

Teton River Fishery Juvenile Trout Abundance and Survival Assessment

Quarterly Performance Report #3: 1st Quarter, 2004 Friends of the Teton River

Martin Koenig, Lyn Benjamin, Bonnie Berger

Projected Goals

One of the primary purposes of the *Teton River Fishery Juvenile Trout Abundance and Survival Assessment* is to estimate the distribution and abundance of juvenile trout throughout the upper Teton River. Additionally, juvenile survival from summer to fall must be calculated. Objective 1 under the original proposal is written as follows:

“Objective 1. Estimate late summer and fall survival of juvenile (age-0) trout in the valley reach of the Teton River.”

Data collected from electrofishing surveys performed during the summer and fall of 2003 must be entered into an electronic database and then analyzed to yield abundance estimates and other descriptive metrics in preparation for survival calculations. The primary study goal at this time is to generate the late fall and summer abundance of the newly hatched year class of trout.

Secondly, the project aims to quantify juvenile trout survival through the winter months. Overwinter survival is calculated in the same manner as described above for Objective 1, yet utilizes data gathered for fall and spring abundance. Hence, springtime abundance estimates of juvenile trout must be collected, entered and analyzed before overwinter survival can be calculated.

“Objective 2. Estimate overwinter (age-0 to age-1) survival of juvenile trout in the valley reach of the Teton River.”

A third goal of the *Teton River Fishery Juvenile Trout Abundance and Survival Assessment* is to investigate the prevalence and potential impacts of whirling disease in the valley reach of the Teton River. During the first quarter of 2004, test fish used in the sentinel exposure series in fall 2003 are to be sampled and analyzed. The resulting data will quantify infectivity of the Teton River and selected tributaries by returning the percent of infected fish per site and average spore counts per fish. In the original proposal, Objective 3, Task A is written as follows:

“Objective 3. Determine the extent of juvenile mortality that can be attributed to whirling disease infection.

Task A: Use sentinel tests to estimate the rate of infection of juvenile rainbow and cutthroat trout in the mainstem Teton River and tributaries.”

The trout of the Teton valley are prized not only by local communities, but also by many seasonal visitors to the area. As a result, there is great public interest in conservation and management efforts aimed at restoring these revered resources. Keeping the public informed about recent findings that may affect trout management and conservation efforts in the Teton River is central to Objective 5:

“Objective 5. Establish methods to educate the public and disseminate information regarding the project.”

Actual Accomplishments

All electrofishing data from summer and fall (2003) surveys were entered and analyzed. A database was created to manage the associated data files using Microsoft Access software. Abundance estimates were generated using MicroFish 3.0 software. In addition, Given that this study focuses exclusively on juvenile trout, abundance estimates were calculated for all fish less than or equal to 200mm fork length. Length-frequency histograms were generated for each survey reach (by species), and a combined length-frequency histogram was created for each survey stream. Abundance data was calculated according to the age/size categories presented by the length-frequency histograms for each species and reach. MicroFish 3.0 also produced capture probabilities and the associated 95% confidence intervals in addition to abundance estimates.

The following will present summary results from the 2003 electrofishing surveys. All results are representative of data collected during the fall sampling period (although summer data is also available). We have chosen to present only fall data in the interest of maintaining a concise report, and because the fall series of data represents the most comprehensive set of data (due to the expansion of the survey from summer to fall).

Table 1. Total catch (by percent) by species and by stream for fall, 2003.

