



Independent Scientific Advisory Board
for the Northwest Power and Conservation Council,
Columbia River Basin Indian Tribes,
and National Marine Fisheries Service
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September 4, 2008

ISAB Report Presentation: Snake River Spill-Transport Review

Dr. Richard Alldredge, ISAB review lead, will present findings from the ISAB's report: Snake River Spill-Transport Review. The report will be released shortly before the September 17 meeting and posted at: www.nwcouncil.org/fw/isab/Default.htm.

The review was originally requested by NOAA Fisheries. The Columbia River Inter-Tribal Fish Commission (CRITFC) and the Oregon Department of Fish and Wildlife (ODFW) added some questions to NOAA's original questions for the ISAB to consider. The ISAB combined and refined the questions from NOAA Fisheries, CRITFC, and ODFW, and address the following questions in the report:

Question 1. Based on available data and analyses, what is the relative benefit of transportation versus in-river migration during April and May in terms of smolt-to-adult return rates, fish travel time, and survival rates to below Bonneville dam for the species listed above? Does the relative benefit of transportation vary during April and May?

Question 2. Based on the data and analyses presented, is there evidence that the new FCRPS Biological Opinion's Reasonable and Prudent alternative action to terminate voluntary spill from May 7 to May 20 is better for the species listed above than an alternative that continues spill throughout May?

Question 3. Based on available data, is there evidence that results from recent years (2006, 2007) are different for any of the species listed above (e.g., different in travel time, downstream survival)?

Question 4. What are the possible impacts of alternative spill-transport scenarios on other native species in general, and Pacific lamprey and Snake River sockeye in particular?

Question 5. What are the ecological/evolutionary issues related to transportation and spill operations? What factors should be considered in defining what is meant by "optimal" when considering spill and transport?

ISAB Snake River Spill-Transport Review



ISAB 2008-5 – Presentation to Council
September 17, 2008

Assignment

- In March '08, NOAA Fisheries requested the ISAB respond to a number of questions about the seasonal variation in the benefit of transportation of smolts from four Snake River Evolutionary Significant Units (spring/summer Chinook, steelhead, sockeye, and fall Chinook).
- In April 2008 CRITFC and ODFW raised some additional questions.



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Acknowledgments



- ISAB colleagues
- Council staff
- NOAA
- CRITFC
- ODFW
- FPC

Combined General Questions

1. Relative benefit of transportation versus in-river migration during April and May
2. No voluntary spill from May 7 to May 20 (2008 BiOp) versus continuing spill
3. Results from recent years (2006, 2007)
4. Impacts on other native species
5. Ecological/evolutionary issues

ISAB Response to General Questions

Question 1.

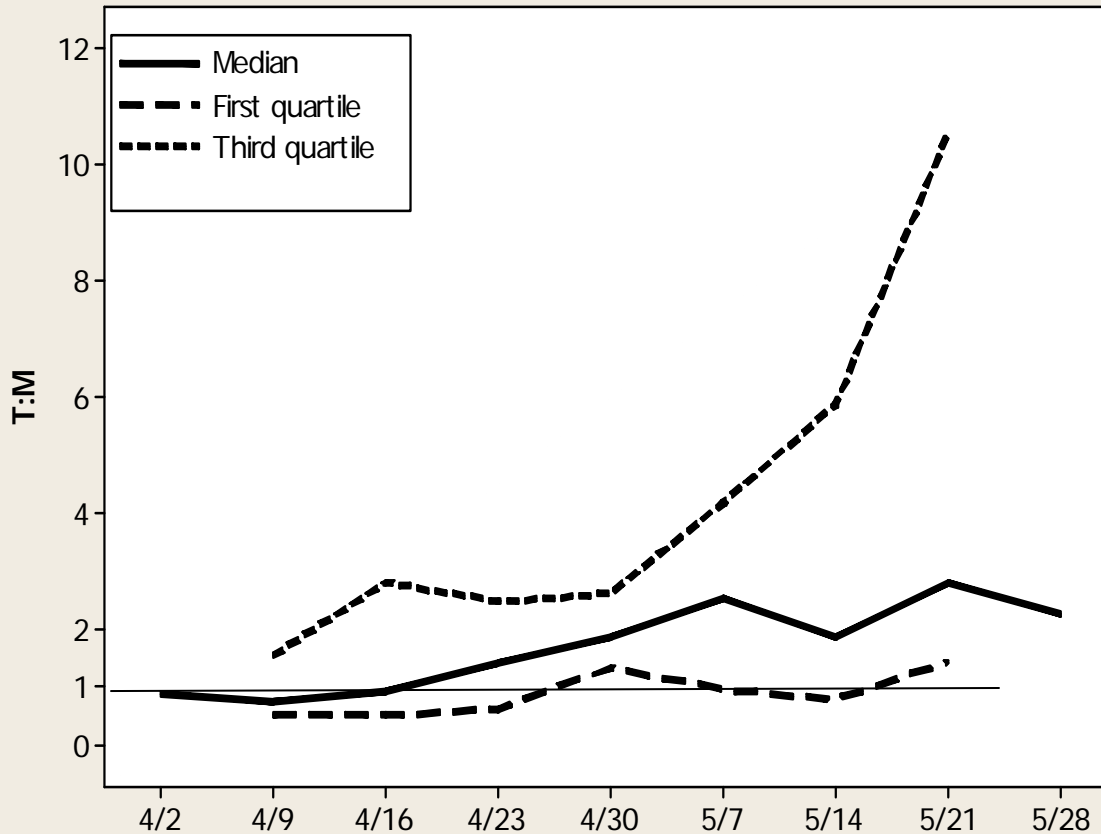
Based on available data and analyses, what is the relative benefit of transportation versus in-river migration during April and May, in terms of smolt-to-adult return rates, fish travel time, and survival rates to below Bonneville Dam for spring/summer Chinook and steelhead? Does the relative benefit of transportation vary during April and May?



