FISHERIES INVESTIGATIONS IN THE YELLOWSTONE AND SHIELDS RIVER BASINS, PARK COUNTY, MONTANA

ANNUAL REPORT FOR 2003

Federal Aid Project F-113-R- 3

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ABSTRACT

Trout abundance at different locations throughout the upper Yellowstone River this spring was similar to most estimates compiled in recent years. Trout populations maintain this abundance despite continued low flow conditions. In spring 2003, combined trout abundance for fish seven inches or longer was estimated to be 1,051 fish/mile near the Mill Creek Bridge located in the heart of the Paradise Valley. Combined trout abundance was 1,369 fish/mile at Livingston, and 555 fish/mile near Springdale.

Mountain whitefish abundance in the Mill Creek Bridge, Ninth Street, and Springdale sample sections this spring was generally less compared to estimates from these same locations in 1999 or 2001. Whitefish abundance of fish seven inches or longer this year was estimated to be 7,742, 3,672 , and 2,017 fish/mile at these three locations, respectively. Whitefish numbers in the Springdale section were especially less compared to their high abundance estimated at this location in 2001. A pattern of decreasing whitefish abundance between upstream and downstream locations was similar this spring to previous whitefish estimates from the upper Yellowstone River.

Brown trout abundance was similar in two sections of the Shields River sampled this spring compared to other recent estimates. Abundance of brown trout seven inches or longer was 274 fish/mile in the Convict Grade section near the Shields River mouth, and 200 fish/mile in the Todd section near the town of Clyde Park.

One-hundred-five rainbow trout trapped moving upstream near the mouth of Mill Creek this spring were all mature fish that presumably entered the stream from the Yellowstone River to spawn. Peak catch rate occurred in mid April. A small number of fish trapped moving downstream at this location were mostly age 1+ cutthroat trout and rainbow trout, indicating that at least some of these fish remain in Mill Creek through winter, rather than returning to the Yellowstone River as young of the year.

Fish traps located above a constructed fish passage barrier in Mill Creek this spring failed to catch any fish that had been marked and released below this barrier. We have no conclusive evidence from this effort that the barrier allows fish passage as flow increases in the spring.

The average size of rainbow trout in spring gillnet catches at Dailey Lake was 9.1 inches this year. Walleye averaged 12.4 inches, and yellow perch 8.2 inches. Walleye and yellow perch averages are similar to samples collected in 2000 and 2001. The rainbow trout average is slightly less than recent years, explained by a larger number of smaller fish in the sample this year. Survivorship of recently stocked rainbow trout appears very good despite continued drought.

OBJECTIVES

Funds for this project are provided by grants from the Federal Aid in Sport Fish Restoration Act (16 U.S.C. 777-777k) supporting the Montana Statewide Fisheries Management Program. This program consists of two elements: Fisheries Management in Montana, and Statewide Program Coordination. The Fisheries Management element includes four activities, each with associated objectives:

State Program Activities and Objectives

1. Survey and Inventory
To survey and monitor the characteristics and trends of fish populations, angler harvest and preferences, and to assess habitat conditions in selected waters.

2. Fish Population Management
To implement fish stocking programs and/or fish eradication actions to maintain fish populations at levels consistent with habitat conditions and other limiting factors.

3. Technical Guidance
To review projects by government agencies and private parties which have the potential to affect fisheries resources, provide technical advice or decisions to mitigate effects on these resources, and provide landowners and other private parties with technical advice and information to sustain and enhance fisheries resources.

4. Aquatic Education
To enhance the public's understanding, awareness and support of the state's fishery and aquatic resources and to assist young people to develop angling skills and to appreciate the aquatic environment.

Statewide activities and objectives are addressed locally by ongoing fisheries investigations and management activities intended to enhance aquatic habitats and recreational fisheries in the upper Yellowstone and Shields River basins.

Local Project Objectives

In fiscal year 2003 (July 1, 2002 to June 30, 2003), project objectives for state project number 3350 (the Yellowstone and Shields drainage areas) were identical to the statewide objectives listed above. Project objectives are intended to guide continuing efforts to maintain and enhance local fisheries. In support of these efforts, the following data collections, compilations, and analyses are reported here under separate headings:

A. Estimates of trout abundance in three sections of the Yellowstone River based on spring sampling in 2003.

B. Estimates of mountain whitefish abundance in three sections of the Yellowstone River based on spring sampling in 2003.

C. Estimates of brown trout abundance in two sections of the Shields River based on spring sampling in 2003.

D. Summary of fish trapping results from Mill Creek: spring 2003.

E. Summary of gillnet catches at Dailey Lake: spring 2003.

State survey, inventory, and fish population management objectives are addressed under headings A through E. Technical guidance and aquatic education objectives are addressed on an ongoing basis by meetings with various angler groups, school groups, journalists, and the public. In fiscal year 2003 these meetings included a final year of participation in a Governor's task force investigating management issues affecting the upper Yellowstone river, work supporting the Upper Shields Watershed and Southern Crazy Mountain Watershed Associations, educational seminars for local school children, continuing education seminars for public school teachers, and meetings with local angling groups to discuss a variety of fisheries topics. Landowner contacts and consultations occurred routinely each month in conjunction with administration of the Montana Natural Streambed and Land Preservation Act and the Montana Stream Protection Act.

PROCEDURES

A. Estimates of trout abundance in three sections of the Yellowstone River based on spring sampling in 2003.

This spring we sampled trout abundance in three sections of the Yellowstone River (Table 1; Figure 1) normally examined as part of routine fisheries surveys (e.g., Tohtz 1996; Tohtz 1999; Tohtz 2001a).

Table 1. Survey sections where trout abundance was sampled from the Yellowstone River in 2003.

Section name	Survey date	Length (ft)	Approximate location \[1]		
Mill Creek Bridge	04/15/03	15,700	Upper Boundary	North	45.42653
				West	110.63109
			Lower Boundary	North	45.43279
				West	110.62998
Ninth Street	04/17/03	8,000	Upper Boundary	North	45.65430
				West	110.54970
			Lower Boundary	North	45.67211
				West	110.53794
Springdale	04/09/03	9,333	Upper Boundary	North	45.69857
				West	110.26393
			Lower Boundary	North	45.72960
				West	110.23761

1. Latitude and longitude (decimal degrees, WGS84 datum).

Fish were sampled with electrofishing gear mounted on an aluminum-hulled jet boat. This gear included a 5,000-watt generator and a Coffelt Model VVP-15 rectifying unit. Anodes were metal hoops with stainless steel droppers suspended from twin booms at the bow of the boat. The boat hull served as the cathode.

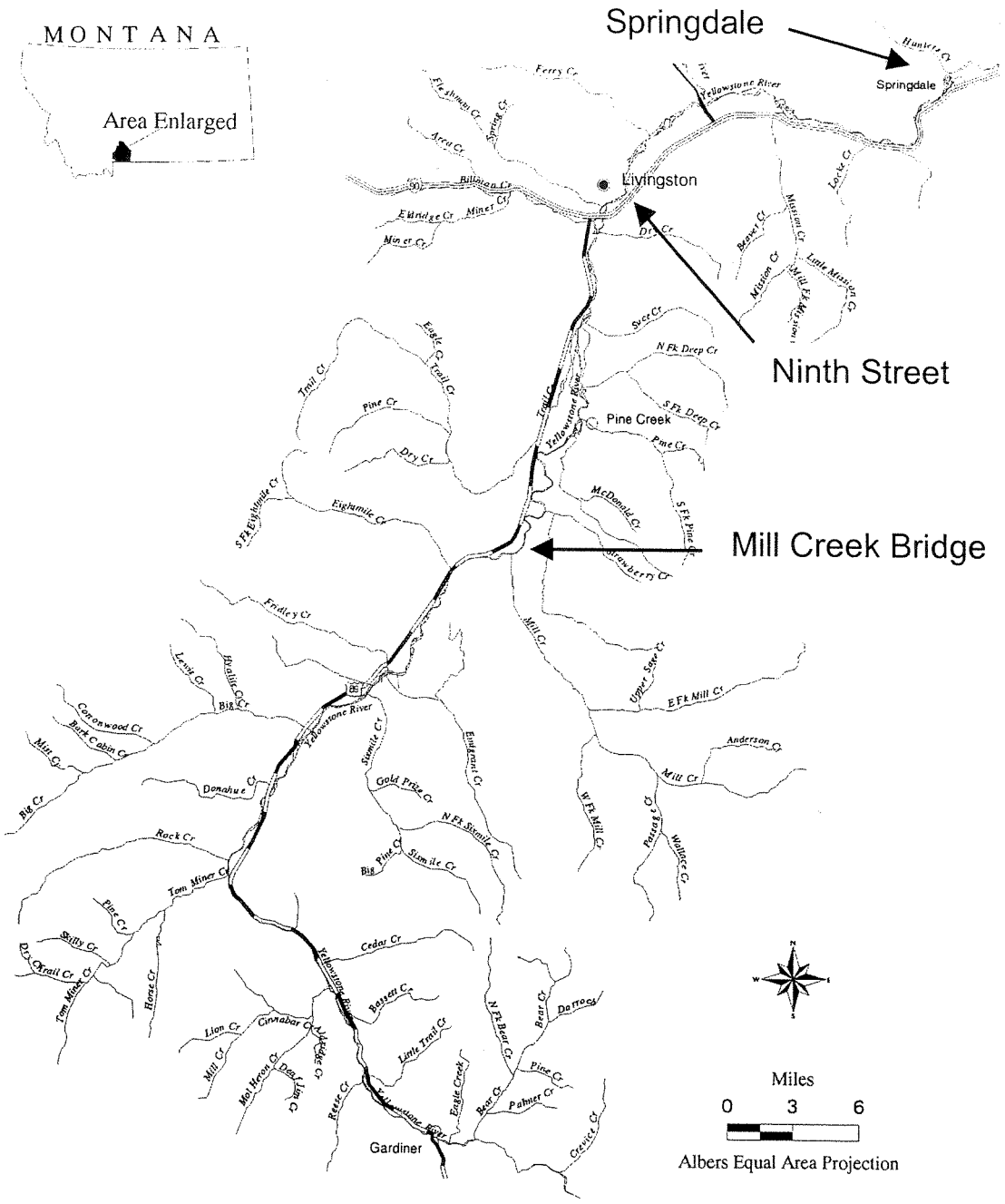

Figure 1. Upper Yellowstone drainage showing locations of the Mill Creek Bridge, Ninth Street, and Springdale sections sampled in spring 2003.

