Short-term Modification of the Adjusted **Total Dissolved Gas Criteria** in the Snake and Columbia Rivers

Water Quality Program
Washington Department of Ecology

DEPARTMENT OF ECOLOGY
State of Washington

Overview

- **Timeline** of this public process
- Discuss elements of **Water Quality Criteria**
- What is **Total Dissolved Gas** or TDG?
- Describe **Short-term Modifications** tool
- **Current Requests** to Modify Total Dissolved Gas (TDG) Criteria
- **draft EIS:** Alternatives Considered & Preliminary Decisions

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- Reasons for Modifying TDG Criteria on the Snake & Columbia Rivers - *WDFW*

STM Process Timeline

- **Opened** scoping comment period (November 16, 2018)
  - Issued a determination of significance in the state SEPA register and,
  - Included a request for comments on the scope of an Environmental Impact Statement
- **Closed** scoping comment period (December 14, 2018)
  - Received 10 comment submissions
  - The comments helped us develop the draft EIS
- **Opened draft EIS comment period** (January 28, 2019)
  - Distributed draft environmental impact statement (EIS)
  - Distributed draft short-term modification language

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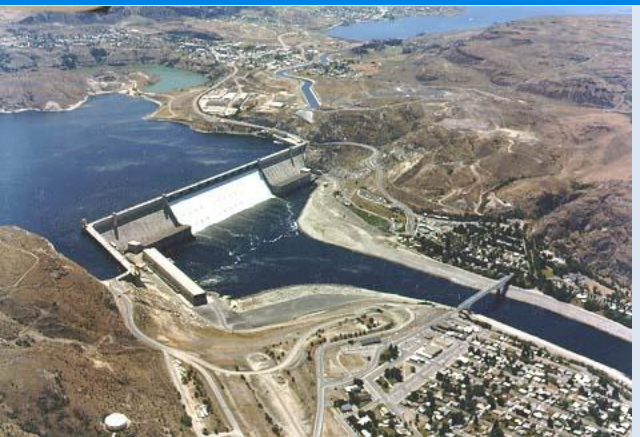
Comment Period Timeline

- In-person hearing (February 13, 2019)
  - Presentation, Q/A, and hearing formal testimony
- Hearing via webinar (February 19, 2019 at 6PM)
  - Presentation, Q/A, and hearing formal testimony
- **Close** 30-day EIS comment period (February 28, 2019)
- Make a Determination to Issue Final EIS by March 21, 2019
  - Will include response to comments
- **Make a determination to issue the Short-term Modification by March 29, 2019**

Water Quality Standards



Water Quality Criteria

- Definition: Element of the water quality standards expressed as
  - numeric criteria (a *concentration or level*) or:
  - narrative criteria or a *description* of good quality waters
    - These criteria represent the quality that must be met in a waterbody to support a particular **designated use**.
    - What is a **designated use**?
      - Those uses that benefit fish, wildlife, and the public.
      - General example of uses are keeping our waters **swimmable** and **fishable**… meaning, safe to swim and in good condition for fish and other animals to thrive.

        (also known as: **recreational** uses and **aquatic life** uses)
    - When **water quality criteria** are met, this indicates that the those designated uses are generally supported.

Aquatic Life Use Criteria

- Aquatic Life Use Criteria are set to provide full protection for the **most sensitive use** in a waterbody.
  - This is often the most sensitive **species** and **life stage**
  - In the PNW this is usually based on the habitat and water quality needs for salmon.

Common numeric water quality criteria set to protect aquatic life are:

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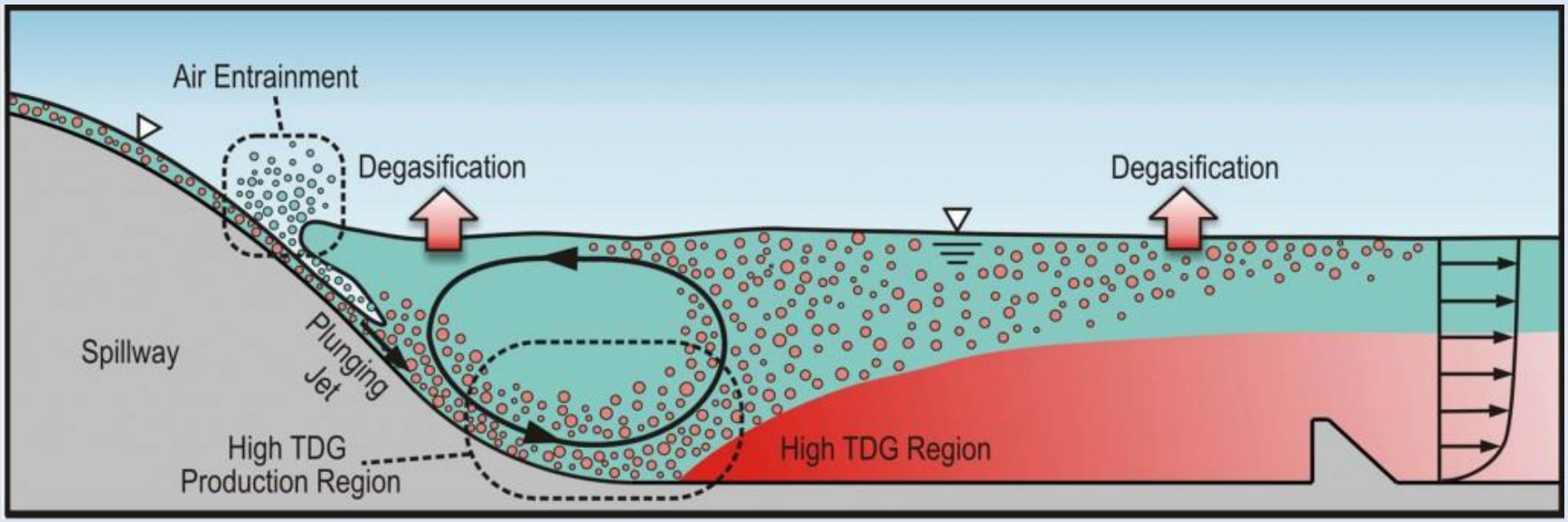
Components of Numeric Criteria

- **Magnitude**
  - How much of a pollutant is safe (*e.g. concentration of mercury*) *OR* a measure of a condition (*e.g. oxygen high, temperature low*)
- **Duration**
  - Period of time over which the concentration is averaged
    - *Examples are – instantaneous, hourly, 12-hour average.*
- **Frequency**
  - How often the numeric value can be exceeded
    - *Examples are – never, once in 3 years, once in 10 years, etc.*

What is TDG?

