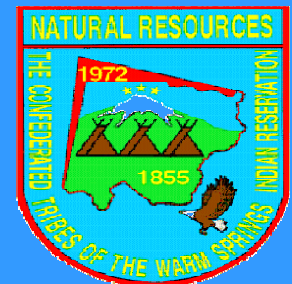


Evaluation of the Shitike Creek Outplanting Program



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Confederated Tribes of the
Warm Springs Reservation of Oregon
Warm Springs OR
541-553-2045



Columbia River

WA

The Dalles

OR

Deschutes River

Sherars Falls
Rkm 71

Warm Springs NFH

Maupin

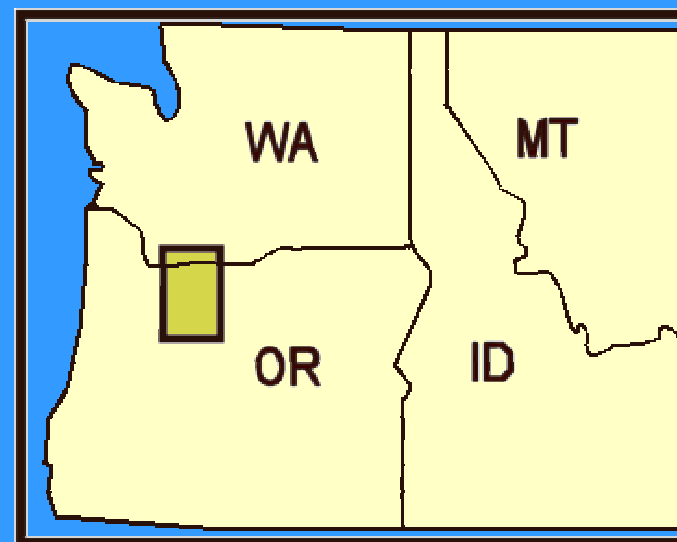
Warm Springs River
Rkm 135

Shitike Cr.
Rkm 155

Pelton Dam
Rkm 166

