F-W-14

ANNUAL PROGRESS REPORT
WATER LEASING STUDY

1998

Submitted to:

Montana Environmental Quality Council
Montana Department of Natural Resources and Conservation
and
Montana Fish, Wildlife and Parks Commission

Submitted by:

Montana Fish, Wildlife and Parks
Fisheries Division

November 30, 1998

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I. INTRODUCTION

This is the ninth annual report prepared by Montana Fish, Wildlife and Parks (FWP) in response to the reporting requirement under 85-2-436 (3) (a), MCA. A water lease was finalized on Mol Heron Creek in May, 1998. However, the Mol Heron lease will not be officially implemented until a water conservation project is constructed in 1999 or later. Two additional leases on approved study streams were actively pursued and eleven others were investigated for their feasibility. Nine previously approved leases and one water right conversion to instream flow were administered during the report period.

II. SUMMARY

Water leasing activities and accomplishments that occurred during 1998 are:

1. Finalized a water lease on Mol Heron Creek, an important cutthroat spawning tributary to the upper Yellowstone River near Gardiner.

2. Completed the second year of a water lease on Chamberlain Creek, an important cutthroat trout stream that is tributary to the Blackfoot River near Ovando.

3. Completed the second year of a water lease on Pearson Creek, an important cutthroat trout stream tributary to Chamberlain Creek in the Blackfoot River basin near Ovando.

4. Completed the third year of a water lease on Cedar Creek, a cutthroat spawning tributary to the upper Yellowstone River near Gardiner.

5. Completed the third year of a water lease on Hells Canyon Creek, a rainbow and brown trout spawning tributary to the Jefferson River near Silver Star.

6. Completed the third year of a water lease on Tin Cup Creek, a rainbow and cutthroat spawning tributary to the Bitterroot River near Darby.

7. Completed the fifth year of a water lease on Blanchard Creek, a Blackfoot River spawning tributary near Ovando.

8. Completed the sixth year of two water leases of existing water rights on Mill Creek, a Yellowstone River spawning tributary near Pray. Also, completed the third year of a third water lease on this stream.

9. Completed the second year of a conversion of some of FWP's irrigation water rights to instream flow on Cottonwood Creek, a tributary to the Blackfoot River that flows through FWP's Blackfoot-Clearwater Wildlife Management Area (WMA) near Ovando.

10. Terminated the process of investigating a new water lease on Rock Creek, a tributary to the North Fork of the Blackfoot River near Ovando.

11. Continued to actively pursue leases on two streams, Big Creek and Rock Creek near Garrison.

12. Investigated eleven leasing inquiries that proved to be infeasible or are still being pursued to obtain initial information as to their suitability for leasing.

III. DESIGNATED STUDY STREAMS

When the water leasing study legislation was approved in 1989, FWP was required to receive approval of the Board of Natural Resources and Conservation (BNRC) to study a stream for leasing. As of July 1, 1995, the BNRC no longer exists and this duty is now the function of the Department of Natural Resources and Conservation (DNRC). The following is a list of the streams approved to date, the approving authority and date of approval. Current law allows no more than 20 streams to be approved for water leasing.

1. Swamp Creek (Big Hole R. drainage); BNRC; March 5, 1990

2. Big Creek (Yellowstone R. drainage); BNRC; March 5, 1990

3. Mill Creek (Yellowstone R. drainage); BNRC; November 9, 1990

4. Cedar Creek (Yellowstone R. Drainage; BNRC; January 6, 1992

5. Blanchard Creek (Blackfoot R. drainage); BNRC; September 25, 1992

6. Hells Canyon Creek (Jefferson R. drainage); BNRC; September 25, 1992

7. Tin Cup Creek (Bitterroot R. drainage); BNRC; October 30, 1992

8. Rattlesnake Creek (Clark Fork R. drainage); BNRC; May 25, 1995

9. Mol Heron Creek (Yellowstone R. drainage); DNRC; November 28, 1995

10. Rock Creek (Blackfoot R. drainage); DNRC; November 28, 1995

11. Chamberlain Creek (Blackfoot R. drainage); DNRC; January 3, 1996

12. Pearson Creek (Blackfoot R. drainage); DNRC; January 3, 1996

13. Rock Creek near Garrison (Clark Fork R. drainage); DNRC; July 15, 1998

Leases have been finalized on all but five (5) of the designated study streams: Swamp Creek, Big Creek, Rattlesnake Creek , Rock Creek and Rock Creek near Garrison. FWP and the potential lessor on Swamp

Creek could not reach agreement on a price for the lease. A sprinkler irrigation project that will salvage water for instream use on Big Creek was funded by FWP; a finalized lease is anticipated in 1999. A sprinkler irrigation project that will salvage water for instream use on Rock Creek near Garrison is being proposed for funding in 1999. Discussions with the potential lessor on Rattlesnake Creek are on hold. Negotiations with the potential lessor on Rock Creek (Blackfoot R. drainage) have ended without a completed lease.

IV. 1998 ACTIVITIES

Water Lease Finalized

A water lease was finalized in May, 1998 with the Church Universal and Triumphant on Mol Heron Creek, a tributary to the upper Yellowstone River near Gardiner. Mol Heron Creek is an important Yellowstone cutthroat trout spawning tributary to the Yellowstone River. The lease is expected to improve instream flows in the lower half-mile of stream. The stream has chronic low flow problems in most years due to irrigation withdrawals by the Church.

About ½ mile above the mouth of Mol Heron Creek, the Church has a large diversion dam used to divert irrigation water to their hay lands along the Yellowstone River. The diversion is sometimes a partial blockage to upstream migration of cutthroat trout and also captures young cutthroat migrating downstream to the Yellowstone River, reducing a source of recruitment to the river fishery. The Church will replace its existing flood irrigation system with a more efficient sprinkler irrigation system that will allow some water to be salvaged. Salvaged water is being leased by FWP. In addition, the Church agrees to pass a minimum instream flow of 5 cfs in the event that salvaged water is insufficient to meet fishery needs. Salvaged water will remain instream to the mouth of the creek to improve the reproductive capacity of the stream and enhance the important cutthroat fishery in the Yellowstone River. In conjunction with water leasing, a new "fish friendly' diversion will be installed at the existing diversion to improve both upstream and downstream fish migration.

Construction of the Church's new irrigation system on Mol Heron Creek is slated to begin in 1999. The lease will not be officially implemented until construction is completed.

Other Leases Actively Pursued on Approved Streams

Big Creek

The lower mile of Big Creek, a tributary to the upper Yellowstone River, is dewatered during the summer irrigation season. Big Creek is used by native Yellowstone cutthroat trout from the Yellowstone River for spawning and rearing. However, reproduction is adversely impacted by seasonal dewatering that occurs in virtually all years. Tributary dewatering is an important, if not the major, factor regulating numbers of adult cutthroat trout in the Yellowstone River. Because of shrinking distribution and declining numbers, the Yellowstone cutthroat trout is classified as a "Fish of Special Concern" in Montana.