Percent of Total Catch						
Species	Size	Fox Cr	Teton Cr	Unnamed Cr	Woods Cr	Teton River
YOY	(<80)	40.90%	71.40%	80.30%		
YCT	(<100mm)	1.40%	0.20%	2.50%		0.50%
YCT	(101-150)mm	1.20%	1.90%	3.50%		0.50%
YCT	(151-200)mm	0.90%	0.50%		3.20%	
Total YCT		3.50%	2.60%	6.00%	3.20%	1.00%
EBT	(<100mm)	5.90%	13.70%	10.10%	48.40%	58.90%
EBT	(101-150)mm	14.20%	10.30%	2.00%	32.30%	36.10%
EBT	(151-200)mm	2.60%	1.90%	1.50%	16.10%	4.00%
Total EBT		22.70%	25.90%	13.60%	96.80%	99.00%
RBT	(<100mm)	5.40%				
RBT	(101-150)mm)	3.80%				
Total RBT		9.20%	0.00%	0.00%	0.00%	0.00%
HYB	(<100mm)	19.60%				
HYB	(101-150)mm)	4.00%				
Total HYB		23.60%	0.00%	0.00%	0.00%	0.00%

Figure 1 presents an overall picture of species composition among the surveyed streams. Overall, Eastern brook trout were found in all reaches of all streams, indicating that they have widespread presence throughout the valley. Eastern brook trout made up a significant portion of the catch in all streams, but dominated the catch from the Teton River and Woods Creek.

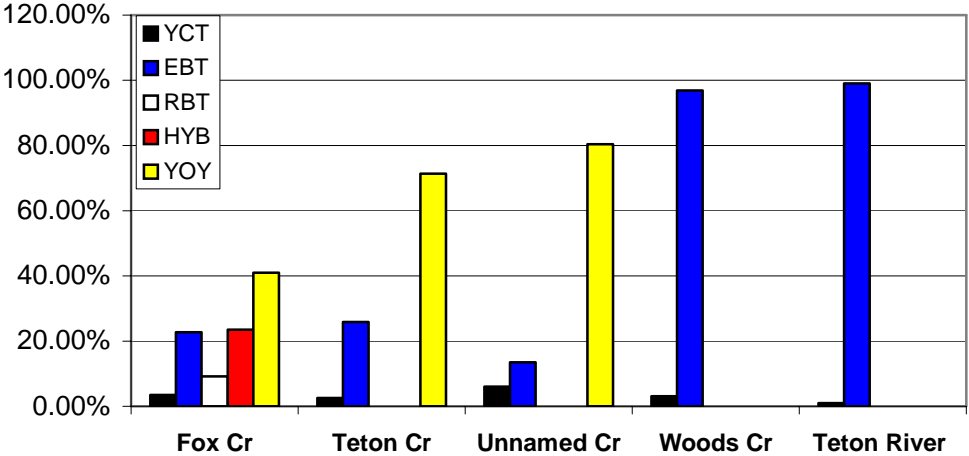


Figure 1. Cummulative percent of total catch by species (<200mm) and stream (Fall, 2003).

Yellowstone cutthroat trout were also present in all streams, but only in very low numbers. Rainbow trout and their hybrids were found to have a strong presence only in Fox Creek. Young-of-the-year (YOY) trout were present only in Fox, Teton and Unnamed Creek (a small tributary to Teton Creek). At the time of capture, YOY trout were too small to be distinguished as either rainbow or Yellowstone cutthroat trout. Although, due to the overall low percentage of rainbow trout present in Teton Creek, it is likely that most YOY fish represent cutthroat trout. Eastern brook trout are easily distinguished from rainbow and cutthroat trout, even at small sizes.

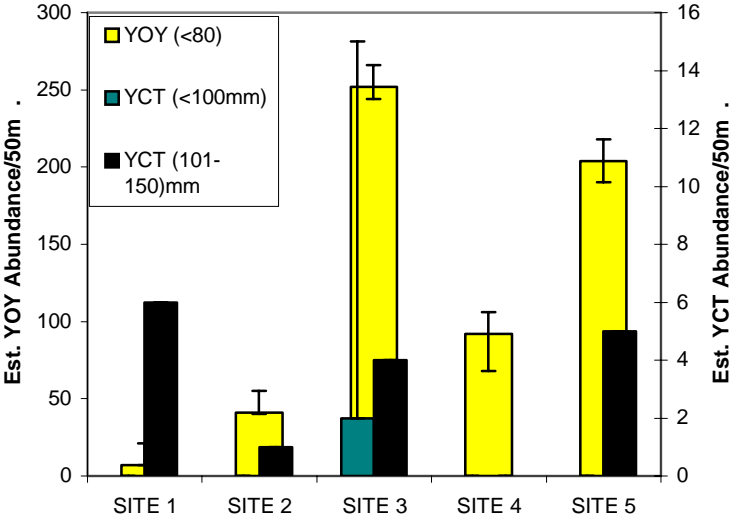


Figure 2. Teton Creek Fall 2003: Estimated abundance by species (<150mm) shown with 95% C.I. where possible.