Reservation Boundary

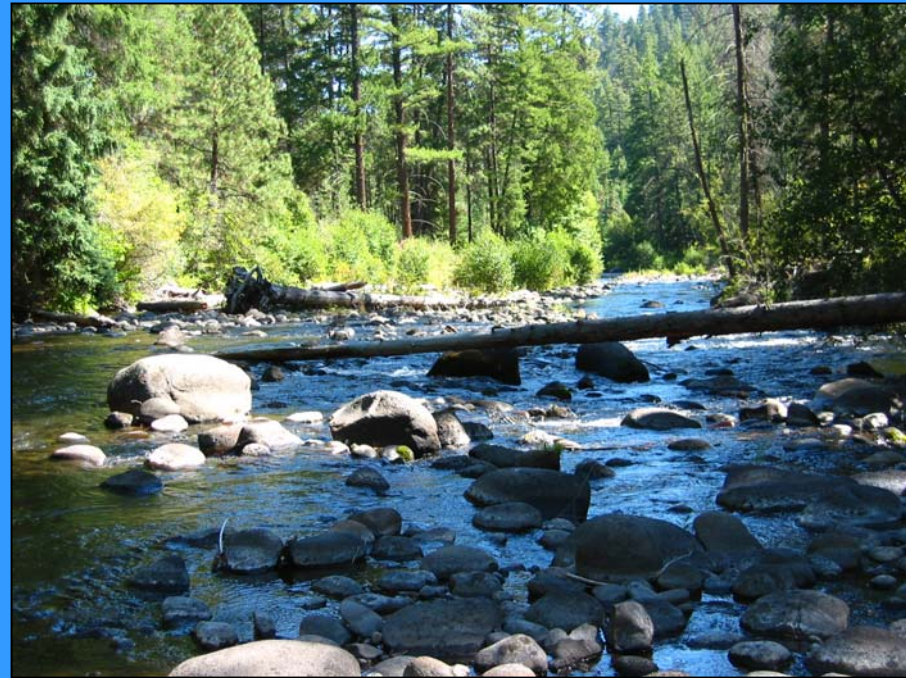
Kilometers
0 5 10 20



Area of Detail

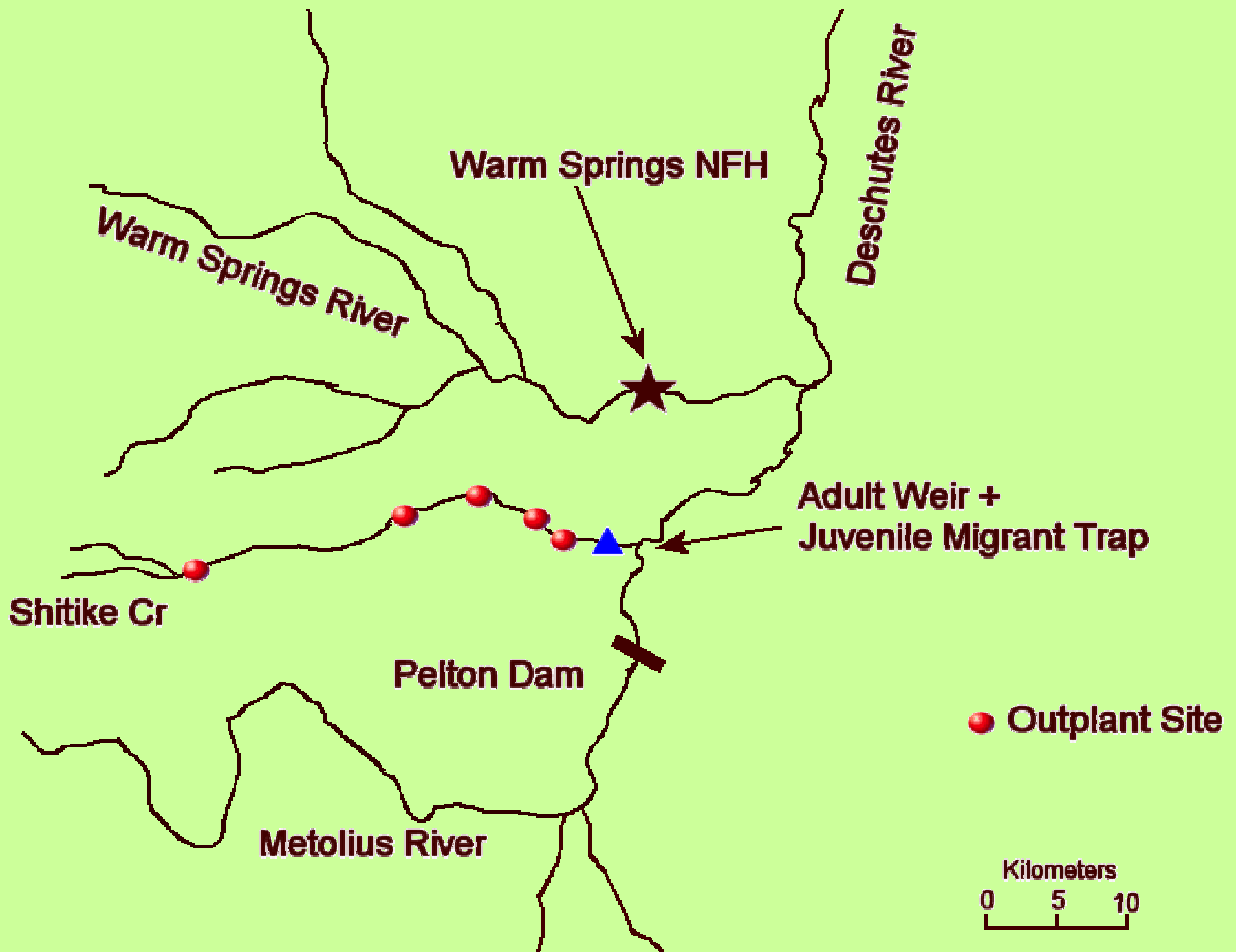
Background of Outplanting Program

- Shitike Creek is one of two streams in the Deschutes subbasin that supports natural production of spring Chinook salmon.
- Spawning density of spring Chinook in Shitike Creek is much lower than in the Warm Springs River, with a range of 6-33 redds counted per year between 1986 and 1999.