This project is being proposed to rewater the lower mile of Big Creek by creating and then leasing "salvaged water". "Salvaged water" would be created by converting existing ditch/flood irrigation facilities operated by two south side landowners (Big Creek and Malcolm ranches) to a more efficient gravity fed pipeline and sprinkler system. In conjunction with converting to a more efficient irrigation system, a water lease would be implemented between FWP and the Malcolm Family, one of the south side landowners who holds a senior water right. In addition to the salvaged water, FWP will lease a portion of the Malcolm's senior-most water right. Additionally, a water lease will be implemented between FWP and the Bar X Ranch, a north side landowner and holder of the senior water rights on Big Creek. The Bar X Ranch created "salvaged water" by recently converting to a more efficient sprinkler irrigation system. The proposed project would provide approximately 11 cubic feet per second (cfs) of water to the lower mile of Big Creek.

Funding for the project has been approved by the Future Fisheries Improvement Program review panel and by the FWP Commission. An Environmental Assessment was prepared and reviewed by the public. Leasing agreements are now being finalized. Project construction is slated to begin in 1999 after "change" applications are approved by the DNRC.

Rock Creek Near Garrison

Rock Creek flows northeast from Rock Creek Lake in the Flint Mountain Range for 10.6 miles before entering the Clark Fork River near Garrison. Irrigation diversions capture much of the creek's flow, completely dewatering the lower mile of creek during much of the summer irrigation season.

Rock Creek supports resident populations of brown trout, the creek's predominant trout species, and brook trout and a few rainbow x cutthroat hybrids. Because lower Rock Creek is typically dry when brown trout from the Clark Fork River move into tributary streams to spawn, the creek receives virtually no use by spawners.

Salvaged portions of six irrigation water rights held by the McGillis Ranch, which include the creek's 2nd and 3rd right by priority, are being proposed for leasing. These rights are diverted at the creek's four lowermost irrigation diversions located within the lower 1½ mile of stream. The four diversions totally dewater the lower creek during much of the irrigation season.

The McGillis Ranch is converting from flood to sprinkler irrigation. Two gravity-fed pivots, using a combined flow of 3.83 cfs, are planned. The Ranch will fund a portion of the project . Additional funding is being sought through the Future Fisheries Improvement Program, administered by FWP. If funded, the salvaged water created by the project will be leased at no cost to FWP for instream use. In addition, the Ranch agrees to pass a minimum instream flow of 5 cfs in the event that salvaged water is insufficient to meet fishery needs. A Future Fisheries Improvement Program grant application will be submitted in January, 1999.

The completion of the irrigation project should provide a continuous flow of water to the Clark Fork River, allowing river brown trout to enter Rock Creek to spawn and young trout to rear before out-migrating to the river. Limited tributary spawning habitat is one factor that contributes to the low numbers of trout

inhabiting the Clark Fork River. Rewatering of Rock Creek could improve the recruitment of brown trout for the Clark Fork fishery and potentially contribute to the recovery of the river's fish populations.

V. REPORTING REQUIREMENTS FOR COMPLETED LEASES

Section 85-2-436 (3)(a) requires that an annual leasing progress report contain specific information on each pilot lease entered into during the report period. Virtually all of the following information, listed below under 85-2-436 (1) (a) and (b), was already provided for the now final Mol Heron Creek lease in the 1997 annual progress report. This report (for 1998) completes the listing of the principal events that lead to the finalization of the lease.

(1)(a) provide the following data for each designated stream reach and each pilot lease entered into under subsection (2):

- (I) the length of the stream reach and how it is determined;
- (ii) technical methods and data used to determine critical stream flow or volume needed to preserve fisheries;
- (iii) legal standards and technical data used to determine and substantiate the amount of water available for instream flows through leasing of existing rights;
- (iv) contractual parameters, conditions, and other steps taken to ensure that each lease in no way harms other appropriators, particularly if the stream is one that experiences natural dewatering; and
- (v) methods and technical means used to monitor use of water under each lease;

(1)(b) based on the data provided under subsection (1)(a), develops a complete model of a water lease and lease authorization that includes a step-by-step explanation of the process from initiation to completion.

The following completes a chronological documentation of the principal events that led to the finalization of the Mol Heron Creek lease.

Oct. 2, 1997 - Letter sent to Jeffrey McNab, Church engineer, requesting information needed to complete the "change" application.

Dec. 29, 1997 - U.S. Forest Service submits written comments in response to the Mol Heron Creek water leasing EA.

Jan. 14, 1998 - Jeffrey McNab, Church engineer, calls regarding what is needed to get the "change" application moving. FWP's needs were listed in letter sent on Oct. 2, 1997. When that information is received, the draft "change" application will be completed by FWP.

Jan. 22, 1998 - Church provides requested "change" information.

Jan. 24, 1998 - "Change" is completed and mailed to Church for review.

Jan. 28, 1998 - Completed "change" is mailed to DNRC after Church review.

Jan. 30, 1998 - EA Decision Notice, which addresses U.S. Forest Service's concerns, is completed and mailed to the public.

Feb. 18, 1998 - Church, DNRC and FWP representatives visit project site.

Feb. 25, 1998 - Supplemental "change" information is requested by DNRC. A written reply is prepared by FWP.

May 11, 1998 - "Change" authorization is received by FWP, finalizing Mol Heron Creek lease.

VI. OTHER INVESTIGATIONS IN 1998

Eleven (11) other leasing opportunities were investigated on the streams listed below, one of which (Mill Creek) is already approved for leasing. Some were not pursued further for reasons that are described below. Others are still under consideration.

1. Mill Creek (four separate inquiries), a tributary to the Yellowstone River near Pray.
2. Warm Springs Creek, a tributary to the Clark Fork River near Anaconda.
3. Brackett Creek, a tributary to the Shields River.
4. Prickly Pear Creek, a tributary to Lake Helena near East Helena.
5. Rattlesnake Creek, a tributary to the Clark Fork River at Missoula.
6. East Gallatin River near Bozeman.
7. Shields River near Wilsall.
8. Beaverhead River near Twin Bridges.

The 1997 progress report listed ten potential leasing opportunities under Part VI, Other Investigations. Only two (Mill Creek and Shroder Creek) are potentially viable.

Some of the reasons leasing opportunities were not further pursued are:

1. The flow amount offered for leasing is too small to make a difference;
2. The water right has a poor priority date;
3. The water right is in the wrong location on the stream;
4. The validity of the water right is in question.
5. The stream does not have a dewatering problem;
6. The fishery benefits are judged too insignificant to justify a lease;
7. The stream is embroiled in a water right controversy that would greatly hamper lease implementation; and
8. The right holders withdrew their offer when made aware of the leasing process and its anticipated time frames.

