MONTANA FISH, WILDLIFE AND PARKS
FISHERIES DIVISION

JOB PROGRESS REPORT

State:	**MONTANA**	**Element 1:**	**FISHERIES MANAGEMENT**
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Project Title:	**STATEWIDE FISHERIES MANAGEMENT PROGRAM**	**Job Title:**	**SOUTH CENTRAL MONTANA COLDWATER FISHERIES INVESTIGATIONS**

Project Period: **JULY 1, 1991 THROUGH JUNE 30, 1995**

ABSTRACT

Cooney Reservoir management direction to produce a mixed trout/walleye fishery continues on schedule. Average size of walleye in the spawning population has increased each year as the population matures. By the spring of 1995, they averaged 25.0 in and 6.65 lbs. Several fish over 14 lbs were taken during 1995. Several larval walleye were sampled in 1993 confirming limited reproduction of walleye in Cooney for the first time. The walleye population size distribution in Cooney is bi-modal with good numbers of small and large fish but few in the intermediate size range. A food availability and diet overlap study conducted during 1992 and 1993 indicated the lack of traditional forage fish may be the primary cause of the this bi-modal distribution. Walleyes appear to be controlling the sucker population through effective cropping of nearly all sub-adult suckers, thus preventing recruitment. Fishing for rainbow trout has improved since the annual plant was increased to 150,000. Rainbow growth has remained good, with spring 1995 fish averaging 13.7 in, and the additional fish have provided better carryover for the winter and spring fishery. Black crappie numbers in Cooney have decreased due to predation by walleye and harvest by anglers.

Cooperative water management in the Musselshell River Drainage has reduced water level fluctuation in Deadman's Basin Reservoir. Mean number of rainbow trout per gill net dropped from 21.25 in spring 1992 to 6.25 in spring 1993 and remained low through 1995, reflecting weak year classes. Kokanee lengths have dropped noticeably in recent years, indicating a reduction in stocking rate is necessary.

Few rainbow trout were captured in gill nets set in Yellowtail Afterbay. Larger fish will be planted in 1995 in hopes of reducing outmigration to the Bighorn River.

East and West Rosebud and Emerald lakes have been planted with DeSmet strain rainbows since 1990 after four years of McBride cutthroat plants had failed to provide a satisfactory fishery. Brown trout present in each lake prey heavily upon all other fish species found in the lakes. It appears that unless the DeSmet rainbows are at least 8.0 in at planting, their chance of surviving brown trout predation is minimal.

One hundred fifty-four of the 318 alpine lakes with fish located in the Absaroka-Beartooth Mountains were surveyed from 1991-1995.

Flow conditions in the Musselshell River have remained good since flows have flushed accumulated sediment in spawning gravels and improved brown trout recruitment. Fish populations are at pre-drought levels.

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PROCEDURES

Existing Fish, Wildlife & Parks (FWP) water rights and the Missouri River Basin Reservation are protected through FWP review of new water use permit applications.

Stream banks and channels are protected from poorly designed projects through FWP participation in administration of the Stream Protection Act and Natural Streambed and Land Preservation Act.

Water discharge permits issued by the U.S. Environmental Protection Agency (EPA) and the Montana Department of Environmental Quality are reviewed and comments offered. Timber sale plans, grazing allotment management plans, environmental assessments and environmental impact statements are also reviewed to ensure adequate protection, mitigation, and compensation of fisheries resources.

Trout population densities in streams are monitored using electrofishing methods described by Vincent (1971). Other electrofishing surveys are conducted as needed to address specific needs using standard methods. Spot creel checks are conducted to determine catch rates and angler satisfaction with regulations. Regulations are adjusted as necessary to help achieve desired fish population levels. In an effort to improve access to the upper Musselshell River, riverfront properties that become available for sale are investigated for potential as fishing access sites.

Lake and reservoir trout populations are monitored through standardized gill net sets, trap netting, and electrofishing surveys. Angler success is assessed through spot creel checks by fisheries and enforcement personnel. Stocking rates and strategies are adjusted as necessary to maintain desired angler catch rates.

Fishing access site acquisition and development for streams and lakes throughout the region are prioritized in coordination with Parks Division personnel. High intensity recreational use of Cooney Reservoir requires intensive management of fishery resources and recreational facilities. Information and education efforts are directed toward encouraging use of other lake and reservoir resources.

RESULTS AND DISCUSSION

Cooney Reservoir

Management of Cooney Reservoir as a mixed walleye/trout fishery has been surprisingly successful (Poore and Frazer, 1990, 1991). In most waters, this combination has not worked well. Rainbow trout are stocked into Cooney annually, and walleye, first introduced in 1984, have been planted every year since except for 1987, 1988 and 1989. No walleye were planted during these three years in an attempt to evaluate spawning success. Gill nets, trap nets and night electrofishing were used to monitor the development of the Cooney fishery. In addition, a graduate student project to evaluate diet overlap and habitat utilization of rainbow trout and juvenile walleye in Cooney was conducted during 1992 and 1993 (Venditti, 1994).

Mean length of rainbow trout collected in fall sampling has remained fairly consistent since 1987 varying from 11.3 to 12.9 inches. The number of rainbows sampled during fall has varied from 37 in 1989 to 103 in 1984. Mean length of rainbows increased 1.2 inches over the winter from 12.5 inches in the fall of 1994 to 13.7 inches in the spring of 1995 (Table 1), and 24% of the fish sampled were over 17.0 inches.

Night electrofishing in Cooney has proven a more successful method for collecting rainbow trout in the spring than sampling with gill nets. The major advantage is that we eliminate the high mortality of fish collected with gill nets. Approximately equal electrofishing effort expended in 1993, 1994 and 1995 sampled 113, 55 and 71 rainbows, respectively. Increasing the stocking rate from 100,000 rainbows in 1989 to an average of 150,000 fish each year beginning in 1990 has improved winter carryover. These extra fish have also contributed to an increased rainbow harvest by ice anglers.

Twelve suckers per gill net were taken in 1991 followed by 21 in 1992 and 1993 and 24 in 1994. The 10-year average from 1979 to 1989 was 67 per net. Suckers sampled in 1991 averaged 11.3 in (smallest 6.8 in) as compared to the 1992 average of 12.8 in (smallest 10.0 in), the 1993 average of 13.8 in (smallest 10.7 in), and the 1994 average of 14.6 in (smallest 8.6 in). Average sucker size continues to increase each year following the introduction of walleye (Figure 1), while the numbers sampled in gill nets has remained about the same over the past six years.

Catch of suckers per trap net set in the fall has varied from a low of 13 in October 1992 to 179 in October 1993. Catch of suckers per trap net set in the spring has varied from 30 in April 1994 to 150 in March of 1992. While the number of suckers sampled with trap nets from both spring and fall has fluctuated considerably, the average size of suckers sampled has increased each year similar to the trends seen in the gill net data. Suckers sampled with trap nets increased from a mean length of 11.3 in during 1991 to 14.6 in for 1994.

TABLE 1. Numbers and Length Ranges of Fish Species Sampled in Cooney Reservoir from 1991 to 1995.