The data also reveal two other patterns in regards to juvenile trout distribution within streams. First, it appears that the presence of YOY fish is patchy, varying greatly between relatively short distances (Figure 2). Figure 2 illustrates a typical example from Teton Creek, the main spawning tributary for fluvial Yellowstone cutthroat trout in the Teton Valley. Sites are ordered according to distance upstream.

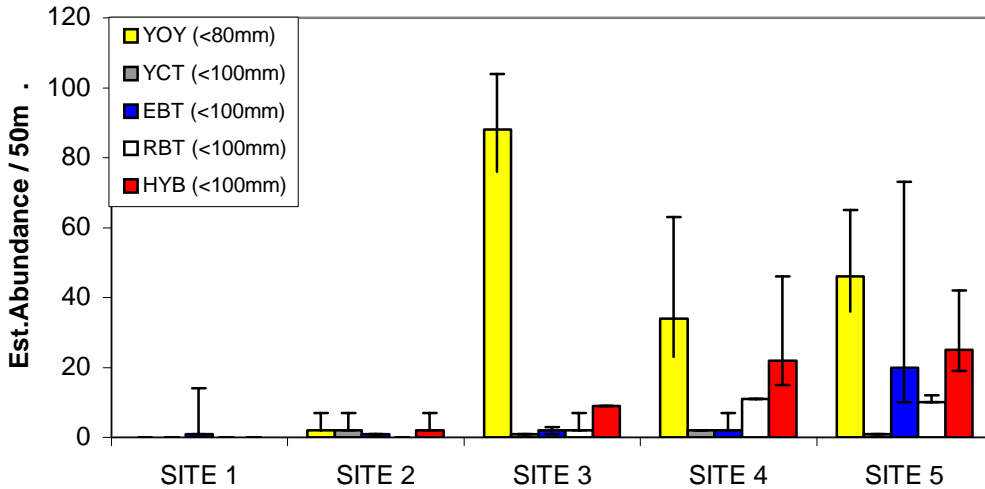


Figure 3. Fox Creek Fall 2003: Estimated abundance by species (<100mm) shown with 95% C.I. where possible.

In addition, the data show a trend for juvenile fish to be more concentrated in reaches farther upstream (Figure 3). This may be related to a number of possible factors. Some of these factors might include temperature, habitat quality or proximity to spawning locations. Future sampling will be aimed at better explaining these patterns.

Yellowstone cutthroat trout have precipitously declined in recent time throughout the Teton valley in recent time. Understanding the distribution of juvenile Yellowstone cutthroat trout and the patterns that govern this distribution will be key to developing recovery strategies for these native trout. The 2003 survey data reveal that only Fox, Teton and Unnamed Creek held YOY fish. Figure 4 presents a comparison of all streams containing YOY fish, and their respective totals of juvenile Yellowstone cutthroat trout.

