



HATCHERY STEELHEAD KELT RECONDITIONING AT DWORSHAK NATIONAL FISH HATCHERY: A MODEL FOR B RUN STEELHEAD

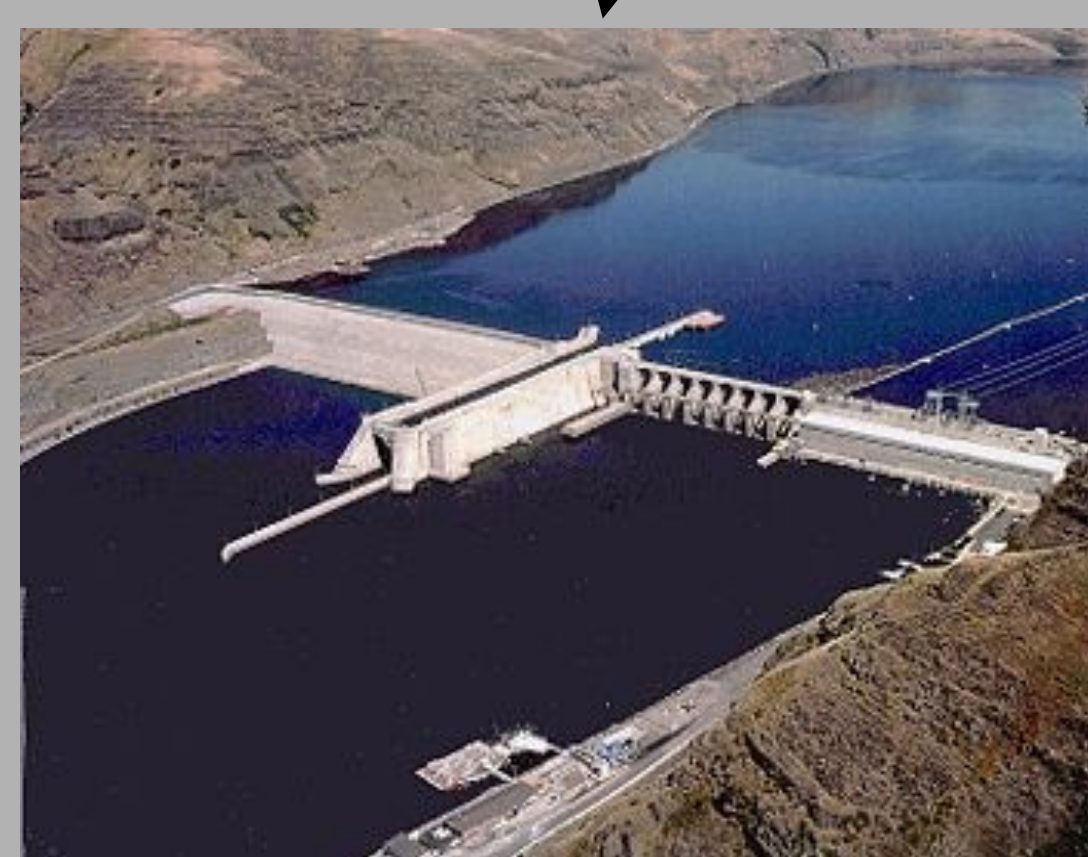
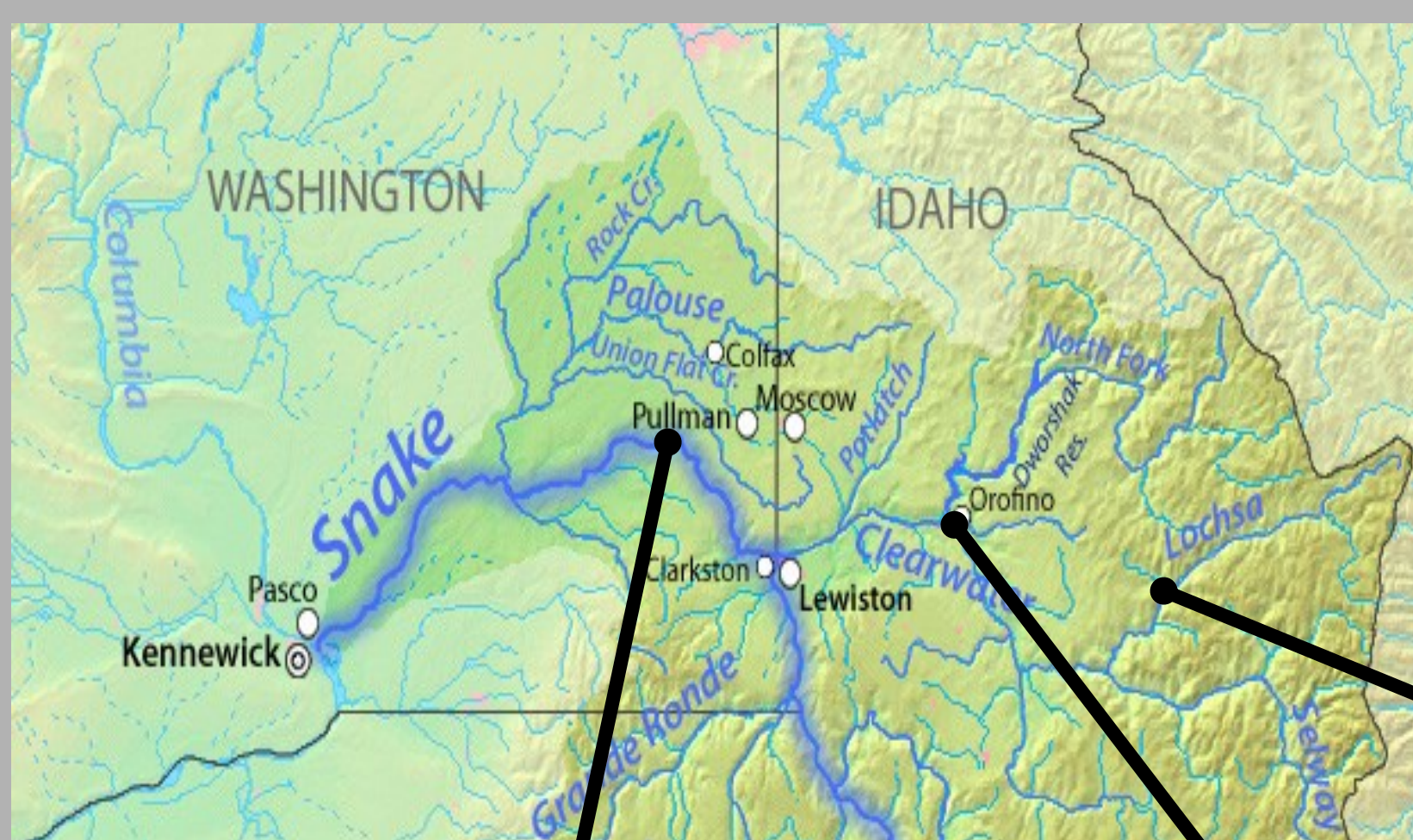