DATE	METHODS (hrs)	RAINBOW TROUT	BROWN TROUT	SUCKERS	WALLEYE	BLACK CRAPPIE	RAINBOW LENGTH RANGE (in)	RAINBOW AVG LENGTH (in)	WALLEYE LENGTH RANGE (in)	WALLEYE AVG LENGTH (in) (weight-lb)
10/16/91	4 Traps	2	1	292	10	58	14.0-14.5	14.3	8.3-11.6	9.7
10/16/91	4 Gill nets	86	5	47	49	4	8.4-15.4	12.7	7.4-11.6	8.8
					11				19.3-26.6	21.7 (4.45)
3/20/92	4 Traps	21	0	603	3	2	12.4-19.4	14.7	10.4-22.3	14.6
3/24-4/14/92	Electrofishing (21)	98	20	0	68	6	6.4-16.3	12.6	8.1-14.5	10.0
					87				18.3-28.2	22.0
10/14/92	2 Traps	1	0	26	1	0	11.6	11.6	16.9	16.9
	4 Gill nets	55	1	86	32	2	10.4-16.2	11.3	7.4-13.0	11.0
					6				19.3-26.6	22.5 (4.05)
4/15-4/22/93	Electrofishing (4)	113	1	0	54	0	5.7-16.9	14.2	9.4-14.2	11.4
					13				18.0-28.5	23.3
4/16/93	4 Traps	3	1	169	4	0	5.9-15.2	10.6	9.2-14.0	11.6
					1				27.1	27.1
10/13/93	4 Traps	11	0	715	16	4	6.2-17.4	12.3	11.1-15.7	13.1
					4				19.3-26.8	22.3
	4 Gill nets	51	6	83	52	1	11.8-16.1	12.9	9.9-14.4	11.5
					17				21.4-27.5	23.5 (5.57)
4/7/94	4 Traps	7	0	121	0	0	12.9-17.4	15.3	-	-
4/7-4/9/94	Electrofishing (4)	55	3	0	14	0	4.9-17.8	13.4	10.5-16.3	11.9
					17				20.7-28.6	23.9 (5.11)
10/5/94	4 Gill nets	103	2	96	28	0	10.3-16.3	12.5	10.6-13.5	12.3
					2				24.0-28.7	26.4 (7.82)
4/17-4/20/95	Electrofishing (4)	71	39	0	97	3	5.5-18.8	13.7	10.2-16.2	12.2
					53				21.3-31.0	25.0 (6.65)

Cooney was drained in 1981 to raise the height of the dam and only a few large suckers remained in the lake following the completion of this project (Figure 1). Over the next two to three years these large suckers produced many small suckers and by 1984, when walleye were introduced, Cooney was again dominated by small white suckers. After three years the walleyes grew large enough to eat the suckers, and since 1987 walleye have consumed nearly all the suckers produced each year.

Electrofishing has been the only effective method found for sampling brown trout in Cooney. Eighty percent of the 79 brown trout sampled over the past five years in Cooney has been taken while electrofishing, and the majority of these browns were taken in and around the mouths of Willow and Red Lodge Creeks. The 79 brown trout ranged in length from 4.0 to 15.6 in with a mean of 8.8 in.

Since the fall of 1991, when nets captured 62 black crappie, only 18 crappie have been sampled by all methods. These 18 ranged in length from 5.6 to 10.2 in with a mean of 8.8 in. Since the initial increase in the late 1980's and early 1990's, the crappie population in Cooney has declined, probably because of walleye predation and harvest by anglers.

Night electrofishing was used to monitor walleye spawning activity each spring from 1992 through 1995. With the exception of 1992, approximately four hours distributed over two nights were spent electrofishing each year. In 1992, additional electrofishing time (approximately 21 hours actual shocking time) was spent collecting walleyes as an egg source for the hatchery in Miles City. Walleyes collected in 1992 were held in live nets until ripe, stripped of eggs, and fertilized with sperm from ripe males. The fertilized eggs were then sent to Miles City for hatching. Fry survival from the walleye eggs collected at Cooney in 1992 was low, probably due to widely fluctuating water temperatures from unseasonably cold weather during the time the walleyes were being held in live nets. Fluctuating water temperatures often interfere with the normal development and maturity of eggs which can affect fry survival rates.

In 1992, 87 walleye over 18.3 in, with a mean length of 22.0 in, were collected during the spawning operation. Each year since 1992, the average size of the adult walleye in the spawning population has increased. The 1993 spring spawning population sampled included 13 walleye over 18.0 in with a mean of 23.3 in; 17 walleye over 20.7 in with a mean of 23.9 in during 1994; and 53 walleye over 21.3 in with a mean length of 25.0 in (6.65 lb) in 1995.

Although scattered walleye were sampled at various locations around the lake, most of the spawning activity is concentrated near the three tributaries. Each year a few ripe fish are found in and around the mouths of Willow Creek and Chapman Creek, but movement up Willow Creek is usually blocked by beaver dams near the mouth, and Chapman Creek is too small for fish to move up any distance. Most spawning activity is concentrated in the lower end of Red Lodge Creek just upstream from where it enters Cooney. Spawning fish seem to prefer an area of gravel bottom and shelf rock with a depth of one to two feet. Being somewhat dependent on lake levels and stream flow, this area is usually at the upper limit of access with our large electrofishing boats. While electrofishing in April 1993, Venditti (1994) sampled ripe walleye from the lower end of Red Lodge Creek and also sampled ripe walleye with a trap net set across the creek near the mouth. We also sampled walleye from the same area in 1993 and 1994 and collected a relatively large number (43 fish from 21.9 to 31.0 in with a mean weight of 6.65 lbs). Red Lodge Creek was 43EF. Most of these large walleye were ripe and appeared to be spawning in this area.

Although walleye spawning activity has been documented in Cooney for a number of years, there has been little evidence that they have been successful. After initial plants of walleye were made in 1984 through 1986 we discontinued planting for three years to evaluate natural spawning success and recruitment. Because we found little evidence of natural recruitment into the population, we again started planting walleye in Cooney in 1990 and they have been planted each year since. For the past several years, we have been stocking 100,000 1.2 in fingerling walleye annually.

During June 1993, Venditti collected 20 larval walleye while making larval fish tows in Cooney. Even though walleye appear to be producing some larval fish, their survival is apparently poor due to food limitations during their first few weeks. He concluded, "the lack of copepods at this critical time in the walleye life cycle may be leading to starvation and the apparent inability of walleye to recruit successfully in Cooney Reservoir." Another factor potentially adversely impacting walleye reproduction in Cooney is early spring flooding, which occurs most years in Red Lodge Creek. Flood flows along with a heavy sediment load often inundate spawning areas located in the lower end of the stream probably destroying many of the eggs prior to hatching. Some years walleye eggs deposited along sandy rocky areas of the lake shore have been left high and dry when the lake level was dropped to accommodate projected flooding from the upstream watershed.

Fall netting on Cooney, usually conducted in mid-October over the past four years, confirms the trend toward average size increase of the older walleye (fish over 19.3 in). Walleye collected in the fall over the past four years have increased an average of 1.56 in and 1.12 lb each year. Numbers of larger walleye sampled in the fall over the past four years have varied from 2 to 21. Growth and survival of smaller walleye (fish from 7.4-14.0 in) from fall sampling remains good. During all four years, fingerling walleye planted in June at 1.2 - 1.4 in grew to a minimum length of 7.4 in and averaged over 8.0 in by October. Numbers sampled varied from 28 to 68. Winter survival and carryover appears adequate. In fall 1994, we sampled only 28 small walleye but by spring of 1995, while electrofishing, we sampled 97 small walleye and could have taken many more. We stopped sampling small walleye once we had an adequate size sample. We had good survival of small walleye in spite of low water levels throughout the summer, fall and into winter during 1994, coupled with extremely heavy fishing pressure. Low water tends to concentrate the small fish in an open basin with very little structure or hiding cover, making them very vulnerable to predation by large walleyes and harvest by anglers.