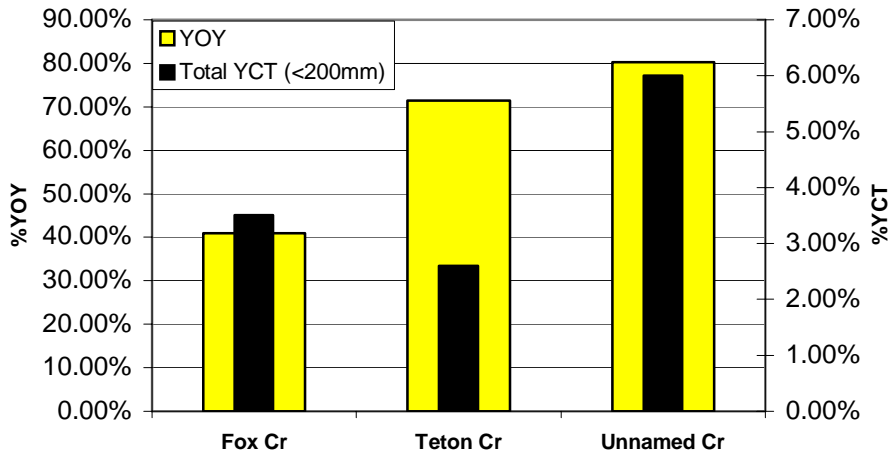


Figure 4. Percent YOY/YCT of Catch by Stream, Fall 2003.

The data presented in Figure 4 reveal that Unnamed Creek, a small spring-fed tributary to Teton Creek held the greatest percentage of Yellowstone cutthroat trout and YOY trout of the total catch. These results also suggest that the numbers of age-1+ Yellowstone cutthroat trout in streams throughout the valley are very low (as indicated by the low % of total catch) and that the distribution is limited to a few streams in the valley. These data also suggest that it will be increasingly important to sample small spring creeks like Unnamed Creek in the future, as these creeks may function as refugia for the last remaining populations of cutthroat trout in the valley.

In September 2003, sentinel cages containing juvenile Yellowstone cutthroat trout were placed throughout the Teton River and selected tributaries in an effort to quantify whirling disease severity. During the last quarter, the Idaho Department of Fish and Game completed processing and testing of these test fish. Results for this first trial of testing are now complete. Table 2 (shown on next page) shows a detailed summary of the results. Figure 5 illustrates a comparison of percent-infected with mean spore counts by location. Overall, the results indicate that whirling disease is indeed present throughout much of the valley, but may not be as severe as previously thought. Of the ten sites tested, eight showed positive for the parasite. All mainstem Teton River sites had fairly low rates of infection, along with low average spore counts. Fox Creek and Teton Creek (two important tributaries) showed higher rates of infection. However, only lower Teton Creek (“Steel Bridge”) showed significant average spore counts per fish. A second round of sentinel testing should be completed to confirm these results and to return data on locations not previously sampled.

Objective 5 deals with dissemination of project-related information to the public. During the first quarter, Martin Koenig (graduate student researcher) assembled and presented a research poster at the 2004 Western Division American Fisheries Society Meeting in Salt Lake City, Utah. Fisheries professionals attended the meeting from all across the western states. This meeting was an ideal opportunity to present and discuss the initial results of the project. A copy of the poster is currently on display at the Friends of the Teton River office in Driggs, Idaho. The poster presented results from the Juvenile Trout Study regarding the distribution and abundance of trout throughout the Teton Valley. Much of the data presented above was included on the poster. The poster also included a topographic map of the valley, which showed locations and pictures of the surveyed reaches.

BONNIE, THE POSTER FILE IN 9+ MB, SO IT'S A REALLY BIG FILE. I THOUGHT IT MIGHT BE IMPRACTICLE TO INCLUDE A COPY OF IT IN THE REPORT. LET ME KNOW IF YOU WANT ME TO EMAIL IT TO YOU TO BE INCLUDED.

Explanation of Performance

Progress made in the first quarter of 2003 in regards to Objective 1 and 2 was significant. For the first time, data is available that describes a portion of the distribution and abundance of juvenile trout in the Teton valley. This initial data will be crucial to the design of upcoming sampling. Future sampling can be designed on the initial information provided by these results in an effort to better answer the questions regarding to cutthroat declines in the Teton River.