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Introduction

- Steelhead, the anadromous form of rainbow trout, are capable of repeat spawning (iteroparity)
- Snake River steelhead have historically been classified as A-run & B-run: B-run fish usually spend 2 or more winters in the ocean and are therefore larger than the 1-sea winter A-runs
- Current populations and iteroparity rates of wild B-run steelhead in the Snake River system are severely depressed due to the operation of hydroelectric dams and other anthropogenic factors, leading to ESA listing of these stocks and recovery plans
- One recovery method is kelt reconditioning: the capture of post-spawn fish (kelts), reconditioning of fish in a captive environment, and release of rematuring fish into rivers to spawn naturally



Lower Granite Dam



Fish Creek



Dworshak National Fish Hatchery

Objectives

- Develop a hatchery model to enable studies of kelt reconditioning using B-run steelhead
- Compare survival of artificially spawned hatchery kelts versus naturally spawned wild kelts



Wild fish are collected post-spawn



Air Spawning

Fish Culture Methods

- Fish were transferred into 4.6m diameter circular tanks, containing ~21k liters
- After 1 week fish were started on a krill diet
- Pelleted feed, top coated with fish oil and Cyclop-eeze (palatability enhancer), was gradually mixed in for enhanced nutrition
- Regular formalin treatments were administered to control fungus
- Mortalities were recorded daily



Reconditioned steelhead kelt

Collection Methods

- Wild post-spawn fish were collected at Lower Granite Dam in 2013, and at the Fish Creek weir on the Lochsa River in 2015
- Post spawn fish were transported to DNFH for reconditioning