One unexplained characteristic of the walleye population in Cooney is the lack of mid-sized walleyes. Cooney contains good numbers of small and large walleyes, but few fish between 14.5 and 19.3 in. Of 639 walleyes sampled at all seasons and by all sampling methods since October 1991, only 14 fish within this size range were taken. Of these 639 walleye, 208 fish were over 19.3 in and 417 were less than 14.5 in. This bimodal population structure is probably the result of a combination of predation by large walleyes on smaller walleyes and the lack of walleye planting from 1987 through 1989. The latest information on walleye populations in Cooney indicates this scenario has changed with relatively good numbers of mid-sized fish now showing up in our sampling operations and in the angling creel. This more recent date will be presented in the next coldwater fisheries Job Progress Report.

During 1992 and 1993, Venditti investigated the diet overlap between juvenile walleyes and rainbow trout in Cooney. He concluded that there was very little overlap in diet because the Arlee strain rainbow trout fed almost exclusively on zooplankton, while the juvenile walleyes fed on chironomids through June, then switched to crayfish, fish, mayflies and zooplankton later in the year. He also concluded that Cooney walleye appear to be relying on non-traditional food sources (invertebrates) well past the size they would normally become piscivorous, due to the lack of prey fish. This could become a problem in the future if multiple year classes of walleye rely too heavily on a limited invertebrate population. This forage problem, along with harvest by anglers and predation by large walleyes, may help explain the low numbers of mid-sized walleyes.

One of the primary reasons for introducing walleyes into Cooney was to help control an expanding sucker population which competes with trout for food and space. Walleyes have been effectively cropping sub-adult suckers and preventing recruitment into the sucker population. In addition to controlling suckers, walleyes have nearly eliminated lake chubs from Cooney. Chubs were abundant prior to 1984 when walleyes were introduced. Walleyes also appear to be controlling the black crappie and brown trout populations in Cooney. Crayfish appear to be increasing in Cooney and are also preyed upon by walleyes at certain times. Since walleyes have already exploited all available forage species in Cooney and, in the case of white suckers, have harvested the entire year class each year since 1990, they have also been foraging at certain times on rainbow trout. This foraging occurs primarily in the spring when rainbows are first stocked into the lake. Predation on rainbows is lessened somewhat because trout grow fast and are soon large enough to be out of the forage size range for most walleyes; and, because they are zooplankton feeders, the Arlee strain rainbows suspend in the water column away from the bottom where most walleyes forage.

Other factors influencing the forage available for walleyes in Cooney are the tributary streams which provide a constant influx of fish. Fish species which enter Cooney from Red Lodge Creek and Willow Creek include white and longnose suckers, mountain whitefish, lake chubs, and brown trout. All of these species live and spawn in these tributaries and move in and out of Cooney. Both tributaries have a history of spring flooding and this, combined with high intensity rainfall throughout the summer, flushes many fish into Cooney. In addition, any reproduction in excess of the streams' carrying capacity would likely end up in Cooney.

Walleyes Unlimited has been pushing for a 14 inch minimum size limit on Cooney to protect the smaller fish from what they perceive as overharvest by anglers. At this time, we do not have solid evidence that this regulation would achieve the desired goal. Certain literature (Brousseau 1987) suggests that minimum size limits should be lake specific and only be applied if the walleye population demonstrates the following characteristics (Serns 1978): 1) low reproduction; 2) good growth, especially of small fish; 3) low natural mortality; and 4) high angling mortality. Natural reproduction and recruitment in Cooney is low, but we annually stock 100,000 fingerlings. Growth of large and small walleye is very good, but mid-sized walleyes are scarce. We do not have good information on natural mortality or angling mortality. Because we have no recent creel information and we know very little about natural versus angling mortality, it would not be a good idea to implement regulation changes until more information about some of these factors can be collected.

Recreational use on Cooney is incredibly heavy and will undoubtedly increase with the recently completed improvements to roads, camping facilities and boat launching areas. Angling pressure alone, between May 1993 and February 1994, was nearly 35,000 angler-days and has undoubtedly increased. To avoid conflicts with other recreational users and to fish for the large walleyes in Cooney, more and more anglers are fishing at night. Increasing the numbers of rainbows stocked into Cooney from 100,000 to 150,000 has improved the trout fishery and provided better carryover into the winter and spring fishery. This increase has not resulted in a decline in trout growth which has remained good over the past five years. At this time, the two-story trout/walleye fishery is doing well and is providing a tremendous amount of fishing opportunity. Maintaining the present fishery is a delicate balancing act that requires constant monitoring and management.

Deadman's Basin Reservoir

Low water levels, a continuing problem at Deadmans during the last half of the 1980's, have not been a major problem since 1991. Deadmans Basin filled to maximum pool four of the five years between 1991 and 1995. In 1992 the lake filled to within 4,000 acre-feet of full pool. Several factors contributed to these improved water conditions. Better precipitation levels were a factor, but probably even more important were changes in water management in the drainage.

All water users in the Musselshell Drainage began working together to improve basin-wide water management, which has had a positive impact throughout the drainage. The Deadmans Basin Water Users Association installed additional electronic monitoring equipment to help them better manage water movement through the basin, and has required all contract water users in the basin to install water measuring devices on their irrigation systems. The Association has also established a protocol for requesting water downstream of Deadmans Basin. An operational change required by the Department of Natural Resources and Conservation (DNRC) has been a major factor in maintaining reservoir levels. Historically, the Water Users Association ran all the water possible through Deadmans Basin providing water for downstream calls by releasing water from it. They are now required to allow water to flow past the diversion and down the natural channel to supply downstream water needs. Reservoir water is being used to supplement downstream calls that are above the natural flows in the river at the time. This protocol has reduced water level fluctuations in Deadmans Basin while improving flow conditions in the section of the Musselshell River between Deadmans diversion and Careless Creek. All of these changes have been positive for the Deadmans Basin fishery.

Deadmans Basin was sampled in May and October each year between 1992 and 1995 utilizing a standardized net set of four floating and four sinking gill nets. White suckers were the most common nongame species collected during this period with catch rates ranging from 10.6 to 32.5 white suckers per net. Other common nongame species collected included longnose and shorthead redhorse suckers. A few mountain suckers, carp and stonecats were also captured, and crayfish were collected during most sampling periods.

Stocked rainbow trout and kokanee salmon were the main game species captured. A few brown trout were also collected in each net series. The brown trout population in Deadmans is self-sustaining and produces some trophy-sized fish at times. A 29 in brown trout weighing 10.4 pounds was captured and released in the fall of 1995.

Actual catch rates for rainbow and kokanee vary considerably from year to year. Catch rates can be an indicator of population strength at any given time, but other conditions such as weather conditions and water levels at the time of sampling can also affect netting results. Gill net data provide a good indication of survival rates of stocked fish by monitoring year class strength on an annual basis.

Various rainbow strains have been stocked into Deadmans in the past, and experimentation with different strain combinations continues. Historically, Deadmans Basin received predominantly domestic Arlee rainbow. In 1984, following three years of apparent total failure of Arlee plants, a wild strain of McConaughy rainbow was added to the program (Fredenberg 1985). McConaughy rainbow did well in Deadmans and totally replaced the Arlee plant during the late 1980s. However, McConaughy rainbow were found to be considerably less catchable than Arlee rainbow, especially for bank anglers, an important part of the angling population at Deadmans (Fredenberg 1986). In order to provide maximum recreational opportunities for all anglers at Deadmans, the stocking request was shifted back to half Arlee and half McConaughy rainbow in 1990. This combination may be further adjusted in the future.