ISAB Response to Question 1

- Transportation in the late-April through May migration season benefits hatchery and wild spring/summer Chinook and steelhead.
- The magnitude of benefits vary substantially across species, within migration season, and between years.

Wild Chinook -- Medians, First and Third Quartiles w/o 2001



Unweighted medians, with first and third quartiles, of (T:M) ratio for wild spring/summer Chinook salmon (years 1998, 1999, 2002-2005).

General Questions (cont'd.)

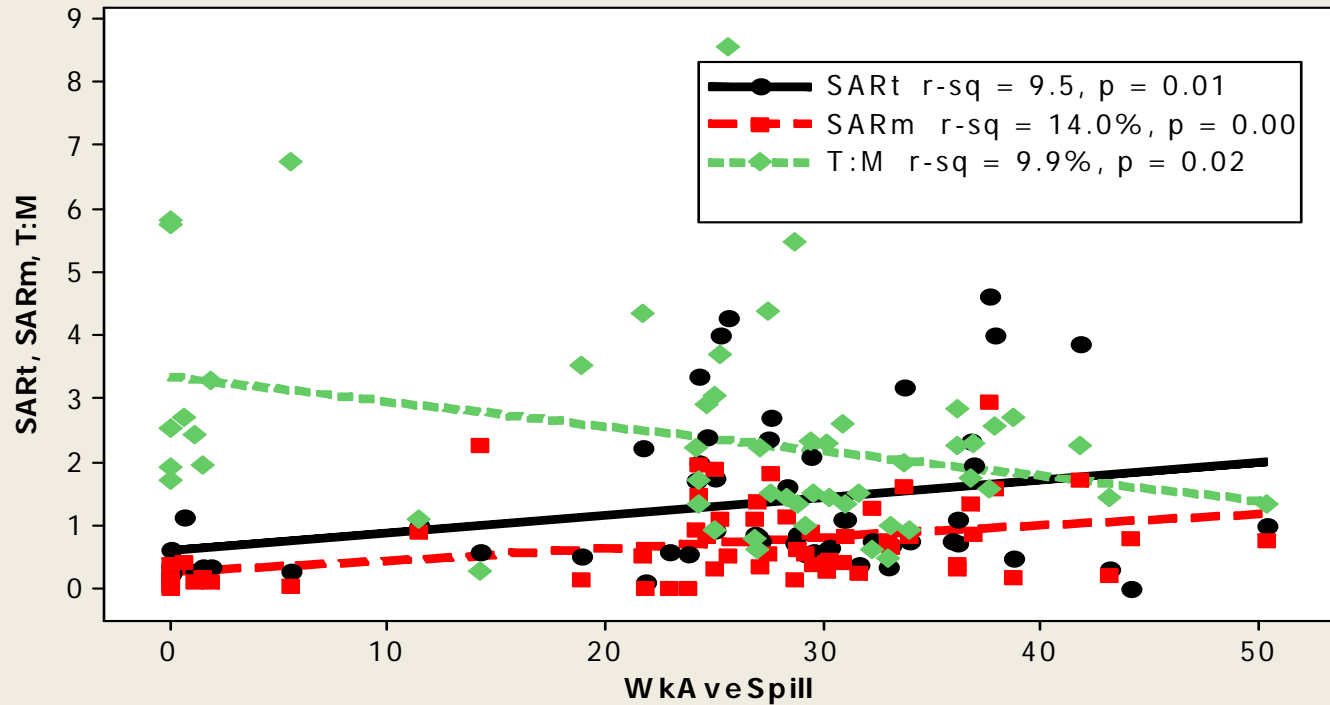
Question 2.