The results of the whirling disease sentinel tests done in September 2003 represent a vital step in the research of Yellowstone cutthroat trout declines in the Teton

GROUP	LAS#	#+/#	%+	INDIV SPORES/HD '000 INDIVIDUAL FISH #	spores/#	MEAN ('000)
Control	03-547	0/35	0			0
Trail Cr Diversion	03-548	7/37	18.9	1.7; 3.3; 3.3; 3.3; 3.3; 3.3; 3.3 10; 1 ; 4 ; 5 ; 9 ; 21 ; 22	21.5/37	0.58
Ross prop.	03-549	0/30	0			0
White Br.	03-550*	20/35	57.1	1.7; 1.7; 1.7; 1.7; 1.7; 3.3; 3.3; 3.3; 3.3; 3.3; 6.7; 6.7; 6.7; 6.7; 13.3; 13.3; 16.7; 26.7; 30; 40 16; 39; 41; 45; 49; 5 ; 6 ; 15; 33; 50; 4 ; 9 ; 26; 34 ; 11 ; 36 ; 17 ; 32 ; 21; 37	191.9/35	5.48
Fox Cr IDFG acc.	03-551**	15/34	44.1	1.7; 1.7; 1.7; 3.3; 3.3; 3.3; 3.3; 3.3; 3.3; 6.7; 6.7; 10; 16.7; 30; 30 4 ; 7 ; 14; 13; 15; 17; 18; 19; 21; 24; 26; 11; 27 ; 5; 29	125/34	3.68
Steel Br.	03-552	18/23	78.3	0; 0; 0; 0; 1.7; 1.7; 3.3; 3.3; 3.3; 6.7; 13.3; 13.3; 26.7; 36.7; 60; 63.3; 70; 93.3; 120; 193.3; 263.3 1; 9; 16; 18; 19; 7; 20; 5 ; 17; 22; 11; 6 ; 10 ; 12; 13 ; 8 ; 4 ; 2 ; 21; 15 ; 3 ; 14 ; 23	986.5/23	42.89
Six Springs	03-553 ***	24/33	72.7	1.7; 1.7; 1.7; 1.7; 1.7; 1.7; 1.7; 3.3; 3.3; 3.3; 3.3; 3.3; 3.3; 6.7; 6.7; 6.7; 10; 10; 10; 13.3; 16.7; 20; 20 1 ; 4 ; 7 ; 15 ; 20 ; 24 ; 27 ; 5 ; 10 ; 11 ; 12 ; 18 ; 22 ; 28 ; 17 ; 31 ; 33 ; 6 ; 21; 23; 25 ; 26 ; 9 ; 29	155.1/33	4.7
Bates Br.	03-554 ****	19/35	54.3	1.7; 1.7; 1.7; 1.7; 1.7; 1.7; 3.3; 3.3; 10; 13.3; 15; 16.7; 16.7; 16.7; 16.7; 20; 36.7; 50; 53.3 11 ; 15 ; 21 ; 22 ; 40 ; 50 ; 12 ; 19 ; 16; 26 ; 8 ; 13 ; 18 ; 24 ; 49; 43; 17 ; 4 ; 6	288.6/35	8.25
Buxton Br.	03-555	1/29	3.5	6.6 20	6.6/29	0.23
Cache Br.	03-556	2/35	5.7	1.7; 3.3 35; 5	5.0/35	0.14
Harrops Br.	03-557	0/22	0			0

Fish # and spore counts listed in red are those noted at sacrifice as having signs (opercular shortening, black-tail, scoliosis, or cranial deformities)

* 03-550 random sample fish# negative=7; 8; 18; 19; 22; 29; 35; 40; 46; 47; 48; 51; 55; 56; 61

**03-551 fish# negative= 1, 2, 3, 6, 8, 9, 10, 12, 15, 20, 22, 23, 25, 28, 30, 31, 32, 33, 34

***03-353 fish# negative= 2, 3, 8, 13, 14, 16, 19, 30, 33

****03-554 fish # negative=2; 14; 20; 31; 32; 34; 37; 41; 44; 47; 48; 53; 57; 58; 59; 60

Table 2. Summary data for 2003 Teton valley whirling disease sentinel tests.