- Plunging water “entrains” or traps air in the river.
- The entrained gases (mostly nitrogen and oxygen) produce pressure.
- This pressure is measured as what is “above normal” in the water column.
- This is recorded as a percentage. 100% is normal or “in equilibrium” with the atmosphere. Anything above this is considered “supersaturation”
  - **Example: 110% TDG is creating 10% more pressure in the water column than normal.**



* Used with permission, from University of Iowa IIHR Hydroscience and Engineering, IIHR TDG home page: https://www.iihr.uiowa.edu/totaldissolvedgas/

Why do we limit TDG?

- Fish and other aquatic life can be affected by high TDG pressure.
- Gas Bubbles can form in tissues and harm aquatic life.
- Some species can try to avoid areas of high TDG while others cannot.

So why increase spill at dams?

- Although spill increases TDG, studies demonstrate that the spillways are safer routes for fish migrating downstream.
- Fish that pass over the dam with spill waters have higher survival rates than those that pass through the turbines.

Total Dissolved Gas Criteria

State-wide

Magnitude	Duration/Averaging Period	Frequency
110%	Instantaneous	Not to be exceeded

Snake and Columbia Rivers

- Seasonal TDG criteria allowable during spill season
- TDG criteria is adjusted to aid in fish passage

Magnitude	Duration / Averaging Period	Frequency
115% forebay	Highest consecutive 12 hour avg. in a day	Not to be exceeded
120% tailrace	Highest consecutive 12 hour avg. in a day	
125% tailrace	1 hour average	