Fish were collected in live cars, identified [1], measured to the nearest 0.1 inch [2], and weighed to the nearest 0.01 pound. Trout were marked with fin clips and returned to the river after marking. Recapture sampling occurred about two weeks later in each section.

Fish abundance was estimated using a log-likelihood model available in software from Montana Fish, Wildlife and Parks (FWP; Anon. 1994). Estimates were evaluated for reliability at alpha = 0.05. Fish were separated into one-inch length groups for all abundance analyses.

B. Estimates of mountain whitefish abundance in three sections of the Yellowstone River based on spring sampling in 2003.

This spring we sampled mountain whitefish abundance in three sections of the Yellowstone River (Table 2) where we also sampled trout abundance. Fish handling and marking procedures were identical to those described in Part A, above.

Table 2. Survey sections where mountain whitefish abundance was sampled from the Yellowstone River in 2003.

Section name	Survey date	Length (ft)	Approximate location \1		
Mill Creek Bridge	04/15/03	2,100	Upper Boundary	North West	45.42653 110.63109
			Lower Boundary	North West	45.43283 110.63005
Ninth Street	04/17/03	3,300	Upper Boundary	North West	45.65430 110.54970
			Lower Boundary	North West	45.65756 110.54321
Springdale	04/09/03	4,400	Upper Boundary	North West	45.69857 110.26393
			Lower Boundary	North West	45.71168 110.26525

1. Latitude and longitude (decimal degrees, WGS84 datum).

1. Common names are used in this report. Scientific names are listed in Appendix A.

2. All fish lengths are total lengths (TL).

C. Estimates of fish abundance in two sections of the Shields River based on spring sampling in 2003.

This spring we sampled fish abundance in the Convict Grade and Todd sections of the Shields River (Table 3; Figure 2). These sections are part of a series of locations we have sampled periodically to monitor fish abundance in the mainstem Shields River (e.g., Tohtz 1996; Tohtz 1999; Tohtz 2001a; Table 3).

Table 3. Shields River sections where fish were sampled in spring 2003.

Section name	Survey date	Section length (ft)	Location\[1]
Todd	3/25/03	7,500	T2N, R9E, 33
Convict Grade	3/28/03	7,725	T1S, R10E, S22-23

1. Township, Range, Section

Fish were sampled in each section with electrofishing gear mounted on a small drift boat. This gear included a 4,500-watt generator and a Leach direct current rectifying unit. The cathode was a steel plate attached to the bottom of the drift boat; the anode was a single hand held (mobile) electrode connected to the power source by about 30 feet of cable.

In all cases, fish were collected in live cars, identified, measured to the nearest 0.1 inch, and weighed to the nearest 0.01 pound. Trout and mountain whitefish were marked with fin clips and returned to the stream. Recapture sampling was conducted about two weeks later in each section.

Data were processed using MR4, a computer program developed by FWP for processing electrofishing records (Anon. 1994). Fish numbers were estimated using the log-likelihood model.

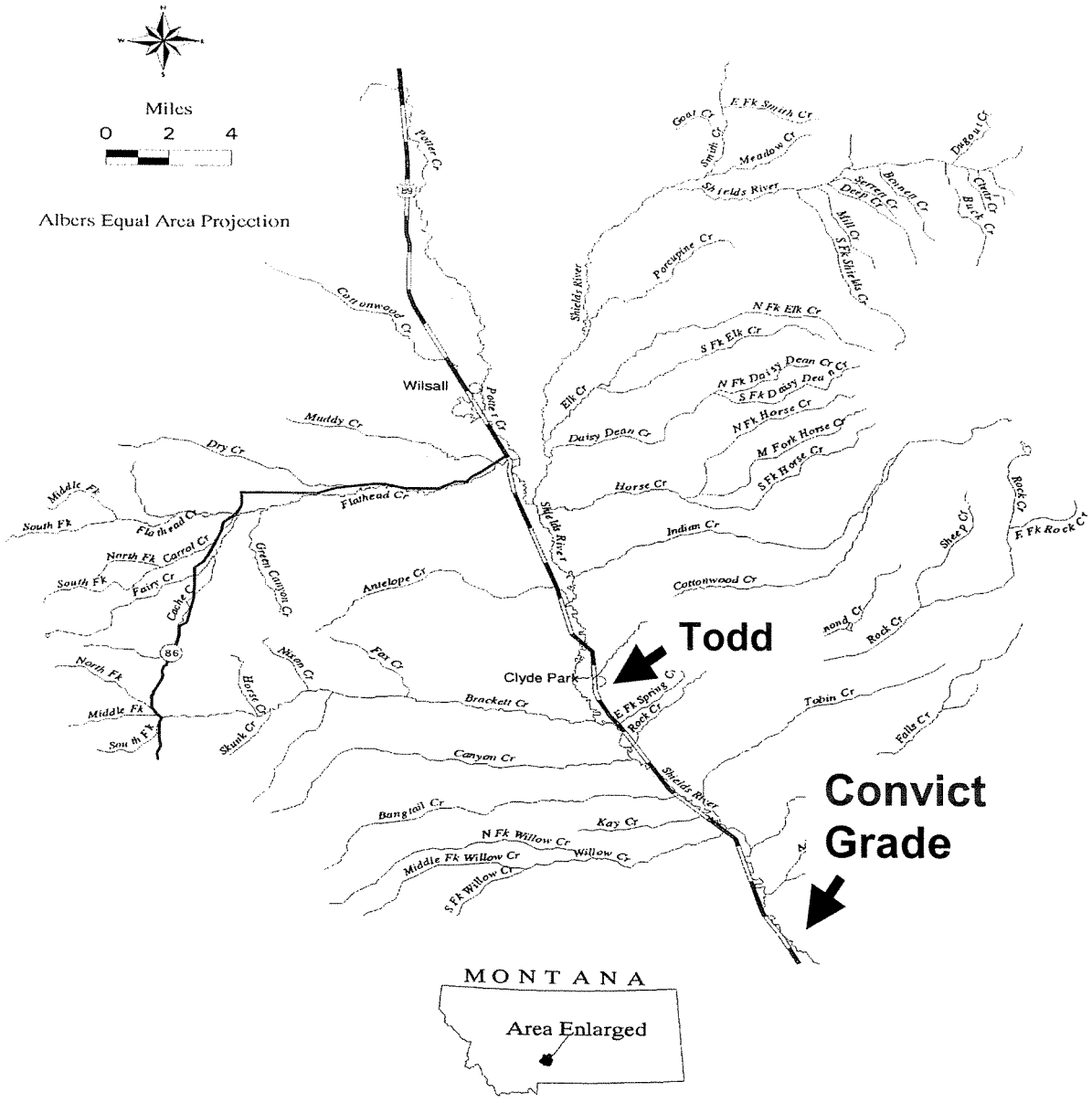

Figure 2. Shields River drainage showing locations of the Todd and Convict Grade sections sampled in spring 2003.

D. Summary of fish trapping results from Mill Creek: spring 2003.

Two-way fish traps were placed in Mill Creek to monitor fish movements before and during spring runoff. Traps were located near the creek mouth, and about six miles further upstream (Figure 3). The upstream trap was positioned about 200 yards above an existing fish passage barrier constructed in 1996 to prevent rainbow trout from moving upstream into areas occupied by unhybridized cutthroat trout. Our main sampling objective was to determine whether or not rainbow trout could swim past this fish passage barrier during the rising hyrograph in spring.

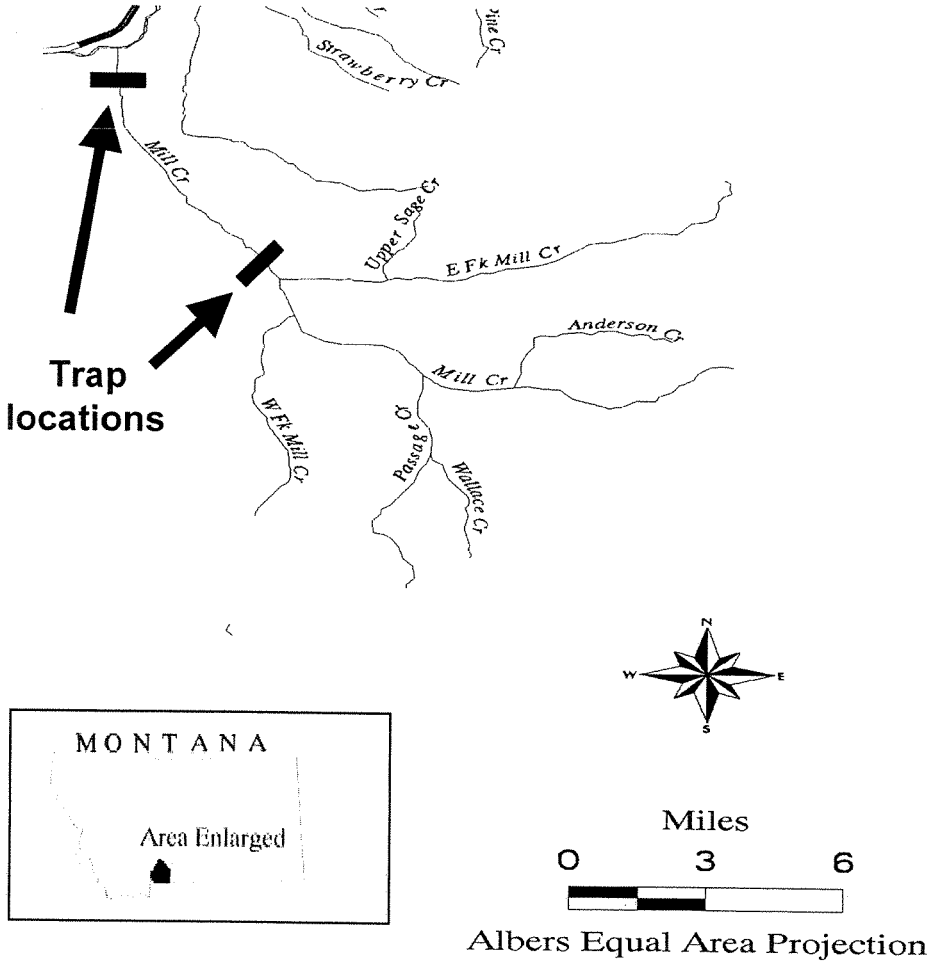

Figure 3. Mill Creek drainage showing fish trap locations in spring 2003.

