead migration timing and survival bottlenecks in upper Columbia (Wenatchee/Entiat/Methow) may relate to Upper Columbia reintroduced stock risks.
- No comprehensive complete inventory of all the dams in the basin currently exists. Each state's inventory uses different criteria, and none are complete.
- Amount of available suitable habitat in the Upper Snake.

Passage technologies and strategies

- Understanding tradeoffs - ultimate challenges/levels of success are variable; challenging to understand from case to case.
- The major challenge in most reintroduction efforts into blocked areas is how to provide effective downstream passage for juvenile fish.
- Downstream passage infrastructure effectiveness monitoring and improvement.
- A gap in science for latent mortality.
- Beliefs: Trap and transport can be an effective tool, but some interests insist on volitional passage, which can create a barrier in and of itself.

Other impacts to Blocked Areas reintroduction success:

- Are downstream fisheries impacts on upstream/blocked areas well understood and managed? Where downstream fish may seem abundant, those fish are destined for upstream areas where they may not be abundant.
- Downstream passage infrastructure effectiveness monitoring and improvement. Need Increased acknowledgment of limiting factors that will impact stocks during their life cycle downstream of the blockage.

Work group understanding:

- Perhaps there needs to be a discussion regarding the legal/policy differences on blocked areas between states, basins, etc. Some explanation by state representatives may be helpful.

Coordinate with other TSWGs:

- Hatcheries/Harvest - Gap in studies on ocean conditions and commercial fishing effects.
- Science Integration Work Group - Need comprehensive life-cycle models for representative populations within each Evolutionarily Significant Unit (ESU) /Distinct Population Segments (DPS).
- Habitat/Predation/Hatcheries - Habitat restoration, toxic reduction, predator abatement, and hatchery funding.

Blocked Areas – Actions and Resources

Coordination Needs:

- Because the basin is fragmented among multiple state and two country jurisdictions, there has been a lack of a broader basin-wide authority or restoration plan. The Columbia Basin Partnership was intended to fill that gap.
- Only non-federal hydropower dams that generate over 5MW are FERC licensed. Many non-hydro dams also block salmon passage and may not be sufficiently managed for fish.
- Understand the impacts of Columbia River Treaty modernization.
- Important to include Canadian neighbors in the discussions on the blocked areas upstream of Grand Coulee.

Specific project needs

- Volitional upstream passage structure design is lacking for Wallowa Lake Dam.
- Little to no regional effort for blocked areas above Hells Canyon Complex. This includes the federal dams above Hells Canyon Complex.
- Regarding the Willamette Basin there are limited resources (money and time) and gaps in understanding (how to provide downstream passage).
- North Fork Clearwater River (habitat upstream of Dworshak Dam) anadromous fish production potential with or without downstream passage structure.
- Need to address all dams that block fish passage, including numerous non-hydropower dams.
- Are Mid-Columbia dams doing their share to meet CBPTF goals?

Resource needs

- Mitigation for hydropower always flows downriver. The areas upriver that are most impacted are generally ignored for mitigation.
- Resource gap: financial support for UCUT Phase 2 Implementation Plan – which will fill gaps in understanding specific to the upper Columbia blocked area.
- Limited resources (flat funding) from Bonneville Power Administration (BPA) Fish/Wildlife mitigation program.
- Habitat restoration, toxic reduction, predator abatement, and hatchery funding.

Next Steps, Upcoming Meeting Topics, and Summary

Next Steps

- **All Between Meeting Work:** identify recommendations that have been proposed to address these needs from other forums
- **KW:** Clean up tier 1 needs and circulate to the group
- **KW**: Draft a meeting summary and circulate to the group
- **KW:** Schedule the December Work Group Meeting


Photo credit: Ingrid V Taylar

Upcoming Meeting Topics

- Start brainstorming actions to address the critical information gaps, needs, and opportunities
- Crosswalk actions with recommendations from this group with other efforts
- Evaluate recommendations and build consensus around round 1 recommendations to go to the Science Integration Work Group and the I/RG


Photo credit: Department of Energy

Thank you!