

2011 LCR Survival Study
Changes in Scope for John Day
11 March, 2011

The purpose of this document is to outline changes to the scope of work for the Lower Columbia River Survival Study as they relate to BiOP Performance Standard compliance testing at John Day Dam in 2011. Initial objectives included estimating passage and survival metrics prescribed in the 2008 NOAA Fisheries Biological Opinion for the FCRPS and the Columbia Basin Fish Accords at a single operation.

The following objectives include compliance monitoring at two spill operations; 30 and 40% spill. The primary objective is to conduct two performance standard level evaluations at John Day Dam. It is not the intent of this design nor is it an objective to compare treatment operations but to achieve the prescribed level of precision required of a performance standard test (i.e. $\pm 3\%$ at $\alpha = 0.05$).

Objectives

1. Monitor the passage of acoustic-tagged yearling and subyearling Chinook salmon and juvenile steelhead at John Day Dam under a 30% spill operation. Estimate the following passage behavior and survival parameters:
 - a. Dam passage survival (CI $\pm 3.0\%$ at $\alpha = 0.05$)
 - b. Survival from entry into the forebay to tailrace exit from the tailrace
 - c. Spill passage efficiency
 - d. Fish passage efficiency
 - e. Forebay residence time (forebay entrance line to passage)
 - f. Tailrace egress (passage to tailrace exit)

2. Monitor the passage of acoustic-tagged yearling and subyearling Chinook salmon and juvenile steelhead at John Day Dam under a 40% spill operation. Estimate the following passage behavior and survival parameters:
 - a. Dam passage survival (CI $\pm 3.0\%$ at $\alpha = 0.05$)
 - b. Survival from entry into the forebay to tailrace exit from the tailrace
 - c. Spill passage efficiency
 - d. Fish passage efficiency
 - e. Forebay residence time (forebay entrance line to passage)
 - f. Tailrace egress (passage to tailrace exit)

Methods

John Day Operations – Operations at John Day will be systematically scheduled to include an equal distribution of 30 and 40 percent spill across the spring and summer study periods (Figure 1).

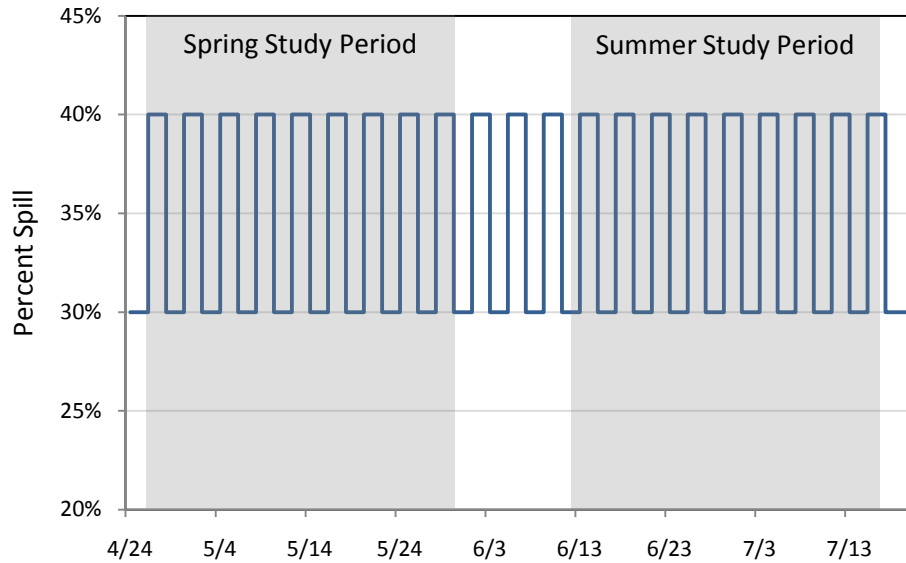


Figure 1. Spill operation schedule for John Day Dam, 2011

Fish Collection, Tagging, and Release - Yearling and subyearling Chinook salmon and juvenile steelhead will be collected, tagged, and released in accordance with the study design outlined in the proposal submitted by Pacific Northwest National Laboratory and funded by the USACE Portland District. Acoustic tagged fish released for estimating passage behavior and survival at John Day will be released near Roosevelt, Washington at Rkm 393 (R_1) (Figure 2).

