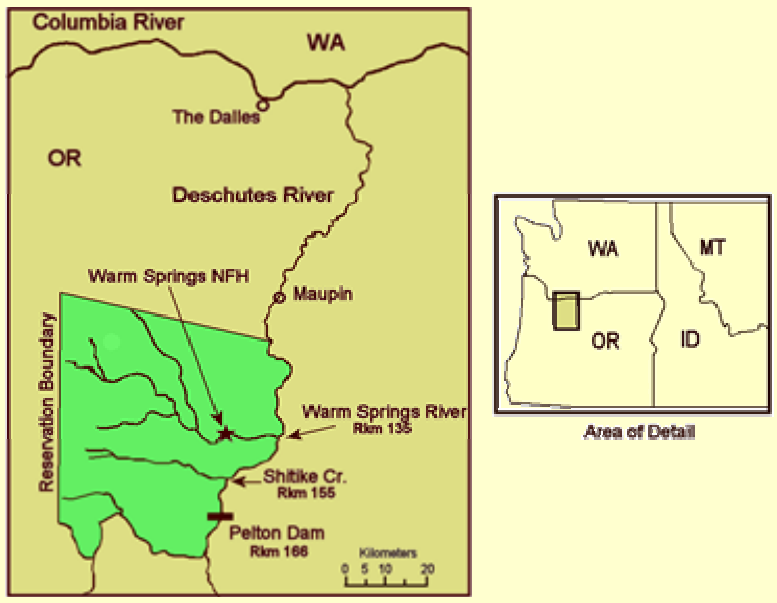
Ecological Interactions Between Hatchery and Wild Fish: Investigations Involving Warm Springs NFH

Introduction

Warm Springs National Fish Hatchery releases juvenile spring Chinook salmon (*Oncorhynchus tshawytscha*) into the Warm Springs River as both age 0+ fish in the fall and age 1+ fish in the spring. In addition, up to 200 returning adult hatchery fish are trapped at the hatchery, held until late August or early September, and released into Shitike Creek as part of an effort to supplement the natural production of spring Chinook salmon.



The U.S. Fish and Wildlife Service and the Confederated Tribes of the Warm Springs Reservation of Oregon have developed a hatchery assessment program designed to evaluate potential hatchery and wild fish interactions resulting from these releases.

Juvenile Interactions

Objective: Determine habitat use and migration timing of juvenile hatchery fish in the Deschutes River.

Methods

•Radio telemetry and PIT tag technology are used to monitor movements and identify over-wintering habitat of juvenile hatchery spring Chinook salmon in the Deschutes River.

•Microhabitat parameters will be measured to determine preferences.

Backpack PIT tag interrogator

Objective: Evaluate habitat use and ecological interactions between juvenile spring Chinook, steelhead, and bull trout.

Snorkel observation of juvenile salmonids in upper Shitike Creek

Juvenile bull trout

Juvenile Chinook salmon and juvenile trout

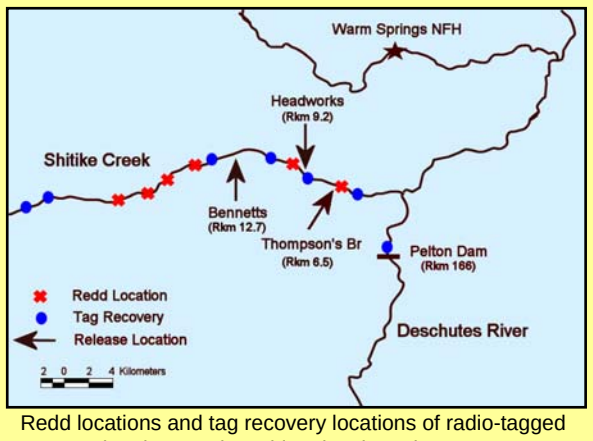
Methods

•Distribution and microhabitat preference (depth, velocity, cover) will be determined from snorkel observation and underwater videography for each species.

•Potential relationships between microhabitat preference and fish density will be examined.

Adult Interactions

Objective: Assess the distribution and behavior of adult hatchery fish released into the stream



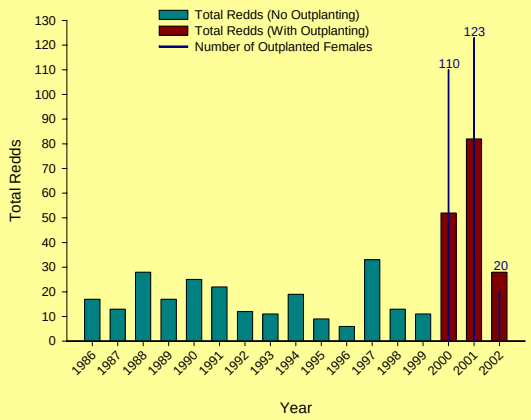
Redd locations and tag recovery locations of radio-tagged hatchery spring Chinook salmon in 2002

Methods

•A subsample of hatchery fish are affixed with radio-transmitters and monitored after release.

•Redd locations, origin of mates, and time of spawning are recorded.

Objective: Estimate the reproductive success of hatchery and wild fish in Shitike Creek.



Number of Redds Counted in Shitike Creek

Methods

•Genetic samples are collected from all adult hatchery fish and a subsample of adult wild fish in the stream.

•Genetic samples are taken from outmigrating smolts and subsequent adult returns.

•DNA assignment tests will be used to estimate relative reproductive success of hatchery-hatchery, hatchery-wild, and wild-wild matings.

Temporary adult weir used to collect genetic samples from wild spring Chinook salmon

Management Implications

•Results from the ecological interaction studies as well as traditional hatchery performance evaluations will be used to update the Warm Springs NFH operations plan for 2007-2011.

•Information gathered from these studies will also be used as a foundation for developing hatchery evaluation programs at other National Fish Hatcheries in the Pacific Northwest.

Spawning spring Chinook salmon.
Photo: Bonneville Power Administration

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