Trap boxes were steel frames covered with plywood and a half-inch steel mesh. Each trap measured 30 x 36 x 48 inches and had a single conical wire mesh entrance about 16 inches in diameter tapering to a four inch opening inside each box. Boxes were set in pairs, one facing upstream, the other downstream (Photo 1). A conduit pipe fence and wire leads were used to block fish passage past the

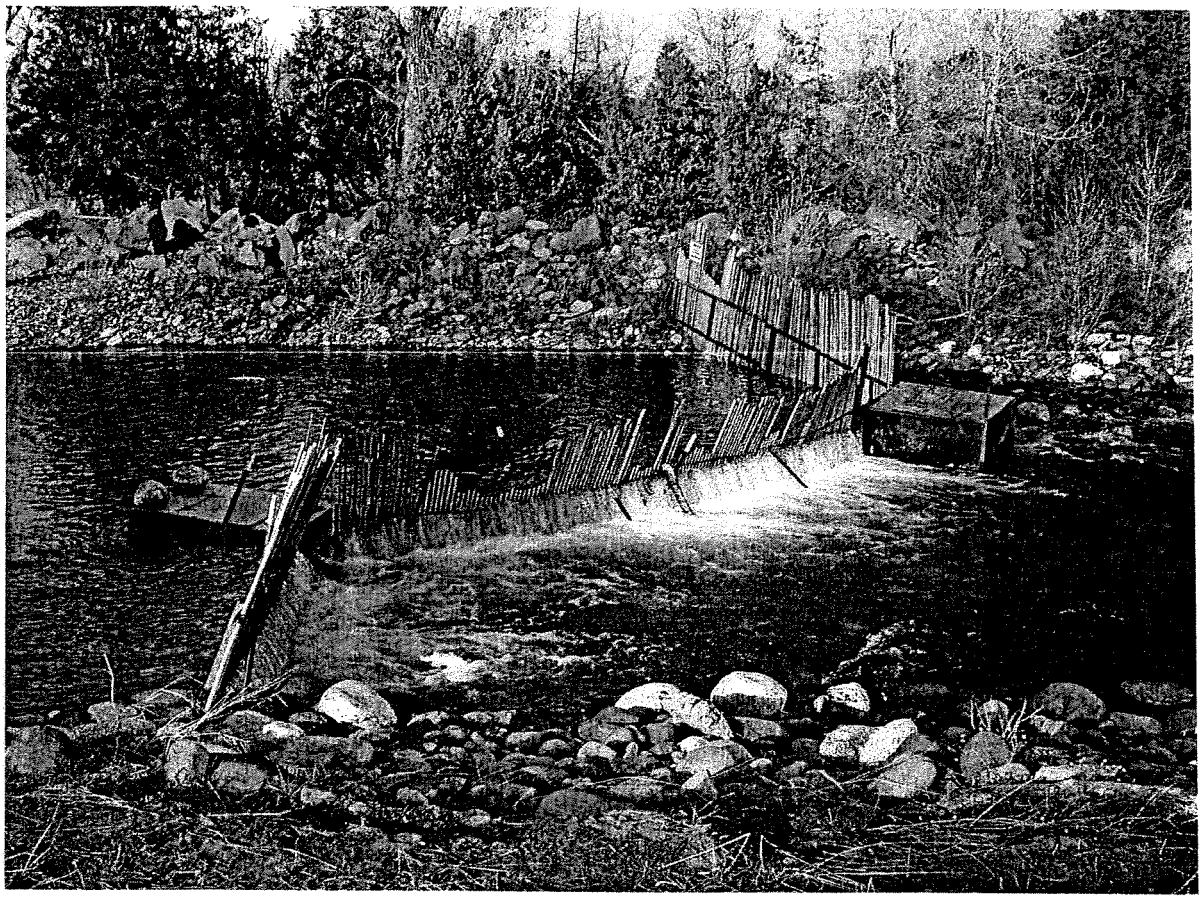

Photo 1. Two-way fish trap (downstream location) placed in Mill Creek to catch adult fish in spring 2003.

traps and to guide fish into either box, depending on which direction fish were moving. Openings in the fence and leads were small enough to prevent fish larger than about 4 inches total length from passing the trap; efficiency of the barrier was less for smaller fish.

The downstream trap was installed on March 14; the upstream trap was installed on March 17. Traps were checked thereafter each day until May 15, when high flow dictated that both traps had to be removed. All fish caught in these traps were identified and measured to the nearest 0.1 inch, and all fish were marked with a fin

clip before being released. Fish caught in the downstream trap received an upper caudal clip; fish caught in the downstream trap received a lower caudal clip. Fin clips from rainbow trout and cutthroat trout were stored in ethanol to allow for genetic anaylses of each fish at a later date, if desired.

Fish caught in upstream trap boxes were released upstream; fish caught in downstream trap boxes were released downstream.

Relative water surface elevations were monitored once each day at a staff gauge located under the East River Road bridge over Mill Creek. Water temperature was monitored continuously using StowAway brand temperature loggers placed in trap boxes at both the upstream and downstream locations.

E. Summary of gillnet catches at Dailey Lake: spring 2003.

Gillnet sampling in year 2003 mimicked previous spring sampling (e.g., Tohtz 2003). A single overnight set using two sinking and two floating experimental gillnets (Shepard 1993) determined the entire sample. Results in 2003 are compared to samples from several previous years.

RESULTS AND DISCUSSION

A. Estimates of rainbow, brown, and cutthroat trout abundance in three sections of the Yellowstone river based on spring sampling in 2003.

Most of our data for rainbow, brown, and cutthroat trout from each of the sections sampled in 2003 fit the log-likelihood model well (Table 4). Pooled data[3] for brown trout captured in the Mill Creek Bridge section modeled at a probability value less than 0.05. Combining length-groups for the pooled model was not possible with our data from cutthroat trout collected in the Springdale section.

Table 4. Trout/mile in three sections of the Yellowstone River based on spring sampling in 2003. Estimates are for fish seven inches (TL) or longer.

Section (mark date):			Overall model			Pooled model		
Fish species	N	SD	DF	Chi-square	P	DF	Chi-square	P /1
Mill Creek (April 15):								
Rainbow trout	598	51	8	16.87	0.03	7	12.80	0.08
Brown trout	290	31	11	19.08	0.06	7	15.38	0.03
Cutthroat trout	163	26	5	4.93	0.42	3	1.30	0.73
Ninth Street (April 17):								
Rainbow trout	1060	125	7	6.99	0.43	5	6.35	0.27
Brown trout	239	34	6	2.92	0.82	4	2.63	0.62
Cutthroat trout	70	21	3	3.06	0.38	2	3.04	0.22
Springdale (April 9):								
Rainbow trout	298	107	5	6.43	0.27	1	2.97	0.08
Brown trout	216	81	7	9.98	0.19	3	1.16	0.76
Cutthroat trout	41	24	1	2.35	0.13	----not suitable----		

1. N=estimated number; SD=standard deviation; DF=degrees of freedom; P=probability value.

3. Our analyses include a procedure that "pools" data by combining one-inch length groups of fish into new groups that contain at least three recaptured fish. Results of this analysis are reported in Table 4 as outputs of the pooled model.

Mill Creek Bridge Section

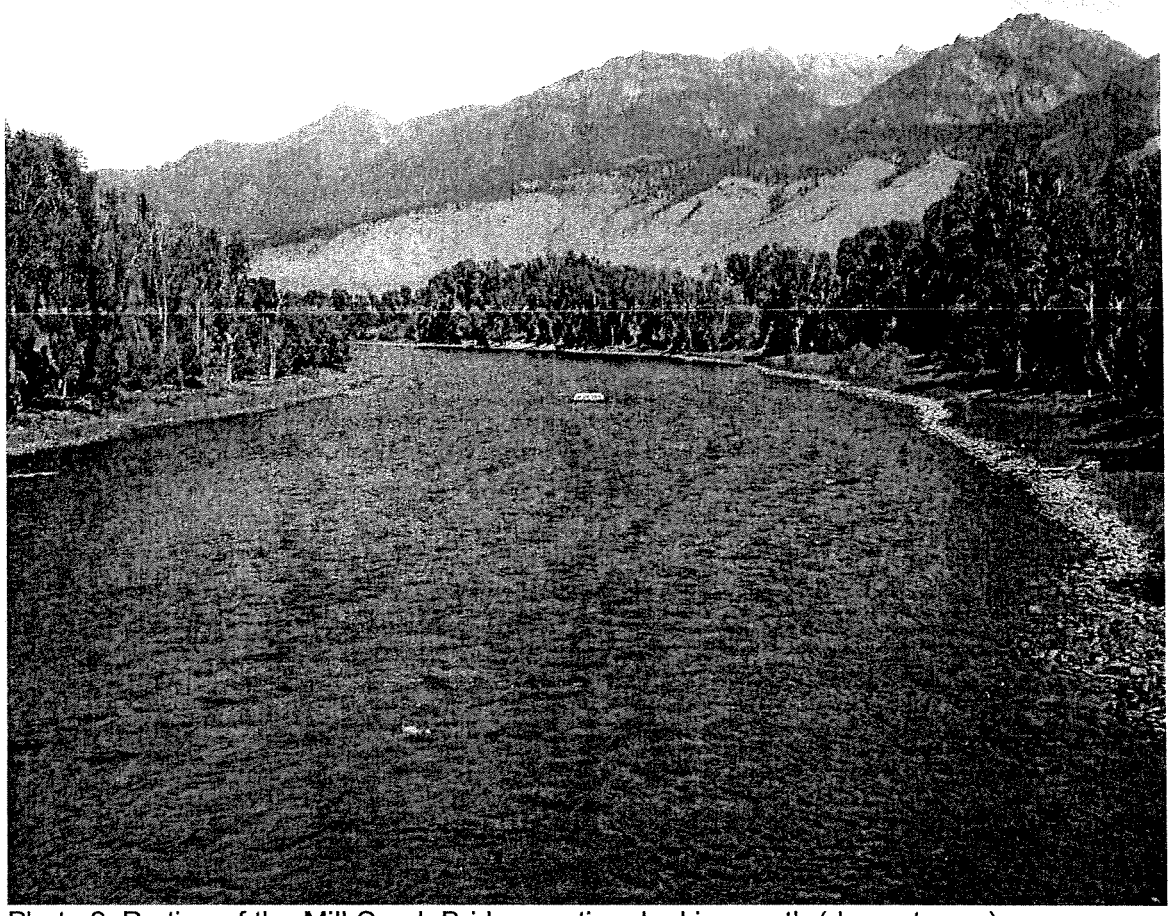

Photo 2. Portion of the Mill Creek Bridge section, looking north (downstream).