A summary of the features and costs of the water leases that have been approved to date under the water leasing study is given in Appendix A.

NOTE: FWP's water rights conversion on Cottonwood Creek is also included in Appendix A.

VII. MONITORING

Flow and Biological Monitoring

Flow and biological monitoring is being done on all leases to determine their effectiveness in improving fisheries. Monitoring intensity varies and is currently done by FWP fisheries biologists and by contract employees when funding is available. FWP currently does not have sufficient staff for intensive monitoring of leases. Local biologists collect data when they can, but have many other duties that often conflict with an adequate monitoring program.

The following is a summary of the monitoring conducted on each stream through 1998.

1. Blanchard, Chamberlain and Cottonwood Creeks. Monitoring of fish populations in these three streams is done by regional fisheries personnel. Their monitoring report for 1998 is presented in Appendix B.

2. Hells Canyon Creek. The lease has been in effect since 1996. Monitoring of spawning rainbow and brown trout migrating upstream and young fish migrating downstream to the Jefferson River is done by the local fisheries biologist, whose monitoring report is presented in Appendix C.

3. Pearson Creek. This lease was first implemented in 1997. Periodic monitoring is done by local biologists. Pearson Creek was historically entirely diverted for irrigation. The lower section of stream channel was nearly obliterated from non-use. It was reconnected to Chamberlain Creek in 1994 through a stream restoration project which reestablished the physical features of the channel. Fish populations were inventoried in 1991 prior to completion of the restoration project. The water lease affects the lower mile of stream, which is in a newly reconstructed and naturally intermittent channel. The primary value of Pearson Creek is to provide a migratory corridor for fish from the Blackfoot River to migrate into the upper reaches of Pearson Creek to spawn. Out-migrant fish have been observed in the stream section since its reconstruction and good numbers of multiple age classes of cutthroat trout have been sampled. Also, brook trout have been collected in a section of the reconstructed channel. Additional monitoring will be needed to determine the long-term effectiveness of the water lease.

4. Mill Creek. Two of the leases have been in effect since 1993 and one of them since 1995. One of the leases, with the Mill Creek Water and Sewer District, provides a 48-hour flushing flow at the time cutthroat trout fry are out-migrating to the Yellowstone River. The other two leases with private individuals provide a base flow throughout the irrigation season to help ensure some flow at the mouth of the creek, which has historically gone dry in most years due to upstream irrigation.

In 1998, monitoring was conducted under contract with the former graduate student who monitored the Yellowstone tributaries in 1996 and 1997. As compared to 1997 counts, the number of fry trapped in 1998 decreased by 77% in Mill Creek. Despite the water lease, the lower mile of Mill Creek was dry for at least 48 hours during mid-September and many young-of-the-year cutthroat trout perished as a result. However, the water leases on Mill Creek prevented greater Yellowstone cutthroat losses by mitigating flow levels during July and August. The abstract for the 44-page monitoring report for the Yellowstone tributaries is presented in Appendix D. Included are the flows for 1998.

5. Cedar Creek. The lease was first implemented in 1996. Monitoring in 1998 was conducted under contract with the former graduate student who monitored in 1996 and 1997.

As compared to 1997 counts (a banner year), the number of fry trapped in Cedar in 1998 decreased by 85%. Flows in lower Cedar Creek dropped below the lease level of 1.3 cfs for seven days in early August, dewatering some redds. Flows then recovered. However, the water lease on Cedar Creek prevented greater Yellowstone cutthroat fry losses by mitigating flows levels during July and September and much of August (see Appendix D).

6. Tin Cup Creek. The lease was first implemented in 1996. Monitoring is done by the local fisheries biologist. Data on rainbow trout spawning and reproduction was collected in 1992, 1993 and 1994, prior to implementing the lease. One year of data (in 1997) has been collected since the lease. The 1997 data show the number of rainbow fry leaving the creek is not an improvement over pre-lease years (see Appendix E). However, sampling rainbow fry is difficult since they leave the creek before high flows are completed. Sampling efficiency is variable depending on flow conditions and the intensity of sampling has an effect on estimating numbers of fry. Further monitoring, planned for 1999, will be needed before firm conclusions can be made about the benefits of the lease to rainbow trout.

Since the Tin Cup lease was implemented in 1996, FWP has had difficulty in obtaining the full amount (4.72 cfs) of its leased water. In 1998, instream flows as low as 1.0 cfs were recorded (see Appendix E). For various reasons, flows in all years have dropped well below our leased amount for 2-3 weeks. FWP's renewal of the Tin Cup lease, which expires on November 4, 2000, is questionable given the extent of existing problems and the inability to demonstrate benefits to date.

APPENDIX A
Features and Costs of Approved Water Leases

SOURCE	LESSOR	LEASE TERM/EXP.	PRIORITY OF RIGHT	QUANTITY LEASED	PERIOD OF USE	COST
Mill Creek	Mill Creek Water and Sewer District	10 years Aug. 1, 2003	95 right with various priorities	41.4 cfs	48-60 hours in Aug. Diversion shut off after 10-day notice from FWP	$12, 750 per year[1]
Mill Creek	Individual	10 years April 1, 2003	June 30, 1880; June 1, 1903	2.0 cfs (1880) and 4.13 cfs (1903) (salvaged water)	May 1 -October 4	$7,500 per year
Blanchard Creek	Individual	5 years June 20, 1999	May 11, 1913 (first right on stream)	3.0 cfs	April 15 -October 15	Up to $2,000 per year
Tin Cup Creek	Six Individuals	5 years Nov. 4, 2000	August 1, 1883 (first right on stream)	2.28 cfs April 1-April 14 4.32 cfs April 15-April 30 4.72 cfs May 1-October 19 1.8 cfs October 20-November 4	April 1- November 4	$6,260 per year
Cedar Creek	US Forest Service	10 years Sep. 20, 2005	April 1, 1890; April 1, 1893; April 1898; April 1, 1904; April 7, 1972 (high water rights only)	6.77 cfs May 1-July 15[2] 6.39 cfs July 16-July 31 9.64 cfs August 1-August 31 6.39 cfs Sept 1 - October 15	May 1-October 15	$1.00 per year
Hells Canyon Creek	Three Individuals	20 years Apr. 1, 2016	December 31, 1884 (first right on stream); August 23, 1889; August 29, 1912	1.12 cfs (salvaged water)	April 1- November 4	$45,000 - One-time payment
Mill Creek	Individual	10 years May 1, 2006	June 1, 1891	2.64 cfs (salvaged water)	May 1-October 19	$4,200 per year
Chamberlain Creek	Individual	10 years Apr. 1, 2007	October 10, 1911	½ the flow up to 25 cfs	April 1 - October 31	$1.00 per year
Pearson Creek	Individual	10 years Apr. 1, 2007	October 10, 1911	Up to 8 cfs	April 1 - October 31	$1.00 per year
Cottonwood Creek	FWP[3]	9 years June 30, 2005	May 1, 1884	14.0 cfs April , 37.0 cfs May 1-June 30, 32.0 cfs July, 9.0 cfs August, 6.0 cfs Sept, 9.0 cfs Oct, 8.0 cfs November (salvaged water)	April 1- November 4	None
Mol Heron Creek	Private ranch	20 years Dec. 31, 2018	July 15, 1884; May 7, 1885; June 15, 1893; January 1, 1900; March 2, 1903; June 5, 1905; August 5, 1920; April 15, 1967	5.0 cfs to 27.0 cfs	April 15 - October 19	$100,000 - one-time payment