Based on the data and analyses presented, is there evidence that the new FCRPS Biological Opinion's Reasonable and Prudent alternative action to terminate voluntary spill from May 7 to May 20 is better for spring/summer Chinook and steelhead than continuing spill throughout May?

ISAB Response to Question 2

- Transportation between May 7 and May 20 benefits both hatchery and wild spring/summer Chinook and steelhead.
- As spill increases, in-river survival increases and the relative benefit of transportation decreases.
- Terminating spill would eliminate the possibility of learning about the effect of partial spill during this critical period.

Hatchery Chinook (without 2001)

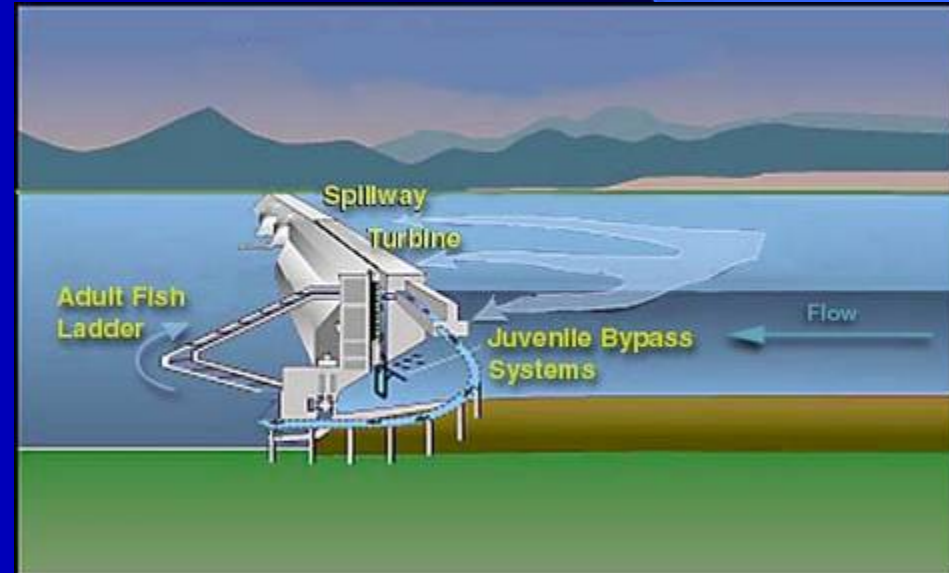


T:M, SAR_T and SAR_M for hatchery spring/summer Chinook salmon versus spill % with regression lines (years 1997-2000, 2002-2005).

General Questions (cont'd.)

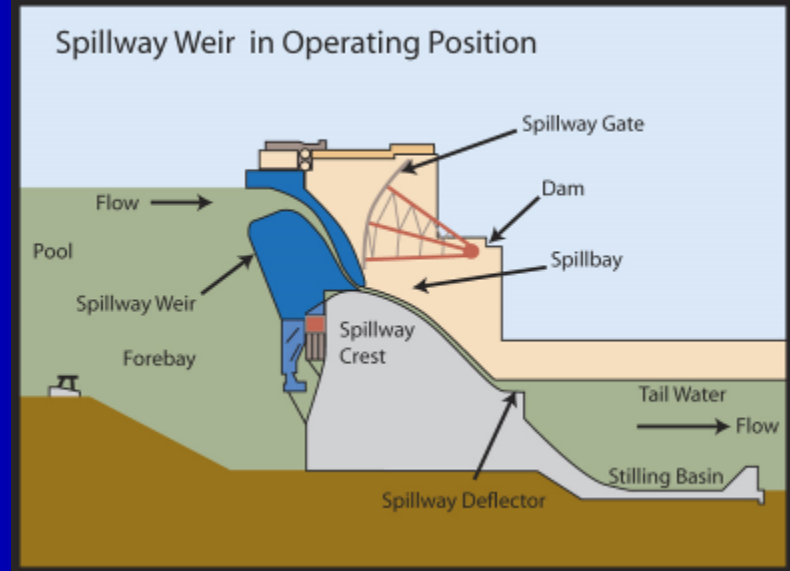
Question 3.

