

# Evaluating the Responses of Snake and Columbia River Basin fall Chinook Salmon to Dam Passage Strategies and Experiences

## Consensus Research Proposal Summary

U.S. vs Oregon Parties and Corps of Engineers

# Background

- 1) Hydrosystem operations and transportation strategies affect the behavior and survival of Fall Chinook salmon
- 2) Conflict between entities on what and how to study
- 3) Multiyear effort to develop consensus approach
- 4) U.S. vs Oregon approved study design in October 2007, reflected in 2008-2017 Management Agreement

# Scope of Study

- Would bypassing or transporting individuals collected in the bypass systems result in a higher SAR for the Snake River fall Chinook population?
- What is the relative performance of in-river fish (i.e. spilled and passed via surface bypass) versus transported fish?
- What are the corresponding smolt to adult return rates under various conditions, various FCRPS entry points, and various routes of passage?
- How do various juvenile migration life history approaches contribute to population level status and trends?

# Analytical Approaches

## 1) Management Strategy Comparison

- transportation with summer spill/surface bypass (TWS)
- screen bypass with summer spill/surface bypass (BWS)

## 2) Passage Experience

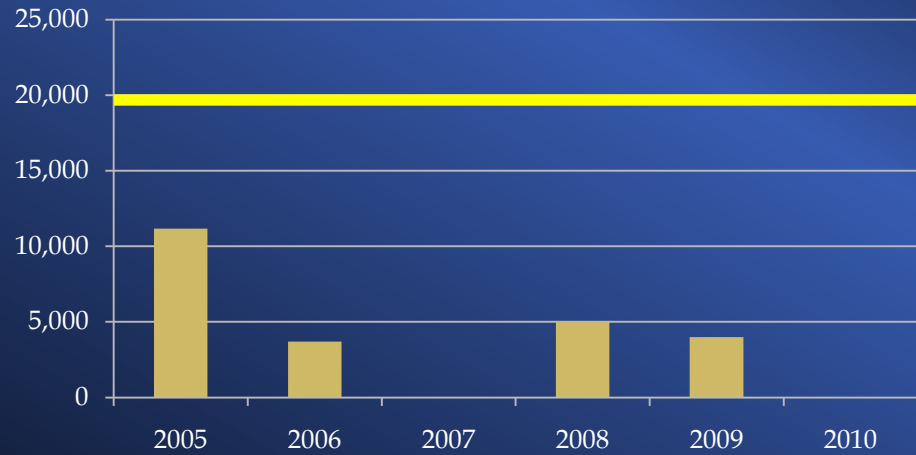
- transportation from a collector dam ("T<sub>0</sub>" group)
- passage undetected through spillways and turbines but not through juvenile collection and bypass systems at all four collector dams ("C<sub>0</sub>" group)
- collection and bypass back to the river at one or more juvenile fish bypass systems at collector dams ("C<sub>1</sub>" group)

## 3) Columbia vs Snake River Population Performance and Behavior Comparisons (Down River-Up River)

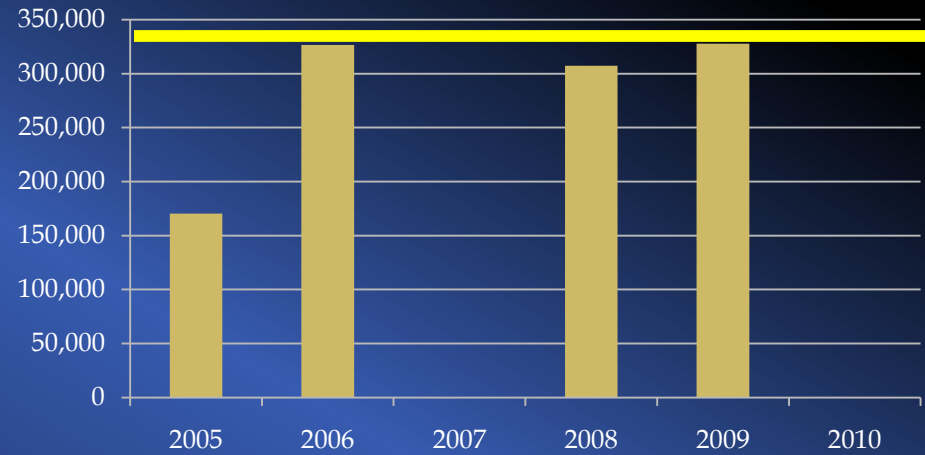
# Nine Mark/Release Groups (5 years of marking)

