F-113-R1
F-113-R2
F-113-R3
Region 2

FISHERIES DIVISION
Federal Aid Job Progress Report

Montana Statewide Fisheries Management

Federal Aid Project No: F-113-R1, R2, R3

Fiscal Year: July 1, 2000 – June 30, 2001
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Project Title: Statewide Fisheries Management
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ABSTRACT

Bitterroot River trout populations overall are holding up well despite two years of severe drought in 2000 and 2001, and the presence of whirling disease infections in the upper river. Westslope cutthroat populations have increased since restrictive fishing regulations were imposed in 1990 and rainbow and brown trout populations are within the normal range of past monitoring. The parasite associated with whirling disease, *Myxobolus cerebralis* was found in higher densities in the upper river particularly the East Fork Bitterroot.. Through radio telemetry, we were able to identify spawning areas used by fluvial westslope cutthroat. Westslope cutthroat used a variety of streams, but the Nez Perce Fork is where most from the West Fork Bitterroot and upper Bitterroot River spawned. Big Creek has also been identified as an important spawning tributary for cutthroatxrainbow trout hybrids.

Fish population monitoring on the Bitterroot National Forest indicates that population trends vary throughout the drainage. No overall trend is apparent, except that the fires of 2000 and resulting watershed instability have caused debris flows and increased water temperatures in some reaches. The debris flows have had serious impacts to the fishery in some streams. Fishing regulation restrictions appear to be having a positive effect in Skalkaho and Daly Creeks. . The long term monitoring of water temperature in Bitterroot drainage streams continues to provide a database that is useful for comparisons between streams. A few more sites were added to the genetics database, which is primarily used to identify the locations of pure and hybridized populations of westslope cutthroat.

The stocking of Lake Como with kokanee has had mixed success. Early survival appeared to be high, however recent sampling has not identified much adult survival or spawning. Stocking of kokanee will be discontinued.

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BACKGROUND

The Bitterroot River flows in a northerly direction from the confluence of the East and West Forks near Conner, Montana. The river flows 84 miles through irrigated crop and pastureland to it's confluence with the Clark Fork River near Missoula, Montana. Five major diversions and numerous smaller canals remove substantial quantities of water from the river during the irrigation season (Spoon 1987). In addition, many of the tributaries, which originate on the BNF are diverted for irrigation during the summer months and contribute little streamflow to the river during that time. Therefore, many tributaries and the mainstem of the Bitterroot River are chronically dewatered during the irrigation season. Streamflow characteristics vary along the Bitterroot River, with the most critically dewatered reach between Hamilton and Stevensville (Spoon 1987). To help alleviate the mainstem dewatering, the MFWP annually supervises the release of 15,000 acre-feet of water from Painted Rocks Reservoir on the West Fork of the Bitterroot River and 3,000 acre-feet of water from Lake Como. Urbanization and associated development of the floodplain is increasing in the Bitterroot Valley (Javorsky 1994).

The Bitterroot River is an important sport fishery for anglers in western Montana. Pressure estimates from the statewide survey indicate that the Bitterroot River supported and estimated 110,931 and 104,144 angler days during 1999 and 2001, despite significant turbidity in 2001 (McFarland R.C. and D. Meredith 2000, 2002). These figures indicate an increasing trend in angling pressure on the Bitterroot River. Due to this increasing pressure, fishing regulations have become more restrictive in recent years to protect the adult fish. A creel census was conducted in 1992 and 1993 to assess these impacts. Overall, it indicated that fishing harvest was not having a serious impact on the population of trout but that monitoring should continue (Clancy 1993). Angling pressure has nearly doubled since that creel census. A Bitterroot River management plan is overdue since the original 5 year plan was written in 1991 (MFWP 1991).

Due to the importance of understanding connections between Bitterroot River salmonids and their spawning areas we implanted radio transmitters in westslope cutthroat trout *Oncorhynchus clarki lewisi* from the Bitterroot River in 2001 and 2002. We followed these fish to identify spawning locations. Streams within the Bitterroot National Forest support widespread populations of native westslope cutthroat and bull trout. Due to the importance of streams within the Bitterroot National Forest (BNF), we have also monitored fish populations there. The Bitterroot National Forest encompasses 1.6 million acres, 71% of which is in Montana. Three mountain ranges, the Bitterroots to the west, the Sapphires to the east, and the Anaconda-Pintlars to the southeast comprise the Bitterroot National Forest. Water flowing within the BNF is excellent in quality and most is considered soft, a result of basin geology. Streams originating from the Bitterroot Mountains are unusually low in hardness and dissolved solids because of the resistant igneous and metamorphic rocks. The streams draining the Sapphire range tend to have higher dissolved solids because of slightly less resistant and more soluble background

geology (Garn and Malmgren 1973). Within Montana, the BNF is the headwaters of the Bitterroot River.

During 2000, wildfires burned significant acreages in the Bitterroot drainage. It is estimated that 356,000 acres were burned. Studies of the impacts of wildfire on fisheries indicate that in healthy systems, most negative impacts are short-term (Gresswell 1999). Since wildfire impacts have been widely studied, we did not focus our work on assessing these impacts. However, a graduate study through Montana State University is researching the impacts of the fires on native and non-native trout.

Historically, Lake Como has been stocked with various species of fish. In the past decade catchable and brood rainbow trout have been stocked annually. Due to the fluctuating water levels in the reservoir, growth and survival has been poor. Beginning in 1997, kokanee, *Oncorhynchus nerka,* were stocked as fingerlings, in an attempt to add some variety for the anglers and study whether kokanee would grow faster than rainbow trout.

METHODS

Fish population estimates on the Bitterroot River were collected on several reaches over the past 19 years. Study reaches were selected based on historical data, streamflow patterns and fishing regulations. The reaches are 2.2-5.1 miles in length. Electrofishing was conducted from a 14-foot long aluminum drift boat fitted with a boom shocking system. The system was powered by 5000-watt generator and current was modified through a Coffelt Mark XXII electrofishing unit. Smooth direct current was used to capture fish. The Peterson mark-recapture method was used to calculate population estimates as modified through the Montana Fish, Wildlife and Parks mark-recapture program. Several mark and recapture runs were required to obtain sufficient sample size to estimate fish populations in some reaches. In recent years, most of the fish collections downstream of Hamilton have occurred at night to facilitate handling of more fish. The population estimates were collected during September and October each year. Brown trout may be migrating by October, therefore, their estimates may be inflated.

During 2001 and 2002 sentinel cages were used to assess the presence and degree of whirling disease. Personnel from the Bozeman office of MFWP installed the cages with the help of regional personnel. During 2001 we monitored cages throughout the Bitterroot River system and during 2002 we concentrated on the East Fork Bitterroot River.

Radio transmitters were surgically implanted into westslope cutthroat during the spring of 2001 and 2002 in the mainstem of the Bitterroot River. In 2001, 15 westslope cutthroat were captured between Anglers Roost and Woodside before they began their spawning migration. In 2002, 10 westslope cutthroat, between Bell Crossing and Stevensville, were captured and transmitters were implanted. The transmitters and receivers were provided by Advanced Telemetry Systems (ATS). The transmitters had an external antennae that

protruded anterior to the vent of the fish after surgery. The weight of the transmitters was between 8 and 11 grams and the frequency range was 40.400 and 40.560
We followed the fish using an ATS 16-channel fieldmaster receiver. After the transmitters were implanted, we attempted to relocate the fish at least weekly until spawning and downstream migration ended.

A variety of ditches divert water from Skalkaho Creek. Some of the ditches divert water and fish directly from the creek while others mix Bitterroot River water and Skalkaho Creek water before diverting it from the creek. Four ditches were sampled in 2001-2002 to assess the number of fish present in the upper end of the ditches during late summer and early Fall. The Hedge ditch, which mixes river and creek water was sampled with a screwtrap during Spring through Fall of 2002 to assess the downstream movement of fish into the ditch.

We monitored fish populations in some streams on the Bitterroot National Forest. Background work that went into selection of the study sites is described in previous reports (Clancy 1993, 1996). Due to the severity and large geographic scale of wildfires on the Bitterroot National Forest in 2000 we selected our sites to assess some of the future impacts. Most of the sites chosen in the past few years are long term monitoring sites established previously. Fish were captured by electrofishing using smooth direct current. On larger streams a bank electrofishing unit is used powered by 4500 watt generator and current is controlled through a Coffelt VVP-15 unit. On small streams a backpack shocker, the Coffelt Mark 10, was used. We estimated trout populations on monitoring reaches using a mark-recapture technique. Monitoring sections are usually 1000 feet long. On the marking run, fish are released as close to their capture site as possible and approximately one week is allowed between mark and recapture. Population estimates are calculated using the Montana Department of Fish Wildlife and Parks Mark-Recapture program.

Westslope cutthroat were collected at some sites for electrophoretic analysis. All fish were sent to the University of Montana for analysis.

Stowaway recorders were placed in streams in late June and early July of each year. They were removed in mid-October and the data was downloaded for analysis. We charted each data set and calculated degree days (defined as the average daily temperature in degrees centigrade summed from July 18 to October 1 each year).

RESULTS AND DISCUSSION

Bitterroot River

During 2001 trout population estimates were collected from two sections of the lower East Fork of the Bitterroot River, and the Hamilton and Stevensville sections of the Bitterroot River. During 2002, one population estimate was collected from each of the lower East Fork and West Fork of the Bitterroot River. Also, in 2002, a trout population estimate was collected on the Darby section of the Bitterroot River (Figure 1).