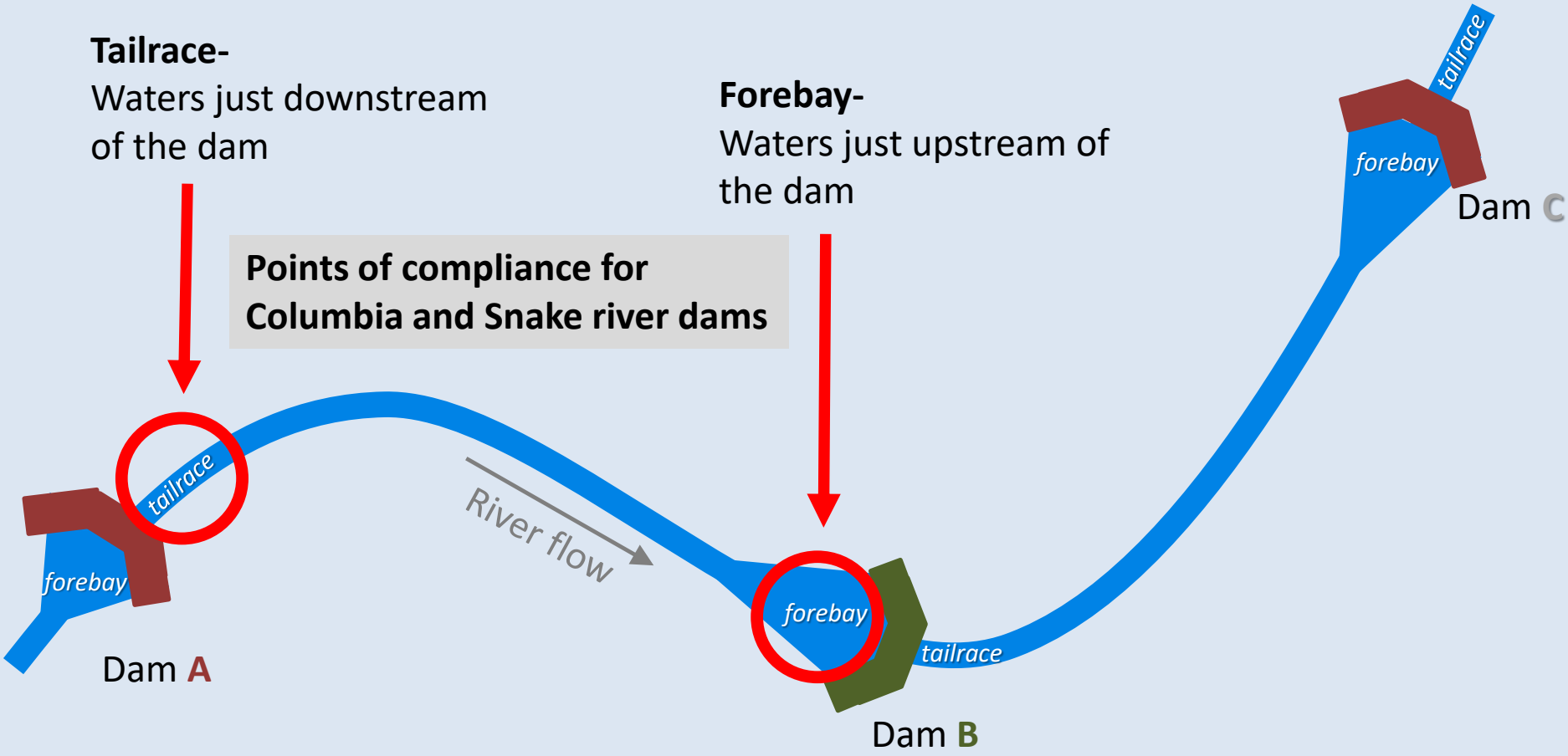
Total Dissolved Gas Criteria

for Columbia & Snake Rivers

Tailrace-
Waters just downstream of the dam

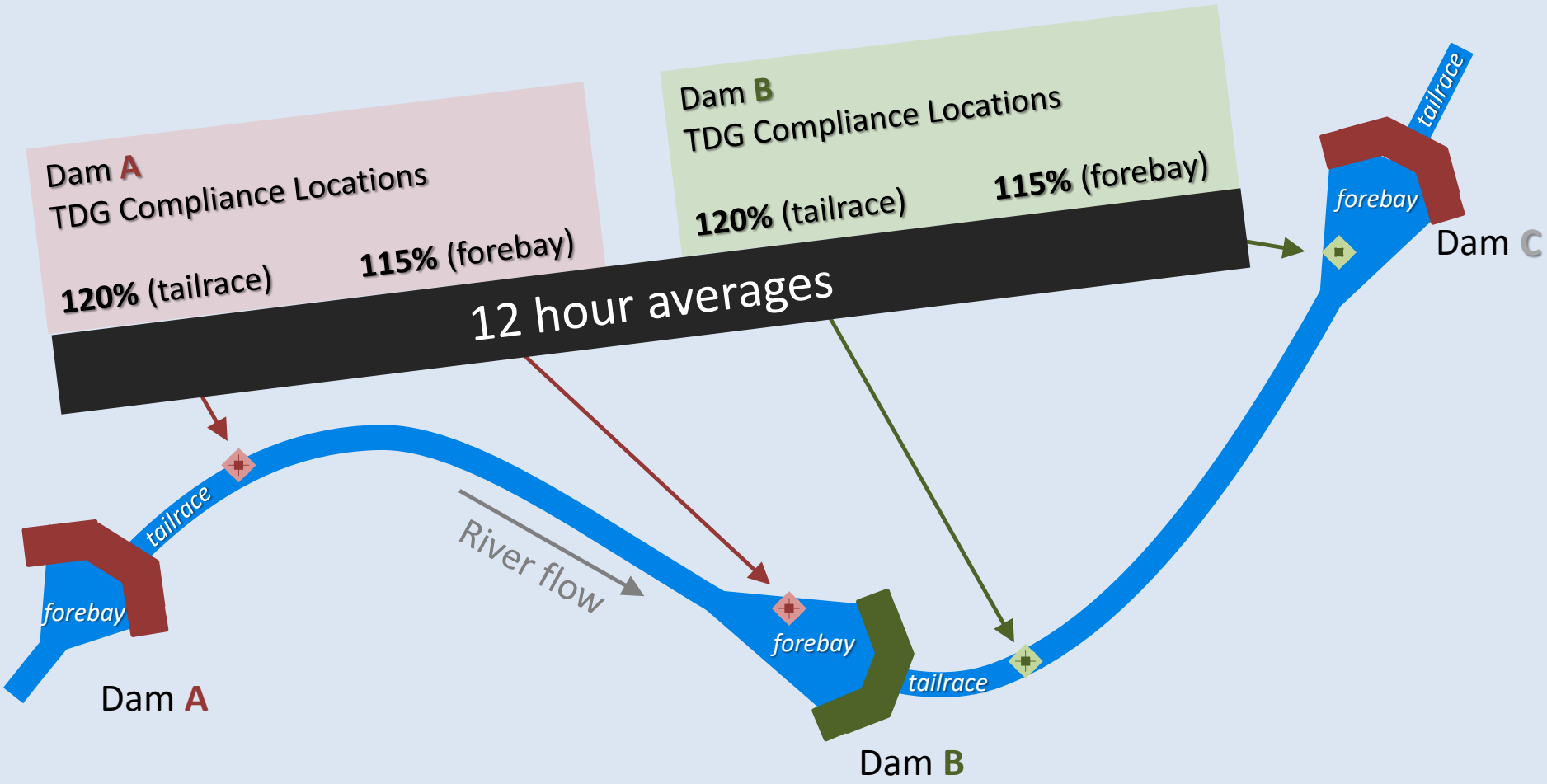
Forebay-
Waters just upstream of the dam

Points of compliance for Columbia and Snake river dams



Total Dissolved Gas Criteria

for Columbia & Snake Rivers



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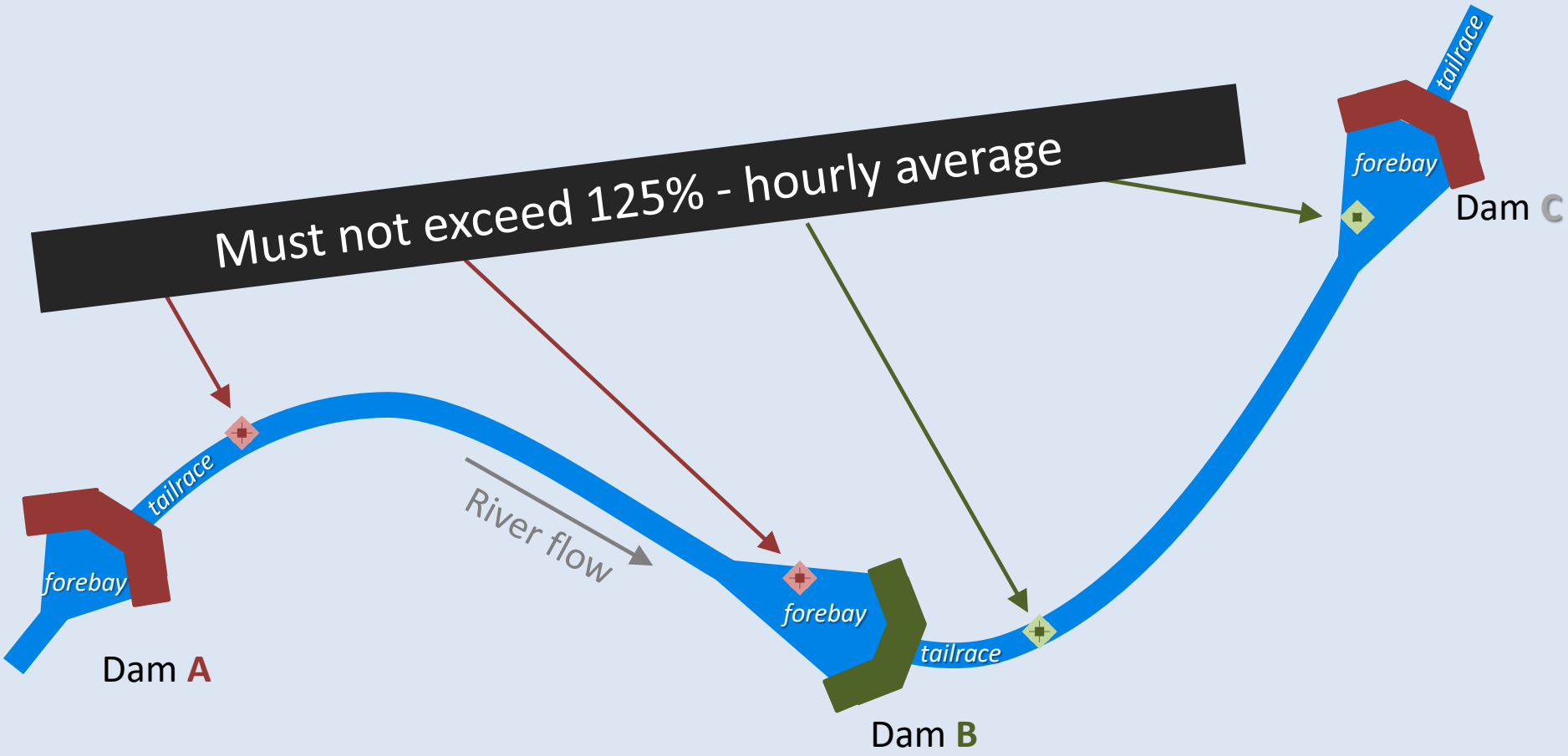