- 1) Snake Basin Surrogate Subyearlings (328,000)
- 2) Snake Basin Production Subyearlings (250,000)
- 3) Snake Basin Production Yearlings (57,000)
- 4) Snake Basin Natural Subyearlings (20,000)
- 5) Hanford Reach natural Subyearlings (20,000)
- 6) Deschutes River Natural Subyearlings (10,000)
- 7) Little White Salmon Production Subyearlings (25,000)
- 8) Lyons Ferry Hatchery Yearlings (30,000)
- 9) Lyons Ferry Hatchery Subyearlings (45,000)

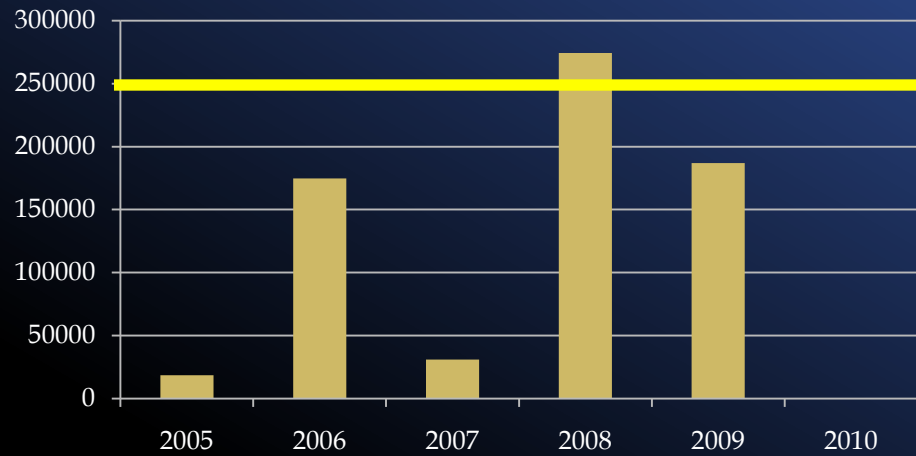
### Natural



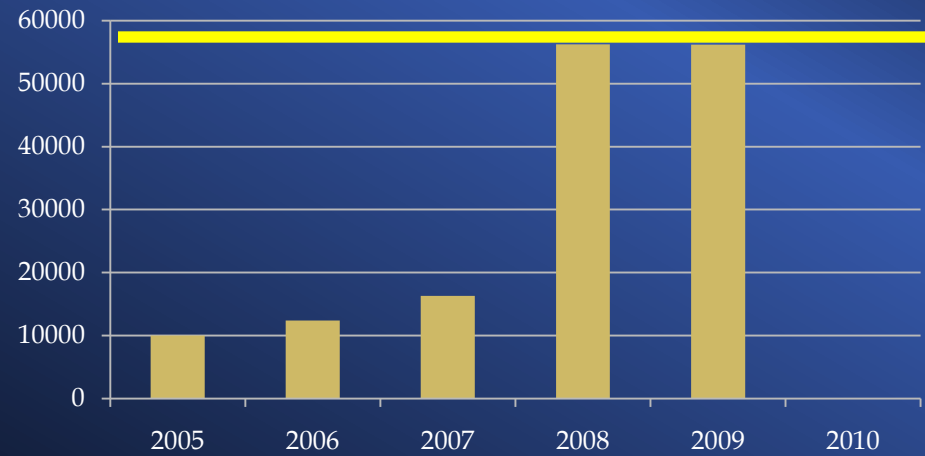
### Surrogates



### GP Subyearlings

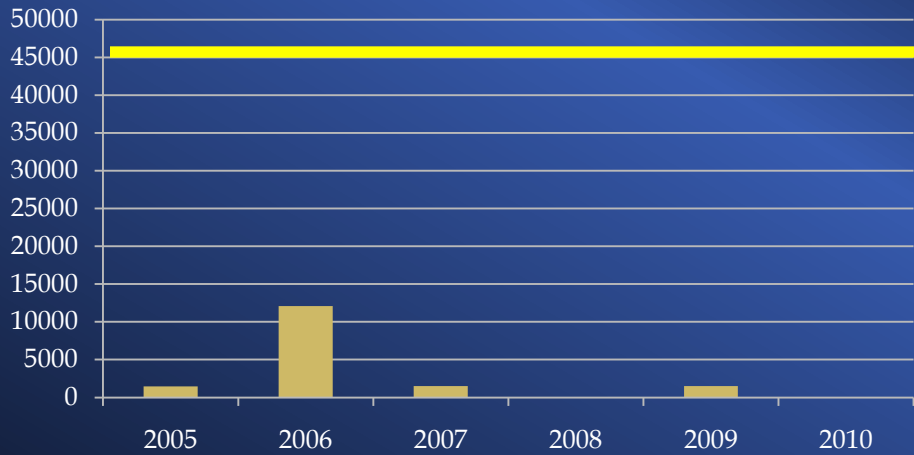


### GP yearlings

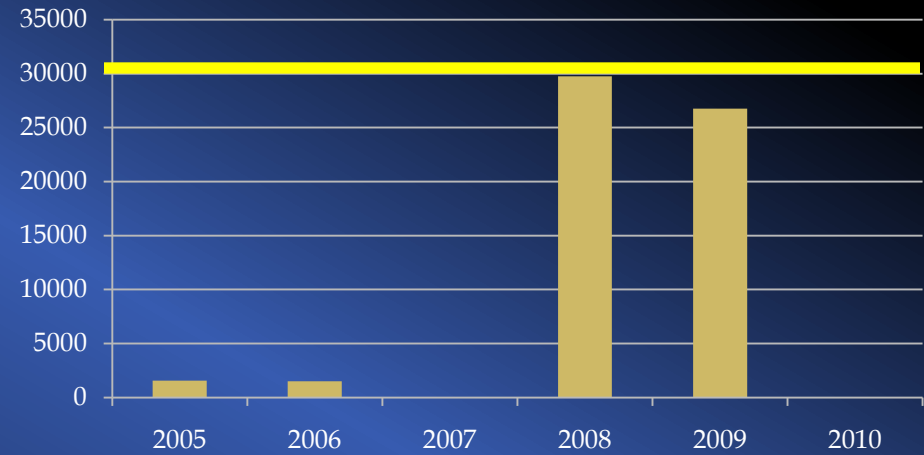




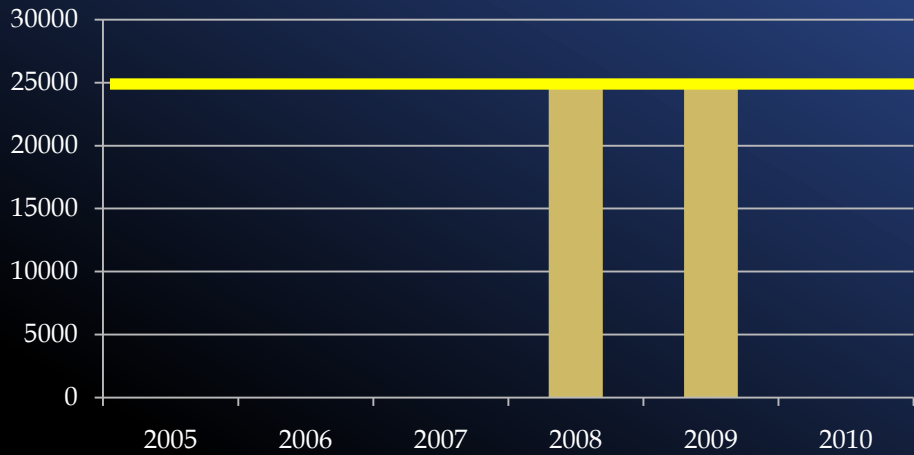
### Lyons Ferry Subyearlings



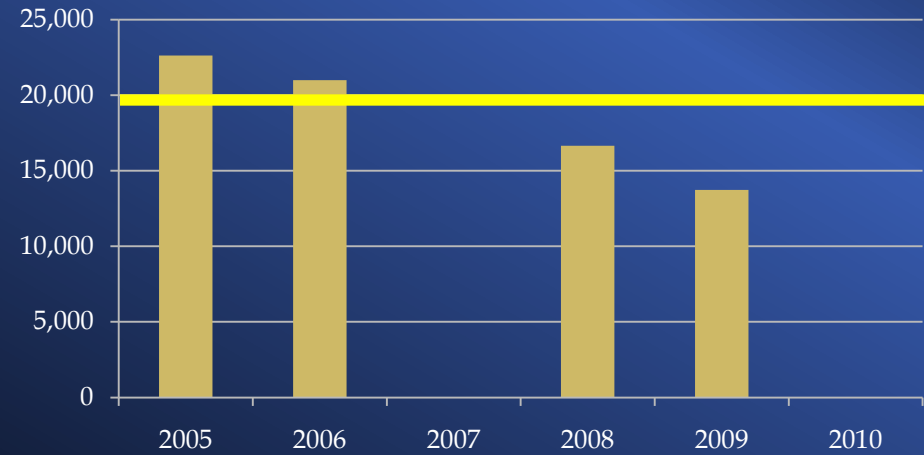
### Lyons Ferry Yearlings



### Little White Salmon



### Hanford Reach



# Next Steps

Phase II workshops

Product - Final Report of Methods



Variable evaluated	Snake River Basin population		Snake River subpopulation		Clearwater River subpopulation	