Rainbow catch rates ranged from a high of 21.25 fish per net in the spring of 1992 to only 3.75 per net in the fall of 1993 (Table 2). High catch rates observed in the spring of 1992 were the result of a very strong two-year-old year class from the 1990 plant, the first year Arlee rainbows were added back into the stocking program.

During most years, the spring rainbow sample at Deadmans is dominated by two-year-old fish which normally provide the bulk of the summer fishery. By fall, this same age group of fish normally represents a much smaller part of the gill net sample as younger fish, especially age 0 fish from the spring plant enter the fishery. There appears to be a significant loss of rainbows from the population by the end of their third growing season in Deadmans.

Catch rates remained high during fall netting in 1992 with about 98% of the catch consisting of age 0 fish from the spring plant and one-year-old fish from the 1991 plant. Two-year-old rainbows from the 1990 plant, which comprised almost 90% of the rainbow sample in the spring, accounted for less than 2% of the fall sample.

Two-year-old rainbows again accounted for 76% of the rainbow sample in the spring of 1993. By fall, catch rates dropped to the lowest level recorded during the reporting period (Table 2). The major reason for this decline was apparent poor survival of the 1993 rainbow plant into Deadmans.

Very few age 0 fish from the spring plant were collected in the fall. Effect of this weak year class remained evident through fall sampling in 1995.

The 1994 spring sample was again dominated by two-year-old rainbows from a strong 1992 plant. Yet overall catch rates remained very low due to poor representation from the weak 1993 plant. Three-year-old rainbows from the 1991 plant outnumbered 1993 fish three to one. Rainbow catch rates increased significantly in the fall of 1994 due to a strong year class from the 1994 plant. However, catch rates remained well below levels observed in 1992.

Two-year-old rainbow from the 1993 year class should have been the dominant fish in the rainbow sample in the spring of 1995, but they accounted for less than one third of the rainbow sample. This weak year class kept catch rates low during spring netting and was responsible for a poor fishery in Deadmans during 1995. Over 80% of the rainbows sampled in the fall of 1995 were from the 1995 plant, with few older rainbows present.

Table 2: Summary Data for Rainbow Trout Captured During Standard Spring and Fall Gillnetting in Deadmans Basin, 1992 through 1995.

Date	Number Captured	Mean No. Per Net	Mean Length (in)	Mean Weight (lbs)	Length Range (in)
1992					
Spring	170	21.25	12.3	0.69	9.7 - 17.5
Fall	146	18.25	11.5	0.55	6.6 - 17.0
1993					
Spring	50	6.25	12.8	0.68	8.5 - 21.3
Fall	30	3.75	12.8	0.72	6.5 - 15.4
1994					
Spring	31	3.88	13.1	0.65	8.9 - 16.2
Fall	82	10.25	9.7	0.41	6.1 - 16.6
1995					
Spring	52	6.50	11.2	0.48	7.0 - 16.0
Fall	54	6.75	8.9	0.30	6.5 - 18.5

Average sizes of collected rainbow also showed the impacts of the weak 1993 year class. Average sizes remained fairly consistent through the spring of 1994 then showed a noticeable decline (Table 2). This decline was a reflection of both a lack of older rainbows from the 1993 plant and more young fish in the sample due to strong year classes produced in 1994 and 1995.

The outlook for the rainbow fishery in Deadmans over the next couple of years is good as the strong 1994 and 1995 year classes enter the fishery.

Kokanee salmon were first introduced into Deadmans in 1984 in an attempt to provide additional recreational opportunities for anglers. They did well, exhibited good growth rates, and began making a contribution to the fishery by the end of their third year in the lake as some of them became sexually mature as two-year-old fish (Fredenberg and Poore 1989). Kokanee plants have continued in Deadmans on an annual basis depending on availability of fish. A combination of poor water conditions and limited availability of kokanee from hatchery sources during some years helped establish a pattern of alternating weak and strong year classes of kokanee in Deadmans. This pattern continued through 1992. Following three years of low water levels in Deadmans, catch rates for kokanee were way down during both spring and fall netting in 1992 (Table 3). Since 1991, water levels have been more consistent in Deadmans, and it appears kokanee population levels have also become more consistent. Catch rates for kokanee during the fall have been over 30 fish per net during the past three years, and even spring catch rates have been fairly high (Table 3). During 1993 and 1994 anglers really began to key into the fall kokanee runs at Deadmans, and a popular through-the-ice snag fishery developed.

One observed problem in recent years, that may be related to the improved consistency of the kokanee population in Deadmans, is a decline in the average size of the mature kokanee in the fall samples. The average length of mature kokanee collected in 1988 was 14.7 in with a majority of these fish being 2 years of age, and some spawners exceeded 19.0 in long (Frazer 1990). In 1990, when most of the spawners were 4 years old, they averaged 17.0 in long (Frazer 1991). Mature kokanee collected in the fall of 1995 averaged 12.5 in long, and the largest fish collected was only 14.9 in long. This decline is an indication that kokanee population levels in Deadmans may be too high for the available food supply, which could be a result of several strong year classes of kokanee in a row.

Planting requests for Deadmans have been 200,000 kokanee per year since they were first introduced. These requests have been filled most years, although in 1987 only about 32,000 kokanee were stocked due to a lack of available fish. The 1987 plant did result in a weak year class of kokanee in the lake (Fredenberg and Poore 1989). Plants in 1992 and 1994 were also reduced to 100,000 and 124,000

Table 3: Summary Data for Kokanee Salmon Captured During Standard Spring and Fall Gillnetting in Deadmans Basin, 1992 through 1995.

Date	Number Captured	Mean No. Per Net	Mean Length (in)	Mean Weight (lbs)	Length Range (in)
1992					
Spring	25	3.13	9.4	0.34	7.1 - 14.4
Fall	51	6.38	12.9	0.80	8.4 - 18.3
1993					
Spring	30	3.75	9.9	0.33	7.0 - 17.2
Fall	244	30.5	12.2	0.59	8.9 - 15.6
1994					
Spring	101	12.6	10.4	0.35	7.3 - 11.9
Fall	295	36.88	11.6	0.52	6.3 - 13.2
1995					
Spring	58	7.25	10.6	0.37	6.9 - 12.4
Fall	258	32.25	12.1	0.60	6.7 - 14.9

respectively due to a lack of fish, with no apparent impact on year class strength. Based on these data it appears that a plant of 200,000 kokanee may be excessive for Deadmans during good water years. In 1995 the kokanee request for Deadmans was reduced to 100,000 fish and it may be reduced lower in the future. Hopefully, through experimentation, the correct stocking rate can be determined to produce a larger average size of kokanee while maintaining a good fishery.

Other management considerations for Deadmans include a recent push by the local Walleyes Unlimited chapter to stock walleyes into Deadmans. A preliminary analysis of available fisheries data indicates that Deadmans may not have the necessary forage base to support a good walleye fishery, and introduction of walleye could negatively impact efforts to improve the salmonid fishery in the lake. Another idea being considered is the introduction of a small number of tiger muskies into Deadmans as a biological control on suckers. Because tiger muskies are sterile hybrids their numbers could be closely controlled. The tiger muskie could provide a limited trophy fishery in Deadmans, but the main reason for the introduction would be to reduce sucker numbers in an effort to improve the existing salmonid fishery. Any introduction will have to undergo formal public review in the form of an Environmental Assessment before it could be implemented.