[1]Lessor pays for water commissioner and the installation of measuring devices on all on-farm turnouts from the pipeline.
[2]These rights are used to maintain a flow of 1.3 cfs at the mouth of Cedar Creek, eliminating effects on other water users.
[3]FWP converted its own water rights to instream flow under 85-2-439, MCA.

APPENDIX B

Blanchard Creek Fishery Improvement Project

Restoration Objective

1)obtain minimum instream flows
2)improve access, spawning and rearing conditions for trout
3)improve recruitment of trout to the Blackfoot River

Project Summary

Blanchard Creek is a small tributary to the lower Clearwater River. Blanchard Creek was historically dewatered in its lower one mile from irrigation withdraw. Fish populations surveys in 1990 indicated this dewatering, and associated poor fish passage at headgates for two irrigation canals, and the Highway 200 stream crossing negatively impacted the fishery in the lower reaches of the tributary. Other problems identified in the drainage were road erosion and livestock impacts to the riparian area.

Although the water lease has been in effect since 1993, the water rights holder began increasing flows in 1991. In 1993, "fish-friendly" diversion structures were constructed and fitted with fish ladders at both diversion points. Improved management of riparian grazing was initiated by Plum Creek Timber Company and the DNRC. A culvert under Highway 200 was modified by the DOT to facilitate fish passage.

Fish Populations

Blanchard Creek has both rainbow trout (lower) and cutthroat trout (upper) dominated stream reaches and is a good producer of both species. Fish population in lower Blanchard Creek in the area of the diversions and water lease (stream mile 0.1) were monitored from 1990 to 1998. During this period, densities and species richness improved (Pierce, Peters and Swanberg, 1996). Densities of both young-of-the year (YOY) rainbow trout (<4.0 inches) and age I plus (>4.0 inches) rainbow trout have improved, with rainbow trout YOY densities estimated at 14.4 ± 0.7 per 100 feet of stream in 1990 compared to 67.0 ± 4.6 in 1998. In 1990, age I plus rainbow trout were estimated at 5.6 ± 2.2 per 100 feet of stream and increased to 12.3 ± 1.5 in 1998.

Year	Species	Size Class(inches)	Density/100ft. (95% C.I)
1990	Rainbow Trout	<4.0	14.4 ± 0.7
		>4.0	$5.6 + 2.2$
1992	Rainbow Trout	>4.0	25.4 ± 1.6
	Brown Trout	<4.0	4.0 ± 6.7
		>4.0	1.0 ± 0.0
	Cutthroat Trout	>4.0	$0.3 + 0.0$
1993	Rainbow Trout	>4.0	16.7 ± 1.3
	Brown Trout	>4.0	$0.3 + 0.0$

1994	Rainbow Trout	<4.0	40.7 ± 3.7
		>4.0	19.0 ± 0.4
	Brown Trout	<4.0	1.8 ± 0.4
		>4.0	0.3 + 0.0
1995	Rainbow Trout	<4.0	40.8 ± 5.3
		>4.0	**11.9** ± 1.3
	Brown Trout	>4.0	1.5 + 0.4
1997	Rainbow Trout	<4.0	12.0 ± 1.7
		>4.0	14.2 ± 2.6
	Cutthroat Trout	>4.0	0.4 + 0.2
1998	Rainbow Trout	<4.0	67.0 ± 4.6
		>4.0	12.3 ± 1.5
	Brown Trout	<4.0	2.0 + 1.4

Chamberlain Creek Fishery Improvement Project

Restoration Objectives

1)obtain minimum instream flows
2)improve access, spawning and rearing conditions for cutthroat trout
3)improve recruitment of cutthroat trout to the Blackfoot River
4)provide thermal refuge and rearing opportunities for fluvial bull trout

Project Summary

The upper reaches of Chamberlain creek supports excellent densities of cutthroat trout; however, sections of lower Chamberlain Creek have been severely altered, leading to a major declines in the cutthroat fishery downstream of stream mile 4.0. Major impacts to the stream include channelization, poor fish passage near the mouth, dewatering and entrainment from irrigation withdraw, poor riparian livestock managment and excessive sediment related to road drainage problems.

Since 1990, Chamberlain creek has been the focus of a comprehensive fishery restoration effort. Major efforts include; road drainage fixes, riparian livestock management upgrades, habitat restoration, irrigation upgrades (consolidating ditches and installing a fish ladder) and improved instream flows through water leasing (Pierce, Peters and Swanberg, 1996. Pierce et al. In-prep, 1998).

Fish Populations

Chamberlain Creek supports a significant migration of Blackfoot River fluvial cutthroat trout with reproduction occurring throughout the system. In 1998, fish population surveys were completed at four index reaches originally surveyed in 1989. A comparison of the electrofishing catch (CPUE for cutthroat trout >4.0 inches) shows a substantial increases in the project area post-project, and stable cutthroat trout numbers (see chart). Beginning in 1997, low densities of juvenile bull trout have been recorded throughout the lower 3.8 miles of Chamberlain Creek. Additional monitoring efforts related to the water lease include the development of flow rating

curves in both the main channel and a major diversion (Pierce et al. In-prep, 1998).

CPUE for cutthroat trout (>4.0 inches) in 4 index sections of Chamberlain Creek before and after restorations activities, 1989 and 1998

Year	Location (rm)	CPUE (#/1000 ft. Based on a single electrofishing Pass)
1989	0.1	5
	0.5	53
	2.8	106
	3.8	404
1998	0.1	144
	0.5	131
	2.8	208
	3.8	236

Cottonwood Creek Fishery Improvement Project

Restoration Objectives

1)Restore connection between upper and lower sections of the creek
2)Initiate water conservation measures.
3)Eliminate loss of fish to irrigation canals.

