



A Pilot Study of Reconditioned Kelt Steelhead Spawning in an Artificial Channel



Washington
Department of
**FISH and
WILDLIFE**

2015 Pilot Study Introduction and Update
Cle Elum Fish Facility, WA



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Kelt Project Background

- Post spawn steelhead are termed kelts.
- Kelt project began in 1999 exploring ways to identify kelts and improve their survival.
- Kelts are captured at Chandler Juvenile Bypass at Prosser Dam.
- Kelts are Reconditioned= treated prophylactically and fed for 6-9 months.
- Kelts are typically released the same year below Prosser Dam to monitor migratory movement upstream. (PIT-tags)
- Collection of young of the year genetic samples at Satus, Toppenish, and Ahtanum has been conducted in order to verify and quantify kelt reproductive contributions in the wild.
- See Hatch et al. 2013 NAJFM for further information on the kelt reconditioning process.

Hypotheses to be tested

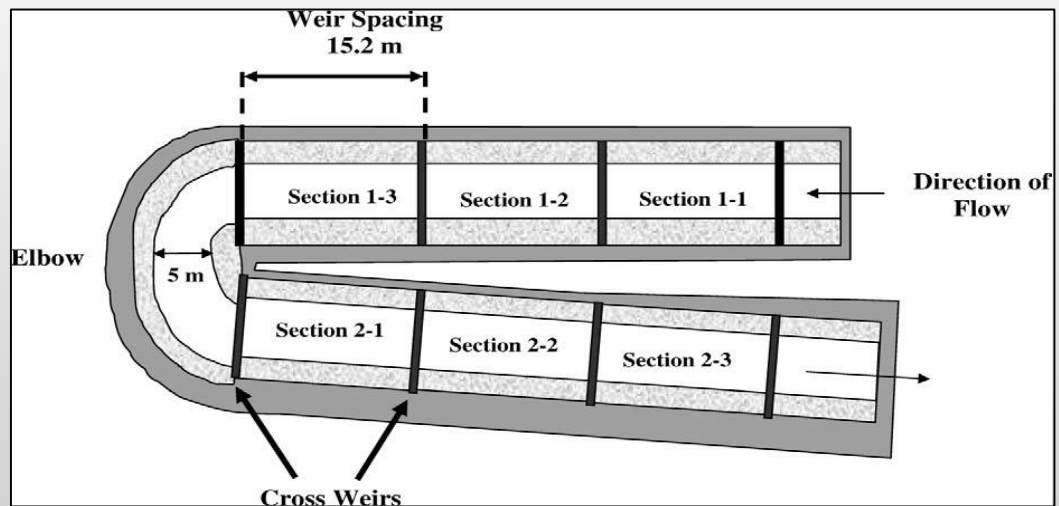
- Reconditioned kelt steelhead can build redds, find mates, and successfully spawn in an artificial spawning channel.
- Spawning behaviors of reconditioned kelt steelhead are similar to those of maiden steelhead in an artificial spawning channel.
- Reconditioned kelt steelhead have reproductive metrics (fry production and survival rates) similar to those of maiden steelhead in an artificial spawning channel.

Study Objectives 2015 (Trial Run)

1. Can sufficient numbers of kelts be collected to make the experiment viable?
2. Will steelhead survive holding, transportation, and successfully use the artificial channel for spawning?

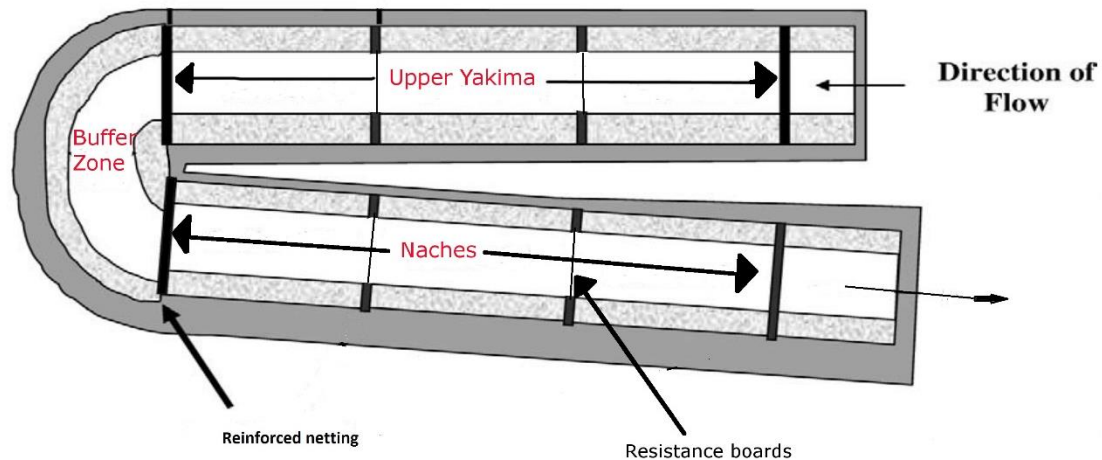
Cle Elum Spawning Channel

- Created in 2000 to research effects of supplementation.
- Channel dimensions are 127m long x 7.9m wide.
- The channel was originally split into 7 sections.
- Monitored and evaluated spring Chinook spawning success (Schroder et al 2008 :TAFS 137:1475-1489).