Yellowtail Afterbay Reservoir

Two floating and two sinking gill nets set in the Afterbay Reservoir in October, 1994 captured nine rainbow ranging from 8.2 to 20.5 in. Four of the rainbow ranged between 8.2 and 9.3 in indicating some planted rainbow were remaining in the Afterbay Reservoir. The remaining rainbow were 17.6 in long or longer and in great condition. The largest one was 20.5 in and weighed 3.61 lbs.

Yellowtail Afterbay Reservoir has been receiving annual plants of 20,000 Eagle Lake rainbow trout. These fish have been stocked in the spring at about 4 in long, and it appears that many of them are moving downstream out of the Afterbay shortly after planting.

In 1995, rainbow will be held through the summer and stocked in the fall at 7 to 8 in to see if more of them will remain in the Afterbay. The only other fish collected from the Afterbay Reservoir in 1994 were white and longnose suckers.

East Rosebud Lake

Through the years, East Rosebud Lake has been stocked with rainbow trout, brown trout, Yellowstone cutthroat trout, and brook trout. From 1986 to 1989, McBride cutthroat were planted because they have shown superior reproductive performance in various other Beartooth lakes with physical characteristics similar to those of East Rosebud Lake. Growth and survival of McBride cutthroat was also poor. Predation by brown trout and downstream movement into the outlet stream are two factors influencing cutthroat numbers in the lake. During checks of the inlet stream each year, no spawning cutthroat have been located. Netting in the lake from 1993 through 1995 also failed to take any cutthroat (Table 4). Additionally, electrofishing in 1995 within a section of East Rosebud Creek located approximately five miles downstream, and in another section located twelve miles downstream, took no cutthroat. It appears McBride cutthroat have disappeared from the system. Because McBride cutthroat failed to provide a satisfactory fishery in East Rosebud Lake, 6,000 DeSmet rainbows have been planted each year since 1990. Average size of these fish at planting time has ranged from 6.3 - 8.1 in.

Four gill nets set in East Rosebud Lake during the spring of 1993, 1994 and 1995 took 17 (12.1 in average), 13 (12.7 in average) and 3 (11.6 in average) DeSmet rainbow trout, respectively. Growth of the DeSmet rainbows is better than for McBride cutthroat but survival is relatively poor. Brown trout in 1993, 1994 and 1995, and for the past 18 years dominated the trout sampled. Several large brown trout (5.10, 6.00 and 8.75 lb) were sampled in 1995. Whitefish were the most abundant species in the nets followed by brown trout and longnose suckers.

Predation by brown trout appears to control all the other fish populations in East Rosebud Lake. The smallest sucker sampled was 7.2 in with a mean of 15.0 inches; the smallest whitefish 8.3 in with a mean of 10.9 in. In earlier studies (Poore and Frazer 1990) 17 in brown trout from East Rosebud Lake had 9 to 10 inch cutthroat in their stomachs. Indications are that the brown trout are foraging heavily upon the DeSmet rainbows just as they did on McBride cutthroat.

Emerald Lake

Emerald Lake, a shallow mesotrophic lake, contains a mixed population of brown trout, brook trout, mountain whitefish and longnose suckers. From 1986 through 1989, McBride cutthroats were stocked in an effort to produce a self-sustaining fishery. As in East Rosebud Lake, growth and survival of McBride cutthroats in Emerald Lake with an established brown trout/brook trout population was poor. DeSmet strain rainbow trout were selected to replace the McBride cutthroat, and 1500 have been planted each year since 1990.

Gill nets set in Emerald lake over the past three years (Table 2) took no cutthroat and only two DeSmet rainbows. Electrofishing in a section of West Rosebud Creek located three miles downstream from Emerald Lake in the fall of 1994 took no cutthroat trout. As in

TABLE 4. Results of Netting Surveys in Four Lakes During 1993, 1994 and 1995.

LAKE	DATE	NO. OF GILL NETS	RAINBOW TROUT	BROWN TROUT	CUTTHROAT TROUT	BROOK TROUT	MOUNTAIN WHITEFISH	LONGNOSE SUCKERS	WHITE SUCKERS
East Rosebud	5/11/93	4	17 (4.3) [1]	21 (5.3)	-	-	23 (5.8)	13 (3.3)	-
			9.7-13.6 (12.1) [2]	6.8-24.8 (15.4)			7.5-12.3 (10.7)	7.2-19.4 (16.1)	
Emerald	5/12/93	1	1 (1)	24 (24)	-	23 (23)	16 (16)	5 (5)	-
			9.0 (9.0)	8.2-13.1 (11.05)		7.7-13.1 (10.5)	10.0-16.5 (15.5)	9.3-17.7 (12.3)	
West Rosebud	5/12/93	3	10 (3.3)	76 (25.3)	-	-	27 (9)	4 (1.3)	-
			9.7-14.1 (12.0)	6.8-14.7 (12.7)			12.7-18.7 (15.5)	11.0-16.9 (15.3)	
Otie	10/22/93	2 Trap Nets	2 (1)	-	-	-	-	-	706 (353)
			8.2-10.0 (9.1)						8.2-1.6 (9.0)
East Rosebud	5/17/94	4	3 (0.8)	14 (3.5)	-	2 (0.5)	16 (4)	11 (2.8)	-
			11.7-14.2 (12.7)	9.5-17.5 (13.0)		9.2-9.9 (9.6)	8.3-12.6 (10.8)	7.5-20.4 (14.8)	
Emerald	6/2/94	1	-	21 (21)	-	5 (5)	11 (11)	-	-
				6.2-14.5 (10.4)		8.5-12.1 (10.6)	13.3-17.4(15.5)		
West Rosebud	6/2/94	3	2 (0.7)	24 (8)	-	-	20 (6.7)	-	-
			13.8-15.2 (14.5)	11.6-19.5 (14.2)			15.0-19.5(16.9)		
East Rosebud	5/3/95	4	3 (0.8)	18 (4.5)	-	-	19 (4.8)	19 (4.8)	-
			10.4-12.7 (11.6)	9.8-29.0 (16.5)			10.1-13.1(11.1)	8.2-20.2 (14.3)	
Emerald	5/5/95	1	1 (1)	8 (8)	-	3 (3)	31 (31)	1 (1)	-
			12.5 (12.5)	9.0-15.5 (11.6)		11.3-13.8(12.6)	10.5-17.6(15.2)	11.8 (11.8)	
West Rosebud	5/5/95	3	7 (2.3)	82 (27.3)	-	3 (1)	34 (11.3)	13 (4.3)	-
			9.6-13.3 (11.3)	6.1-16.6 (12.2)		11.5-13.8(12.8)	12.0-20.7(16.4)	9.8-17.4 (13.2)	

1) Total Number Sampled (catch per net)
2) Length Range (Mean Length) in inches

past years, brown trout (24, 21, 8) and brook trout (23, 5, 3) were more abundant in the nets than rainbow or cutthroat trout during all three years. The smallest fish sampled during the period was a 6.2 in brown trout. Fifty-eight mountain whitefish ranging from 10-0 to 17.4 in were sampled over the three years. As in East Rosebud Lake, over-winter survival of planted DeSmet rainbow trout was poor again, indicating brown trout and brook trout are controlling fish populations in Emerald Lake.

West Rosebud Lake

West Rosebud Lake contains a mixed population of brown trout, brook trout, mountain whitefish, and longnose suckers. Based on the same considerations used for East Rosebud Lake and Emerald Lake, McBride cutthroat were also selected for West Rosebud Lake and, as in the other two lakes, failed to achieve the desired management objectives. Therefore, DeSmet strain rainbows were also introduced into West Rosebud Lake during May 1990, and 2500 have been planted each year since.