Project Summary

Losses of native fish and poor water management provided the impetus for a comprehensive fisheries and water conservation effort on the Cottonwood Creek mainstem. The effort included fitting 2 major diversions with fish ladders, screening two irrigation canals, lining an 8,000 ft irrigation canal and leasing an estimated 8,663 acre feet of salvage water per year for instream flow purposes. Related efforts include improved riparian livestock management and conservation easements in the middle reaches of Cottonwood Creek.

Project Monitoring

Two types of project monitoring have been employed on the Cottonwood Creek project in the area of the Dryer Diversion. The first included installation of a staff guage mounted to a partial flume positioned in the Dryer ditch 0.1 mile downstream of the fish screen. The gauge identifies the maximum diversion allowed under the water lease (13 cfs = 0.6 feet on gauge). The second level of monitoring includes fish population sampling below the Dryer Diversion in a reach of Cottonwood Creek that historically was completely dewatered during the late irrigation season (July-October) prior to the water lease.

Summary of Electrofishing Catch Statistics for Cottonwood Creek (Stream Mile 12.0), 1997 and 1998.

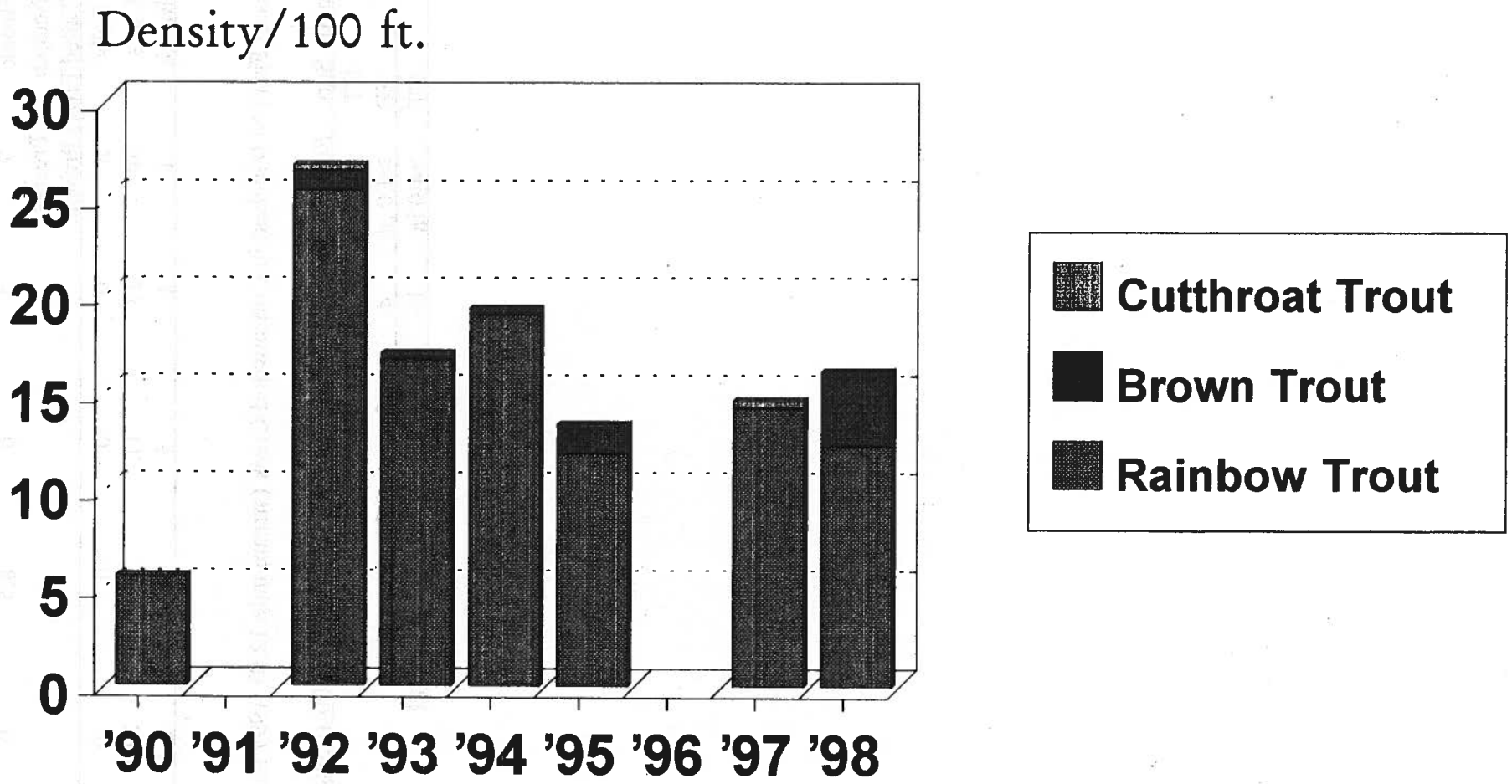
Date	Section Length	Species	Total # Captured	Total # First Pass	# YOY 1st pass	CPUE (#/1000 ft.)	YOY CPUE (#/1000 ft.)
7/30/97	470 ft.	Bulls	5	2	0	4.3	0
		Cutts	18	12	3	25.5	6.3

	Brook	7	4	0	8.5	0
	Sculpin	Present				
	Tailed Frogs	Present				
10/01/98 470ft.	Bulls	2	0	0	0	0
	Cutts	38	27	11	57.4	23.4
	Brook	1	1	1	0	2.1

Estimated Densities of Fish (>4.0 inches) in Cottonwood Creek (stream mile 12.0), 1997 and 1998.