Our surveys in the Mill Creek Bridge section this year showed rainbow and brown trout abundance that was similar to estimates from surveys from the last few years (Figure 4). In 2001, we observed a statistically meaningful increase in rainbow trout abundance at this location (Tohtz 2001b). Excellent new recruitment and survivorship of this species apparently continues in this area of the river, despite our continuing drought.

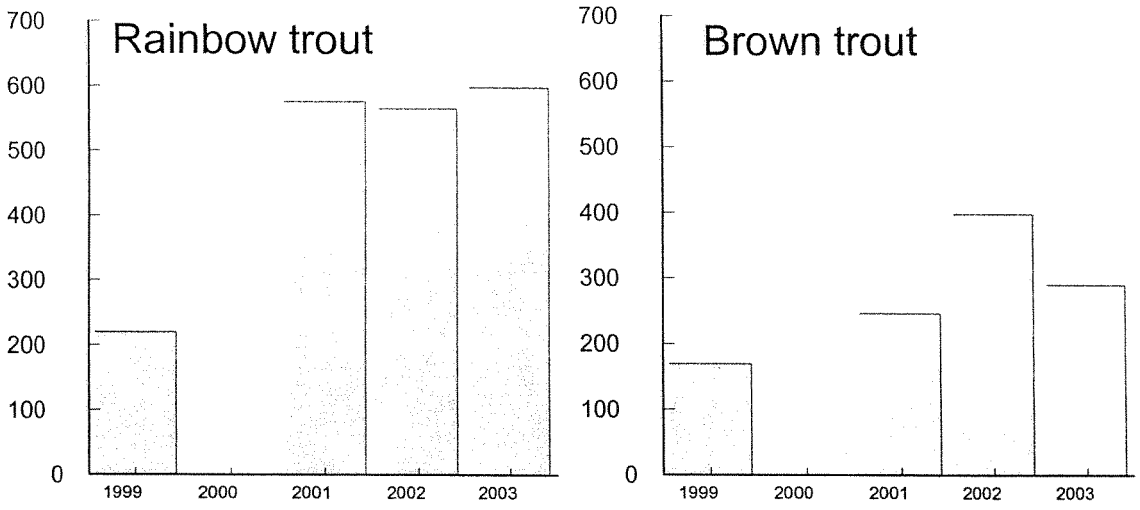

Figure 4. Rainbow trout and brown trout abundance in the Mill Creek Bridge section of the Yellowstone River based on spring sampling from 1999 through 2003. Estimates are for fish seven inches (TL) or longer. Vertical scales are fish/mile. Fish were not sampled at this location in 2000.

Cutthroat trout abundance was lower this year compared to other recent surveys, a trend we noticed in all areas sampled this spring. By conventional measures, this reduction is not yet statistically significant (Figure 5), and may not have meaningful implications for cutthroat populations. Perhaps we are simply observing different distributions of cutthroat trout in response to a wet spring and somewhat higher than normal runoff in most of the drainage, including tributary streams. However, drought continues. In part for this reason, we will continue to monitor cutthroat abundance as part of routine fish population surveys.

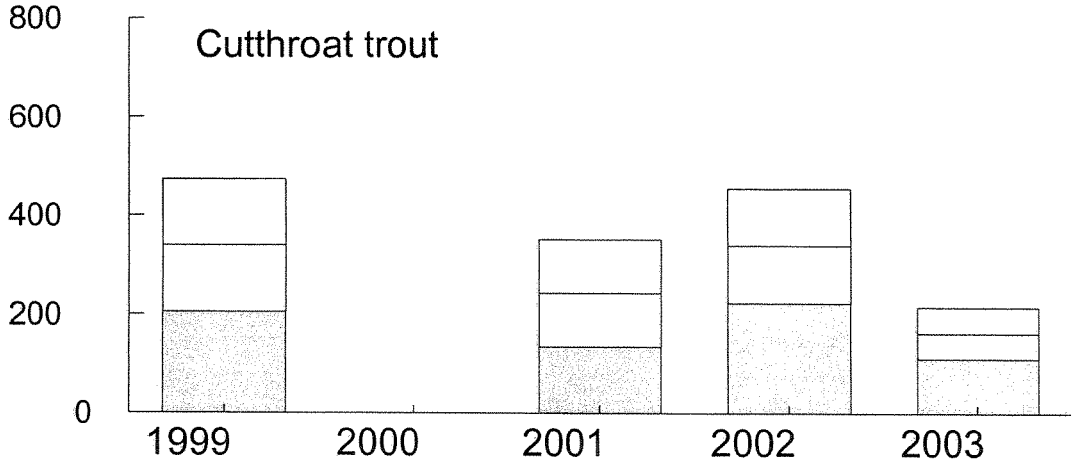

Figure 5. Cutthroat trout abundance in the Mill Creek Bridge section of the Yellowstone River based on spring sampling from 1999 through 2003. Estimates are for fish seven inches (TL) or longer. Vertical scale is fish/mile. Open intervals are plus or minus two SD of each point estimate. Fish were not sampled at this location in 2000.

Ninth Street Section

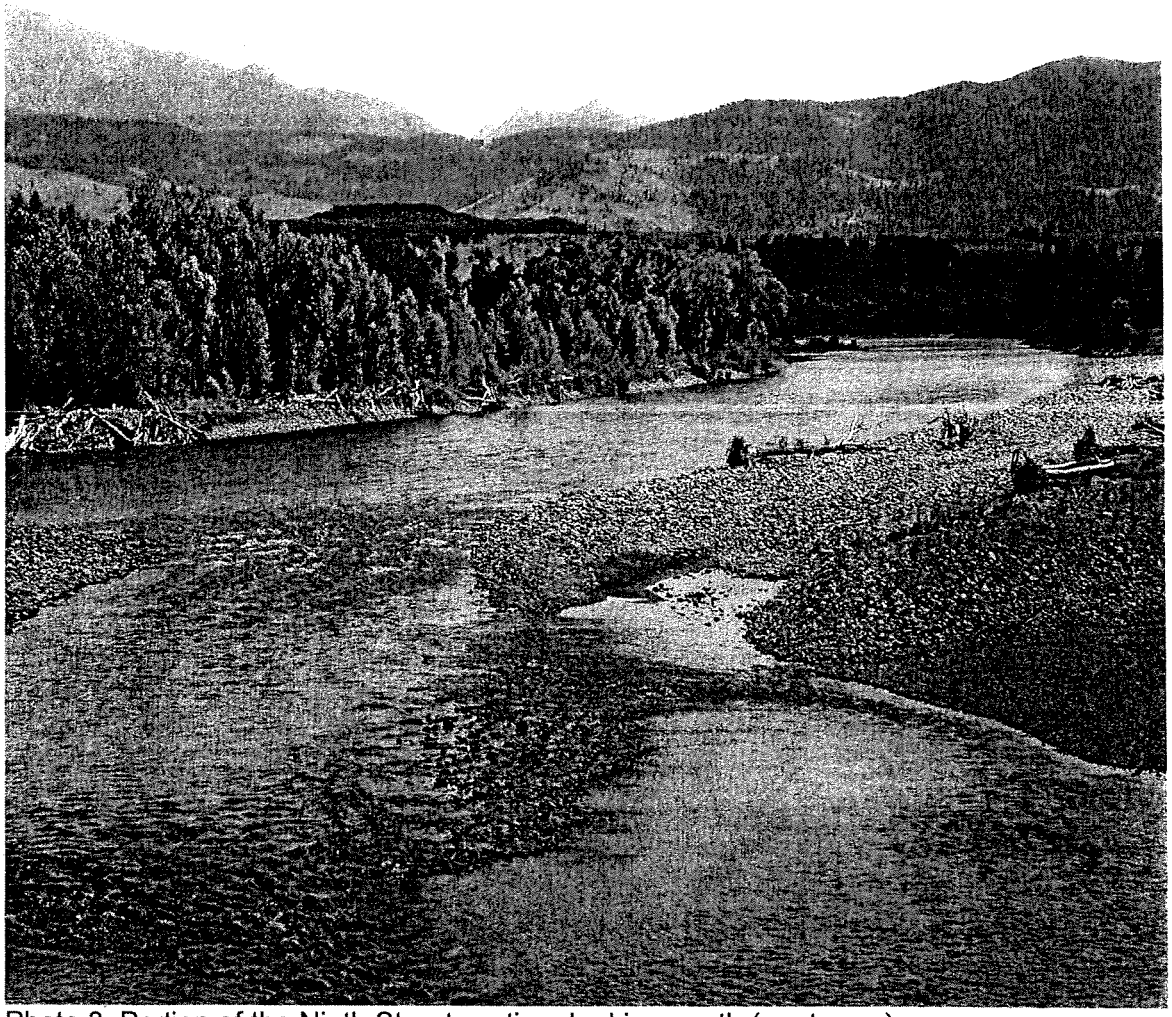

Photo 3. Portion of the Ninth Street section, looking south (upstream).

Estimates of cutthroat trout and brown trout abundance in the Ninth Street section were similar in 2003 to other recent surveys (Figure 6). Both species appear to have fully recovered from displacement (Tohtz 1998) that occurred during the large runoff events of 1996 and 1997. However, recent drought continues to be a concern.