Three gill nets set each spring over the past three years took no cutthroat from earlier plants and only a total of 19 DeSmet rainbows of the approximate 7500 rainbows stocked over the period. One hundred eighty-two brown trout caught during the same period outnumbered rainbows nearly 10 to 1. Eighty-one mountain whitefish, ranging in length from 12.0 to 20.7 in with a mean of 16.2 in, were the only other species taken in significant numbers. A 6.1 in brown trout was the smallest fish sampled. An abundance of brown trout, as shown by the netting data, makes it very difficult for small fish of any species to survive in West Rosebud Lake. Of the three lakes just discussed, West Rosebud Lake is the one most dominated by brown trout. In the fall of 1994, large numbers (several hundred) brown trout and mountain whitefish were observed in West Rosebud Creek just upstream from the lake during the annual spawning migration.

McBride cutthroat from four years of plants in West Rosebud, Emerald and East Rosebud lakes have all shown poor growth and survival. In addition, no evidence of natural reproduction or spawning fish has been found. Similarly, survival of DeSmet strain rainbows has also been marginal, although growth has been better than exhibited by the cutthroat. The pattern of effective cropping of sub-adult fish of all species by a well-established brown trout population is a dominant influence in all three lakes. Brown trout dominance evident in these lakes, all waters with similar physical features and fish populations, makes development of a self-sustaining fishery very difficult. One clear pattern shown in the netting data over the past five years is the larger the average size of the fish at planting time, the better the survival. Over the past five years, the average size of rainbows at planting time has ranged from the smallest at 6.3 in for 1993 to 8.1 inches from 1992. Sampling in all three lakes in 1994 took none of the small average sized plants from 1993. Five rainbows were netted, but age data showed they were all from the 1992 plants. The best survival by any of the rainbows over the past five years was shown by the 1992 plants which were the largest when planted. Survival rates of intermediate sized fish from the other three years of rainbow plants fell between these two extremes. It appears that planting fish larger than a minimum of 8.0 in in these three lakes with a well established predatory brown trout population is necessary.

In addition to the competition with brown and brook trout, the fisheries in all these lakes receive relatively heavy fishing pressure. Although brown trout are the most abundant and successful species in these lakes, they are relatively difficult for anglers to catch, so most of the pressure and harvest is concentrated on the more easily caught DeSmet rainbows. Up-to-date information on fishing pressure, harvest, catch rates, angler preferences and attitudes, and hatchery fish returns is lacking for these three lakes. Because this information is important for informed management decisions, a creel study was initiated in July 1995. This creel study, scheduled to run through Labor Day, is a cooperative project between the FWP and the USFS. Information from this study along with existing data will be used to better evaluate the feasibility of establishing a self-sustaining fishery or resorting to the stocking of legal-sized fish annually.

Absaroka-Beartooth Wilderness Lakes

The Absaroka-Beartooth Wilderness Area established in 1978 encompasses 930,584 acres and contains more area over 10,000 feet in elevation than any other area in the U.S. It rates as one of the top four or five wilderness areas in the country, receiving about 320,000 visitor-days of use each year. The Absaroka-Beartooth Wilderness area (A-B), and lands immediately adjacent, contain 948 high mountain lakes, 318 of which contain fish and 630 that are barren. Approximately 204 of these lakes have self-sustaining fisheries, and 114 are stocked. Stocking schedules vary from yearly in some of the more heavily used areas to once every 6 to 10 years in the lakes managed for trophy fisheries.

Pat Marcuson, during the time he worked for FWP out of Red Lodge, gathered a tremendous amount of information on the A-B lakes and created a massive database. He also developed fisheries management plans for each major drainage. Since that time, a computer database containing the latest information on the lakes with fisheries has been developed. Two to five temporary employees, working from mid-July to September, collect fisheries information used to update the high mountain lake computer database and for periodic updates to the drainage management plans. Fisheries management plans originally developed in 1980 for all the A-B mountain lakes were updated with the latest information available and reissued in 1991. A separate management plan is available for all the lakes located in each major drainage of the A-B mountain range. During 1991, 1992, 1993 and 1994 a total of 154 lakes were surveyed and the findings are included in Appendix 1. Management recommendations are also included for most of the lakes.

Recently more and more controversy has surfaced over stocking fish in wilderness areas. Some wilderness coordinators, particularly from within the USFS, and other groups, have expressed views that fish stocking may be a threat to wilderness integrity. Some have advocated that all stocking in wilderness areas be stopped. Wilderness fish stocking has its pros and cons, but the present system used in the A-B mountains has worked well for many years and has provided countless hours of fishing enjoyment for wilderness users. Surveys have shown that fishing is the primary wilderness activity for many users. Other reasons for fish planting in wilderness lakes include maintaining genetic refuges for sensitive species, improving genetics of fish populations by preventing hybridization of native species, and supplementing reproduction of a native species in lakes with limited spawning habitat.

Another issue often debated is whether or not to plant fishless lakes. Because of the steep terrain, elevation, and stream access, most lakes in the A-B mountains were originally fishless. Fish planting and movement of fish from other lakes established populations in many lakes and changed the resident fauna. To better understand the relationship between fish and the natural fauna in lakes with and without fish, a study was initiated in the summer of 1995. This cooperative project between the USFS and FWP involves sampling the fauna in several similar high elevation lakes with and without fish populations.

In keeping with the "wilderness philosophy," FWP has long recognized the value of fishless lakes. In the A-B wilderness, over 66% of the lakes remain fishless. Longstanding plans to introduce fish into any other fishless lakes have been on hold pending clarification of wilderness stocking policies.

Musselshell River

Flow conditions in the Musselshell River have remained good since recovering from extreme drought in 1988 which totally dewatered parts of the Selkirk electrofishing section during late summer. During 1990 the Musselshell River experienced extremely high flows in the spring, and 1993 flow remained high throughout the summer and fall season. The brown trout population in the Musselshell has responded favorably to these improved flow conditions. Previous reports discussed low flow in 1985 which resulted in a 50% decline in the brown trout population in the Selkirk shocking section (Fredenberg 1987). The maximum brown trout population recorded before this decline was 466 brown trout, 6 in and longer, per mile. Brown trout population levels had not recovered to this level by 1990. In 1991, exceptionally high spring runoff flows prevented the completion of a mark-recapture estimate on the Musselshell.

The brown trout population increased dramatically in 1992 with an estimate of 364 6 in and longer brown trout per mile, the best population level recorded since the low water in 1985. In addition to these fish, 1992 was the first year since annual electrofishing was started at Selkirk in 1985 that it was possible to get a good estimate on brown trout less than 6 in long. These fish accounted for an additional 526 brown trout per mile making a total estimate of 890 brown trout per mile in 1992.

Based on scale analysis, 626 brown trout per mile or almost 70% of the total population estimated in 1992 were one-year-old fish from the 1991 spawning season. Past reports have discussed a serious accumulation of sediment over most of the gravel in the shocking section, which occurred during low flows in the late 1980's (Frazer 1990). Improved flows in 1990 started to flush out this sediment, and very high flows in the spring of 1991 moved most of the remaining sediment out of the shocking section. Brown trout took advantage of the improved habitat conditions and produced a strong year class in 1991.

The sampling frequency on the Musselshell was changed to every other year in 1992, so no sampling was conducted in 1993. Spring flows were high in 1993 (although not as high as 1991 flows), but average flows remained consistently higher throughout the summer in 1993 than during any previous sampling year. These good flow conditions helped produce another strong year class of brown trout in 1994.