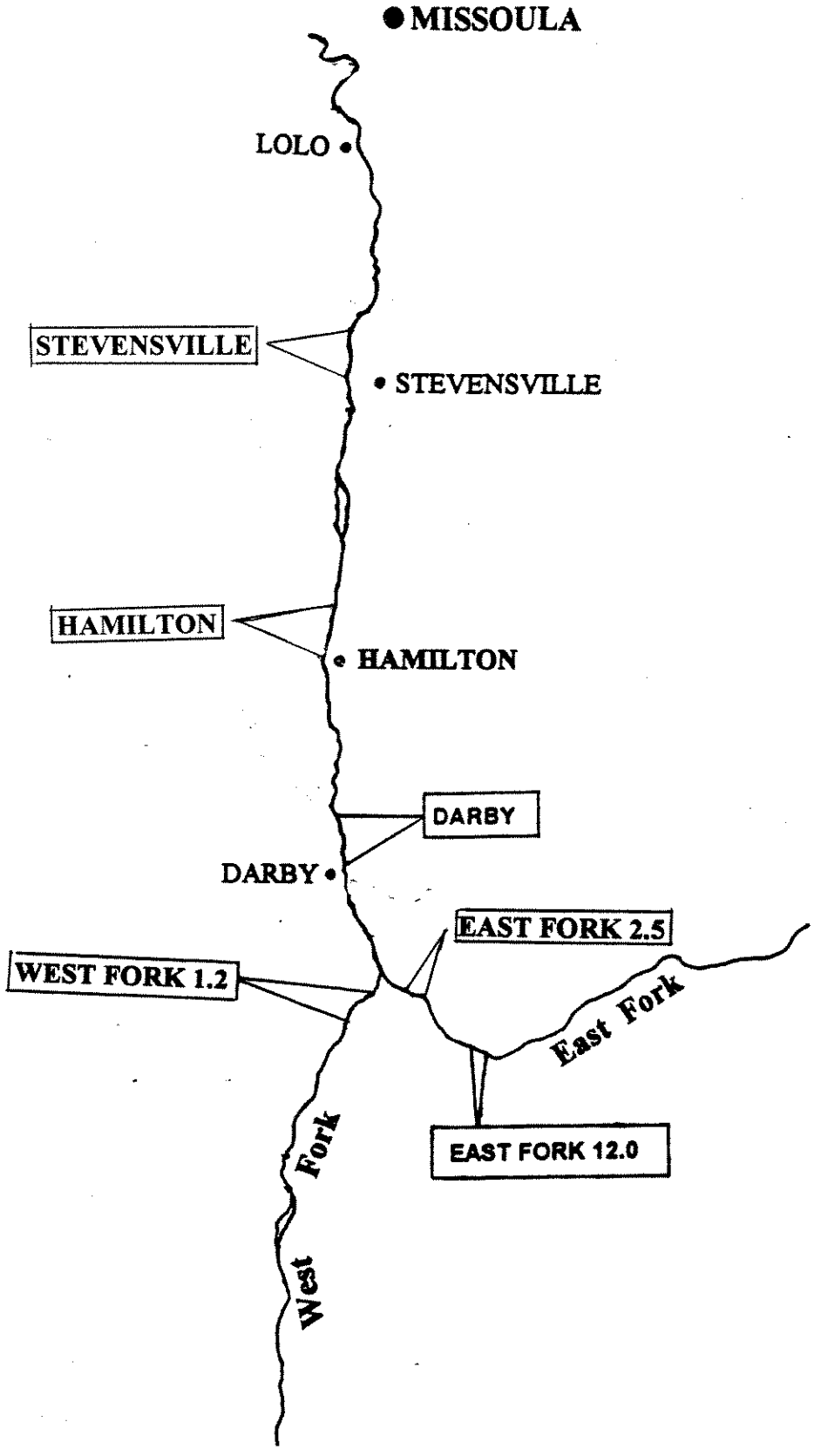

FIGURE 1. Map of electrofishing sections on the Bitterroot River sampled during 2001 or 2002.

Rainbow Trout

The rainbow trout estimates in the mainstem of the Bitterroot River indicate lower than average populations of 8-12 inch fish and average to above average numbers of larger rainbow trout (Figures 2-7). The number of 8-12 inch fish at Darby and Hamilton is much lower than average compared to past estimates. At Stevensville the number of 8-12 inch fish was within the range of past estimates. Whirling disease was detected with higher infection rates in the upper river than past years and 2000 and 2001 were drought years that could have impacted the survival of younger year classes. At this time, it is not possible to determine if whirling disease is responsible for the decrease in smaller fish. In the Hamilton and Stevensville sections the infection rate of whirling disease has been low to non-existent. The larger fish over 12 inches are within the normal range of past estimates at all three study locations.

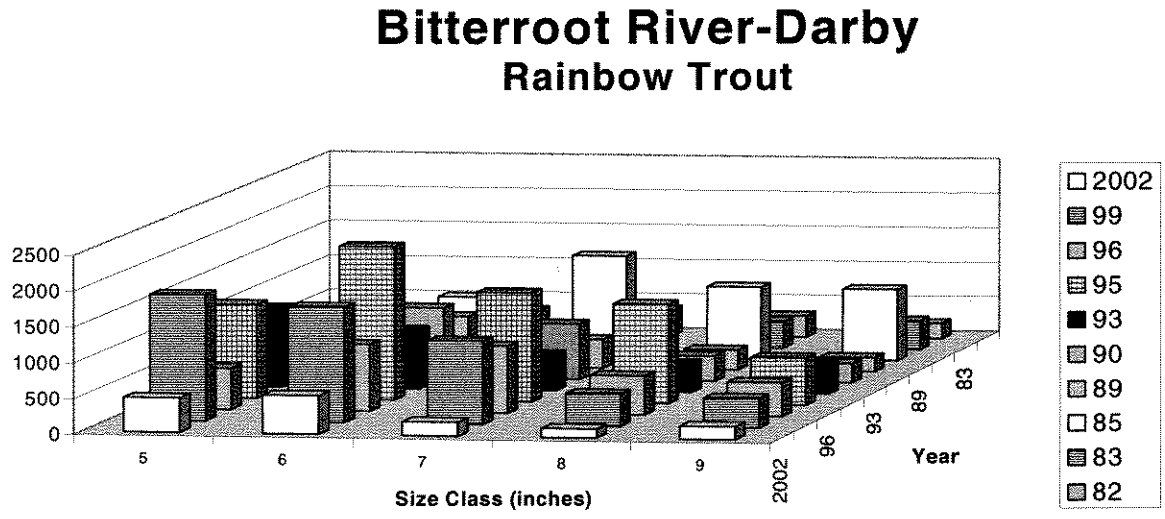

Figure 2 . Population estimates of rainbow trout in the Darby Section between 5.0 and 9.9 inches during the years indicated

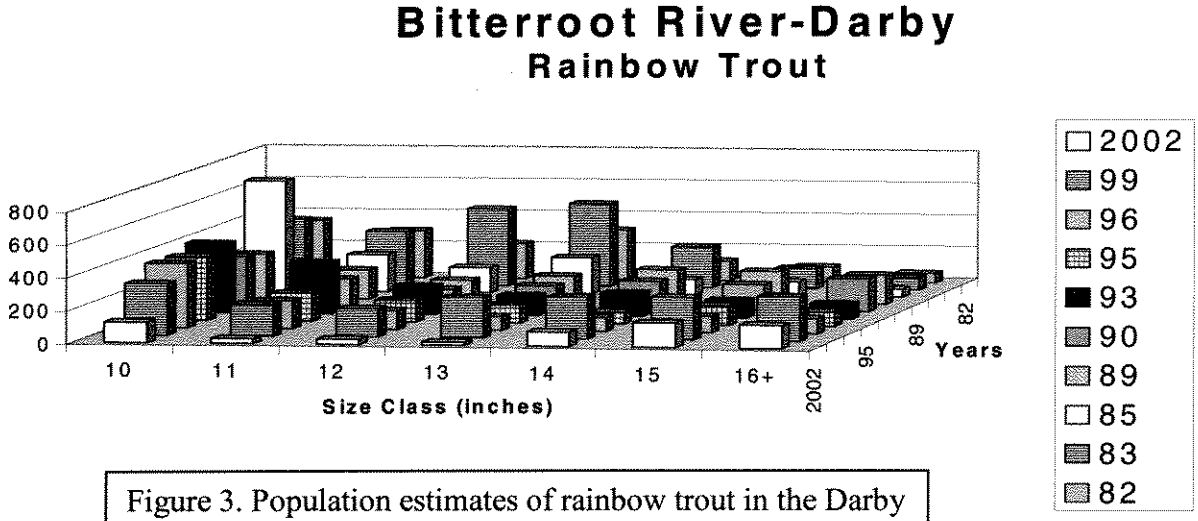

Figure 3. Population estimates of rainbow trout in the Darby section larger than 10 inches during the years indicated.

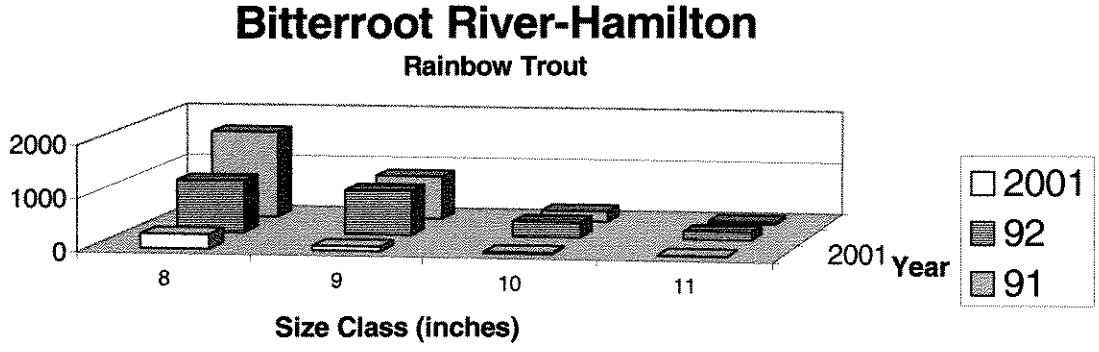

Figure 4. Population estimates of rainbow trout between 8.0 and 11.9 inches on the Hamilton section of the Bitterroot River during the years indicated.

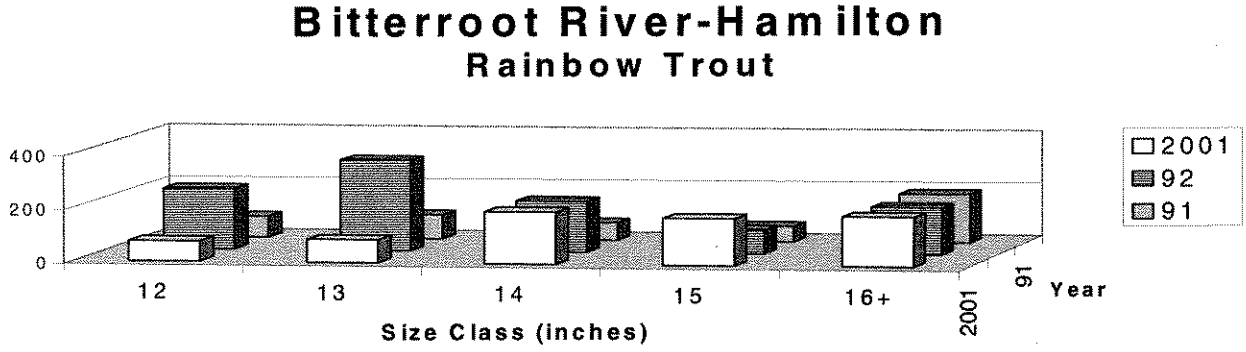

Figure 5. Population estimates of rainbow trout over 12.0 inches in the Hamilton section of the Bitterroot River during the years indicated.