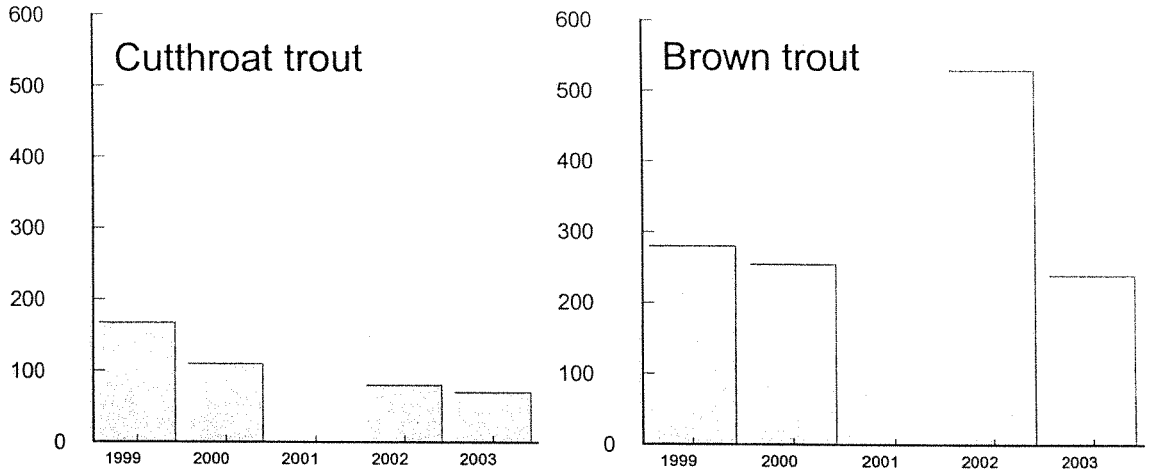

Figure 6. Cutthroat trout and brown trout abundance in the Ninth Street section of the Yellowstone River based on spring sampling from 1999 through 2003. Estimates are for fish seven inches (TL) or longer. Vertical scales are fish/mile. Fish were not sampled at this location in 2001.

Rainbow trout abundance this year was similar to last year's estimate, and resembles estimates from samples collected before the high runoff events of 1996 and 1997 (Figure 7).

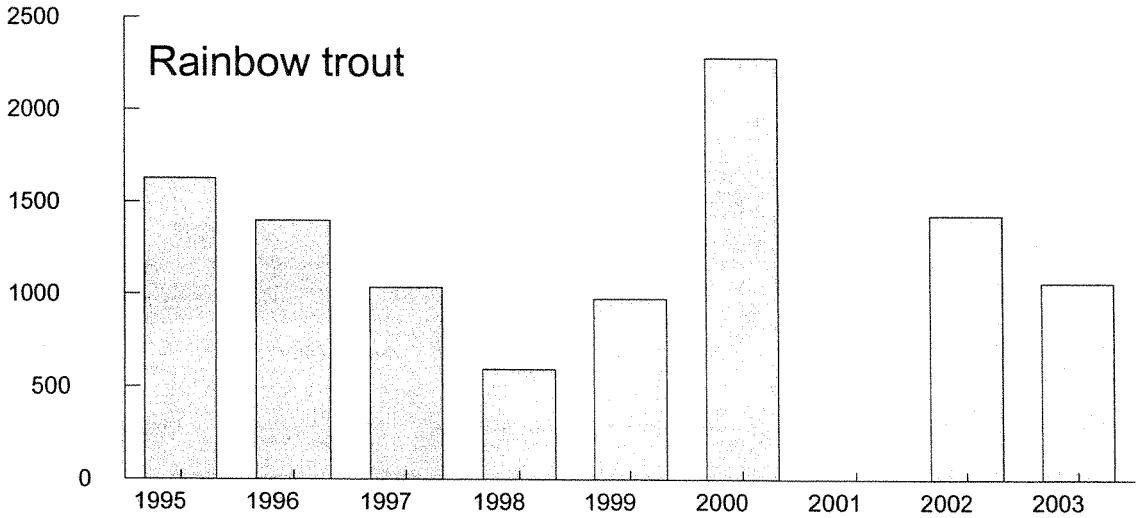

Figure 7. Rainbow trout abundance in the Ninth Street section of the Yellowstone River based on spring sampling from 1995 through 2003. Estimates are for fish seven inches (TL) or longer. Vertical scale is fish/mile. Fish were not sampled at this location in 2001.

Springdale Section

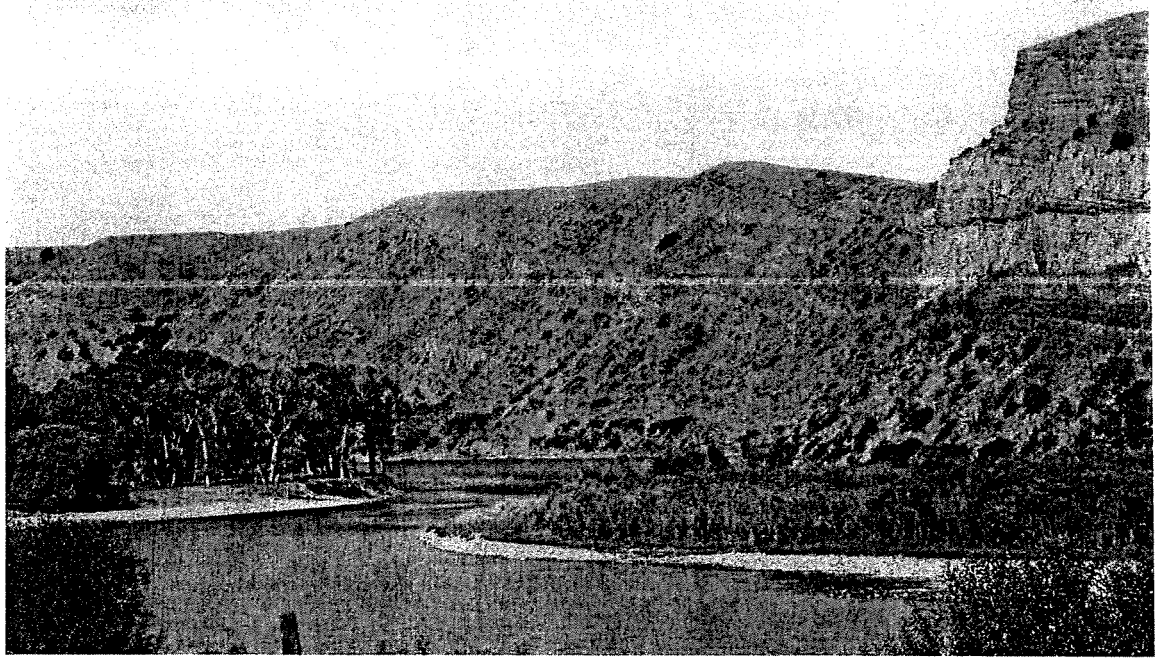

Photo 4. Portion of the Springdale section, looking west (upstream).

Our estimates of cutthroat and rainbow trout abundance near Springdale in 2003 were similar to estimates from other recent surveys (Figure 8). However, point estimates for both species suggest that a recent trend of increasing abundance at this location (e.g., Tohtz 2001b, Tohtz 2003) has stopped. We may now be seeing different, perhaps adverse, population responses to several years of significant drought. Sampling will occur in this section again next year in part to monitor this trend.

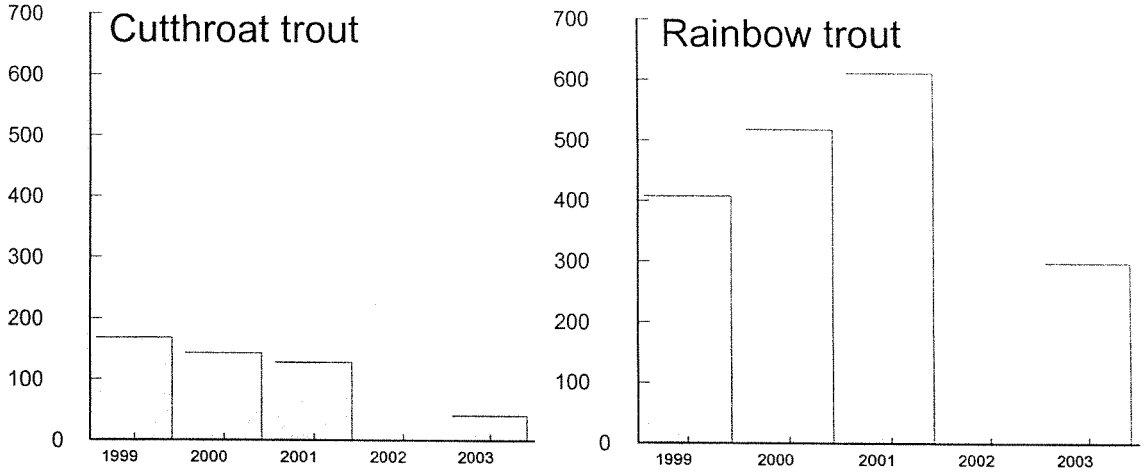

Figure 8. Cutthroat trout and rainbow trout abundance in the Springdale section of the Yellowstone River based on spring sampling from 1999 through 2003. Estimates are for fish seven inches (TL) or longer. Vertical scales are fish/mile. Fish were not sampled at this location in 2002.

Brown trout abundance in the Springdale section was similar in 2003 to estimates from previous years (Figure 9).

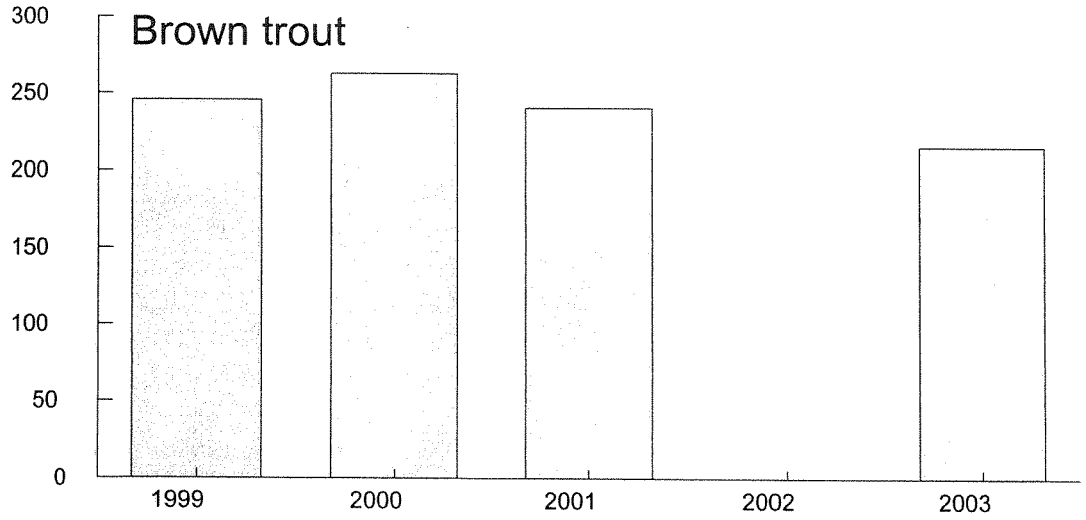

Figure 9. Brown trout abundance in the Springdale section of the Yellowstone River based on spring sampling from 1999 through 2003. Estimates are for fish seven inches (TL) or longer. Vertical scale is fish/mile. Fish were not sampled at this location in 2002.