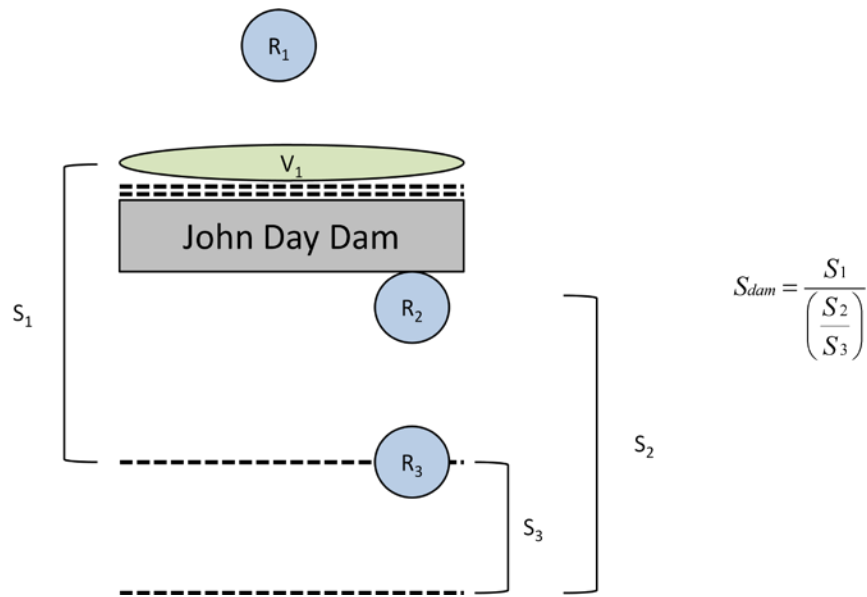


Figure 2. Schematic of the Virtual-Paired Release model for a single dam.

Acoustic-tagged fish used for controls will be released at the John Day downstream tailrace boundary where project operations have no effect on water velocity or direction (R₂; Rkm 346) and at Celilo, OR (R₃; Rkm 325).

Releases of yearling Chinook salmon and juvenile steelhead for testing are scheduled to begin on 26 April and continue through 29 May, 2011. Releases of subyearling Chinook salmon for John Day are scheduled to begin on 13 June and continue through 16 July, 2011. These schedules are tentative based on the arrival of target species at the John Day Smolt Monitoring Facility and as such are subject to change.

Sample sizes were calculated to provide the required precision around the dam passage survival estimates for both operations. Sample sizes for conducting a single BiOp Performance Standard compliance test for John Day were 1,500, 800, and 800 per species for the R₁, R₂, and R₃ release sites, respectively (see Figure 2). To conduct an additional compliance test an additional 1,500 fish per species will be released at R₁.

Experimental Design - The basis for the experimental design for the LCR Survival Study is presented in detail in the Statistical Design for the Lower Columbia River Acoustic-Tag Investigations of Dam Passage Survival Associated Metrics (Skalski, 2009)¹. Implementation of this design is detailed in the final proposal submitted by Pacific Northwest National Laboratory². This design uses the Virtual-Paired Release Model to estimate dam passage survival (see Figure 2). The survival model first estimates survival to the primary array for treatment fish released at R₁ and regrouped based on time of passage at V₁. Second, it estimates survival for the reach downstream of John Day by pairing survival estimates for the reference groups (S₂ and S₃). Estimates of survival for each release location (V₁, R₂, and R₃) are pooled across the entire study period to capture any seasonal variability in survival. Given this design and the location of the releases it is not expected that survival for the control fish (S₂ ÷ S₃) will be dependent on project operations at John Day, therefore, no additional releases are required at R₂ and R₃ to accommodate a second treatment.

¹ Skalski, J.R. 2009. Statistical Design for the Lower Columbia River Acoustic-Tag Investigations of Dam Passage Survival and Associated Metrics. Study Design Document by the Columbia Basin Research School of Aquatic and Fishery Sciences, Univ. of Washington, Seattle, for the U.S. Army Engineer District, Portland, Oregon. Available at www.nwp.usace.army.mil/environment/home.asp.

² Available at www.nwp.usace.army.mil/environment/home.asp