Requirements for Applying the Adjusted TDG Criteria

- Gas abatement plan (approved by Ecology)
  - Long-term strategy to incorporate structural and operational measures to continue to reduce a TDG production during spill
- Fisheries management plan
  - Approach for reducing and eliminating negative impacts to salmon and steelhead
- Physical and biological monitoring plans
  - Plans that outline monitoring program for water quality and the biological health of aquatic life

Reasons to further allow increases to TDG limits

- Formal requests to remove 115% forebay criterion:
  - The Washington Department of Fish and Wildlife
  - Columbia River Inter-Tribal Fish Commission
  - Northwest Sportfishing Industry Association
  - Columbia Riverkeepers
  - Save Our Wild Salmon
  - *Several letters were signed by other organizations.*
- Flexible Spill Agreement
  - Dependent on removal of 115% forebay criterion for 2019 spill season
- Orca Task Force Recommendations
  - Include allowing more spill over dams for fish passage in an effort to increase prey salmon for Southern Resident Killer Whale population.

Short-term Modifications

Short-term Modification (STM)

Water Quality Standards Tool at *Chapter 173-201A-410 WAC*

- Definition:
  - Modification of water quality criteria on a short-term basis
    - *Specific to a water body*
    - *After Ecology review and approval, a STM may allow a temporary reduction of water quality where necessary to achieve an objective*
- Duration
  - Typically on the order of *hours or days* (shorter duration STM)
    - *Reviewed and issued by Ecology as an administrative order*
  - Longer duration STMs are possible – these may apply to a waterbody for a duration of *weeks or months*
    - *The STM can be issued to be applied periodically for up to 5 years*
    - *Requires:*
      - *Public involvement process and,*
      - *State Environmental Policy Act (SEPA) analysis*

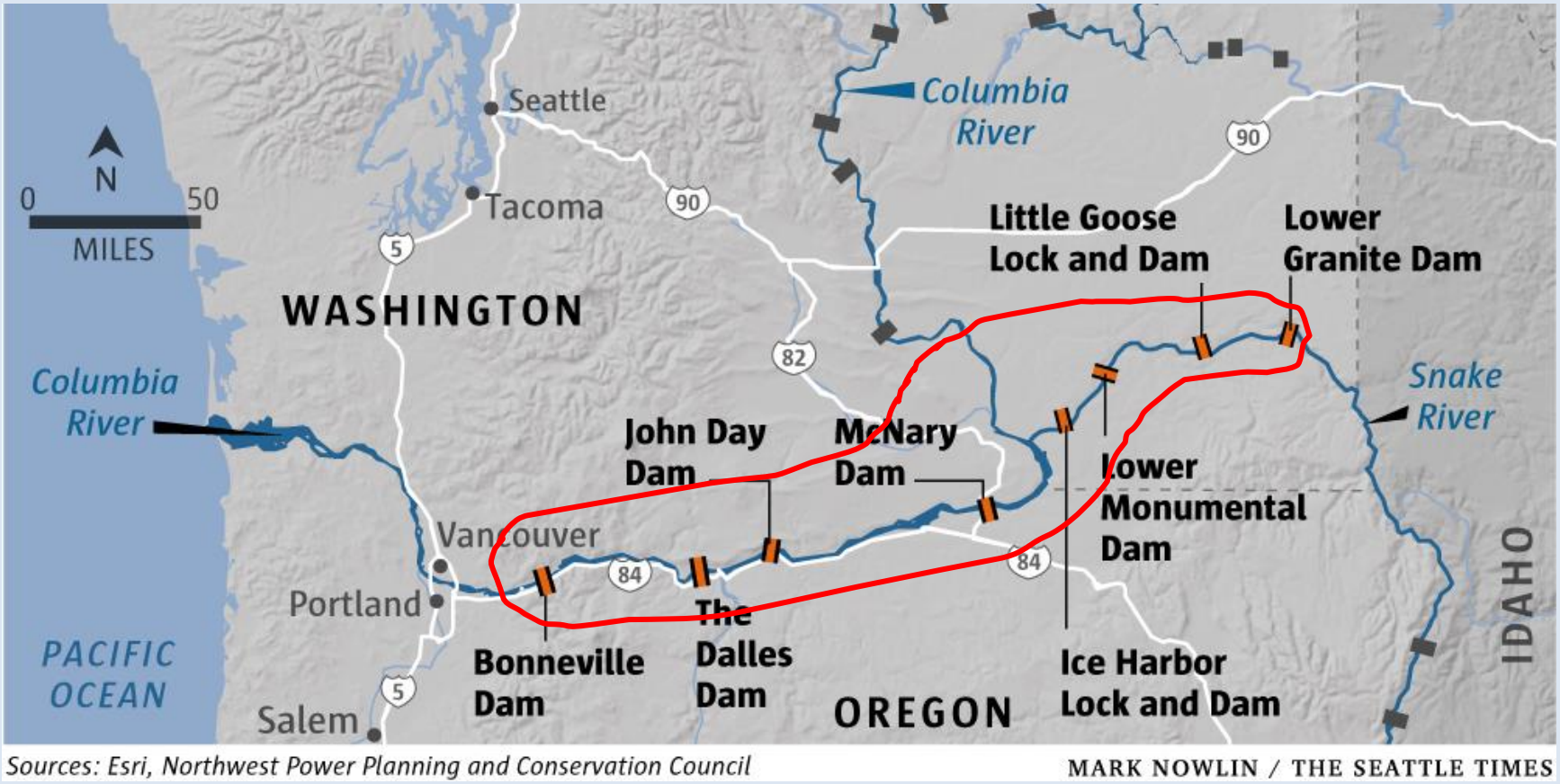
Short-term Modifications (STMs)

- Conditions of a short-term modification:
  - Must be authorized by the Department of Ecology
  - Conditioned, timed, and restricted to minimize degradation of water quality, existing uses, and designated uses
  - Can be approved to allow some degradation of water quality as long as it does not significantly interfere with designated use or cause long-term harm to the environment
  - STM is valid only for the duration of the activity