Shitike Creek Outplanting Program

- In 2000, large returns of hatchery fish to Warm Springs NFH enabled the Tribes and the Service to develop an adult outplanting program in Shitike Creek.
- Goal: Increase production of spring Chinook salmon by releasing adult hatchery spring Chinook salmon from Warm Springs NFH into Shitike Creek.

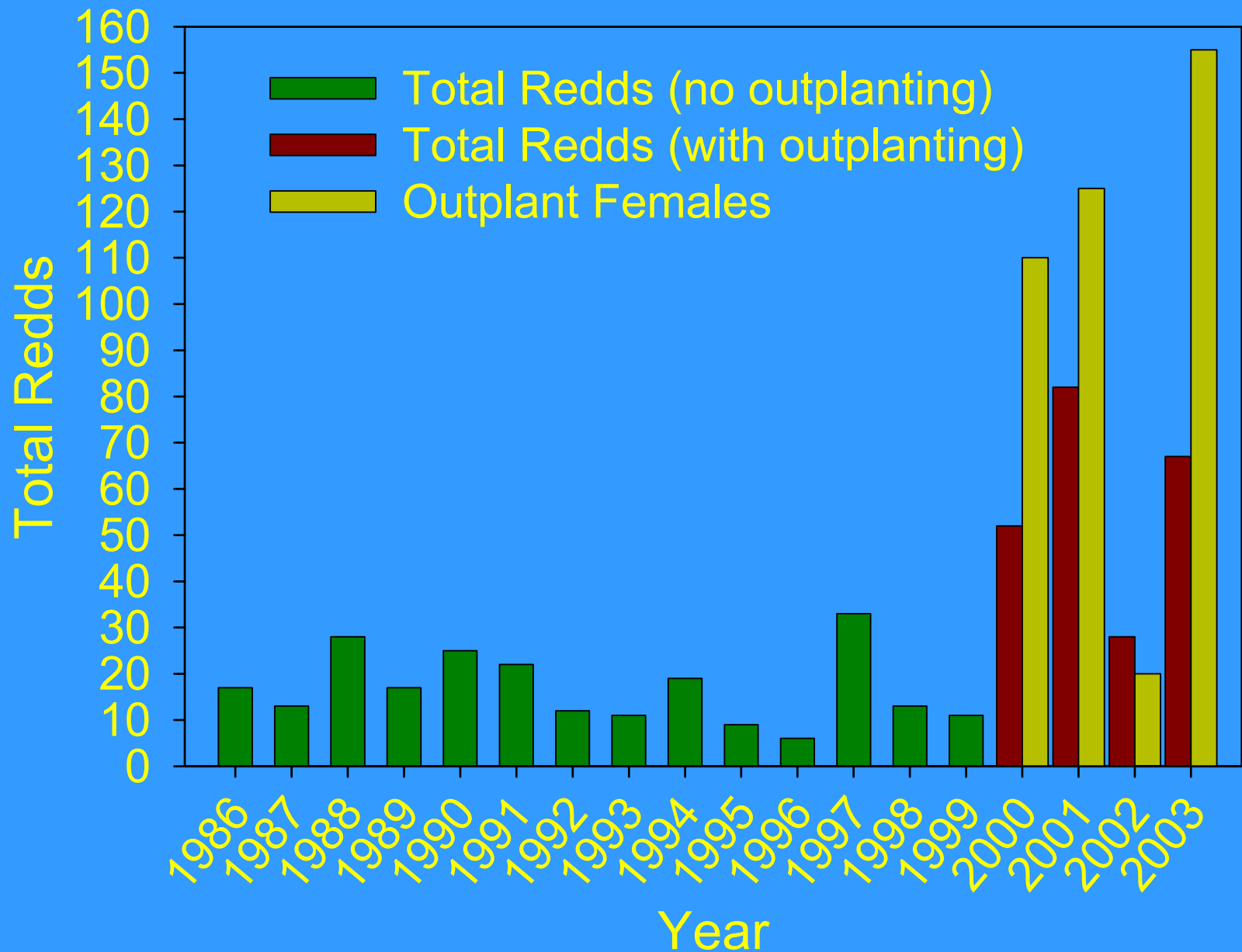




Number of Hatchery SCS Outplanted

Year	Male	Female	Total
2000	49	110	159
2001	75	123	198
2002	63	20	83
2003	110	155	265