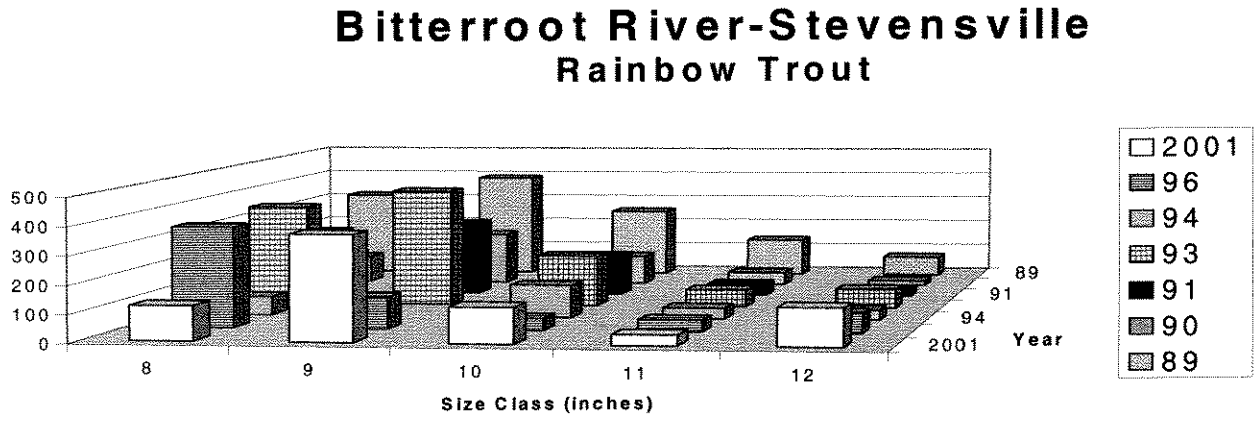

Figure 6. Population estimates of rainbow trout between 8.0 and 12.9 inches in the Stevensville Section of the Bitterroot River during the years indicated.

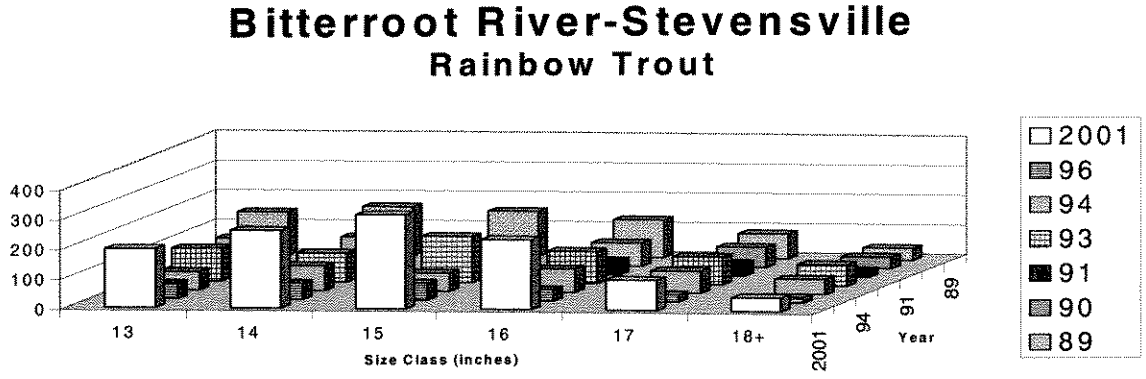

Figure 7. Population estimates of rainbow trout over 13 inches in the Stevensville section of the Bitterroot River during the years indicated.

Brown Trout

Due to the time of year we collect population estimates spawning migrations have likely begun and this could bias our population estimates. Therefore, brown trout population estimates are more of an index than numeric estimate. Brown trout populations have remained stable in the 3 study sections (Figures 8-13).

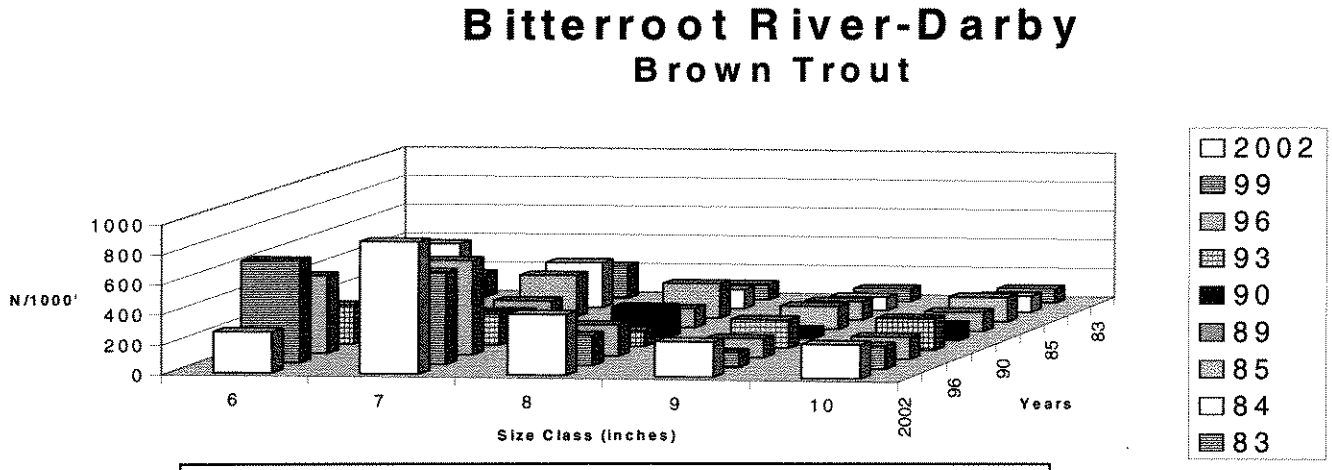

Figure 8. Population estimates of brown trout between 6.0 and 10.9 inches in the Darby section of the Bitterroot River during the years indicated.

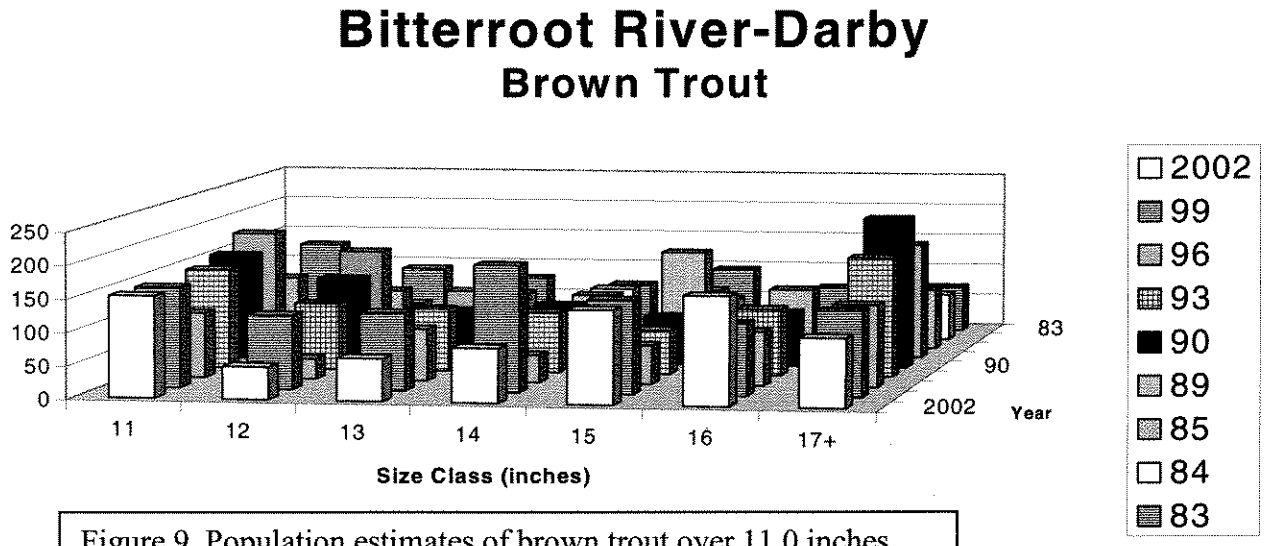

Figure 9. Population estimates of brown trout over 11.0 inches long in the Darby section of the Bitterroot River during the years

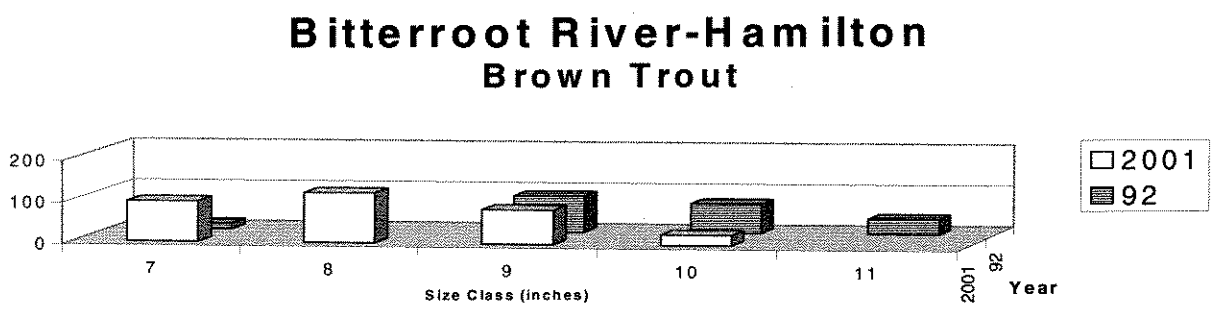

Figure 10. Population estimates of brown trout between 7.0 and 11.9 inches in the Hamilton section of the Bitterroot River during the years indicated

Bitterroot River-Hamilton
Brown Trout

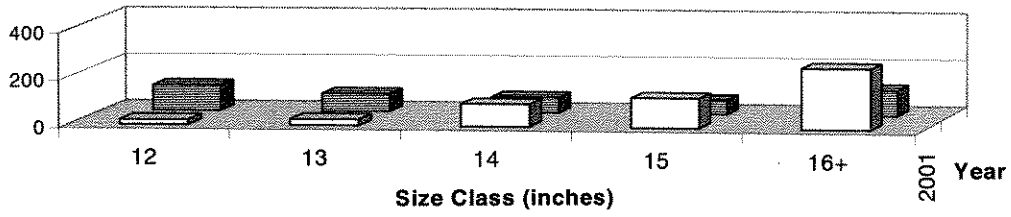

Figure 11. Population estimates of brown trout over 12 inches in the Hamilton section of the Bitterroot during the years indicated.

