

**Summary of 2014 Study Plans & Methodology for Whooshh Fish Transport System
installed at Roza Dam Adult Collection Facility**

Dave Fast, Manager
Mark Johnston
Research Scientist IV
Yakama Nation Fisheries
P.O. Box 151
Toppenish, WA. 98948
509-945-1133

1. Salmon Voluntary Entry Into Whooshh System

Methodology. Feasibility research conducted at Roza Dam Adult Collection Facility. This is a short term study to determine the feasibility of having salmon voluntarily enter into the Whooshh system without the assistance of human handling. Returning adult spring Chinook salmon follow standard operating procedures for processing at the collection facility. Salmon voluntarily migrate (head first) up the Alaska Steep Pass and slide still head first) down the flume toward the anesthetic holding tank. As they slide down the flume, they are directed into a V that places them in the center of the flume (==>===). Immediately downstream of the V set up they “voluntarily” enter into the Whooshh tube, and are passed through the tube to another holding tank.

Results. The adult salmon ascended the steep pass and descended down the flume. They entered into the V notch head first and then were swept into the Whooshh tube, and passed into the holding tank.

2. Long Term Effects of Passing through Whooshh System on Adult Survival and Egg Viability.

Methodology. All of the adult brood stock for the Cle Elum Supplementation and Research Facility (CESRF) are collected at the Roza Adult Collection Facility on Roza Dam. All fish going into the Upper Yakima are monitored at this facility. Randomly selected adult spring Chinook salmon are collected in April, May and June and then anesthetized, measured, weighed, dna collected, PIT tags inserted, hand carried to a fish transport truck and driven to CESRF. They are then held in an adult holding tank until spawning at the hatchery begins in early September. For this feasibility research, a portion [approximately 12%] of the adult broodstock collection was transported to the fish transport truck via the Whooshh system rather than hand carried to the truck.

40 ft Whooshh Fish Transport System

Total Study Subjects: 554 Wild/Natural/ & Hatchery Control Spring Chinook

Collected & held: May - June

Spawned: Sept - Oct

Hypothesis. There are two hypotheses that are being tested with this research.

1. The survival of the hand carried broodstock and the Whooshh transported broodstock to spawning is equal.
2. The survival of the eggs from the female fish that were hand carried is equal to the survival of the eggs from the Whooshh transported fish.

Actual Results. Summary results below and complete data attached.

1. Mortality rate of Whooshh transported broodstock was better than hand carried. The Whooshh fish mortality was approximately one-half that compared with the hand carry method.

	Hand Carry	Whooshh Transport
CHINOOK	H&H	WHOOSHH
Mortality Females	4.2%	2.3%
Mortality Males	14.6%	9.1%
Mortality Total	8.8%	4.6%

* Note three fish jumped out of the holding tank during the holding period. Two jumpers were from the hand carried group and one was from the Whooshh transported group. All three fish were removed from the summary results above to establish the above summary percentages.

2. Egg survivability is statistically equivalent between the hand carry method and the Whooshh transported fish. Note: The Wild/Natural subject set contained only a small number of fish. See Data set for details.

	Hand Carry	Whooshh Transport
CHINOOK	H&H	WHOOSHH
Hatchery Control	98.3%	98.7%
Wild/Natural	94.6%	92.1%

Please see attached PDF for full data set