Number of Spring Chinook Redds Counted in Shitike Creek 1986-2003



Shitike Creek Outplanting Evaluation Project

- In 2002, the Service received funding to implement a monitoring and evaluation program.
- The goal of the M+E program is to evaluate the benefits and risks associated with outplanting adult hatchery fish into the stream.

- Objective 1:

Assess the distribution and behavior of outplanted spring Chinook in Shitike Creek.

- Determine the distribution of outplanted spring Chinook using radio telemetry.

- Compare the spawn timing of outplanted and non-outplanted spring Chinook.

- Determine redd locations, redd characteristics, and mate choice of outplanted spring Chinook

- Objective 2:

Estimate the relative reproductive success of outplanted and non-outplanted spring Chinook.

- Collect genetic samples from all outplanted and non-outplanted adult spring Chinook in Shitike Creek.

- Collect genetic samples from 1,000 juveniles per brood year.

- Determine genotypes for all adult spring Chinook and determine parents of juveniles and subsequent adult returns.

- Objective 3:

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

- Monitor juvenile abundance and distribution of juvenile fish in Shitike Creek.

- Determine microhabitat use, frequency of association, and behavioral interactions between juvenile fish species.

Objective 1:

Assess the distribution and behavior of outplanted spring Chinook in Shitike Creek.



Methods

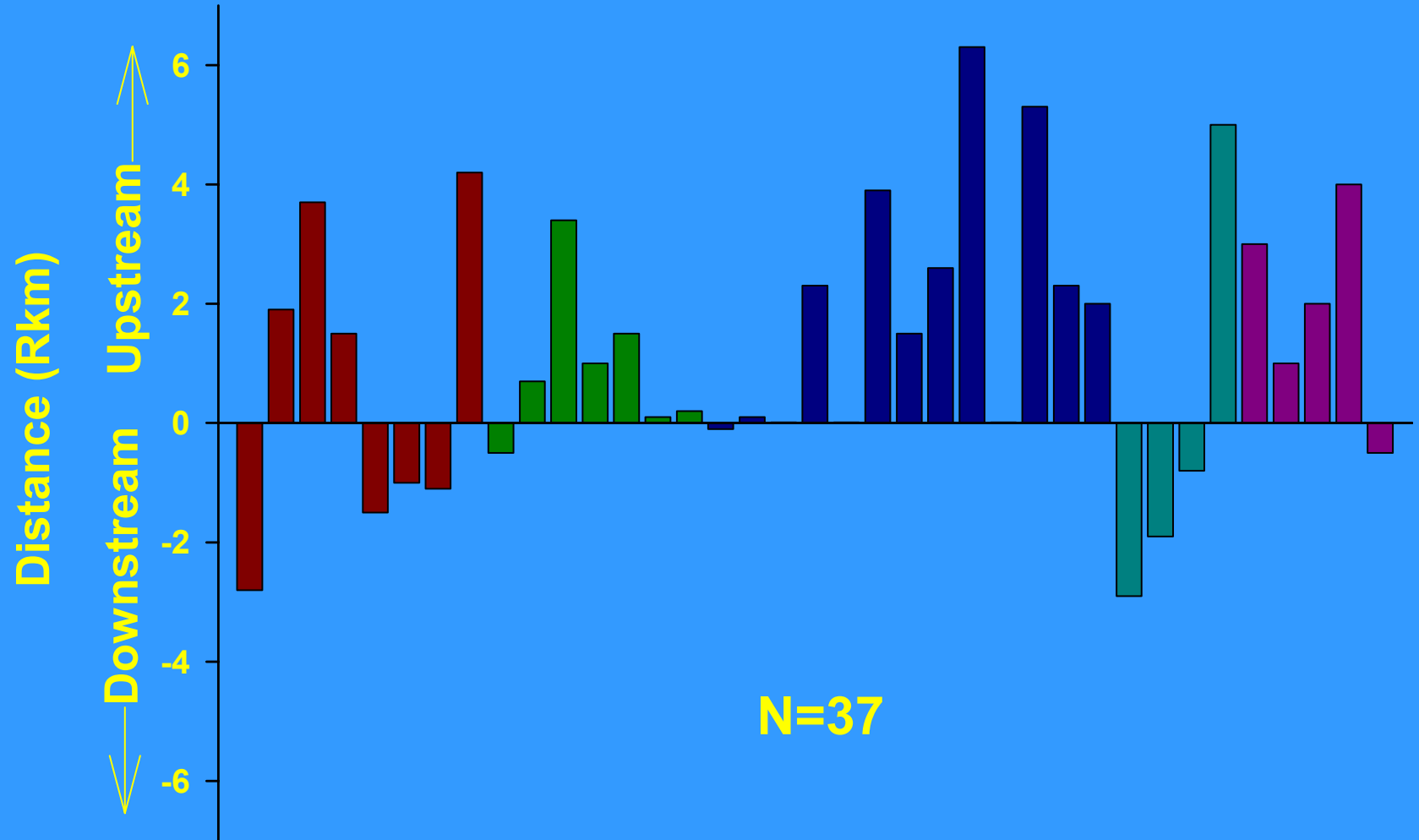
- A subsample of the outplanted fish are affixed with radio-transmitters and tracked upon release.
- Redd locations, time of spawning, origin of mates, and extent of spawning are recorded.