Bitterroot River-Stevensville
Brown Trout

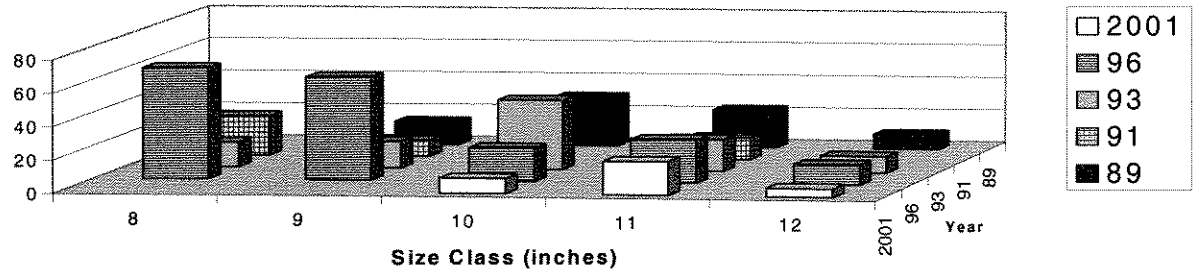

Figure 12. Population estimates of brown trout between 8.0 and 12.9 inches in the Stevensville section of the Bitterroot River during the years indicated

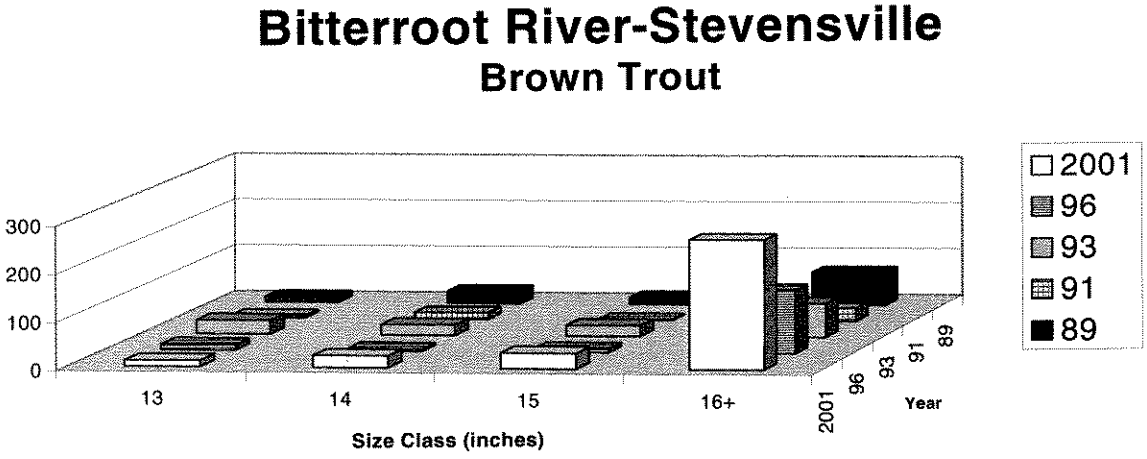

Figure 13. Population estimates of brown trout over 13 inches in the Stevensville section of the Bitterroot River during the years indicated.

Westslope cutthroat

The populations of westslope cutthroat appear to be continuing to increase in the mainstem of the Bitterroot River. The population estimate in the Darby section indicates higher numbers of fish and the population estimate at Hamilton was possible only because we handled significantly more fish than previous years (Figures 14, 15). We also handled more westslope cutthroat in the Stevensville section than past years but still not enough to calculate a population estimate.

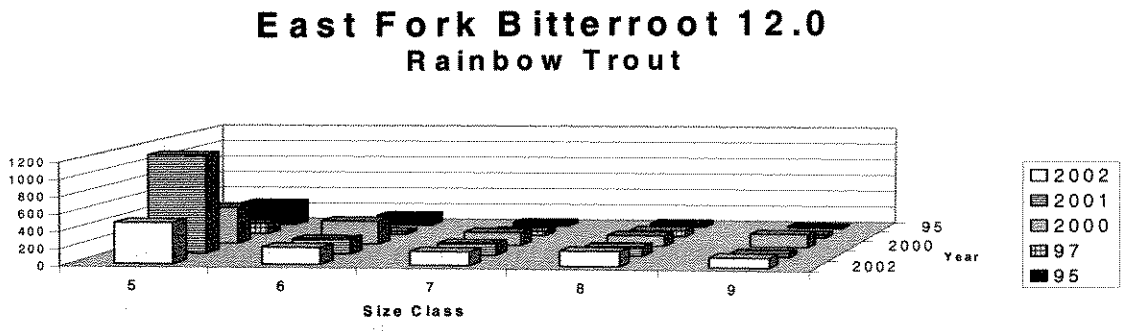

Figure 20. Population estimates of rainbow trout between 5.0 and 9.9 inches long in the East Fork Bitterroot River near Sula during the years indicated.

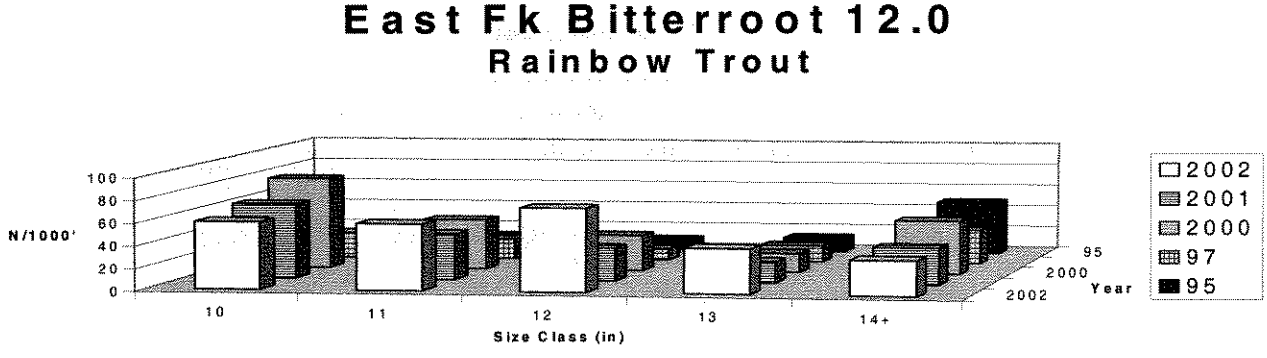

Figure 21. Population estimates of rainbow trout longer than 10.0 inches in the East Fork Bitterroot River near Sula during the years indicated.

Whirling Disease

Sampling fish for the presence of *Myxobolus cerebralis* was first undertaken in the Bitterroot River in 1995. Since then, continuous sampling has occurred by Fish Wildlife and Parks personnel from Bozeman and region 2. We have used a combination of grab samples and sentinel cages to assess the presence and distribution of the parasite. Prior to 2000 we found that the parasite is present in the Bitterroot River and infected fish at scattered locations (Clancy and Javorsky 2001). Recent sampling has indicated that the upper Bitterroot River, and particularly the East Fork Bitterroot River, have high infection rates (Table 1). We have not seen obvious affects on trout populations in this area, but we will continue to monitor them. We will also attempt to identify any source that may be present in the East Fork.

Table 1. Testing for the presence of *Myxobolus cerebralis* in the Bitterroot drainage during 2000-2002.

Bitterroot River	10/24/00	Near Hamilton T6N,R20W,S12	Rb – 50	Sentinel cage	Negative
		Near Stevensville T9N,R20W,S22	Rb – 50	Sentinel cage	Negative
		Near Darby T3N,R21W,S2	Rb – 49	Sentinel cage	1 Rb positive
East Fork Bitterroot River	10/24/00	Near Dickson Creek T2N,R20W,S22	Rb - 49	Sentinel cage	7 Rb positive grade 1-3

Bitterroot River	5/11/01	Near Lolo T11N,R20W,S1	Rb – 43	Sentinel cage	Negative
		Near Stevensville T9N,R20W,S22	Rb – 50	Sentinel cage	Negative
		McCalla Sp.Ck. T9N,R20W,S21	Rb - 50	Sentinel cage	Negative
		Near Hamilton T6N,R20W,S12	Rb – 42	Sentinel cage	Negative
		Near Darby T3N,R21W,S2	Rb – 49	Sentinel cage	14 Rb positive grade 1-3
		Below Rye Ck.	Rb - 50	Sentinel cage	31 Rb positive grade1-4
East Fork Bitterroot River	5/11/01	Near Dickson Creek T2N,R20W,S22	Rb – 37	Sentinel cage	28 Rb positive grade 1-4
West Fork Bitterroot River	5/11/01	Near Trapper Ck. T2N,R21W,S26	Rb – 49	Sentinel cage	Negative
		Below Painted Rocks T1S,R22W,S26	Rb - 45	Sentinel cage	
Bitterroot River	6/19/01	Near Stevensville T9N,R20W,S22	Rb – 48	Sentinel cage	Negative
	6/29/01	Near Stevensville T9N,R20W,S22	Rb – 43	Sentinel cage	Negative
East Fork Bitterroot River	4/19/02	Below Dickson Cr.	Rb-17	Sentinel cage	12 Rb positive grade 1-4
	4/19/02	Upstream of Spring Gulch	Rb-40	Sentinel cage	19 Rb positive grade 1-4
	4/19/02	Below Tolan Creek	Rb-50	Sentinel cage	Negative

Radio Telemetry

Beginning in 1998 we began a program to assess the migatory movements of fluvial cutthroat and bull trout in the Bitterroot drainage. With the use of radio telemetry we have been able to track these fish during annual spawning migrations into tributaries in the upper Bitterroot basin and have progressed in a downstream direction (Table).

The radio telemetry data to date has shown that westslope cutthroat spawn in a variety of tributaries. The Nez Perce Fork of the Bitterroot River is an important spawning tributary

for westslope cutthroat in the Bitterroot River south of Hamilton. Several other tributaries are also used by westslope cutthroat for spawning (Table 2).

During 2001 and 2002 a westslope cutthroat attempted to ascend Skalkaho Creek, most likely for purposes of spawning. Despite 4 large diversion structures in Skalkaho Creek the fish in 2001 ascended them all and migrated to Skalkaho Creek on the Bitterroot National Forest. During 2002 a different fish was unable to pass the diversions and eventually descended back into the Bitterroot River. Due to the efforts of these fish to migrate to upper Skalkaho Creek, we assessed the creek for potential solutions to upstream and downstream migration barriers.

Table 2. Location of capture and eventual upstream migration of westslope cutthroat trout affixed with radio transmitters during likely spawning migrations in the years indicated.

Year and # of transmitters	Location of capture	Upstream extent of migration and # of fish
1998(9)	West Fork Bitterroot River near Conner	Nez Perce Fork - 6
		West Fork Bitterroot - 3
1999(10)	Bitterroot River near Darby	Nez Perce Fork – 3
		West Fork Bitterroot - 2
		Trapper Creek - 1
		East Fork Bitterroot - 1
		Rye Creek - 1
		Tincup Creek - 2
2001(15)	Bitterroot River near Hamilton-Corvallis	Nez Perce Fork - 4
		West Fork Bitteroot - 2
		East Fork Bitterroot - 1
		Lost Horse Creek - 1
		Tincup Creek - 1
		Bitterroot River - 1
		Blodgett Creek - 3
		Skalkaho Creek - 1

		Mill Creek - 1
2002(10)	Bitterroot River near Bell Crossing	Big Creek - 5
		Skalkaho Creek – 1
		Bitterroot River - 4

Skalkaho Creek ditches

Electrofishing in the ditches from Skalkaho Creek indicates that a significant number of fish are moving into the ditches during the irrigation season (Figures 22-25). While electrofishing only gives us a one time view of the number of fish in a reach of ditch, the fact that repeated electrofishing continued to capture significant numbers of fish after the previously sampled fish has been removed, indicates that fish continue to move into the ditches (Figures). We captured large numbers of westslope cutthroat in Ward and Skalkaho-Highline ditches (Figures 24, 25). In 2001, when we returned to the Skalkaho-Highline, less than one month after the removal of the previous catch, we captured a large number of fish. We captured more westslope cutthroat that the previous run. This may be due to downstream movement of westslope cutthroat that occurs this time of year in Skalkaho Creek (Nelson 1999).