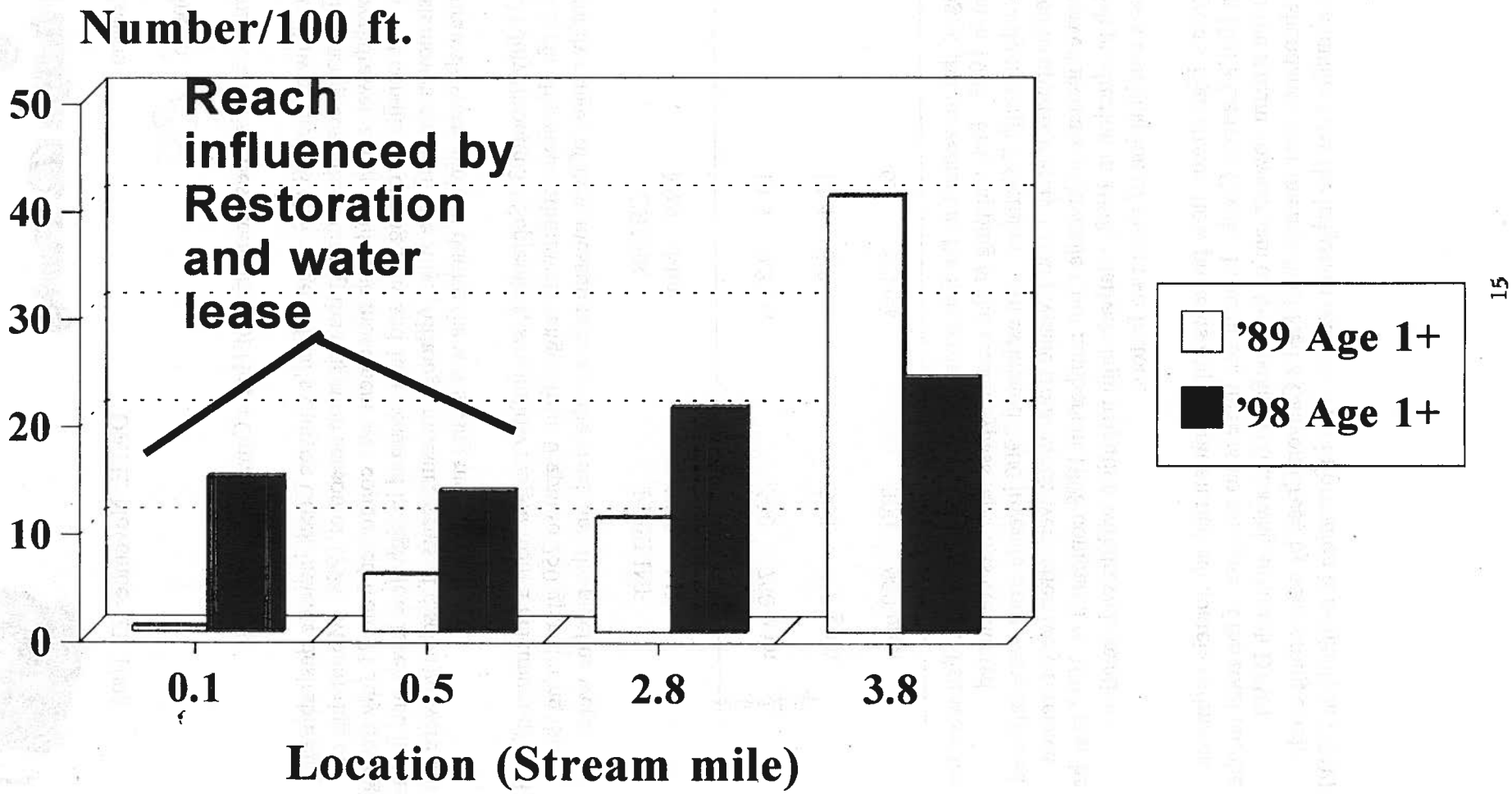
Date	Sec_Length	Spp	Size Class	1st Pass	2nd Pass	Prob.	Estimate/1000' (95% C.I.)
30-July-97	470	CT	>4.0 in.	9	3	0.67	29 ± 11
		EB	>4.0 in.	4	0	1.00	9 + 0
01-Oct-98	470	CT	>4.0 in.	15	8	0.47	68 + 49

Estimated Trout Densities (Fish >4.0 inches) for lower Blanchard Creek, 1990 to 1998 Stream mile 0.1



Instream Flows in effect since 1991

Electrofishing Catch for Cutthroat Trout for Four Sections of Chamberlain Creek 1989 and 1998



Before and After Restoration Efforts

APPENDIX C

Montana Department of Fish, Wildlife & Parks

TO: Fred Nelson DATE: November 23, 1998

FROM: Ron Spoon RS

SUBJECT: Streamflow and fisheries monitoring of Hell's Canyon Creek- 1998.

Similar to 1997, streamflow at the U.S.G.S. gage in Hell's Canyon Creek indicate desirable egg incubation and juvenile rearing conditions during the irrigation season of 1998. Monitoring of streamflow, pipeline withdrawal, and juvenile fish movement was conducted from 21 July through 6 October. Relatively wet conditions during May and June resulted in high flow levels and it was difficult to monitor fish movement until late July. Although measurements of discharge were not taken, irrigation withdrawals were minimal during the wet spring months.

During the period of 21 July through 30 September, streamflow ranged from a maximum of 14.3 cfs to a minimum of 5.2 cfs. Pipeline withdrawals ranged from 0 gpm to 750 gpm during the same period. The monthly ranges of flow measurements in the creek and the pipeline were:

	CREEK		PIPELINE	
	Max	Min	Max	Min
Late JULY	14.3	9.8 cfs	500	750 gpm
AUGUST	12.4	5.8 cfs	500	700 gpm
SEPTEMBER	6.3	5.2 cfs	300	600 gpm

As in 1997, monitoring of fish movement at the fish screen bypass indicated that no fish were lost to the irrigation system in 1998. Fish trapping at the screen bypass pipe was conducted continuously from 21 July through 7 October. An estimated 2900 juvenile trout were captured at the bypass, compared to approximately 1,000 juvenile trout which were effectively screened during 1997. The observed increase in juvenile trout numbers in 1998 compared to 1997 may be a result of increased fish production in 1998, relatively high irrigation withdrawals relative to stream flow in 1998, or a combination of these two factors.

During relatively wet years, high stream flow prevents trap operation that adequately estimates total fish production in Hell's Canyon Creek. In addition, there is no estimate of the total number of trout fry that rear in the stream downstream of the pipeline withdrawal, although DFWP monitors trends in fry abundance near the mouth of Hell's Canyon Creek by conducting catch-per-unit-effort surveys annually after the irrigation season. This information is available in DFWP files.

APPENDIX D

Abstract

Yellowstone cutthroat trout fry outmigration was monitored on Locke, Mill, Cedar, and Mol Heron creeks during 1998 and compared to data from 1996 and 1997 to evaluate the effect of current water leases on fry recruitment to the Yellowstone River, Montana. This study examined how the climatic difference affected Yellowstone cutthroat trout fry outmigration from these four tributaries from July 6 to September 17, 1998. The summer of 1998 was warmer and drier than the two previous summers, although it was not a drought year. Total numbers of fry captured were down from surveys conducted in1996 and 1997 in all creeks except Mol Heron. As compared to 1997 counts, the number of fry trapped decreased 97% in Locke Creek, 77% in Mill Creek, and 85% in Cedar Creek. The number of fry trapped in Mol Heron Creek increased by 11% from the count in 1997, but was 31% lower than the count in 1996. High daytime temperatures in July and dramatic declines in streamflow in Locke, Mill and Cedar creeks may have contributed to lower outmigration. Mean stream temperatures in Locke Creek exceeded 17 C from July 3 to August 18, encompassing the entire outmigration period. Despite the water lease, Mill Creek was dry for at least 48h during mid-September and many young of the year Yellowstone cutthroat trout, along with other trout species and sculpin, were found dead as a result. Flows in Cedar Creek dropped below the lease level of 0.04 m^3/s for 7 d in early August, resulting in prolonged dewatering of redds. However, in contrast to the disastrous effects of prolonged inadequate flows seen on Locke Creek, the water leases on Mill, Cedar and Mol Heron Creeks prevented greater Yellowstone cutthroat trout fry losses by mitigating flow levels during July and August.