Spawning Methods

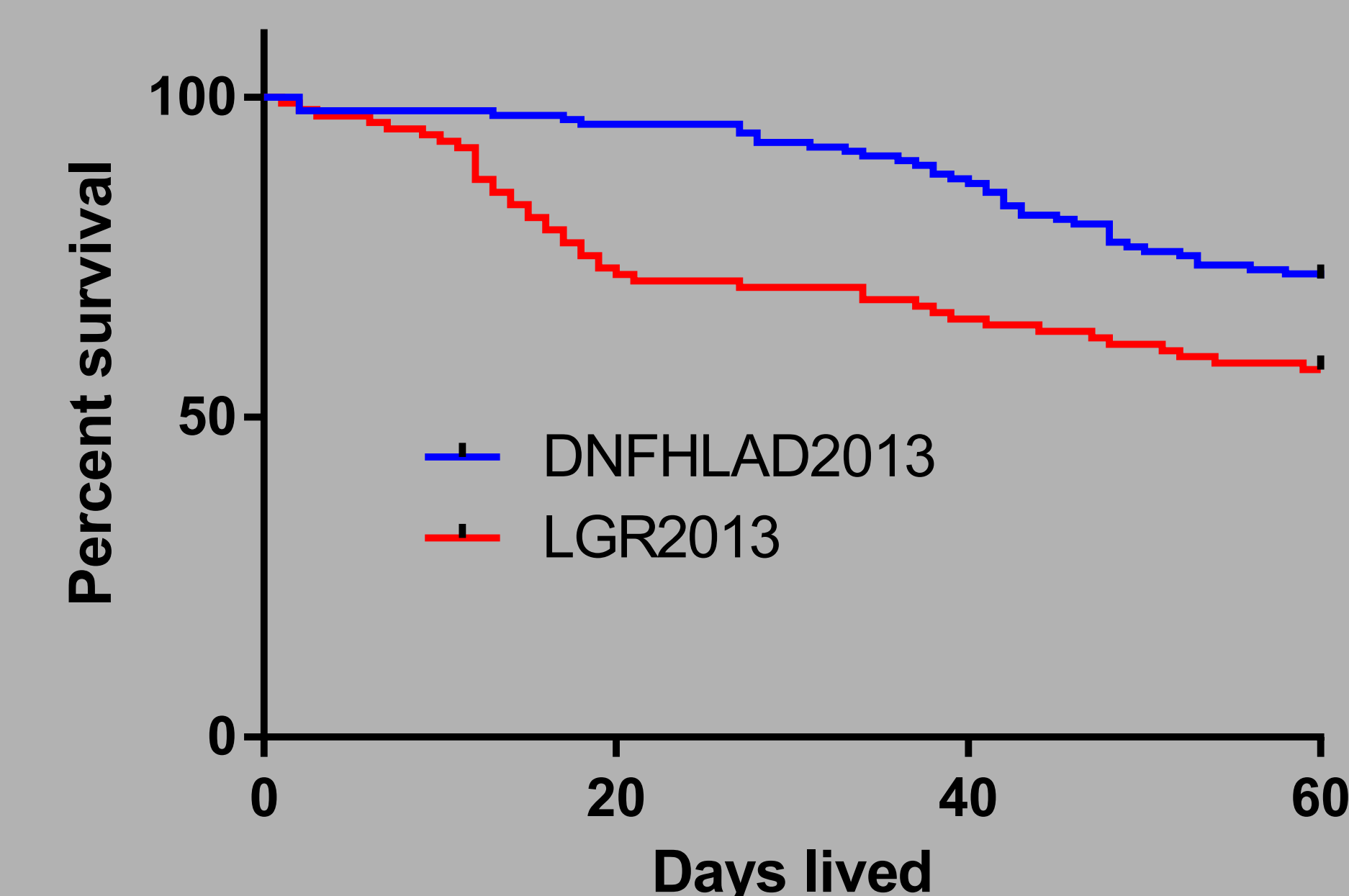
- Ladder-returning hatchery steelhead were collected at DNFH
- Females were sedated with Aqui-S 20E
- Females were non-lethally spawned ("air spawned") by inserting a 16G 1.5" hypodermic needle into the abdomen, posterior of the pelvic fin
- Low pressure oxygen was then pumped into the peritoneal cavity to expel the eggs
- Excess air was released from cavity with light pressure to abdomen
- Fish were PIT tagged