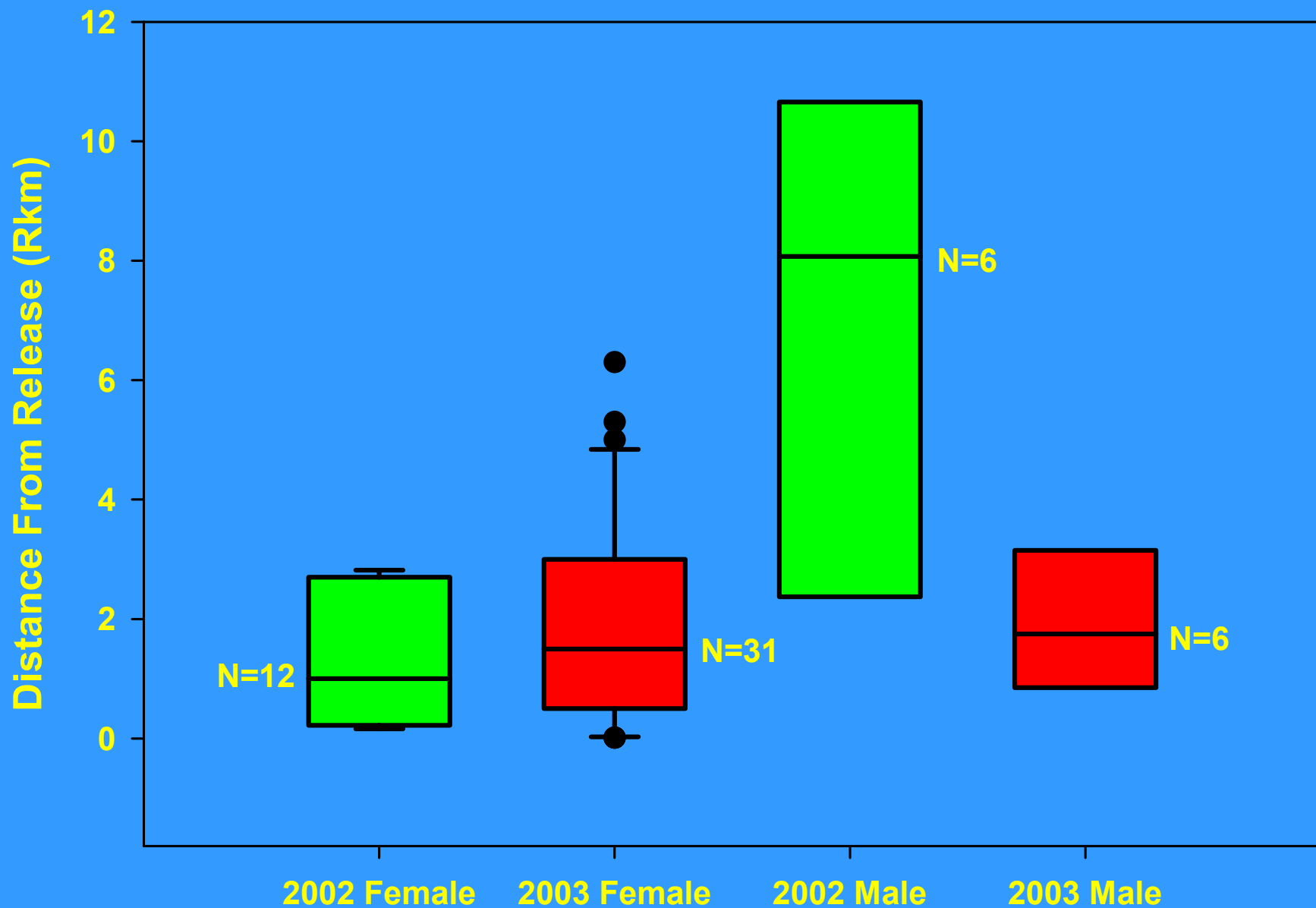
Release location of outplanted spring Chinook salmon, 2003