Due to the fact that cutthroat trout implanted with radio transmitters attempted to ascend Skalkaho Creek in 2001 and 2002, it appears that some juvenile cutthroat trout may be passing downstream over the diversion dams and entering the Bitterroot River. Since it is not possible at this time to discriminate between resident cutthroat and juvenile migatory cutthroat, we are not sure of the life strategy of the fish captured in the ditches. It is possible that both migratory and resident forms are present.

During 2002 a screwtrap was installed in the Hedge Ditch. We were attempting to assess downstream movement of fish into lower Skalkaho Creek. The screwtrap was installed 5/28/02 and removed 9/20/02. The fish that were captured in large numbers were brown trout and numerous suckers and minnows. Some of the smaller salmonids were difficult to identify in the field, but no cutthroat trout were positively identified.

Thompson Ditch

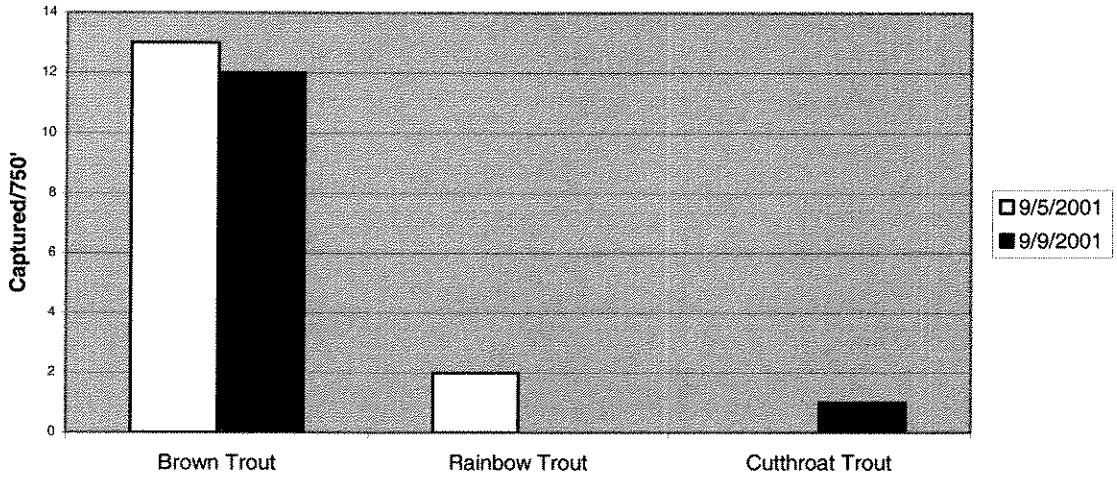

Figure 22. The number of fish captured in the Thompson Ditch by electrofishing during the date indicated.

Hughes Ditch

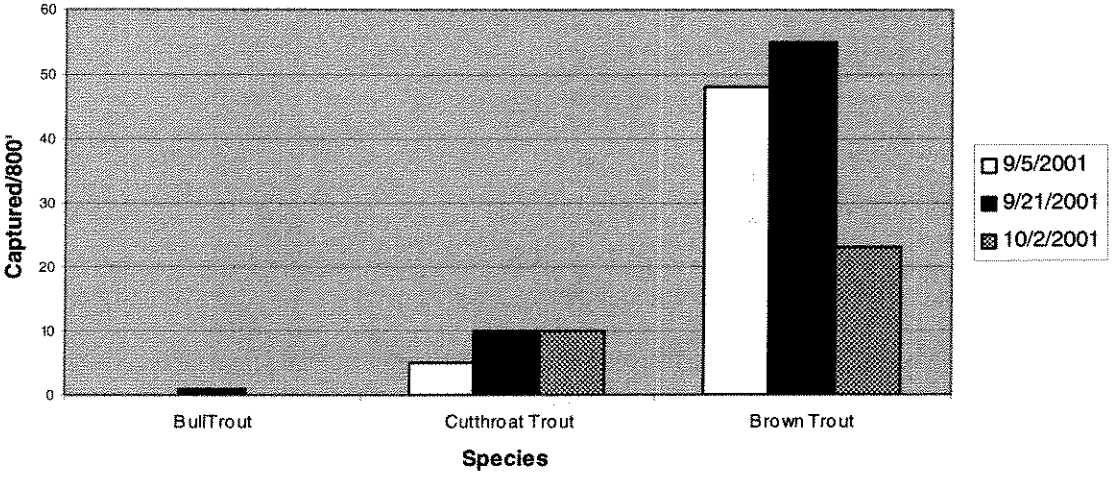

Figure 23. The number of fish captured in the Hughes Ditch by electrofishing during the date indicated

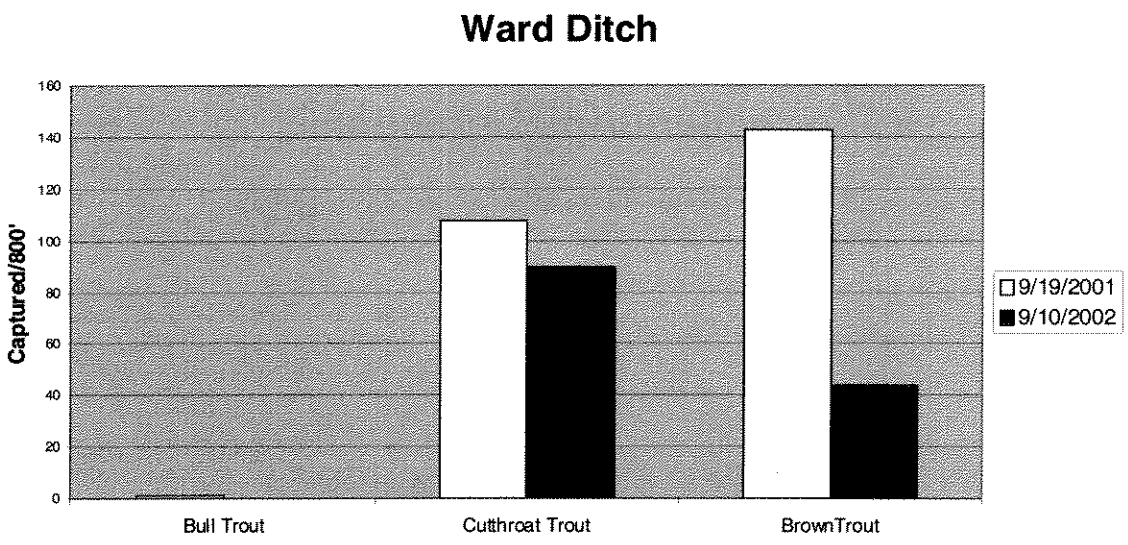

Figure 24. The number of fish captured in the Ward Ditch by electrofishing during the date indicated.

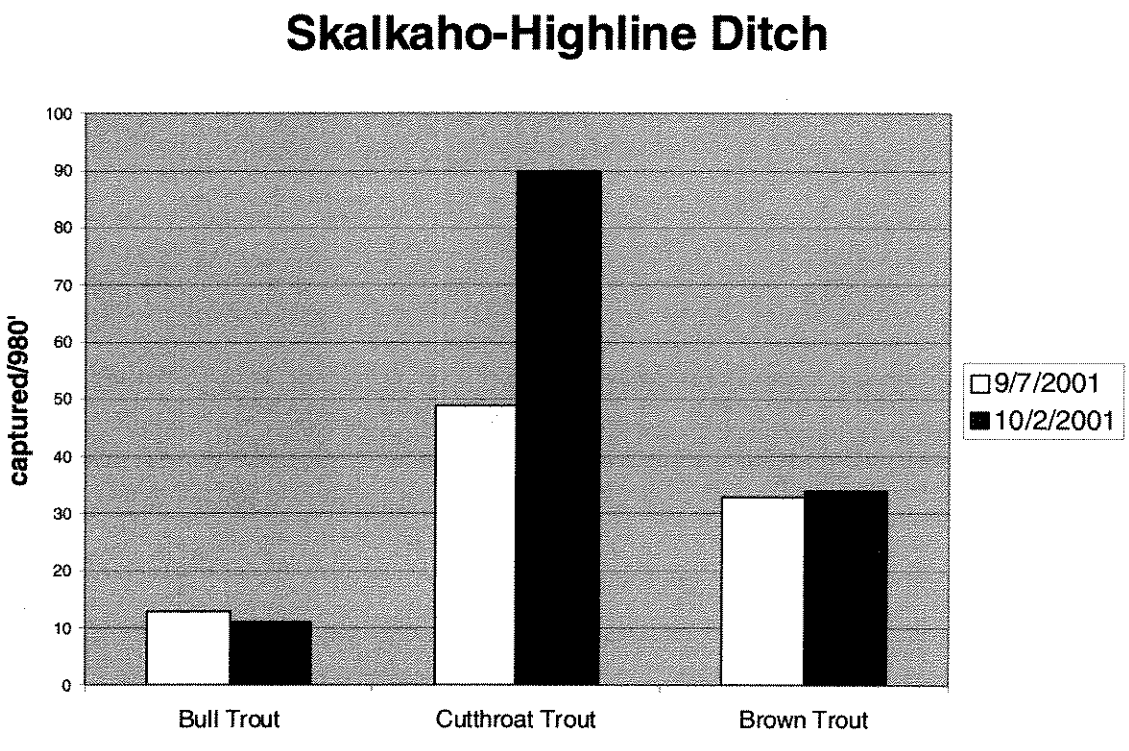

Figure 25. The number of fish captured in the Skalkaho-Highline Ditch by electrofishing during the date indicated.

Bitterroot National Forest

During 2001 and 2002, we continued to monitor fish populations at established sites within the Bitterroot National Forest. Due to the widescale forest fires of 2000 and subsequent debris flows in some tributary streams, a graduate study was initiated to assess the impacts of the fires on native salmonids. Most of the study sites for the graduate study are duplicates of long term monitoring sites sampled previously by personnel from the Bitterroot National Forest or MFWP. I have not included the population estimates from that effort in this report. That data is being collected through Montana State University. The data from that study is being assimilated into our monitoring database.

Stevensville District

Kootenai Creek 3.5

We have monitored a reach on Kootenai Creek since the catch-and-release regulations were instituted in the mid 1990's. Initially, we attempted to obtain population estimates by mark and recapture. In 1995 and 1998 we captured fish by angling, inserted a tag in them and then snorkeled to obtain a population estimate. In 1999 we began to assess the size of fish captured by angling as the monitoring method. When size of angler caught fish is compared between 1995 and 2002, it appears that the number of fish longer than 7 inches and average size increased between 1995 and 1998, but between 1998 and 2002, the size and number leveled off (Figure 26).