❖ The STM does not lessen or remove any obligations or liabilities under other federal, state, and local regulations

Preliminary Decisions

Geographical Scope



EIS Alternatives Considered

- **Alternative 1**:
  - Maintain the 115% forebay criterion
  - Maintain the 120% tailrace criterion
  - Maintain the 125% *maximum* criterion

No Action

- **Alternative 2**:
  - ***Remove*** the 115% forebay criterion
  - Maintain the 120% tailrace criterion
  - Maintain the 125% *maximum* criterion
- **Alternative 3**:
  - ***Remove*** the 115% forebay criterion
  - ***Remove*** the 120% tailrace criterion
  - Maintain the 125% *maximum* criterion

Short-term Modification: Preliminary Decision

- **Alternative 2**:
  - ***Remove*** the 115% forebay criterion
  - Maintain the 120% tailrace criterion
  - Maintain the 125% *maximum* criterion

- Provide STM for up to 3 years
  - Will allow modified criteria each year only during spill season:
    April 3 - June 20

- Continue to require monitoring for gas bubble trauma as described in biological monitoring plans

Other Preliminary Decisions

- Ecology received requests to simplify compliance measures of the TDG criteria.
  - Match Oregon's averaging duration periods.

Other Preliminary Decisions

- Averaging period for 120% tailrace criterion
  - Washington: consecutive 12-hour average ("12h rolling average")
  - Oregon: average of the 12 highest hours in one day

  Ecology will modify the averaging period from the 12 highest consecutive hours to the 12 highest TDG measurement in one day

- Averaging period for 125% tailrace criterion
  - Washington: one hour average - *maximum*
  - Oregon: two hour average - *maximum*

  Ecology will modify the averaging period for the 125% tailrace criterion from 1-hour *to* 2-hour average - will match Oregon method.

Why Modify TDG Criteria on the Snake and Columbia Rivers?

Overview of spill benefits and flex spill agreement

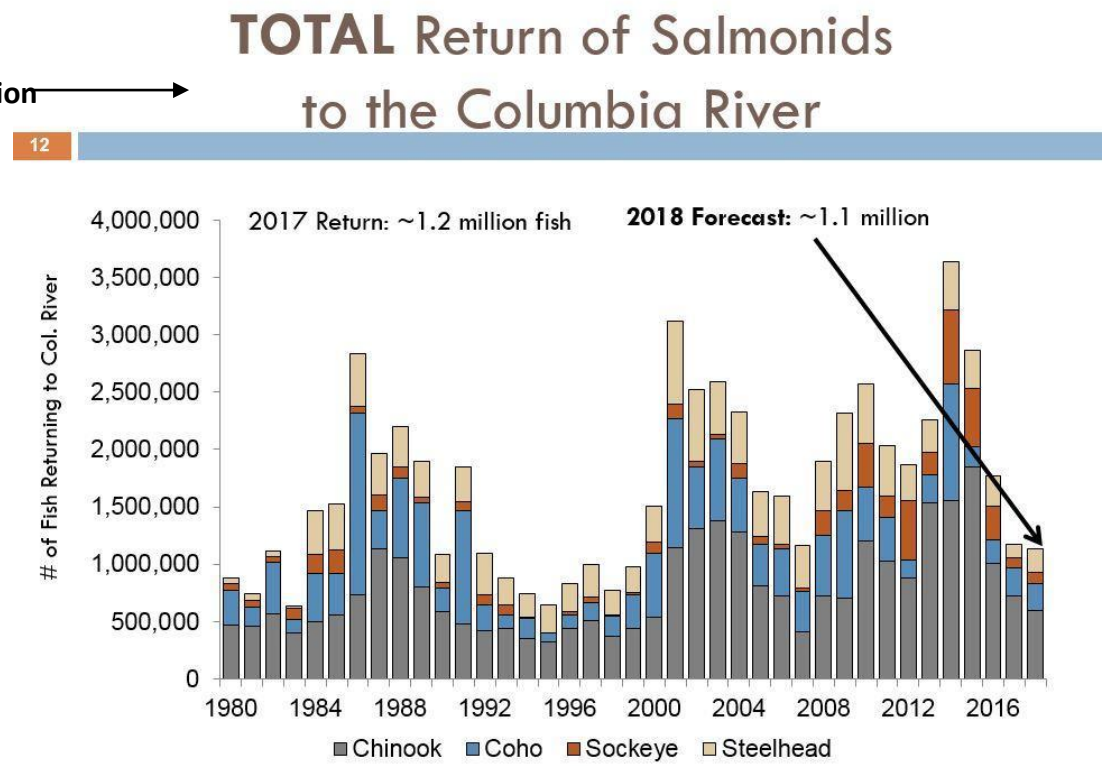
Washington Department of FISH and WILDLIFE