The total brown trout estimate for 1994 was 857 brown trout per mile, down slightly from the 1992 level. However, the 1994 population contained 504 6 in and longer brown trout per mile, which was above the next highest population level recorded before the 1985 drought, and an estimated 356 brown trout per mile between 4 in and 6 in long. No age data were available for these brown trout, but comparing length frequency data to previous scale data, it appeared that the 1994 population consisted of approximately 65% age 1 fish from the 1993 spawn.

Again, this recruitment showed the value of good flows in maintaining the brown trout population in the upper Musselshell River. Flows were down some in 1994, but still well above the low flows experienced in the late 1980's. Flows were even better in 1995 with higher sustained flows throughout the summer. Improved flows along with recent strong year classes of brown trout should help maintain an excellent brown trout population in the upper Musselshell River for the next few years.

MANAGEMENT RECOMMENDATIONS

Cooney Reservoir

Continue monitoring the status of trout/walleye fishery with gill net trap net and electrofishing. If funding is available, implement a creel census on Cooney to assess natural mortality vs. angling mortality, harvest, fishing pressure, catch rates, and angler attitudes and preferences. Follow development of the black crappie population and its effect on the rainbow trout fishery. Follow growth rates and carryover of planted rainbow trout and adjust stocking to maintain desired levels. Discontinue taking walleye eggs at Cooney since the recent spawning operations on Ft. Peck have been so successful at supplying Montana's walleye egg needs.

Deadmans Basin Reservoir

Continue to monitor rainbow year class strength and rainbow catch rates. Adjust stocking rates of different rainbow strains to provide maximum recreational opportunities for the greatest number of anglers.

Continue to monitor year class strength and average size of kokanee salmon. Adjust stocking rates to increase the average size of mature kokanee back to 14 in or longer while continuing to maintain a good kokanee fishery.

Continue to serve as an active member on the Musselshell Basin Commission.

Initiate an EA process, including extensive public review, to evaluate the potential of introducing tiger muskie and/or walleye into Deadmans Basin. Develop a management plan and a source of fish for these introductions if either proves to be a viable management option.

Yellowtail Afterbay Reservoir

Maintain the same stocking rate of Eagle Lake Rainbow. Hold these fish in the hatchery through the summer and plant in the fall at 7 to 8 in in length to try and reduce the number of trout that migrate downstream through the Afterbay Dam.

East and West Rosebud and Emerald Lakes

Continue planting rainbow trout at a minimum size of 8.0 in. Analyze creel information and incorporate findings into future management decisions. Continue monitoring growth, survival and spawning activity of DeSmet rainbow trout.

Absaroka-Beartooth Mountain Lakes

Continue monitoring status of fish populations in selected lakes and continue stocking as outlined in mountain lake management plans. Adjust stocking rates and management direction based on the latest findings from lake surveys.

Musselshell River

Continue to monitor brown trout population trends in the Selkirk shocking section on a biennial basis.

Continue to work for improved flow conditions in the Musselshell River by maintaining an active roll on the Musselshell Basin Commission.

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WATERS REFERRED TO:

Lakes

Abandoned Lake	5-22-7108-03
Alp Lake	5-22-7142-03
Amphitheater Lake	5-22-7146-03
Anchor Lake	5-22-7148-03
Asteroid Lake	5-22-7187-03
Astral Lake	5-22-7190-03
Aufwuchs Lake	5-22-7193-03
Bald Knob Lake	5-22-7203-03
Beckworth Lake	5-22-7246-03
Big Butte Lake	5-22-7249-03
Bill Lake	5-22-7266-03
Billy Lake	5-22-7268-03
Bramble Lake #38	5-22-7315-03
Bramble Lake #39	5-22-7316-03
Bramble Lake #40	5-22-7317-03
Bramble Lake #41	5-22-7317-03
Brent Lake	5-22-7325-03
Bridge Lake	5-22-7330-03
Camp Lake	5-22-7406-03
Chickadee Lake	5-22-7453-03
Cliff Lake	5-22-7460-03
Cloverleaf Lakes	5-22-7468-03
Comet Lake	5-22-7500-03
Cooney Reservoir	5-22-7518-05
Copeland Lake	5-22-7525-03

Crow Lake	5-22-7602-93
Curl Lake	5-22-7630-03
Dead Horse Lake	5-22-7656-03
Deadman's Basin Reservoir	5-18-7540-05
Desolation Lake	5-22-7677-03
Diaphanous Lake	5-22-7689-03
Dollar Lake	5-22-7693-03
Dreary Lake	5-22-7696-03
Dryad Lake	5-22-7698-03
East Rosebud Lake	5-22-7714-03
Emerald Lake	5-22-OOCT-03
Emerald Lake	5-22-7812-03
Estelle Lake	5-22-7817-03
Farley Lake	5-22-7854-03
Felis Lake	5-22-7859-03
First Rock Lake	5-22-7868-03
Frenco Lake	5-22-7952-03
Gallery Lake	5-22-7963-03
Glacier Lake	5-22-7980-03
Green Lake	5-22-8036-03
Heidi Lake	5-22-8059-03
Hellroaring Lake #4	5-22-8064-03
Hellroaring Lake #5	5-22-8064-03
Hipshot Lake	5-22-8110-03
Huckleberry Lake	5-22-8150-03
Hunger Lake	5-22-8152-03
Incisor Lake	5-22-8157-03
Indian Knife Lake	5-22-8159-03
Island Lake	5-22-8162-03
Jay Lake	5-22-8185-03
Jeff Lake	5-22-8190-03
Jorden Lake	5-22-8204-03
Kaufman Lake	5-22-8225-03
Kersey Lake	5-22-8274-03
Keyser Brown Lake	5-22-8288-03
Kidney Lake	5-22-8295-03
Kookoo Lake	5-22-8310-03

Lady of the Lake	5-22-8316-03
Leaky Raft Lake	5-22-8368-03
Leo Lake	5-22-8370-03
Lightning Lakes	5-22-8372-03
Lillis Lake	5-22-8386-03
Line Lake	5-22-8428-03
Little Falls Lake	5-22-8445-03
Little Glacier Lake	5-22-8446-03
Little Washtub Lake	5-22-8450-03
Lost Lake	5-22-8510-03
Lost Lake	5-22-8512-03
Lower Aero Lake	5-22-8526-03
Lower Basin Lake	5-22-7223-03
Lower Snow Lake	5-22-9296-03
Lower Twin Lake	5-22-9525-03
Margaret Lake	5-22-8582-03
Marker Lake	5-22-9576-03
Martes Lake	5-22-8590-03
Martin Lake	5-22-8593-03
Mary Lake	5-22-8596-03
Melody Lake	5-22-8659-03
Midnight Lake	5-22-8670-03
Mirror Lake	5-22-8680-03
Moccasin Lake	5-22-8694-03
Moon Lake	5-22-8708-03
Mouse Lake	5-22-9545-03
Mutt Lake	5-22-8750-03
Nemidji Lake	5-22-8783-03
Nugget Lake	5-22-8815-03
Oly Lake	5-22-8825-03
Otie Lake	5-22-8833-03
Ovis Lake	5-22-8848-03
Owl Lake	5-22-8849-03