Channel Setup and Improvements

- Gravel size suitable for spring Chinook.
- Reinforced netting at buffer zones and at outflow.
- Populations were isolated. 3 sections.
- Installed resistance boards to set water depth.



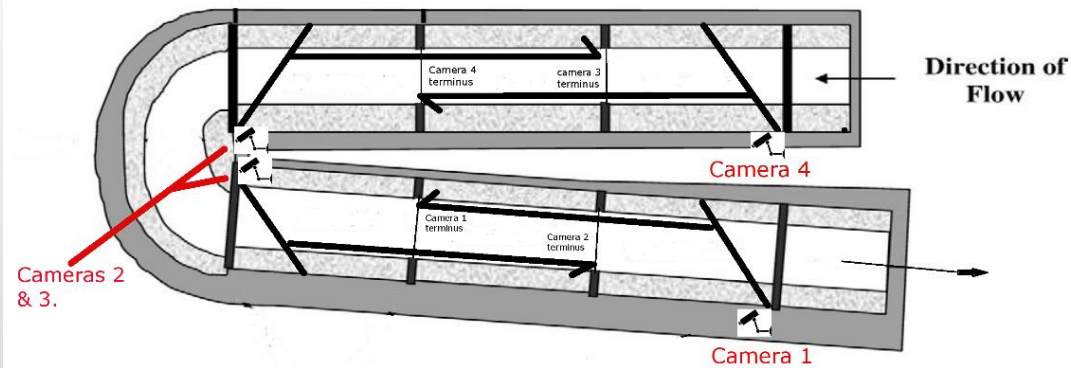
Primarily 2 inch gravel



Mixed with .75 and 1.25 inch gravels

Channel Setup and Improvements cont.

- Side netting repaired.
- Remote access video cameras installed.
- Floating covers constructed and deployed.



How to obtain enough fish for experiment

- Determined that we would use upper Yakima and Naches river origin kelts due to closeness in genetic composition.
- Utilized PIT tag histories and radio tracking data (Yakima River VSP project) to determine kelt origins.
- Fish held at Prosser for the winter.
- All female fish had blood samples taken to determine maturation status. (estradiol).
- Resident male collections from Naches and upper Yakima would supplement the low number of kelt males we had available.

Survival and transport

- Kelts that survived over winter were transported from Prosser to the Cle Elum spawning channel on February 19, 2015.
- There were 10 Naches (10F:0M) and 15 upper Yakima (10F:5M) kelts released to the channel.
- In the Naches group 5 mature females and the upper Yakima group 9 mature females. Male status unknown.
- Some fish injured during transport.
- 12 resident males from Naches subbasin and 15 resident males from the upper Yakima River released to channel.



Pictured: Joe Blodgett w/ kelt



Pictured: Zach Lessig releasing resident males

Spawning

- Redd construction was observed less than week later on February 27th in the upper Yakima section.
- Naches redd construction started approximately on March 24th.
- Last redd construction occurred in upper Yakima section on May 4th.
- Upper Yakima section 7 redds/ 7 small or test redds.
- Naches redd construction 2 redds/ 2 small or test redds



Redds from two different locations at Cle Elum Spawning channel in 2015.

Spawning continued



Spawning behavior video. Recorded by Chad Stockton.

Kelt and resident removal/isolation

- 1 female and 2 male kelts were recovered from the channel at the beginning of June.
- 1 male died on route to release above Roza.
- Remaining female is being reconditioned at Prosser.
- Fish mortalities not likely a result of disease. Result of transport Injury?
- Gondal Somatic Index would suggest that most mature fish successfully spawned.
- Resident fish corralled into the elbow section for PIT-tag retention study.



Prosser Reconditioning Facilities

Juvenile Collection

- Juvenile emergence began in late May.
- Emergence coincided with Temperature Units (TU's) based on first spawner.
- Have averaged 10 juveniles captured per day at both Naches and upper Yakima sections.



Progeny



Challenges

- Determine cause of redd aggregation in the upper Yakima section.
- Silt buildup.
- Habitat improvement (create pools).
- Long duration of spawn timing with kelts and juvenile emergence coinciding.
- Missing fish. (predation?)
- Reduce fish injury when transporting.
- Redesign capture box.



2015 Successes

- Successfully captured and reconditioned enough mature steelhead for spawning channel.
- Kelts appear to be spawning by creating redds and demonstrating typical spawning behavior.
- Possible progeny are currently being collected.

2016 and beyond

- Include behavior observations of resident/maiden/kelts and interactions.
- Quantify differences in reproduction.
- Publish results of study in peer-reviewed journal.

Questions?

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