Michael Garrity
WDFW
February 13, 2019

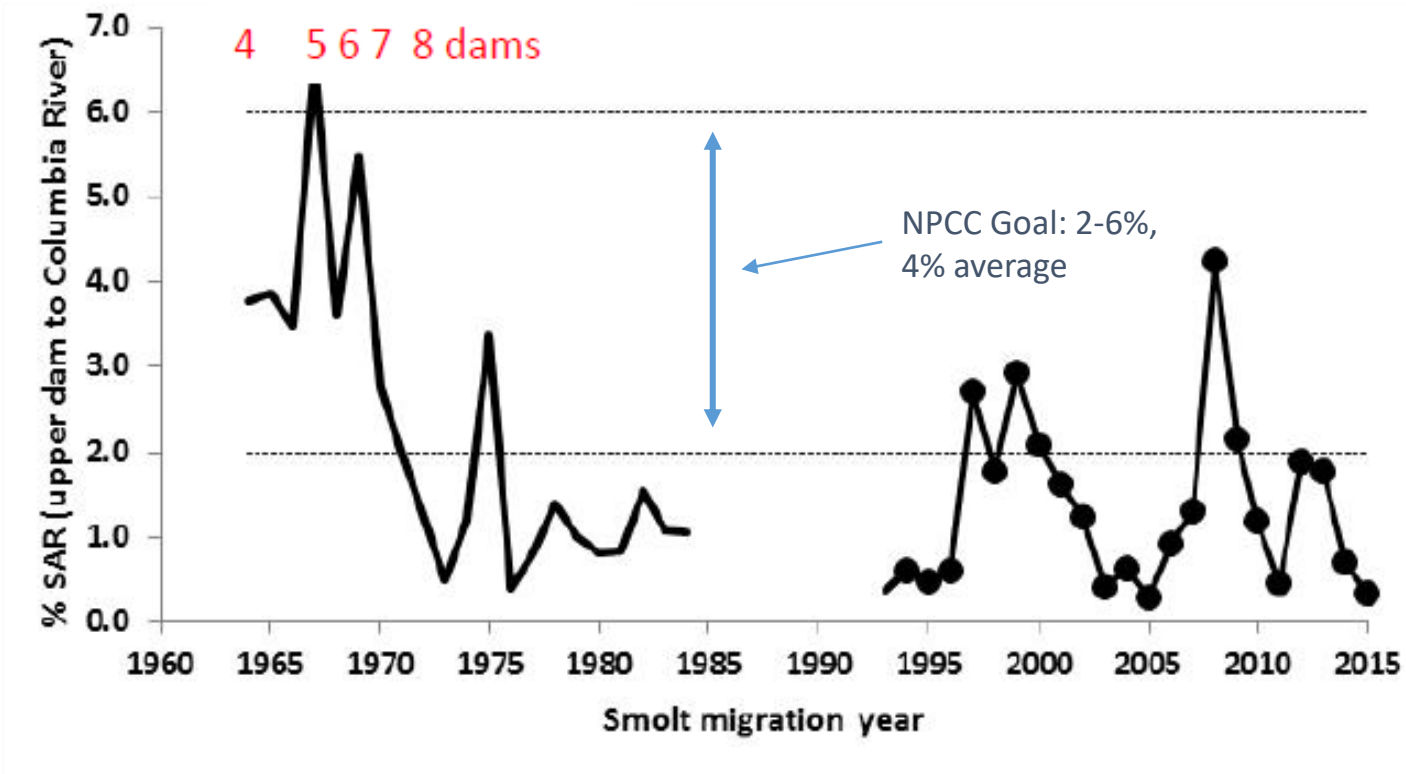
Lower Columbia and Snake River dams

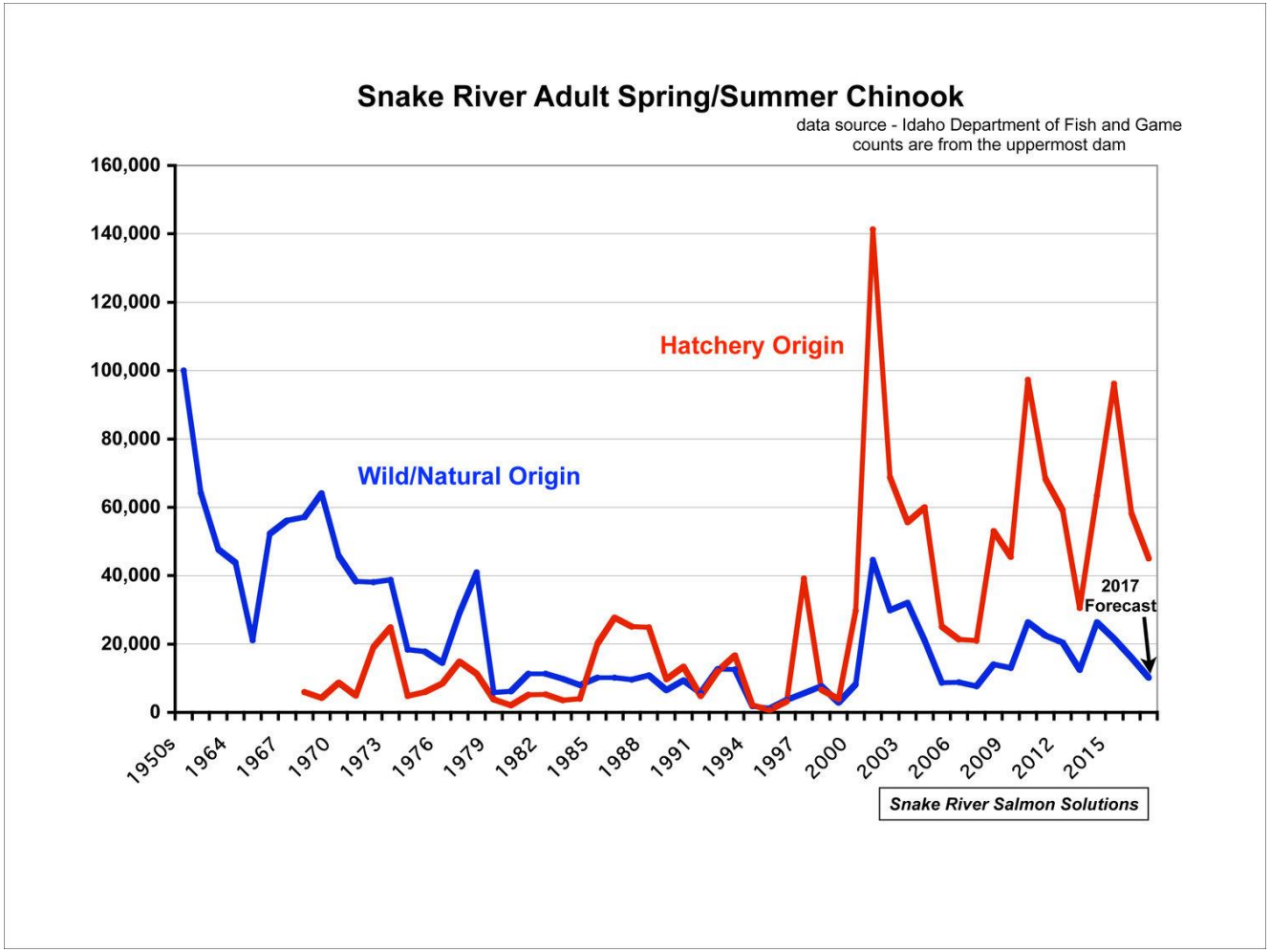
Biological pressure point: Progress for salmon and steelhead, but not enough