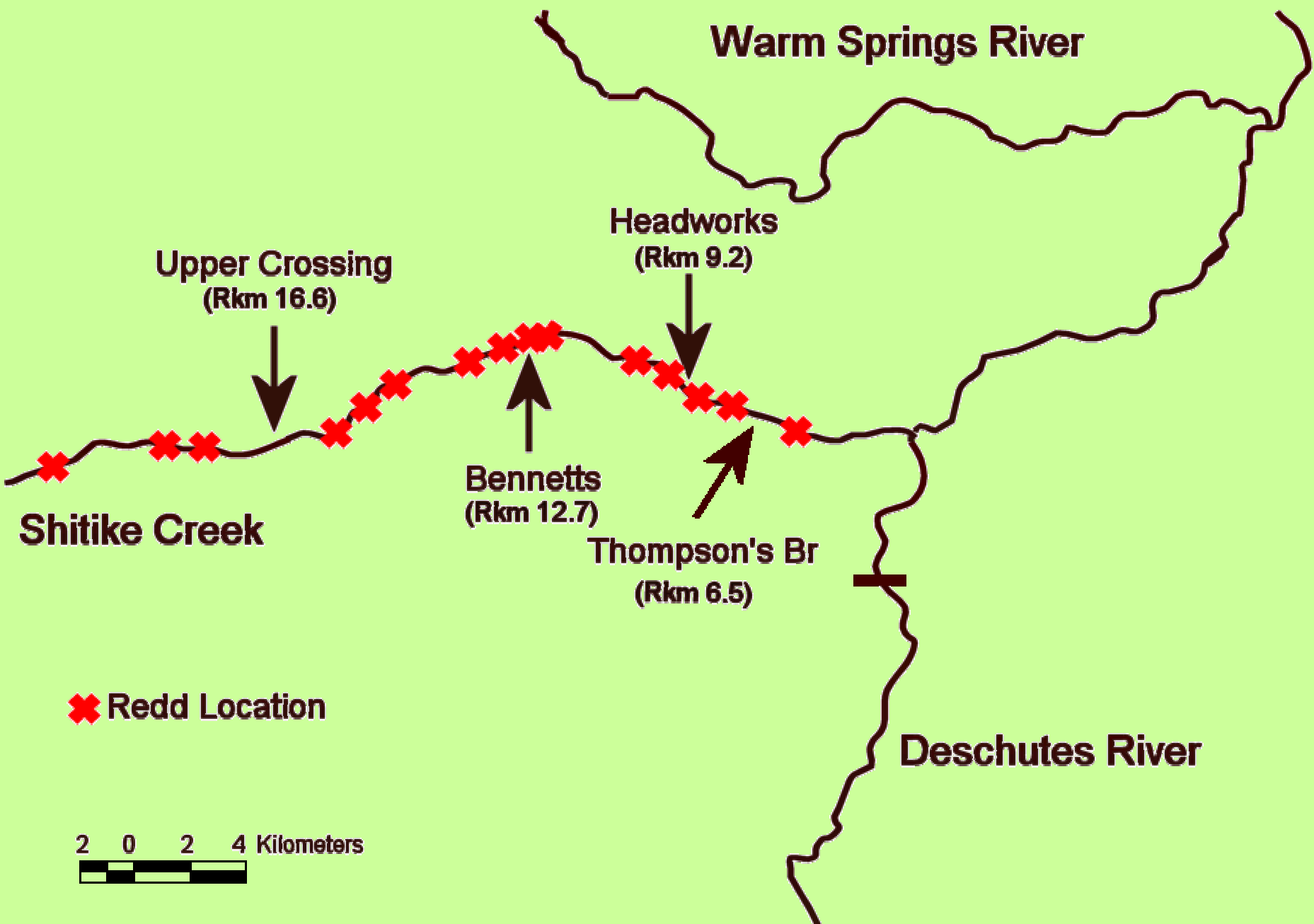
<i>Location</i>	<i>Male</i>	<i>Jack</i>	<i>Female</i>	<i>Total</i>
Thompson (Rkm 6.5)	36 (1)	1	53 (9)	90 (10)
Headworks (Rkm 9.2)	25 (1)	3	33 (6)	61 (7)
Bennetts (Rkm 12.7)	21 (4)	1	34 (12)	56 (16)
Upper Crossing (Rkm 16.6)	12 (1)	0	18 (3)	30 (4)
Peter's Pasture (Rkm 40.0)	11 (1)	0	17 (4)	28 (5)
Total	105 (8)	5	155 (34)	265 (42)