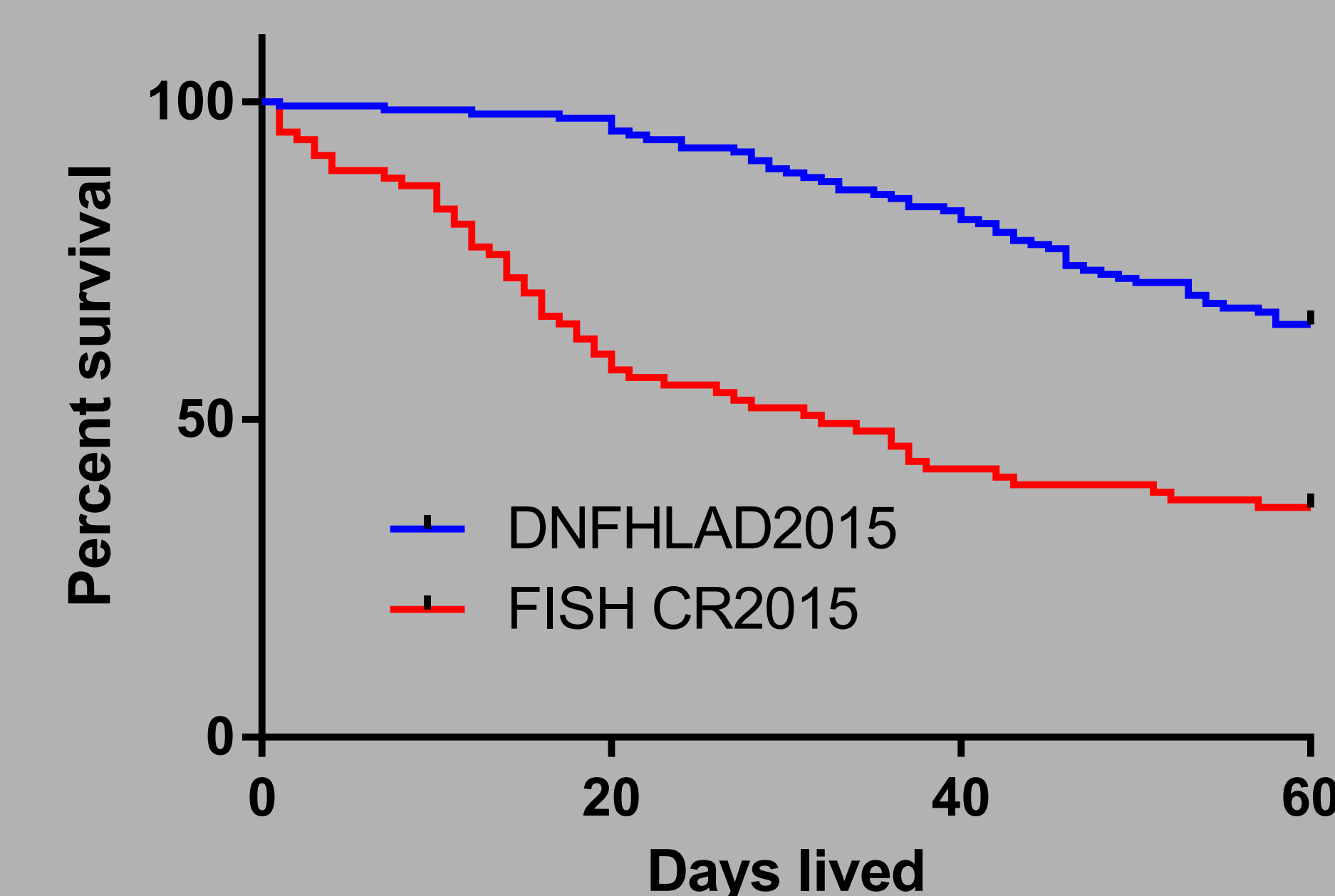
Fish reconditioning habitat

Results

A AIR SPAWN VS NATURAL SPAWN 2013



B AIR SPAWN VS NATURAL SPAWN 2015



Air spawned VS naturally spawned fish from (A) Dworshak National Fish Hatchery ladder-returning air spawn fish VS Lower Granite Dam for 2013, and (B) Dworshak National Fish Hatchery ladder-returning air spawn fish VS Fish Creek for 2015

Conclusions

- Mortality was significantly delayed by approximately 36 days in air spawned hatchery kelts compared with naturally spawned wild kelts
- Overall survival rates were similar between air spawned hatchery origin kelts and wild kelts collected post-spawn



Reconditioned kelt being released

Acknowledgements

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