NPCC recovery goal: **5 million**

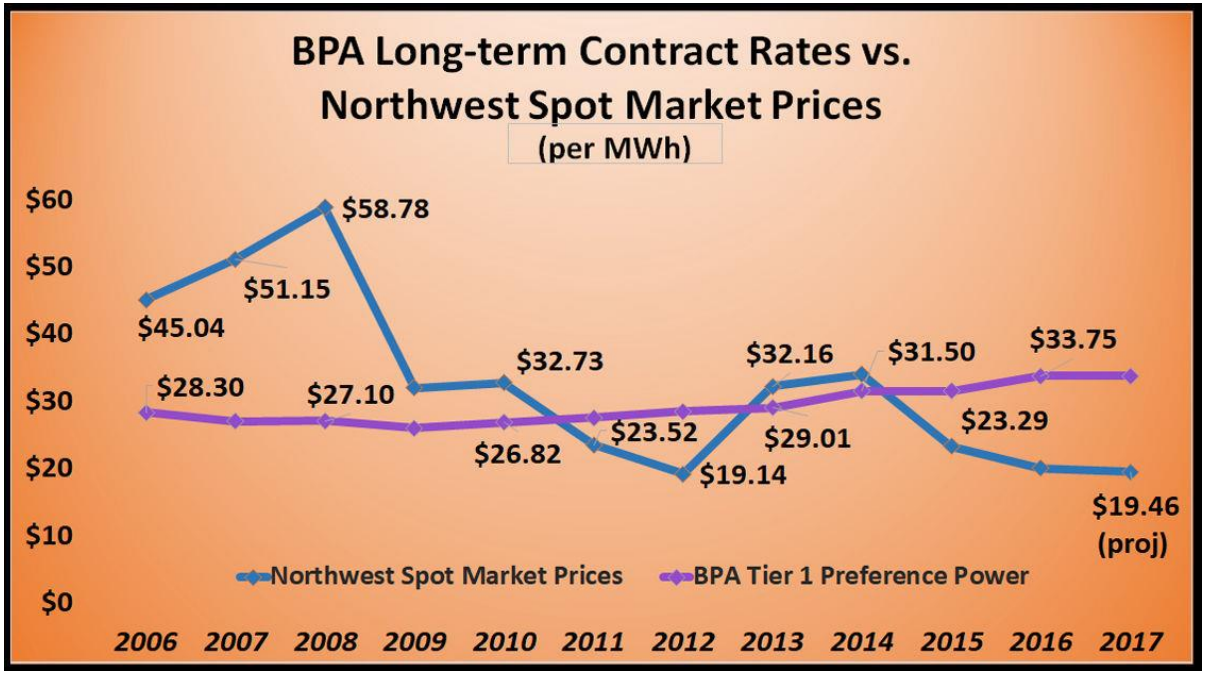


Snake River smolt to adult returns – too low!



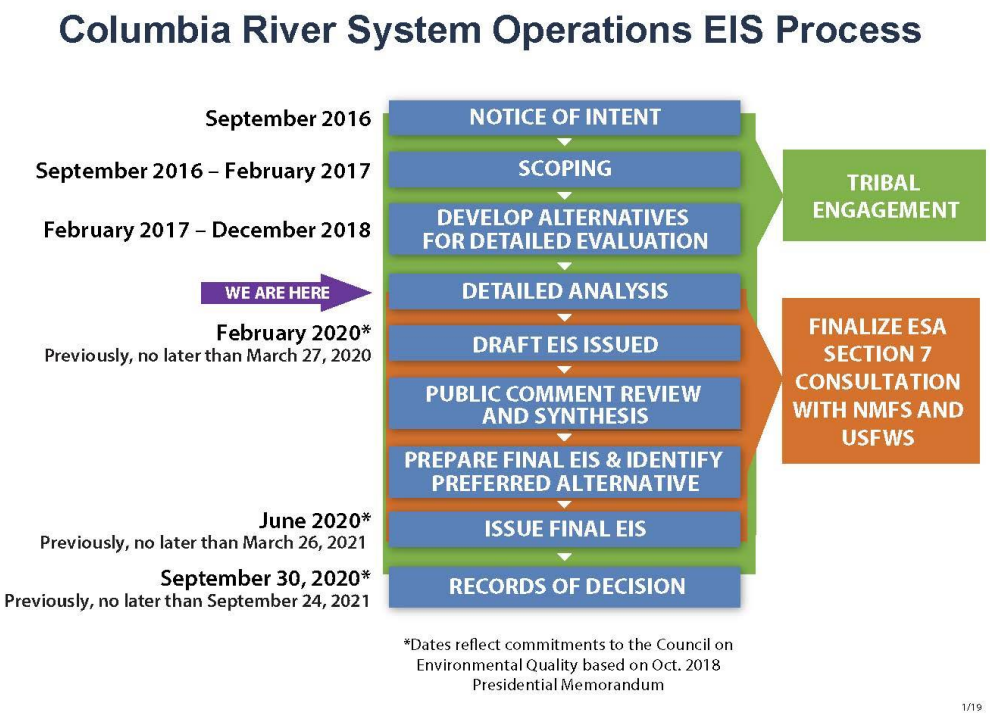

Snake River Adult Spring/Summer Chinook
data source - Idaho Department of Fish and Game
counts are from the uppermost dam
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
Hatchery Origin
Wild/Natural Origin
2017
Forecast
1950s
1964
1967
1970
1973
1976
1979
1982
1985
1988
1991
1994
1997
2000
2003
2006
2009
2012
2015
Snake River Salmon Solutions

Economic/energy pressure point: BPA can benefit from flexible power marketing opportunities