Distance From Release Location

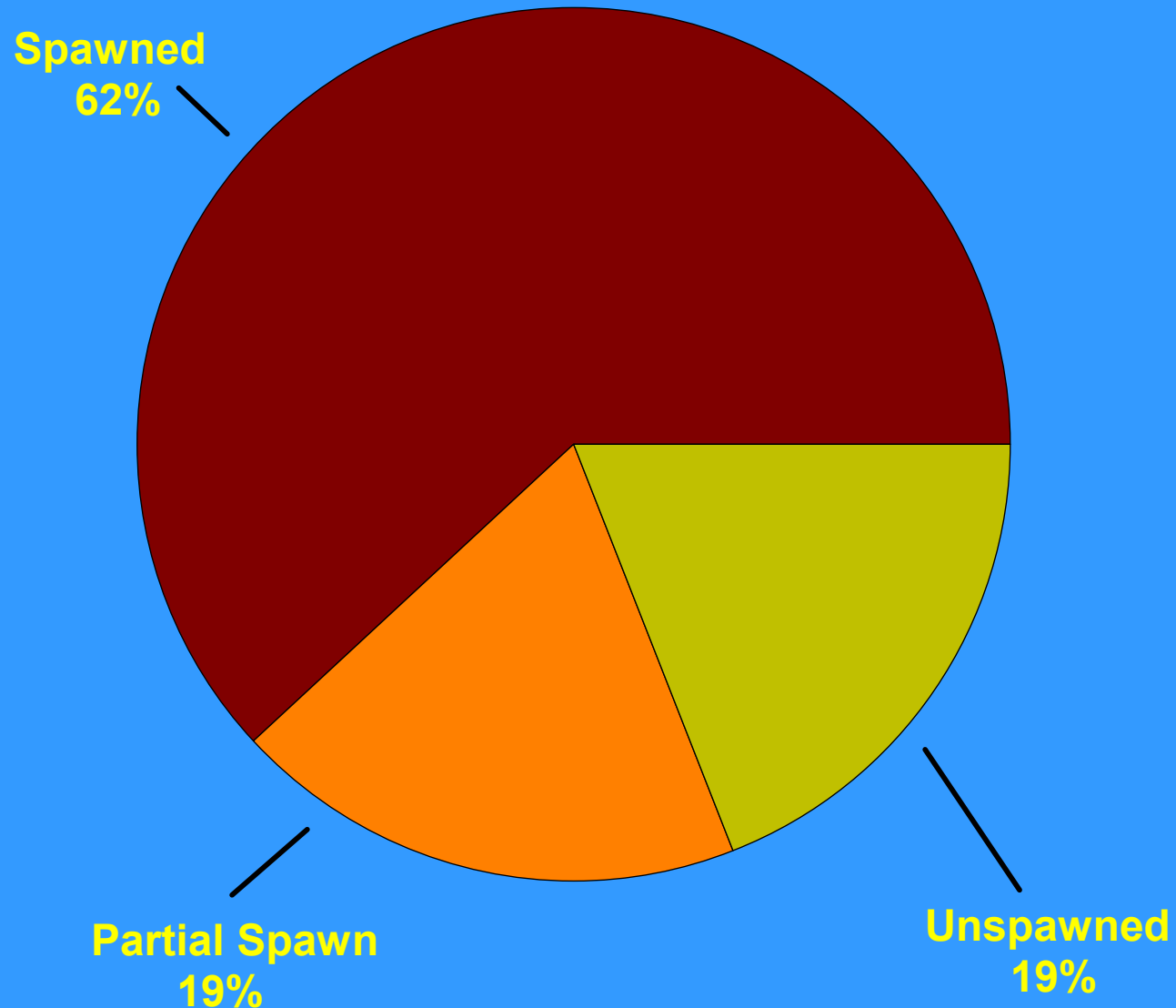


Median Distance for Radio Tagged Fish





**Extent of Spawning for Outplanted Female Spring
Chinook Salmon in Shitike Creek, 2003**
N=21



Objective 2:

Estimate the reproductive success of hatchery and wild spring Chinook salmon in Shitike Creek.



Determining Fitness

- At each sampled lifestage, we will determine the proportion of offspring produced by each outplanted fish in the 2002-2004 run years.
- Offspring lifestages examined:
 - Young-of-the-year - 0+, Spring and Fall
 - Yearlings - 1+, Spring and Fall
 - Adults – Mini-Jacks (2yr), Jacks(3yr), Adults (4+5yr)

Sampling Methods

- Starting in 2002, genetic samples have been collected from all outplanted fish.
 - 2002: 83 samples
 - 2003: 265 samples



- Weir was set up in 2002 and 2003 to sample adults.

- No adults were sampled in 2002 or 2003. Six carcasses were sampled in 2003.



- Juvenile outmigrants are sampled at a smolt trap.

- 486 fall outmigrants of 2002 brood were collected in 2003.



Preliminary Findings

- In 2002, 20 females and 63 males were outplanted.
- 28 redds were counted in Shitike Creek.
- At least 7 outplanted females and 14 outplanted males contributed to fall outmigrants sampled at the screw trap.
- Of 12 radio-tagged females, five were tracked onto redds.
- Four carcasses of radio-tagged fish were recovered: three unspawned and one spawned out.

Future Plans

Telemetry and Weir

- Developed a new weir design with a video-monitoring system to improve estimate of non-outplanted fish in Shitike Creek.
- Telemetry will continue for 2004 outplant.
- Telemetry information will be combined with reproductive success information to look at relationships between outplant location, redd location, spawn timing, etc. and production of juvenile outmigrants (outmigration timing, size, fall versus spring).

Future Plans

Reproductive Success

- Since 2002 outplant was not representative, we may extend study to include outplants through 2005.
- In 2004, progeny of fish from a USGS HxH, HxW, and WxW crosses will be outplanted. Opportunity to determine if differences in reproductive success are due to different genetic crosses.
- Issue of sampling at different life-stages needs to be addressed (emergent fry, instream sampling of juveniles, adult returns).