	Surrogates	Natural	Surrogates	Natural	Surrogates	Natural
<b>SARs for passage strategies and passage-experience groups (can also be analyzed by dam)</b>						
TWS <sup>a</sup>	X	0	x	0	x	0
BWS	X	0	x	0	x	0
Transported (T <sub>0</sub> )	X	0	x	0	x	0
Undetected (C <sub>0</sub> )	A	0	a	0	a	0
Bypassed (C <sub>1</sub> )	X	0	x	0	x	0
Jun to Aug (T <sub>0</sub> , C <sub>1</sub> )	x	0	x	0	x	0
Sep to Dec (T <sub>0</sub> , C <sub>1</sub> )	x	0	0	0	x	0
<b>Ratios of SARs</b>						
T/I	X	0	x	0	x	0
T <sub>0</sub> /C <sub>0</sub>	A	0	a	0	a	0
T <sub>0</sub> /C <sub>1</sub>	X	0	x	0	x	0
C <sub>0</sub> /C <sub>1</sub>	A	0	a	0	a	0
<b>Post-release attributes</b>						
Passage timing	X	X	X	X	X	X
Travel time	X	X	X	X	X	X
Reservoir overwintering	X	X	X	X	X	X
Exposure to spill	X	X	X	X	X	X
Migrant size	X	X	X	X	X	X
Migration and survival <sup>b</sup>	X	X	X	X	X	X
Survival	A	A	A	A	A	A

<sup>a</sup> Fish designated to the transport group will be bypassed back to the river if the decision is made