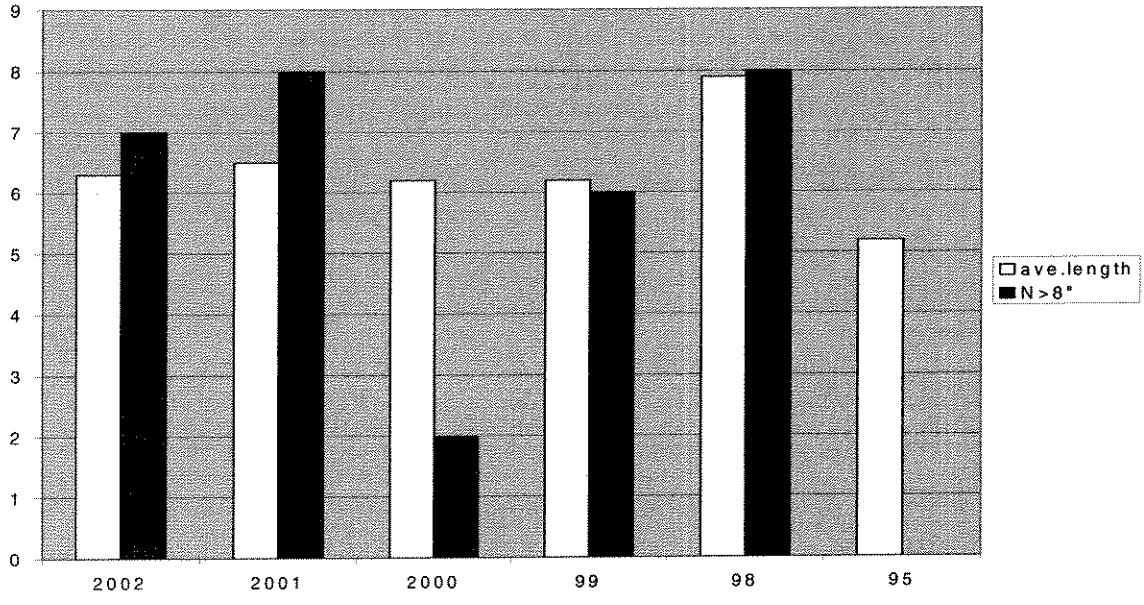

Figure 26. Average length and number of cutthroat caught flyfishing in Kootenai Creek in 4 hours of fishing during the years indicated.

Darby District

The trends in cutthroat populations vary by site and it is not possible to characterize them on a district wide basis, partially due to impacts of the fires of 2000.

Skalkaho Creek 16.8

The number of large westslope cutthroat continues to increase since the catch and release regulations took effect (Figure 27). The bull trout population in this reach has remained fairly stable since sampling began in 1989 (Figure 28)

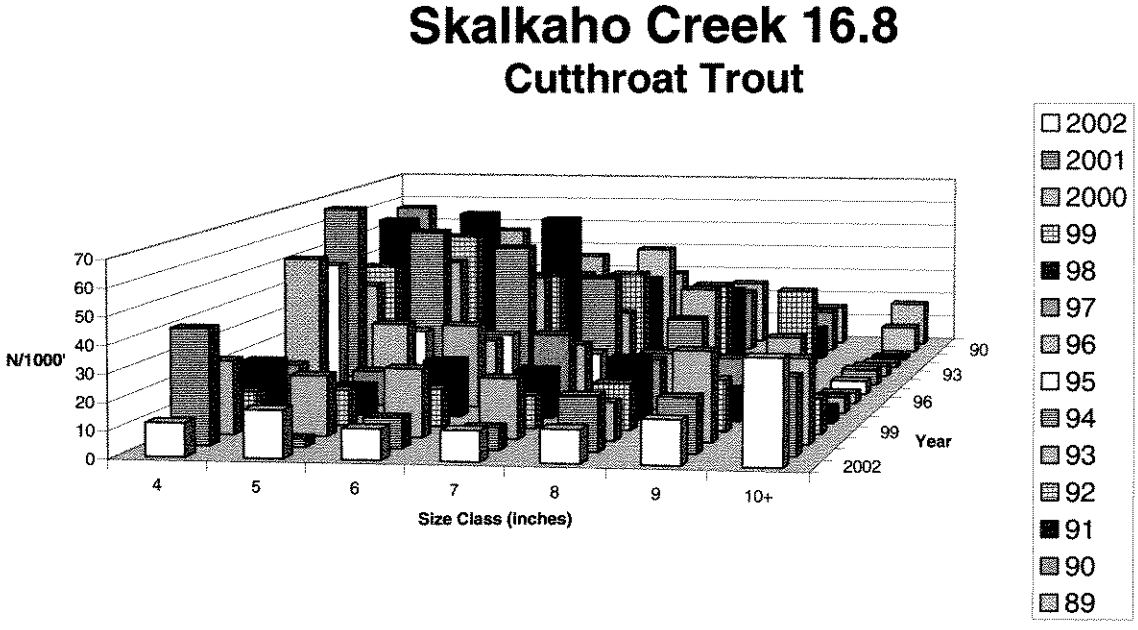

Figure 27. Population estimates of westslope cutthroat in the Skalkaho Creek 16.8 section during the years indicated.

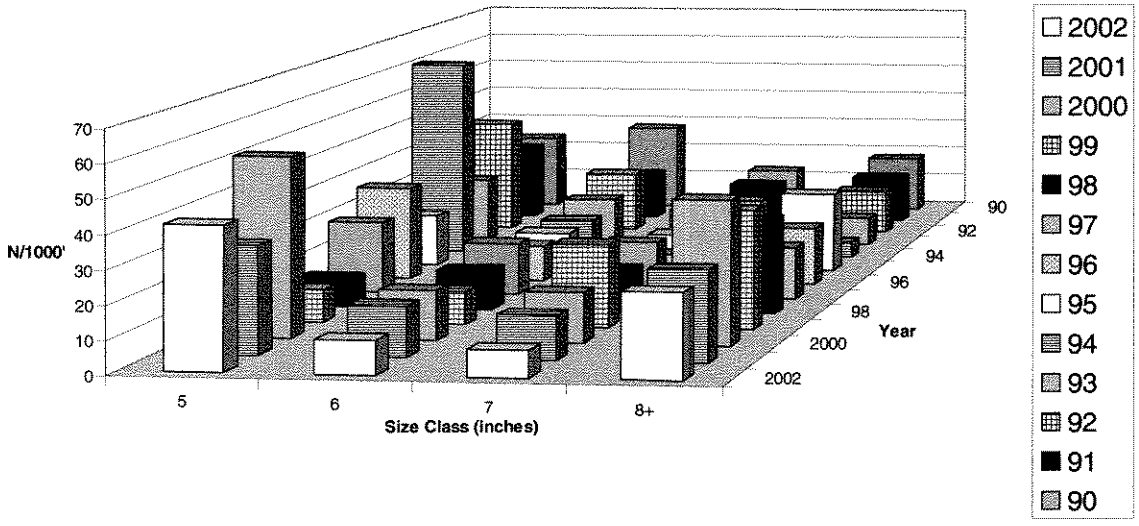

Figure 28. Population estimates of bull trout in the Skalkaho 16.8 section during the years indicated.

Daly Creek 0.7

During 2001 and 2002 the long term monitoring section of Daly Creek was sampled. The population of larger westslope cutthroat remains high compared to past sampling but the number of bull trout is somewhat lower than in the past (Figures 29, 30). This reach is subject to catch-and-release fishing regulations.

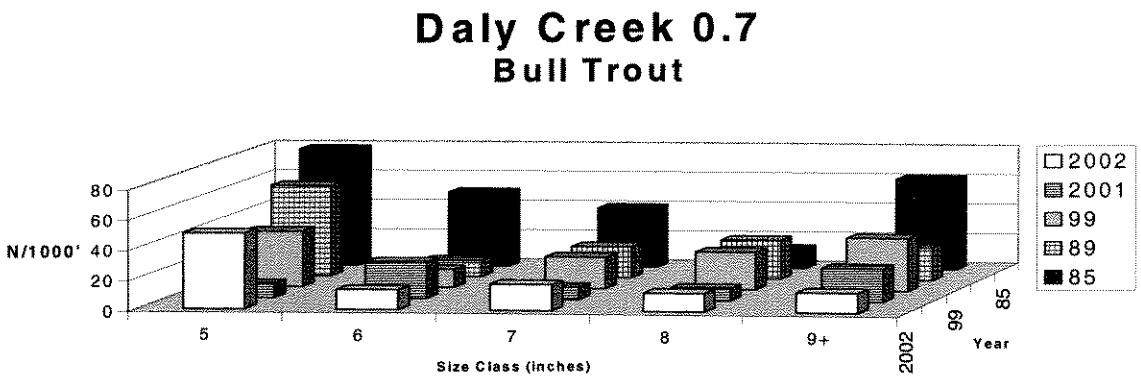

Figure 29. Population estimates of bull trout in the Daly Creek 0.7 section during the years indicated.

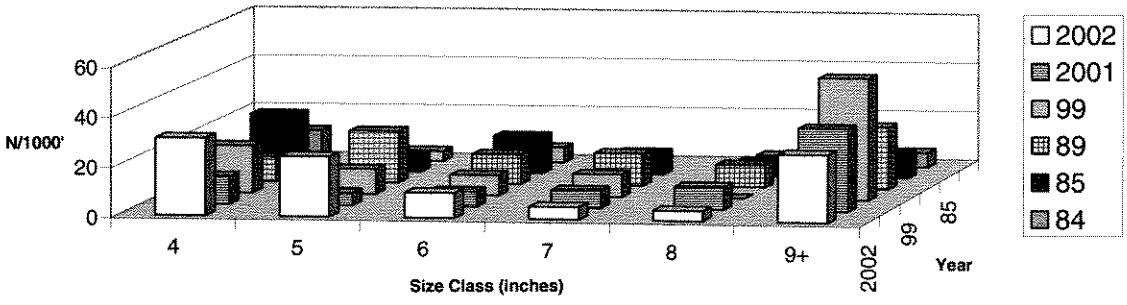

Figure 30. Population estimates of westslope cutthroat in the Daly Creek 0.7 section during the years indicated.

Sleeping Child Creek 10.2

This monitoring section has been elecrofished since 1989. The population of westslope cutthroat fluctuates annually, but was impacted seriously by debris flows in 2001 and 2002 (Figure 31). During 2002, no fish in the 4-5 inch range were captured, indicating that at least one year class of cutthroat trout was probably destroyed by the debris flows. The population of bull trout in this reach is small and difficult to enumerate.

