

# MYTHBUSTERS #1

## *Revealing Fish and Wildlife Myths* Public Power Council Fish and Wildlife Committee

**MYTH:** Spill is the safest route of passage.

### **THE FACTS:**

- Spill is not “natural” and has risks.
- More spill does not always lead to higher survival.
- Increased migration speed does not equal increased survival.
- High spill volumes may adversely affect the upstream migration of adult salmon.

### **Studies used to support these facts?**

Regionally developed and reviewed fish passage and survival studies performed by NOAA-F Northwest Fisheries Science Center, U.S.G.S - Biological Survey, PNNL – Battelle, University of Washington, and University of Idaho and Normendau, Inc.

### **What this means:**

- Spill is a safe route of passage but not necessarily the safest.
- To assume that one route of passage is the best in all circumstances would limit the ability to secure the best survival conditions for migrating juveniles.
- New Surface Bypass Systems (SBSs) provide the highest survival route of passage, but use much less water than conventional spill.
- Spill reduces clean and renewable generation resources and increases reliance on other forms of generation, usually from fossil fuel based sources.

### **Why do spill advocates support this myth?**

They believe:

- Spill is the form of passage that most mimics a natural river.
- Spill does not require any handling or artificial intervention (nor do transport or bypass).
- Spill increases the speed of juvenile migration which is believed to increase survival.
- Fish passing through juvenile bypass systems have a lower survival rate.

### **Studies used to support this myth?**

The Fish Passage Center’s Comparative Survival Study

- The analysis is complex; the results are not repeatable.
- The study does not consider other factors that affect fish survival such as fish size or time of migration.
- The study does not consider recent survival improvements at dams.

### Why might this myth be perpetuated?

- Spill was historically thought the safest route of passage at dams.
- Many state and tribal fish managers believe that all fish should migrate in-river and do not accept barge transportation as a viable management tool.
- Spill volumes are a simple tool that fish managers can verify on the internet from their desk.
- Spill is a simple concept that can be effectively communicated to the public, press and fish advocates.
- Spill is a costly operation. Some are using this to decrease the value of hydropower to make dam removal more feasible.

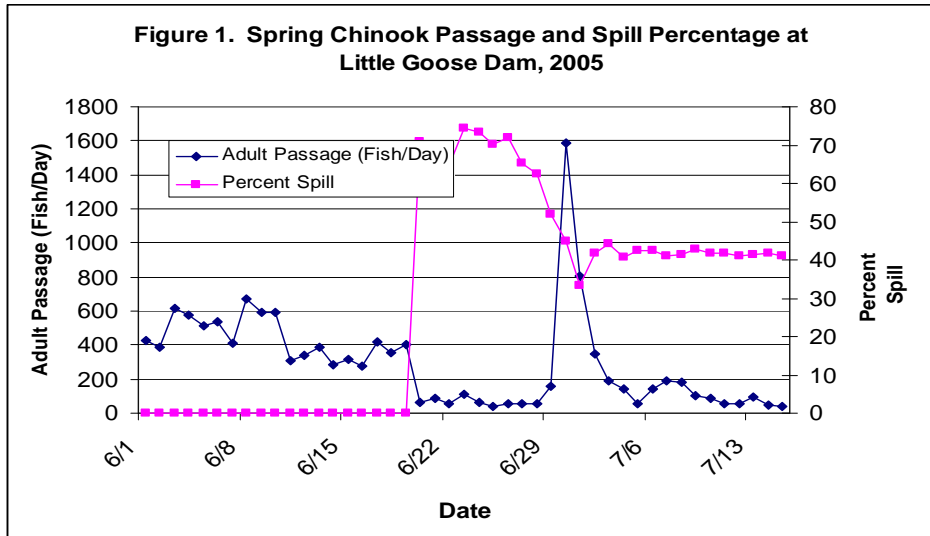
### What is the current state of the science on this issue?

- ***Spill is not “natural” and has risks:***
  - Juvenile fish must dive before passing under spillgates. Egress conditions are very turbulent and may injure fish and increase incidence of predation.
  - High spill volumes may increase total dissolved gas above state water quality standards, and may negatively affect the survival of salmonids and other aquatic organisms.
- ***Increased migration speed does not equal increased survival:*** Speed of migration is not the only factor that affects juvenile survival and subsequent adult returns
  - Smith, et. al., (2002) stated that higher survival was correlated with release date, river flow, water temperature, and turbidity. Because of strong correlations among the environmental variables, the researchers determined that it was not possible to determine unequivocally which variable had greatest influence on survival.
- ***More spill does not always lead to higher survival:*** Spill is one tool used to safely pass juvenile fish through the federal hydrosystem. Spill volumes are set at each dam after extensive study by independent researchers. In 2004, NOAA-F found that survival of Snake River juvenile spring chinook at The Dalles Dam was higher under a 30% spill as compared to 64% spill (Ferguson 2004).

**Table 1. Summary of 2004 NOAA report:**

The Dalles Dam	64% Spill	30% Spill
Subyearling (spring) Chinook	76% survival	92% survival

- ***High spill volumes may adversely affect the upstream migration of adult salmon:*** High spill volumes can slow or stop the migration of adult fish, or cause fish to “fall back” through the spillways after they pass through the adult fish ladder. Delayed migration was dramatically demonstrated in 2005 at the Little Goose Dam when summer spill was ordered by the Oregon District Court (Figure 1). The University of Washington found that 70% spill nearly stopped the migration of adult fall chinook. Migration successfully continued when spill was reduced to 40%.



Courtesy Columbia River DART, University of Washington, School of Aquatic & Fishery Science

*Spill is not always the route of passage that provides the highest survival:* Table 2 provides a summary of the latest juvenile fish passage survival estimates for the federal hydrosystem.

<b>Table 2. 2008 Summary of Fish Passage Routes and Survival Rates for Juvenile Snake River Spring/Summer Chinook Salmon Passing Dams in the Federal Columbia River Power System.</b>					
Hydroelectric Dam	Route of Passage and Survival				
	Spillway Passage	Juvenile Fish Bypass System	Surface Bypass System	Transport System	Turbine Survival
Lower Granite	93%	97%	98%	98%	95%
Little Goose	97%	96%	New	98%	92%
Lower Monumental	96%	92%	New	98%	88%
Ice Harbor	95%	99%	97%	-	-
McNary	97%	96%	98%	98%	90%
John Day	96%	95%	98%	-	82%
The Dalles	94%	-	-	-	84%
Bonneville – Powerhouse 1	93%	-	92%	-	95%
Powerhouse 2		98%	100%	-	97%

**Data Sources:** COMPASS Modeling for 2008 BiOp and research and analysis conducted from 2003-07 by USGS – Biological Survey, Battelle/Pacific Northwest National

Laboratories, University of Idaho, University of Washington, NOAA-Fisheries and Normendau Assoc. Inc.

### **Literature Cited**

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