Variable	Snake River Basin population		Snake River subpopulation		Clearwater River subpopulation	
	Age-1	Age-0	Age-1	Age-0	Age-1	Age-0
SARs for passage strategies and passage-experience groups (can also be analyzed by dam)						
TWS <sup>a</sup>	X	X	x	x	x	x
BWS	x	X	x	x	x	x
Transported (T <sub>0</sub> )	X	X	x	x	x	x
Undetected (C <sub>0</sub> )	X	X	x	x	x	x
Bypassed (C <sub>1</sub> )	x	X	x	x	x	x
April and May (T <sub>0</sub> ,C <sub>1</sub> )	x	x	x	x	x	x
June–July (T <sub>0</sub> , C <sub>1</sub> )	0	x	0	x	0	x
Ratios of SARs						
T/I	x	X	x	x	x	x
T <sub>0</sub> /C <sub>0</sub>	x	X	x	x	x	x
T <sub>0</sub> /C <sub>1</sub>	x	X	x	x	x	x
C <sub>0</sub> /C <sub>1</sub>	x	X	x	x	x	x
Post-release attributes						
Passage timing	X	X	X	X	X	X
Travel time	X	X	X	X	X	X
Reservoir overwintering	X	X	X	X	X	X
Exposure to spill	X	X	X	X	X	X
Migrant size	X	X	X	X	X	X
Survival	X	X	X	X	X	X

# Next Steps

## Phase III Workshops

Potential ISAB/ISAB/Public comment of draft results report.

Product - Final Report of Research Results