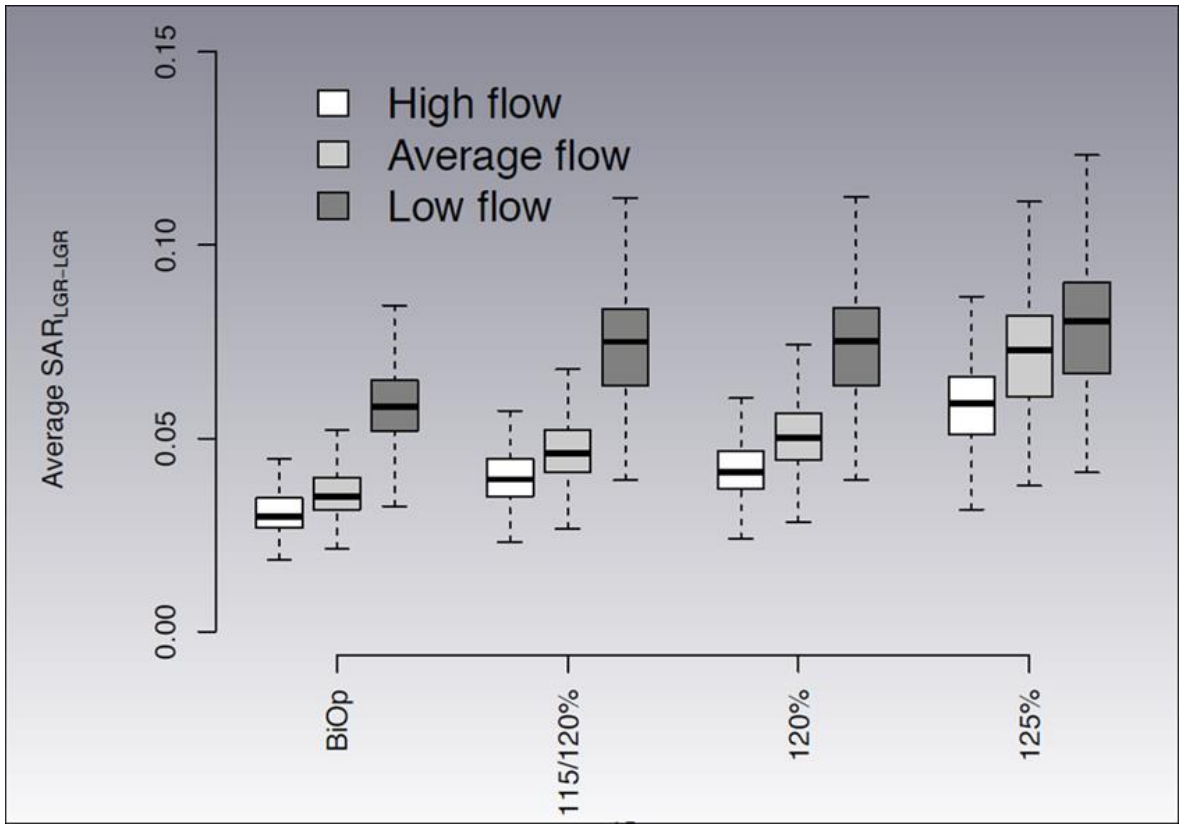


Legal pressure point: Five FCRPS BiOps invalidated since 1993 – can we get off the litigation treadmill?

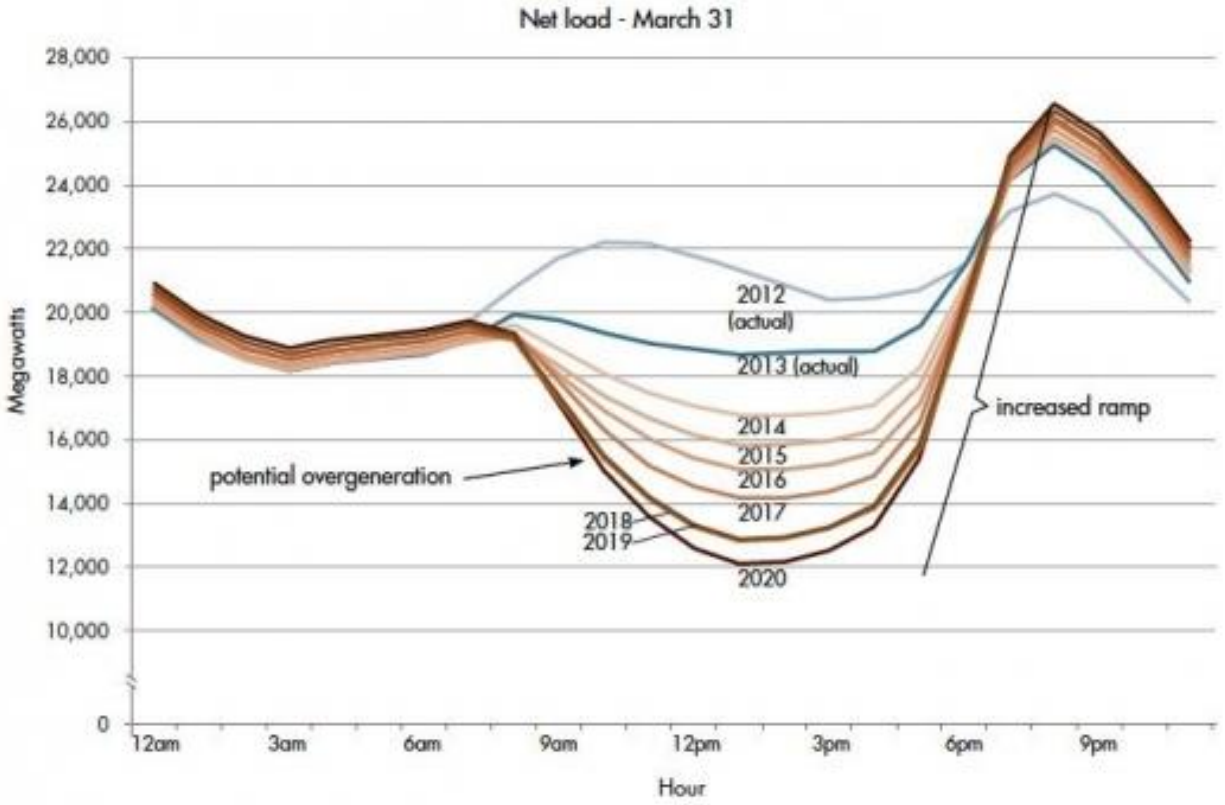
Interim BiOp during NEPA process: window to try something new?



CSS model suggests that increased spill will help



Energy market shows value in capturing emerging peak demand periods



Flex spill agreement in a nutshell

- **Who**: Agreement among **Bonneville Power Administration, U.S. Army Corps of Engineers, U.S. Bureau of Reclamation, Nez Perce Tribe, and states of Washington and Oregon**
  - Also supported by **Columbia River Inter-Tribal Fish Commission and states of Idaho and Montana**

- Potential jumping off point for broader **legal agreement** and more **stable fish and wildlife funding**

Flex Spill Agreement, cont'd…

- **Fish benefits**: Increases total spill over next 2-3 years. Reduced "powerhouse encounters" projected by CSS to improve smolt-to-adult ratio and spring Chinook returns

- **Power benefits**: Decreasing spill during short daily periods of high energy demand can help BPA's budget

Flex Spill Agreement, cont'd…

- Applies at **eight lower Snake and lower Columbia dams**
  - 2019: 16 hours of spill to 120% TDG with eight hours of 2014 BiOp (lower) spill
  - 2020-21: 16 hours of spill to 125% TDG at most dams with eight hours of 2014 BiOp spill

Questions?

How to Provide Your Comment

COMMENTS DUE BY FEBRUARY 28, 2019

Comment Online
http://ws.ecology.commentinput.com/?id=c3GbH

Contact Information:

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