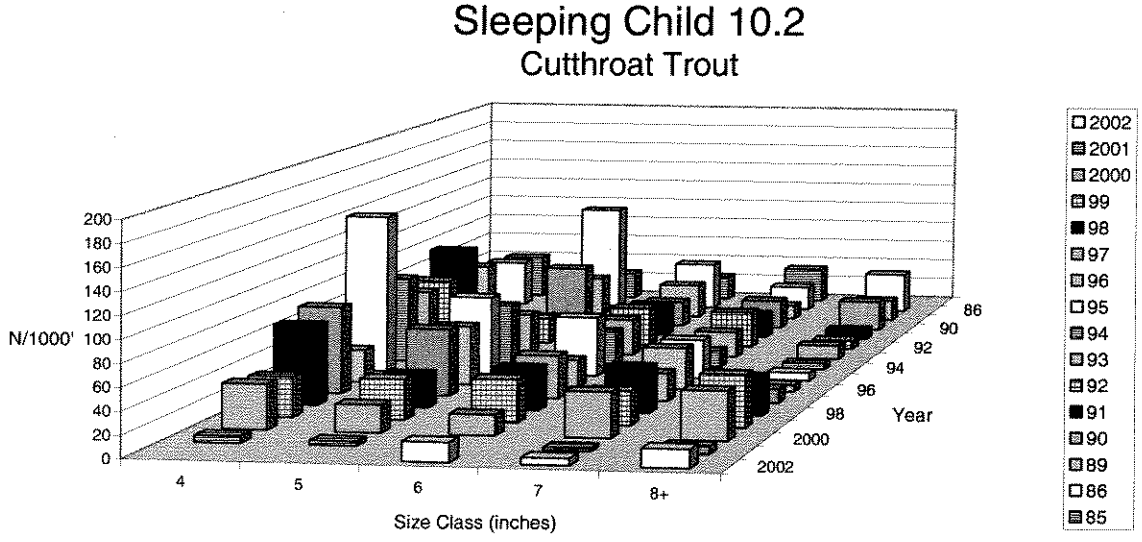

Figure 31. Population estimates of westslope cutthroat in the Sleeping Child 10.2 section during the years indicated.

Sula District

Some of the long-term monitoring reaches were sampled during 2001 and 2002. Most of the population estimates were within range of past data.

Martin Creek 1.3 and Moose Creek 1.4

The lower reaches of Martin and Moose Creeks support similar populations of westslope cutthroat (Figures 32-35). The 2002 population estimate of westslope cutthroat was similar to past years.

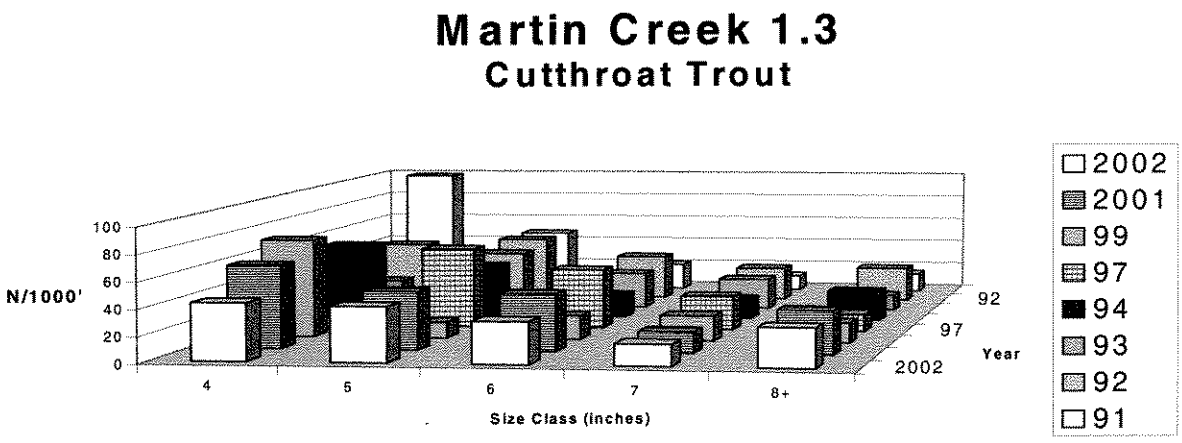

Figure 32. Population estimates of westslope cutthroat in the Martin Creek 1.3 section during the years indicated.

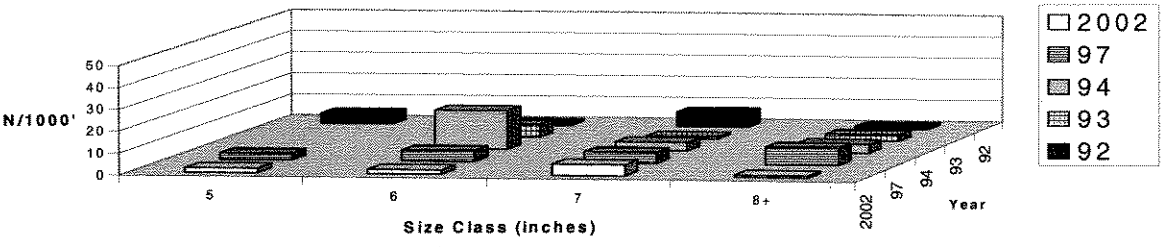

Figure 33. Population estimates of bull trout in the Martin Creek 1.3 section during the years indicated.

Moose Creek 1.4
Cutthroat Trout

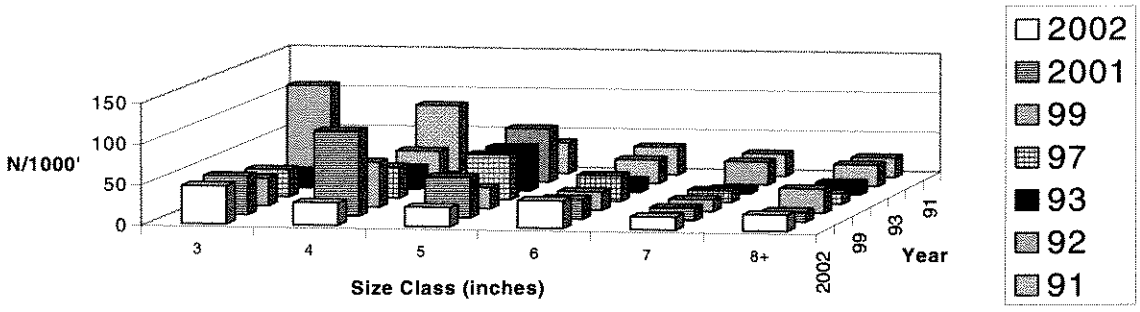

Figure 34. Population estimates of westslope cutthroat in the Moose Creek 1.4 section during the years indicated.

Moose Creek 1.4
Bull Trout

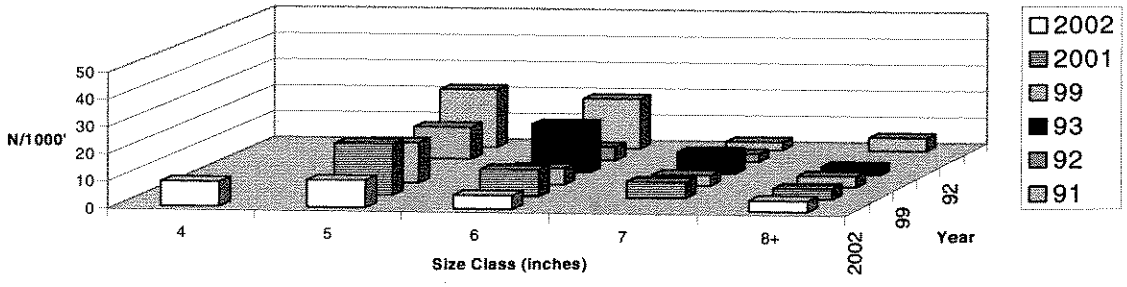

Figure 35. Population estimates of bull trout in the Moose Creek 1.4 section during the years indicated.

Meadow Creek 5.6

This reach has been sampled sporadically since 1989. In 2001 and 2002 the population estimates of westslope cutthroat and bull trout are within the range of past estimates (Figures 36-37).

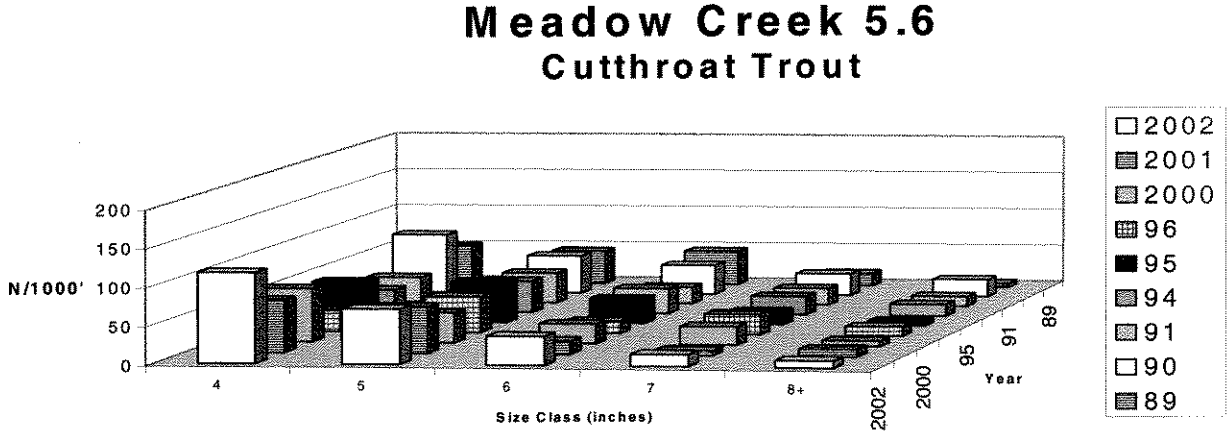

Figure 36. Population estimates of westslope cutthroat in the Meadow Creek 5.6 section during the years indicated.

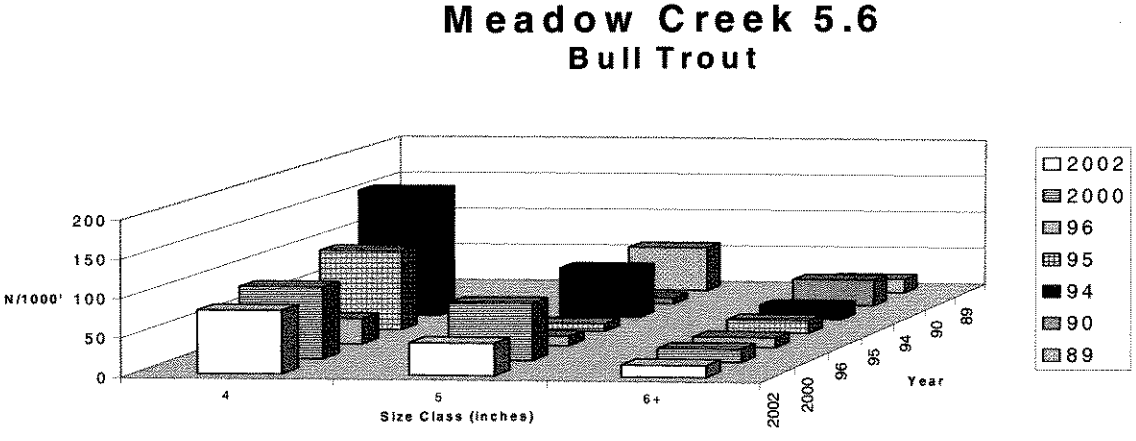

Figure 37. Population estimates of bull trout in the Meadow Creek 5.6 section during the years indicated.