B. Estimates of mountain whitefish abundance in three sections of the Yellowstone River based on spring sampling in 2003.

Our data for mountain whitefish from three sections sampled in 2003 fit the log-likelihood model well (Table 5).

Table 5. Mountain whitefish/mile in three sections of the Yellowstone River based on spring sampling in 2003. Estimates are for fish seven inches (TL) or longer.

			Overall model			Pooled model		
Section (mark date):	N	SD	DF	Chi-square	P	DF	Chi-square	P\[1]
Mill Creek (April 15):	7,742	599	5	4.24	0.52	3	4.24	0.24
Ninth Street (April 17):	3,672	384	5	1.54	0.91	2	0.23	0.89
Springdale (April 9):	2,017	423	4	3.04	0.55	1	0.86	0.35

1. N=estimated number; SD=standard deviation; DF=degrees of freedom; P=probability value.

Mountain whitefish abundance was uniformly less in each river area sampled in 2003 compared to estimates from these same locations made in previous years (Figure10; Figure 11; Figure 12). Perhaps mountain whitefish abundance is suppressed by several years of continuous drought.

Figure 10. Mountain whitefish abundance in the Mill Creek Bridge section of the Yellowstone River based on spring sampling in 1999, 2001, and 2003. Estimates are for fish seven inches (TL) or longer. Vertical scale is thousands of fish/mile.

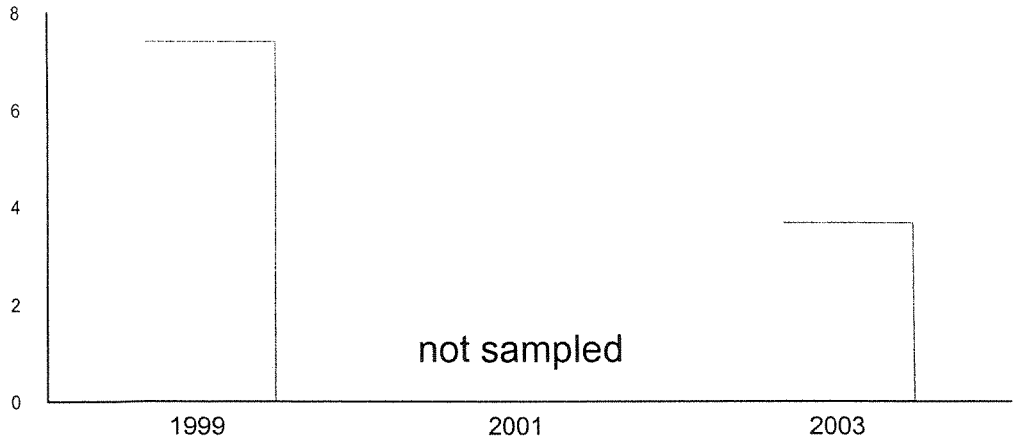

Figure 11. Mountain whitefish abundance in the Ninth Street section of the Yellowstone River based on spring sampling in 1999 and 2003. Estimates are for fish seven inches (TL) or longer. Vertical scale is thousands of fish/mile.

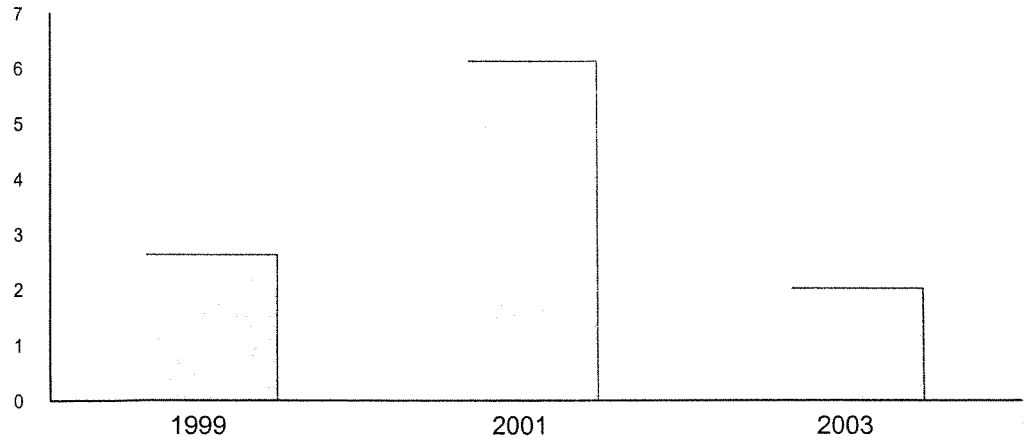

Figure 12. Mountain whitefish abundance in the Springdale section of the Yellowstone River based on spring sampling in 1999, 2001, and 2003. Estimates are for fish seven inches (TL) or longer. Vertical scale is thousands of fish/mile

Maximum whitefish abundance still occurred in the Paradise Valley. Fish numbers progressively decreased at downstream locations (Figure 13).

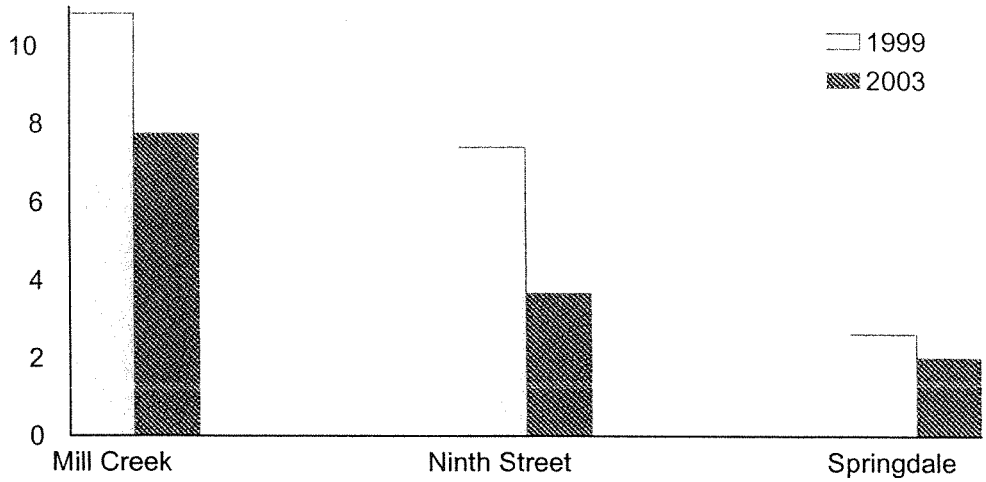

Figure 13. Mountain whitefish abundance at three locations in the Yellowstone River based on spring sampling in 1999 and 2003. Estimates are for fish seven inches (TL) or longer. Vertical scale is thousands of fish/mile.

C. Estimates of brown trout abundance in two sections of the Shields River based on spring sampling in 2003.

Data for brown trout collected in the Shields River this spring fit the log-likelihood model well, with one exception: data for brown trout collected in the Convict Grade section fit the overall model at a probability value less than 0.05 (Table 6).

Table 6. Brown trout/mile in the Convict Grade and Todd sections of the Shields River based on spring sampling in 2003. Estimates are for fish six inches (TL) or longer.

Section (mark date):			Overall model			Pooled model		
	N	SD	DF	Chi-square	P	DF	Chi-square	P \[1]
Convict Grade (April 9):	274	50	5	15.08	0.01	5	2.90	0.23
Todd (March 25)	200	22	8	11.98	0.15	5	6.18	0.29

1. N=estimated number; SD=standard deviation; DF=degrees of freedom; P=probability value.
2. Insufficient DF for this model.

In both sections, brown trout abundance was similar compared to other recent surveys at these same locations (Figure 14). Abundance was also similar between the upstream and downstream locations, a pattern of similarity noted in earlier reports (e.g., Tohtz 2001a; Tohtz 2001b).

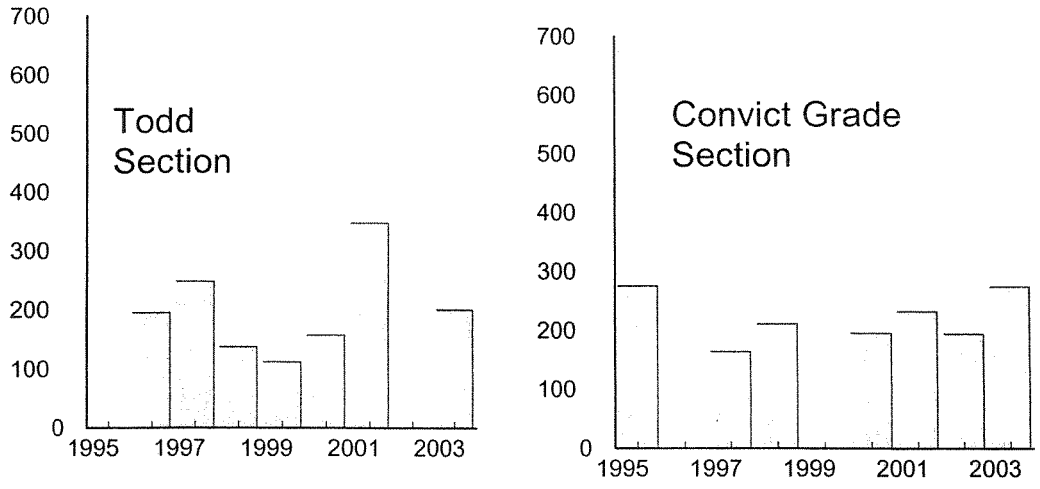

Figure 14. Brown trout abundance in the Todd and Convict Grade sections of the Shields River based on spring sampling from 1995 through 2003. Missing values are years when fish were not sampled at these locations. Vertical scales are fish/mile.