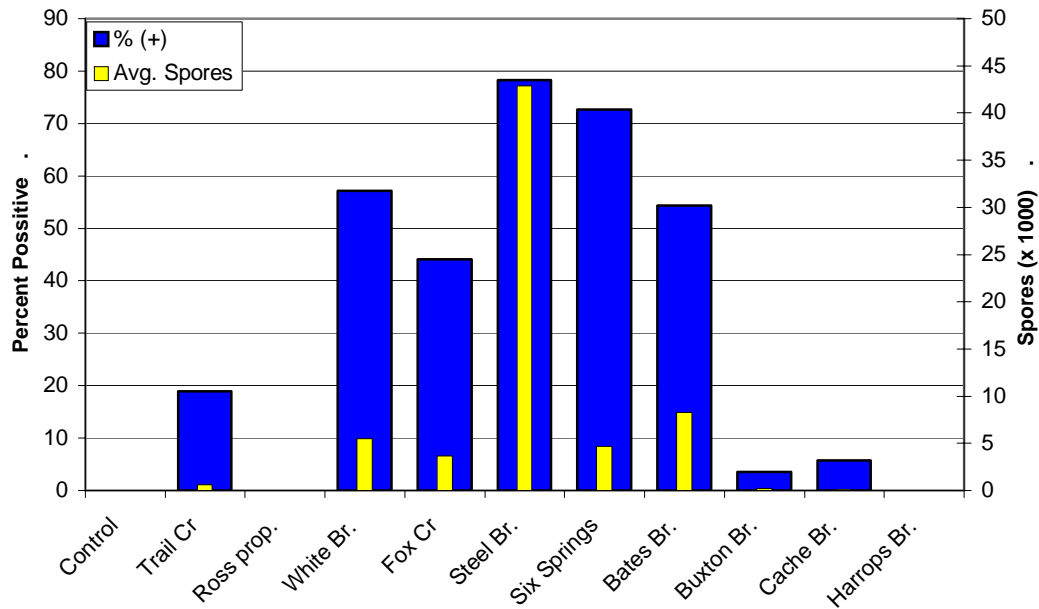


Figure 5. Comparison of percent-infected and mean spore counts per fish by location.

valley. These data were collected, processed and analyzed in a timely fashion. The Idaho Department of Fish and Game played a crucial role in filling the whirling knowledge gap in the Teton River. As with the electrofishing data, these initial data regarding whirling disease infectivity have not only increased our understanding of the Teton valley, but will play a vital role in shaping upcoming sampling efforts.

Significant progress was made towards Objective 5. The Western Division American Fisheries Society meeting was an ideal forum to present the initial results of the Juvenile Trout Study. This forum offered an opportunity to obtain important feedback from fisheries professionals throughout the western states, many of whom are currently researching similar topics. Additionally, this meeting was a great way to share information about the Juvenile Trout Project to the public concerned with fisheries issues in the Teton valley.

In summary, the project appears to be on task and is accomplishing the predetermined objectives in a timely fashion.

Other Pertinent Information

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Future Action

The next quarter will include collecting springtime abundance estimates throughout the tributaries sampled in the 2003 season. The resulting data will be utilized to determine overwinter survival in those reaches. Additionally, the next quarter mark the expansion of the Juvenile Trout Project to include adult redd surveys and the installation of up to 30 temperature logging devices. The goal of the redd survey is to enumerate the size, timing and distribution of spawning populations within key tributaries in the valley. These tributaries will include but are not limited to Fox Creek, Teton Creek, and Warm Creek.

Martin Koenig (graduate research assistant) is currently designing a presentation to illustrate the initial data on the distribution and species composition of juvenile trout in the Teton River. Lyn Benjamin will present the talk at the upcoming Henry's Fork Watershed Council meeting on April 20, 2004.

In order to better characterize distributions of whirling disease infectivity in key spawning and rearing tributary systems, a second sentinel exposure series is planned for June 2004. This exposure series will be conducted in similar fashion to the 2003 exposure, yet will focus more on tributary sites, with some replication of important 2003 sites. The goal is to gain greater understanding about whirling disease distribution and its potential threat to juvenile trout while they are still rearing in tributary locations.