Warm Springs Creek 3.5

This reach of Warm Springs Creek was sampled in 2001 and 2002. The number of westslope cutthroat was similar to past sampling (Figure 38).

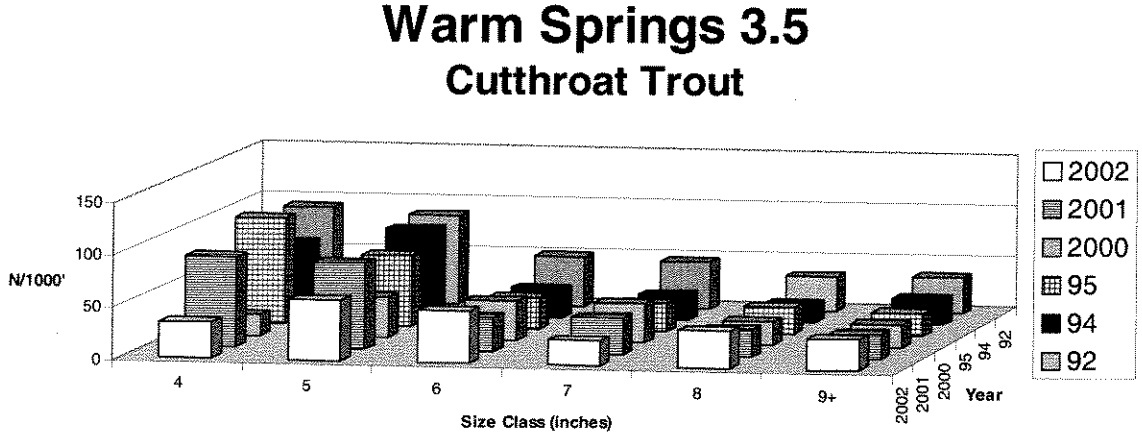

Figure 38. Population estimates of westslope cutthroat in the Warm Springs 3.5 section during the years indicated.

Water Temperature

We have been collecting water temperature data using HOBO-Temp and optic stowaway temperature monitors since 1993. From 1993 to 2002 we have collected between 1 and 8 years of data at 126 sites in the Bitterroot drainage. Thirteen of the sites are index sites. The fires of 2000 altered the temperature profiles of several streams including most of the index streams. Some of the sites are experiencing much warmer mid-summer temperatures than before the fire. These impacts are being studied through a separate project at Montana State University.

Genetic testing

Westslope cutthroat from 104 sites on 67 streams and 1 lake have been tested for genetic purity (Table 3). The overall trend is similar to past reports, where most of the hybridization occurs in the Bitterroot Mountains, likely a result of mountain lake stocking (Clancy 1998).

Table 3. Results of electrophoretic testing of westslope cutthroat in selected streams of the Bitterroot drainage.

Stream	Location	Sample Size	Year	Status
Ambrose Creek	T9N,R18W,S18	6	1994	1
Bass Creek	T10N,R20W,S33	11	1984	3
	T10N,R21W,S34	2	1995	1,3*
Bear Creek	T7N,R21W,S34	11	1991	2
Beaver Creek	T4S,R22W,S4	2	1992	1
	T4S,R22W,S5	11	1995	1**
Big Creek	T8N,R21W,S10	5	1992	2
Bitterroot River	T4N,R20W,S35	4	1996	1**
	T3N,R21W,S2	7	1999	2*
	T5N,R21W,S1,12	10	2001	2*
	T7N,R20W,S30,31			
Bitterroot R. E.Fk	T2N,R18W,S24	6	1995	1***
Bitterroot R. E.Fk.	T2N,R17W,S22	10	1999	1
	T2N,R16W,S20	22	2001	1
	T2N,R16W,S11	7	2001	1
Bitterroot R. W.Fk	T1S,R22W,S15	9	1998	2,3
	T2N,R21W,S24	6	1998	1
	T3S,R22W,S9	3	1992	1
	T3S,R22W,S9	13	1991	1
	T2S,R22W,S27	16	1994	1
Blodgett Creek	T6N,R21W,S17	6	1994	2
	T6N,R22W,S13	9	1994	2
	T6N,R22W.S16	12	1994	2
Bluejoint Creek		5	1987	1
	T2S,R23W,S2	10	1994	1
	T2S,R23W,S4	6	1994	1
Boulder Creek	T1N,R21W,S18	12	1994	1**
	T1N,R22W,S3	17	1996	1**
Burnt Fk. Bitterroot	T8N,R19W,S14	8	1994	1
	T7N,R18W,S5	14	1994	1
Camas Creek	T5N,R21W,S32	10	1998	3
Cameron Creek	T2N,R19W,S11	7	1994	1
Camp Creek	T1S,R19W,S21	5	1994	1

	T1N,R19W,S27	21	1999	2,3
Canyon Creek	T6N,R21W,S29	10	1994	1**
	T6N,R21W,S29	9	1998	1
Carlton Creek	T11N,R20W,S33	10	1998	3
Chaffin Creek	T2N,R21W,S3	15	1990	1
Chicken Creek	T2S,R23W,S36	10	1995	1
Coal Creek	T2S,R22W,S16	15	1990	1
	T2S,R22W,S16	11	1994	1
Daly Creek	T5N,R18W,S19	10	1994	1
Deer Creek	T3S,R22W,S9	18	1999	1
Eightmile Creek	T10N,R21W,S2	10	1998	1
Fred Burr Creek	T7N,R21W,S21	12	1991	1
	T7N,R22W.S14	7	1991	1
Gash Creek	T8N,R22W,S32	5	1999	1
Gird Creek	T5N,R19W,S11	3	1998	1
Gold Creek	T7N,R19W,S1	30	1985, 1990	1
continued				
Stream	Location	Sample size	Year	Status
Hughes Creek	T3S,R22W,S2	12	1994	1
Kootenai Creek	T9N,R21W,S14	10	1994	1
Laird Creek	T1N,R20W,S10	8	1995	1
Lick Creek	T4N,R2W,S21	1	1992	1
Little Bluejoint Creek	T2S,R22W,S5	8	1994	1
	T2S,R22W,S4	10	1995	1
Little Boulder Creek	T1S,R22W,S26	4	1994	1
Little Rock Creek	T3N,R22W,S1	4	1998	3
Lost Horse Creek	T4N,R22W,S11	12	1994	2
Martin Creek	T2N,R17W,S16	25	1985	1
Maynard Creek	T1N,R19W,S18	10	1995	2
Meadow Creek	T1N,R18W,S10	21	1989	1
Mill Creek	T6N,R21W,S4	14	1991	2
Moose Creek	T2N,R17W,S17	25	1985	1
NelsonCreek,West Fork	T1N,R22W,S26	22	1999	2
Nez Perce Fork	T1S,R22W,S7	6	1994	1
	T1S,R22W,S18	6	1994	1
North Rye Creek	T3n,R20W,S24	8	1990	1
One Horse Creek	T10N,R20W,S9	6	1998	1
Overwhich Creek	T2S,R20W.S34	9	1996	3
Piquett Creek	T1N,R21W,S10	15	1990	1

Railroad Creek	T5N,R18W,S29	1	1992	1
Reimel Creek	T1N,R19W,S15	2	1992	1
	T1N,R19W,S35	3	1992	1
Roaring Lion Creek	T5N,R21W,S16	11	1994	1
Rye Creek	T3N,R20W,S31		1985	1
	T3N,R20W,S25	10	1994	1
Sawtooth Creek	T5N,R21W,S9	10	1994	1
Schoolmarm Lake	T2N,R19W,S22	9	1998	1
Sheafman Creek	T7N,R21W,S30	21	1991	3
Skalkaho Creek	T5N,R18W,S19	15	1991	1
	T5N,R19W,S27	10	1994	1
	T5N,R20W,S16	25	2002	2
Slate Creek	T2S,R22W,S1	13	1991	1
	T2S,R22W,S1	11	1994	1
Sleeping Child Creek	T4N,R19W,S2	42	1985	
	T4N,R19W,S28		1989	1
Smith Creek	T8N,R21W,S22	16	1999	1
South Fk. Lost Horse	T4N,R22W,S14	12	1994	2
Sweathouse Creek	T8N,R21W,S19	12	1991	3
Sweeney Creek	T10N,R20W,S20	11	1998	2,3
Threemile Creek	T10N,R18W,S18	10	1994	1
Tincup Creek	T3N,R21W,S17	50	1982	2
	T3N,R22W,S32	10	1992	2,3
Tincup Lake	T2N,R23W,S12	7	1998	1**
continued				
Stream	Location	Sample Size	Year	Status
Trapper Creek	T2N,R21W,S21	13	1992	2
Warm Springs Creek	T1N,R20W,S14	5	1990	2
	T1N,R20W,S27	11	1994	1
West Creek	T2S,R22W,S27	10	1995	1
Willow Creek	T6N,R19W,S10	5	1990	1
Woods Creek	T3S,R22W,S21	10	1995	1

Status:
1 = pure westslope cutthroat
2 = hybridized with rainbow trout
3 = hybridized with Yellowstone cutthroat
* = Bass Creek 1995 – one pure westslope and one pure Yellowstone cutthroat
* = Bitterroot River 1999 – five pure westslope, one 1st generation hybrid and one from hybrid swarm. Bitterroot River 2001- seven pure westslope, 3 hybrids with rainbow.
** = 1 locus characteristic of westslope and rainbow – assume pure westslope until further sampling
*** = East Fork Bitterroot 1995 – 5 pure westslope and 1 pure rainbow

Lake Como

Lake Como has been stocked annually with rainbow trout and during 1997-1999 and 2002 was stocked with kokanee. Each Fall we set gillnets to assess the status of the fishery. Trends in the data are probably not evident due to limited sampling (Table 4).

Table 4 . Capture of fish in 2 gillnets set overnight in Lake Como during the year indicated. Total number of each species is listed with the average length in parenthesis.

Year	Rainbow trout	Kokanee	Largescale sucker
1998	4 (8.6)	61(8.7)	25(10.1)
1999	3(10.3)	15(7.8)	13(12.0)
2001	0	80(7.0)	30(8.5)
2002	8(10.5)	17(7.7)	33(8.4)

The stocking of kokanee will not occur in the future because of the lack of survival into larger fish. It appears that survival after the first year is limited or growth is very slow because fish longer than 10 inches have not been captured since stocking began.

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Prepared by Christopher G. Clancy
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Stream	Code Number	Key Words
Bitterroot River drainage	2-03-8865	Trout populations Whirling Disease

Water Temperature
Fishing regulations
Westslope cutthroat
Rainbow trout
Brown trout
Bull trout
Brook trout
Radio Telemetry