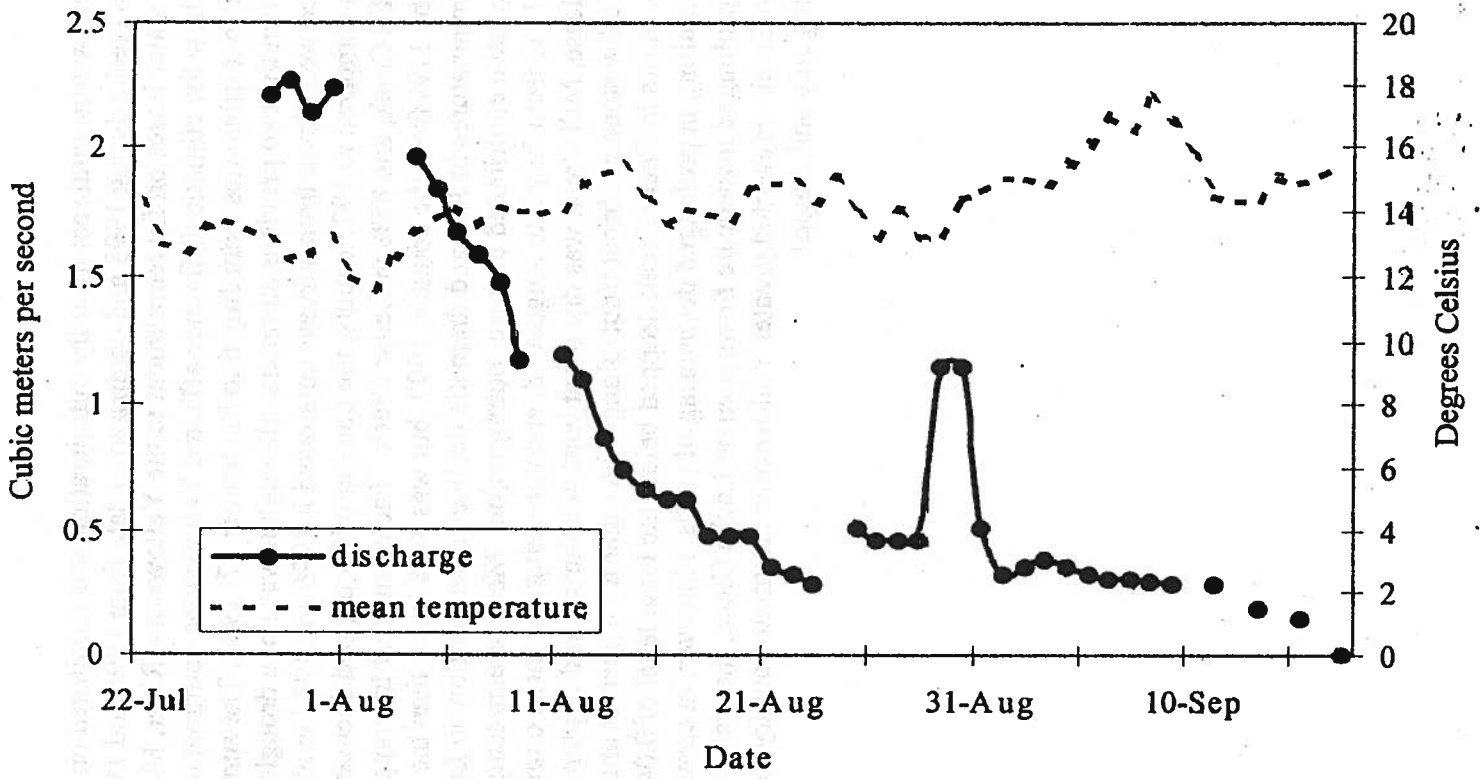


Figure 4. Daily discharge and mean daily water temperature for Mill Creek, Montana, from July to September, 1998