D. Summary of fish trapping results from Mill Creek: spring 2003.

Downstream Trap

One-hundred-five rainbow trout were captured moving upstream in the lower trap near the mouth of Mill Creek. All were mature fish (Figure 15). We first caught fish a few days after the trap was installed. The last rainbow trout were caught in the downstream trap April 26. Catch rate increased with increasing flow, peeking by mid April (Figure 16). Although fish were still moving upstream in late April, trapping them became increasingly difficult, primarily because of increasing flow and associated problems with debris.

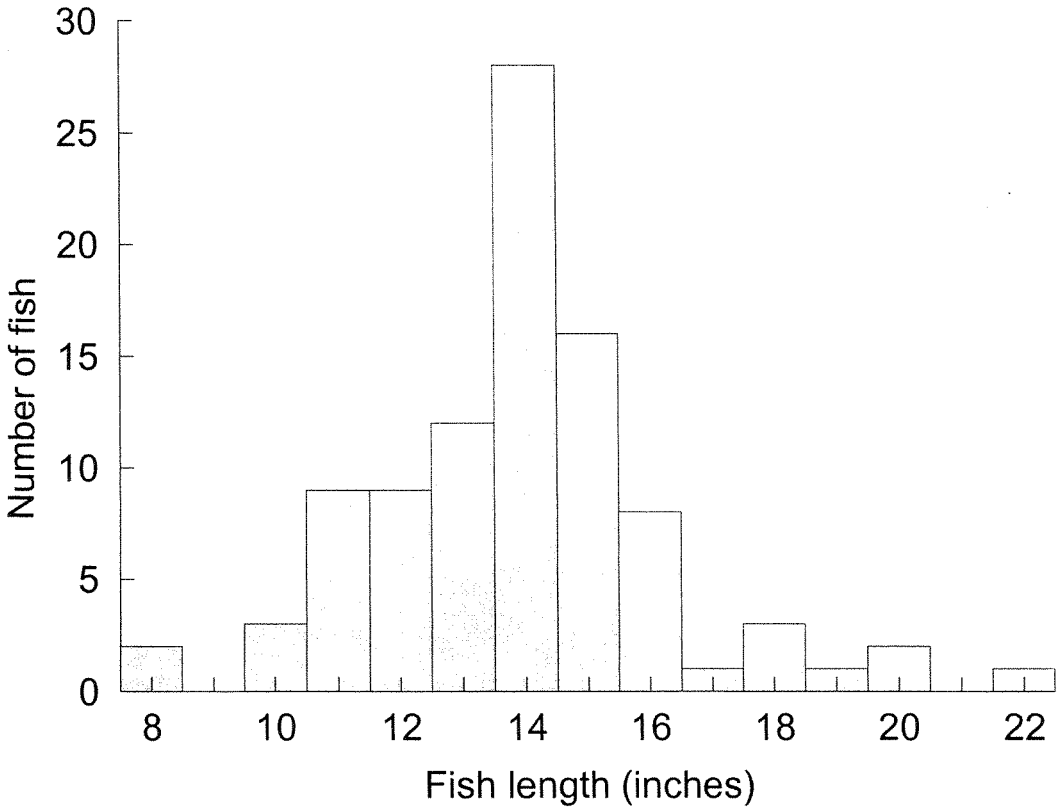

Figure 15. Length frequency distribution of rainbow trout caught moving upstream near the mouth of Mill Creek in spring 2003.

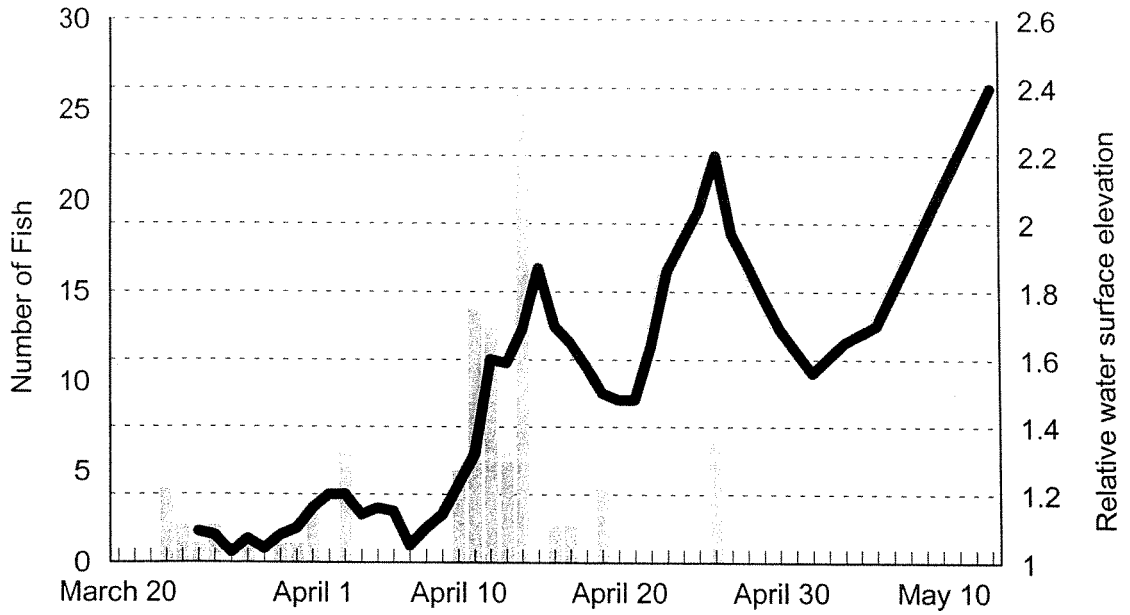

Figure 16. Rainbow trout caught moving upstream near the mouth of Mill Creek in spring, 2003. Vertical bars show number of fish. Solid line shows relative water surface elevation each day.

Thirty-two salmonids were caught moving downstream in the lower trap. These were mostly small fish: eight rainbow trout averaged 5.7 inches, nine cutthroat trout averaged 7.4 inches, and thirteen mountain whitefish averaged 5.5 inches long. We also caught two brown trout that were 3.8 and 10.2 inches long, respectively. Most of the rainbow and cutthroat trout were age 1+ suggesting that at least some portion of fish from these populations remain in Mill Creek over winter, rather than returning to the Yellowstone River as young of the year.

All hybrid-looking fish (rainbow x cutthroat crosses) captured in the downstream trap were mature fish caught moving upstream. We first caught fish that we deemed to be hybrids at this location on April 17, and captures of hybrid-looking fish began to increase by April 26, suggesting that hybrid fish might be entering Mill Creek to spawn later than unhybridized rainbow trout. Unfortunately we could not maintain effective traps much past April 26. For this reason, we also failed to capture a significant number of mature cutthroat trout by the time our trapping effort ended: their peak spawning movements occur later in the spring.

We documented a spring run of mature-size mountain whitefish (Figure 17) moving into Mill Creek closely correlated with increasing flows (Figure 18). This movement was unknown to us previously, and demonstrates again how placing barriers in streams to protect upstream populations of cutthroat trout could have unintended consequences for other species that may depend on connected drainage systems.

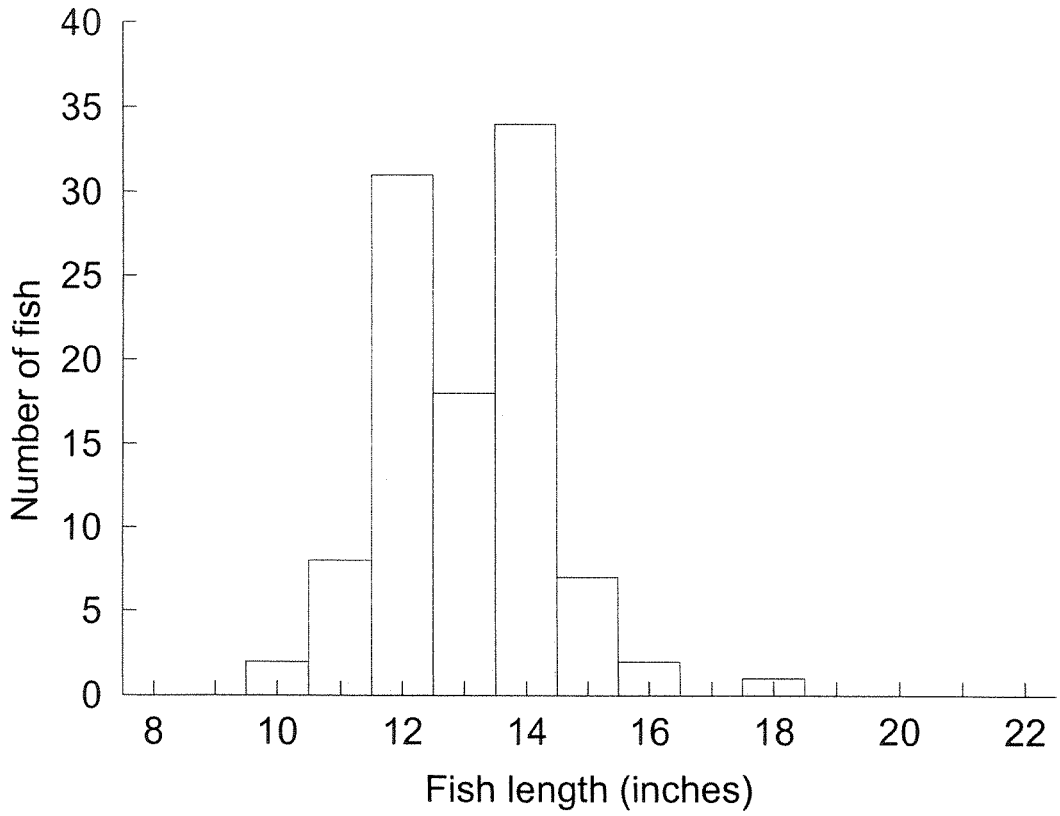

Figure 17. Length frequency distribution of mountain whitefish caught moving upstream near the mouth of Mill Creek in spring 2003.