Based on available data, is there evidence that results from recent years (2006, 2007) are different for spring/summer Chinook and steelhead? [e.g., different in travel time, downstream survival]

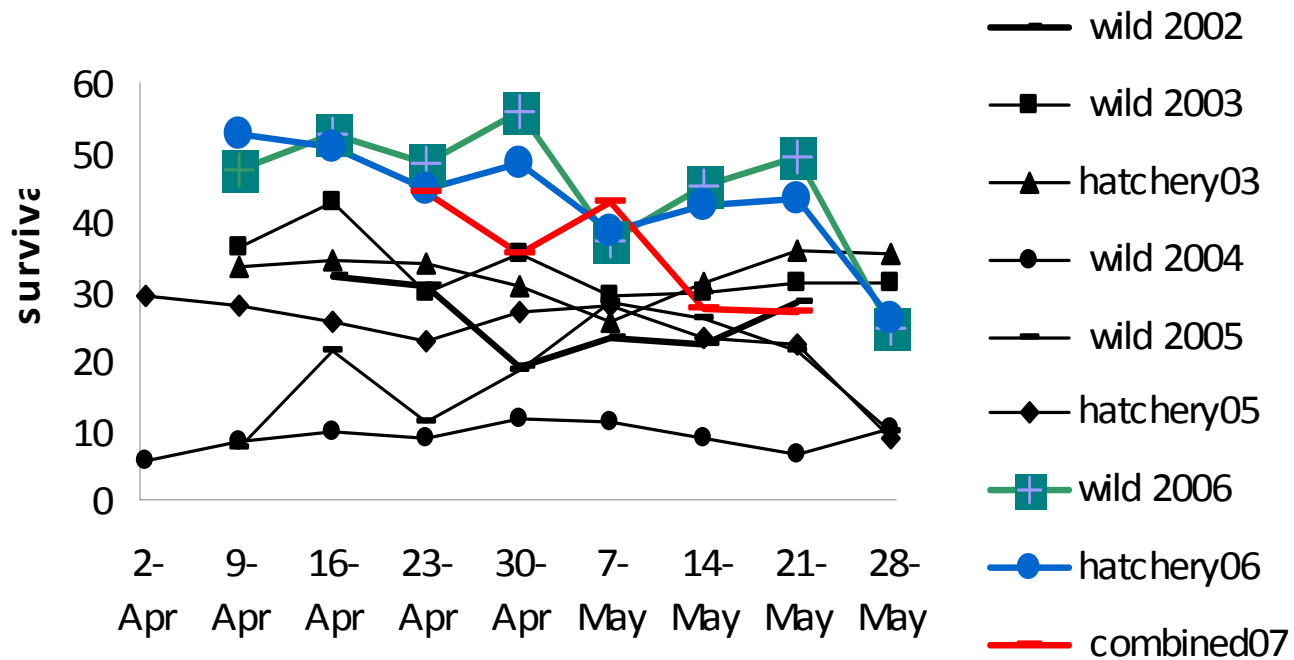


ISAB Response to Question 3

- Recent structural and operational changes have improved the survival of in-river migrating spring/summer Chinook, steelhead, and sockeye
- A more complete answer to this question depends on continuation of recent changes for more years and return of surviving adults.



Steelhead Survival



Steelhead downriver survival
 (Compiled from Faulkner et al. 2007, Faulkner et al. 2008, and Williams et al. 2008)

General Questions (cont'd.)

Question 4.

What are the possible impacts of alternative spill-transport scenarios on other native species, in general, and on Pacific lamprey and Snake River sockeye, in particular?

ISAB Response to Question 4

- Data are limited, but impacts of alternative spill-transport scenarios on native species are expected to vary greatly.
- Concerns include juvenile lamprey impingement on bar screens and sockeye descaling in bypass systems.



General Questions (cont'd.)

Question 5.

What are the ecological/evolutionary issues related to transportation and spill operations? What factors should be considered in defining what is meant by “optimal” when considering spill and transport?

ISAB Response to Question 5

- The relative benefit of transportation could decrease as spill % increases due to depensatory mortality.
- In-river migration could reduce the risk of epizootics compared to crowded conditions in barges.
- Barging may increase the incidence of straying.
- Implementing a particular spill-transport regime year after year could influence evolution of subsequent downstream migratory behavior.

ISAB Recommendations

- During the late April-May migration period, concurrent transportation and spill is suggested whenever river conditions allow.
- Continue recent spill-transport operations to improve future evaluations of the trade-offs associated with spill and transport decisions.

ISAB Recommendations (cont'd.)

- Study the impact of spill-bypass-transport operations on downstream juvenile lamprey migration.
- Study and compare rates of mortality in sockeye smolts for various routes of hydrosystem passage.

ISAB Recommendations (cont'd.)

- Study straying rates for Snake River steelhead and Chinook for all hatchery/wild, transported/in-river combinations.
- Evaluate juvenile passage alternatives against the recommended default – spill.

Thank you!