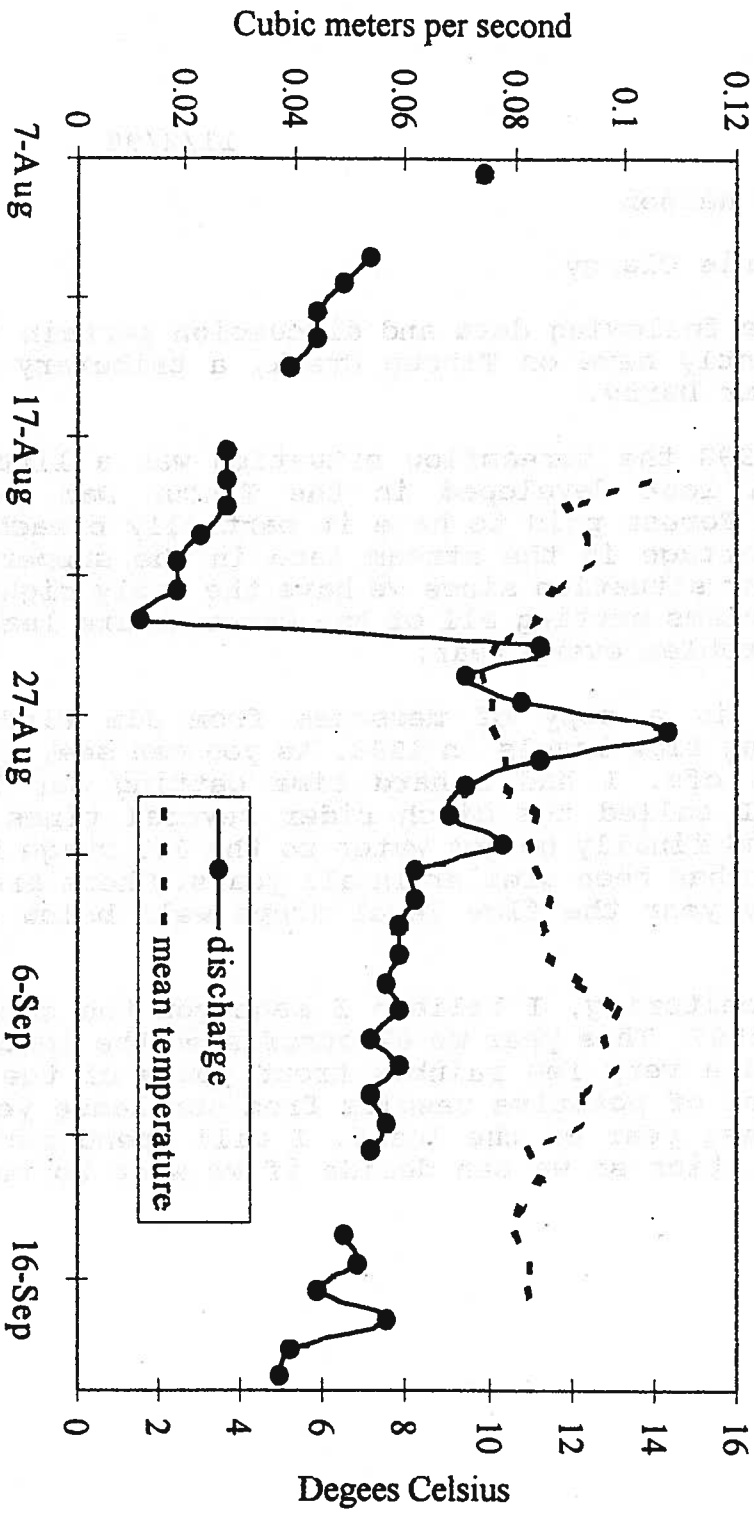


Figure 5. Daily discharge and mean daily water temperature for Cedar Creek, Montana, from August to September, 1998

APPENDIX E

11/2/98

TO: Fred Nelson

FROM: Chris Clancy

Fred, the following data and discussion pertain to the water lease we presently have on Tincup Creek, a tributary of the Bitterroot River near Darby.

During 1998 the streamflow situation was a little different from usual. A leak developed in the Tincup Dam and the Bitterroot National Forest paid to have it partially breached. This led to a water shortage in the stream late in the summer. This should not affect our situation since we have the early right. However, we did have problems getting all of the water we are leasing, but this has been a problem every year.

Attached is a copy of messages from Jim Findley of the USGS, indicating flow levels in 1998. As you can see, flows dropped to as low as 1 cfs. I had a hard time getting our leased water this summer. I called the ditch rider several times during this time period and finally he got water to the 1.7 stage by about 9/10. The situation has been similar in all years. There are varying reasons, but every year the flow level drops well below our lease for 2-3 weeks.

As for monitoring, I believe I sent you the data on fry trapping through 1997. This year we electrofished the lower end of the creek and found a very few rainbow trout young of the year. I have not seen a lot of positive results from our lease yet. I believe 1999 is the last year of the lease. I will spend more time monitoring this situation so we can decide if we want to renew it.

8/13/98

Part 1

TO: cclancy / r1, bitterroot

Part 2

jim findley @ geo survey re rating for tin cup 755-6686
a little low, about 3.8 cfs

art taylor @dnrc decreased water 110 cfs at painted rocks

9/2/98

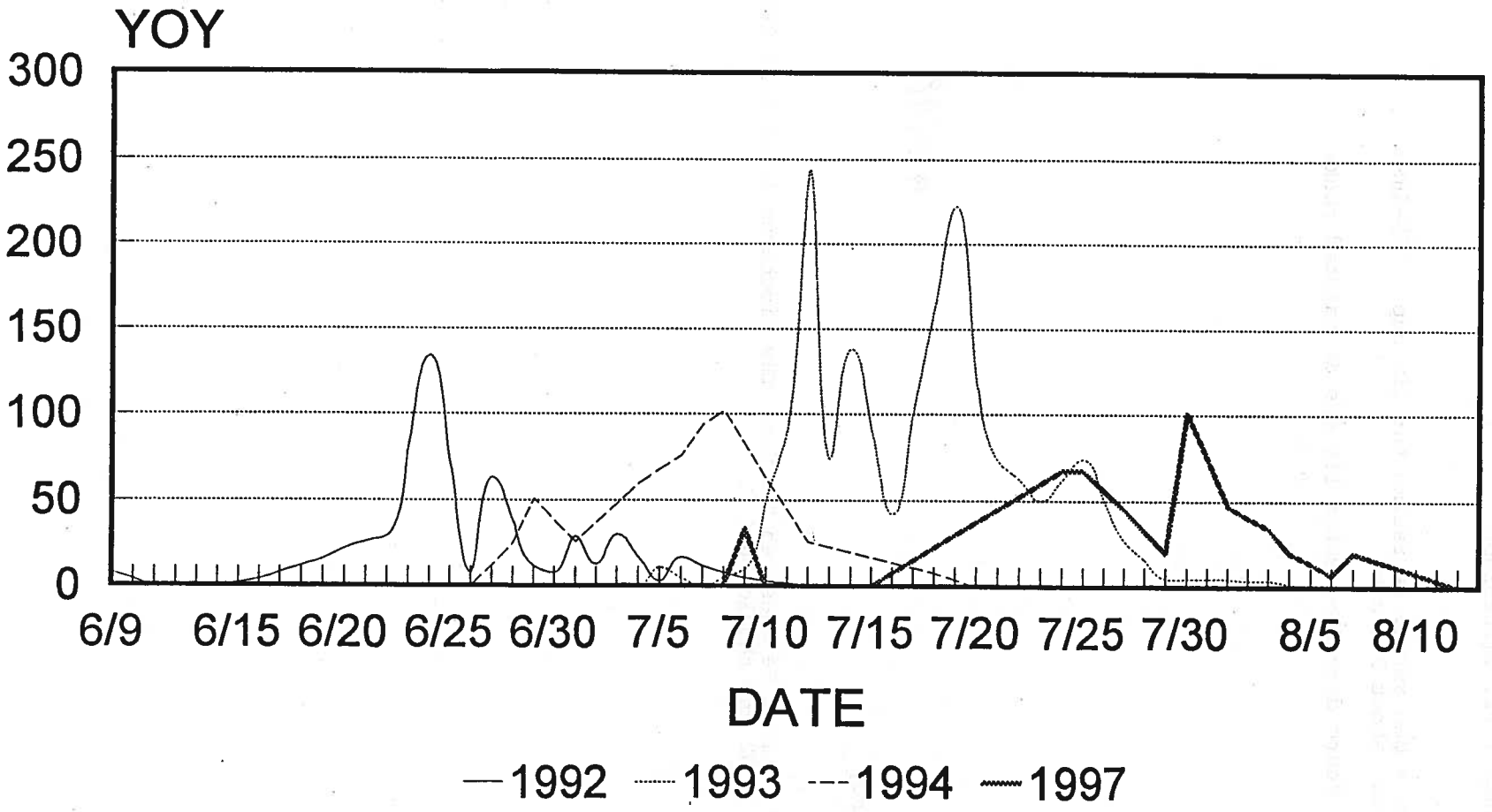
Part 1

TO: cclancy

Part 2

Jim Finley called. He measured Tin Cup. The discharge is at 0.97 CFS. The gage height is 1.52 and should be 1.7.

TINCUP CREEK
YOUNG-OF-YEAR



RAINBOW TROUT