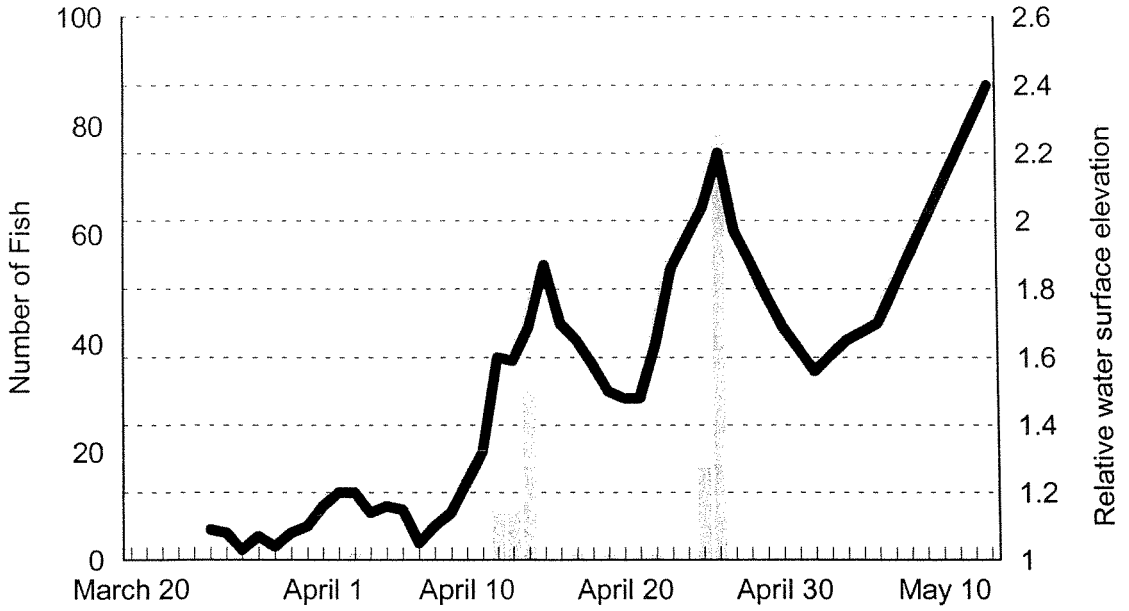

Figure 18. Mountain whitefish caught moving upstream near the mouth of Mill Creek in spring 2003. Vertical bars show number of fish. Solid line shows relative water surface elevation each day.

Upstream Trap

Very few fish were caught in the upstream trap located just above a constructed fish passage barrier. Excluding fish recaptured at this location after being marked, only five fish were caught moving downstream at this location. All were cutthroat trout (Table 7).

Table 7. Fish trapped moving downstream above a constructed fish passage barrier on Mill Creek, spring 2003.

Species	Length (inches)	Date of capture
Yellowstone cutthroat trout	8.6	April 11
Yellowstone cutthroat trout	12.7	April 12
Yellowstone cutthroat trout	3.5	April 16
Yellowstone cutthroat trout	6.1	April 23
Yellowstone cutthroat trout	11.1	April 27

No fish caught in the upstream trap had been marked below the barrier, supporting the idea that the barrier may effectively block fish passage from downstream areas during the rising hydrograph in spring. However, we did catch more fish moving upstream than down at the upstream trap location, despite the fact that their was only a few hundred yards of stream between this trap and the fish passage barrier. These captures occurred throughout the duration of the trapping effort, and included a rainbow trout and a possible rainbow x cutthroat hybrid caught well into the trapping effort, in addition to cutthroat trout (Table 8).

Table 8. Fish trapped moving upstream above a constructed fish passage barrier on Mill Creek, spring, 2003.

Species	Length (inches)	Date of capture
Yellowstone cutthroat trout	12.8	March 18
Yellowstone cutthroat trout	5.2	April 2
Yellowstone cutthroat trout	5.3	April 2
Yellowstone cutthroat trout	13.4	April 8
Yellowstone cutthroat trout	15.1	April 14
Yellowstone cutthroat trout	11.8	April 24
Rainbow trout	13.2	April 6
Rainbow x cutthroat	13.8	April 10
Mountain whitefish	10.2	March 19

Possibly these fish held in a small area below the trap for several weeks after it was installed before moving upstream. But they may also have negotiated the barrier as spring runoff progressed, perhaps entering the upstream trap ahead of marked fish that would have passed the trap later if we could have maintained the trapping effort longer. Regardless, at this point we have no definitive evidence that the barrier is not doing the job that it was intended to do.

E. Summary of gillnet catches at Dailey Lake: spring 2003.

The average number of rainbow trout caught in each gillnet at Dailey Lake was much larger in 2003 compared to similar sampling efforts in recent years (Table 9). Average fish length was smaller because all of the increased catch is explained by a larger number of smaller fish in the sample (Figure 19). A larger number of smaller fish indicates good survivorship of recently stocked rainbow trout.

Table 9. Summaries of gillnet catches at Dailey Lake based on spring sampling from 1997 through 2003.

		Rainbow trout		Yellow perch		Walleye	
Year	Set date	Fish/net	Mean TL (inches)	Fish/net	Mean TL (inches)	Fish/net	Mean TL (inches)
1997	04/23	9.8	17.4	35.8	8.8	15.3	14.6
1998	05/03	5.8	18.9	59.0	8.9	15.8	10.6
1999	04/27	10.3	15.0	210.3	6.3	15.0	13.4
2000	05/16	4.8	16.2	14.5	8.9	11.8	13.2
2001	05/17	4.5	17.4	8.5	8.5	11.8	13.5
2002	05/20	5.3	15.7	28.5	8.9	11.5	13.1
2003	05/14	22.8	9.1	58.?	8.2	8.8	12.4

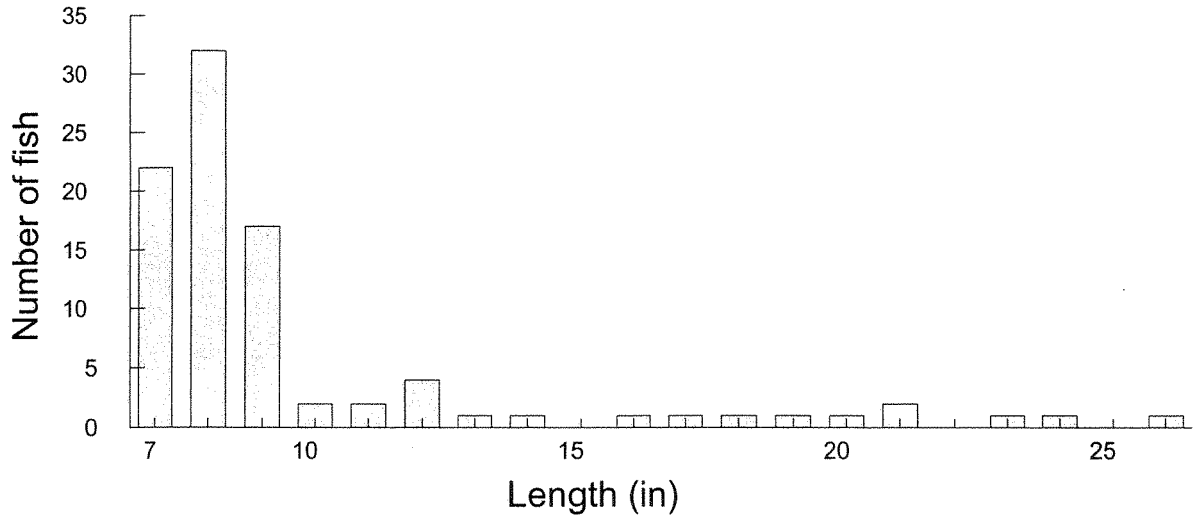

Figure 19. Length frequency distribution of rainbow trout caught in gillnets at Dailey Lake in spring 2003.

The average length of yellow perch in our sample this year resembled last year's catch. Average length has been consistently similar now for several years (Table 9). The average number of yellow perch caught in our nets in recent years has increased (Table 9). Yellow perch continue to thrive in Dailey Lake.

The number of walleye caught in our nets this year was slightly less than our sample size in recent years (Table 9). Average length was also slightly less. Small differences like these could easily be explained by chance occurrences in sampling. Like rainbow trout and yellow perch, walleye seem to be maintaining steady growth and abundance over time. For these reasons, current stocking rates (Table 10) will be continued at this time.

Table 10. Numbers of walleye and rainbow trout stocked in Dailey Lake from 1999 through 2003.

Year	Species	Variety	Number	Mean length (in)
1999	Walleye	Fort Peck	5,000	1.6
	Walleye	Fort Peck	5,000	3.3
	Rainbow trout	Eagle Lake	10,098	4.8
	Rainbow trout	Desmet	5,000	5.3
2000	Walleye	Fort Peck	5,000	1.6
	Walleye	Fort Peck	5,000	3.3
	Rainbow trout	Eagle Lake	10,000\[1]	3.5\[1]
	Rainbow trout	Desmet	4,769	4.6
	Rainbow trout	Arlee	10,140	2.5
2001	Walleye	Fort Peck	5,000	1.6
	Walleye	Fort Peck	5,000	3.5
	Rainbow trout	Eagle Lake	10,000\[1]	3.5\[1]
	Rainbow trout	Desmet	4,769	4.6
	Rainbow trout	Arlee	10,140	2.5
2002	Walleye	Fort Peck	5,000	1.7
	Walleye	Fort Peck	3,542	2.6
	Rainbow trout	Eagle Lake	10,305	3.8
	Rainbow trout	Desmet\[2]	5,049	5.0
	Rainbow trout	Arlee	10,392	3.0
2003	Walleye	Fort Peck	5,000	1.1
	Walleye	Fort Peck	5,069	3.0
	Rainbow trout	Eagle Lake	10,179	3.5
	Rainbow trout	Desmet\[2]	5,227	6.3
	Rainbow trout	Arlee	10,000	3.8

1. Approximate
2. The "Desmet" strain rainbow stocked at Dailey Lake includes other wold rainbow strains.

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APPENDIX A: Common and scientific names for fish referred to in this report.

Common name	Scientific name
Brown trout	*Salmo trutta*
Mountain whitefish	*Prosopium williamsoni*
Rainbow trout	*Oncorhynchus mykiss*
Walleye	*Stizostedion vitreum*
Yellow perch	*Perca flavescens*
Yellowstone cutthroat trout (cutthroat trout)	*Oncorhynchus clarki bouvieri*