Picasso Lake	5-22-8877-03
Pinchot Lake	5-22-8890-03
Pipit Lake	5-22-8907-03
Recruitment Lake	5-22-8979-03
Renie Lake	5-22-8994-03
Robin Lake	5-22-9006-03
Rock Island Lake	5-22-9030-03
Rough Lake	5-22-9038-03
Russell Lake	5-22-9072-03
Schoolmarm Lake	5-22-9660-03
Second Rock Lake	5-22-9114-03
Sedge Lake	5-22-9118-03
Senal Lake	5-22-9125-03
September Morn Lake	5-22-9128-03
Shadow Lake	5-22-9142-03
Shelf Lake	5-22-9156-03
Ship Lake	5-22-9170-03
Silver Lake	5-22-9184-03
Silver Lake	5-22-9185-03
Silver Lake	5-22-9246-03
Skeeter Lake	5-22-9208-03
Skull Lake	5-22-9210-03
Sky Top Lake #37	5-22-9604-03
Sky Top Lake #38	5-22-9213-03
Sky Top Lake #39	5-22-9212-03
Sky Top Lake #40	5-22-9212-03
Sky Top Lake #41	5-22-9212-03
Sliderock Lake	5-22-9240-03
Sodalite Lake	5-22-9324-03
Spaghetti Lake	5-22-9332-03
Speculator Lake	5-22-9333-03
Star Lake	5-22-9339-03
Sundown Lake	5-22-9365-03
Sunken Rock Lake	5-22-9590-03
Swede Lake	5-22-9387-03
Sylvan Lake	5-22-9394-03
Thiel Lake	5-22-9400-03
Trail Lake	5-22-9480-03
Triangle Lake	5-22-9487-03
Triangle Lake	5-22-9488-03
Tumble Lake	5-22-9510-03

Turgulse Lake	5-22-9513-03
Twin Outlets Lake	5-22-9528-03
Upper Aero Lake	5-22-9618-03
Upper Basin lake	5-22-7224-03
Upper Snow Lake	5-22-9296-03
Upper Twin Lake	5-22-9526-03
Vernon Lake	5-22-9688-03
Wade Lake	5-22-9708-03
Wall Lake	5-22-9712-03
Weasel Lake	5-22-9726-03
Weeluna Lake	5-22-9729-03
West Rosebud Lake	5-22-9744-03
Windy Lake	5-22-7656-03
Wright Lake	5-22-9830-03
Yellowtail Afterbay Reservoir	

Streams

East Rosebud Creek	5-22-2254-01
Musselshell River	5-18-4350-01
Red Lodge Creek	5-22-4886-01
West Rosebud Creek	5-22-6804-01
Willow Creek	5-22-6916-01

APPENDIX 1

Summary of Data Collected During 1991, 1992, 1993, and 1994 by Gill Nets and Hook and Line from Alpine Lakes in the Absaroka-Beartooth Mountains.

APPENDIX 1. **Summary of Data Collected During 1991, 1992, 1993, and 1994 by Gill Nets and Hook and Line from Alpine Lakes in the Absaroka-Beartooth Mountains.**

1991 LAKE	DRAINAGE	CODE	SPECIES	STATUS	LAST STOCKED	SAMPLE DATE	NO. OF FISH	LENGTH RANGE (in)	MEAN LENGTH (in)	COMMENTS
Bramble Lake #38	BR	38	CT	Barren	Never					Shallow lake - don't stock.
Bramble Lake #39	BR	39	CT	Barren	1965	8/20				Stock CT at 50/acre every 4 years.
Bramble Lake #40	BR	40		Barren	Never					Barren, shallow lake.
Bramble Lake #41	BR	41	CT	ST	1987	8/20	9	9.8-14.2	11.8	Stock CT at 50/acre every 4 years.
Bridge Lake	BR	36	CT	ST	1989	8/22	43	6.5-16.7	9.0	Heavy use by anglers. Continue present management.
Kersey Lake	CF	60	EB	SS	?	9/11	58	6.2-13.5	10.2	LT are reproducing. Better size of EB due to predation by LT. CT are moving down from upstream lakes.
			LT	SS	1981		2	16.0-28.8	22.4	
			Chub	SS	?		1	6.5	6.5	
Leaky Raft Lake	CF	33A	CT	ST	1984	8/14	26	9.5-12.8	10.8	Reduce stocking rate to 50/acre.
Line Lake	CF	246	CT	ST	1987	7/31	3	17.0-22.0	19.3	Continue present management. Few large fish 4#-5# present.
Little Washtub Lake	CF	51	GR	ST?	1985	8/15	0			Continue present management.
Lower Aero Lake	CF	29	EB	SS	?	8/13	45	6.5-15.1	10.3	CT drift down from Upper Aero. Fish spawn in stream between two lakes. EB fat.
			CT	SS	?		6	10.4-15.6	14.3	
Rock Island Lake	CF	73	CT	ST	1990	9/13	2	15.2-15.9	15.6	Continue present management. Gets heavy angling pressure.
Upper Aero Lake	CF	31	CT	ST	1988	8/14	29	10.3-15.5	13.7	Continue present management.
Vernon Lake	CF	68	CT	SS	?	9/13	58	7.0-15.2	10.5	Continue present management.
			EB	SS	?		7	7.5-16.4	10.2	Fishery doing well.
Zimmer Lake	CF	32	CT	ST	1984	8/13	12	7.0-14.8	12.3	Limited spawning in outlet. May need to reduce stocking rate.

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Status
SS=self sustaining population
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APPENDIX 1. (Cont.) Summary of Data Collected During 1991, 1992, 1993, and 1994 by Gill Nets and Hook and Line from Alpine Lakes in the Absaroka-Beartooth Mountains.

1991 LAKE	DRAINAGE	CODE	SPECIES	STATUS	LAST STOCKED	SAMPLE DATE	NO. OF FISH	LENGTH RANGE (in)	MEAN LENGTH (in)	COMMENTS
Lost Lake	Lake Fork RC	32	CT	SS	?	8/29	3	10.8-15.0	13.4	GR apparently did not reproduce. Plant GR when available, CT self-sustaining.
			GR	ST	1984		0			
Emerald Lake	RC	8	CT	ST	1987	7/17	33	7.0-11.0	9.7	Wyoming lake.
			EB	SS			2	11.5-13.6	12.5	
Glacier Lake	RC	9	CT	ST	1988	7/17	11	9.0-15.4	13.0	Continue present management.
			EB	SS	?		16	6.5-11.9	9.2	
Hellroaring Lake #4	RC	20	CT	(SS)	?	7/30	17	4.8-16.5	8.4	Continue present management. CT move down from Hairpin Lake. Redds observed in outlet.
			EB	SS	?		0			
Hellroaring Lake #5	RC	21	CT	SS	?	7/30	2	8.5-9.7	9.1	Continue present management.
			EB	SS	?		20	5.8-11.4	8.5	
Little Glacier Lake	RC	7	EB	SS	?	7/17	33	5.9-10.8	7.4	Wyoming lake. CT move upstream into lake from Glacier Lake at high water.
			CT	(SS)	?		17	7.8-17.2	13.1	
Lower Twin Lake	RC	5	EB	SS	?	-				Wyoming lake. Visual survey many fry present.
Moon Lake	RC	15	CT	ST	1990	7/18	28	8.2-15.7	12.5	Continue present management.
Shelf Lake	RC	16	EB	SS	?	7/18	11	7.9-13.3	11.0	Continue present management.
Sliderock Lake	RC	30	EB	SS	?	7/30	51	6.3-12.6	9.4	Continue present management.
Upper Twin Lake	RC	4	EB	SS	?	-				Wyoming lake. Visual survey many fry present.
Asteroid Lake	SR	80	GT	?	1982	7/24	0			Maintain GT fishery in this lake.
Bill Lake	SR	76	GT/RB/ CT	SS	?	7/24	3	9.3-9.8	9.5	Continue present management. Hybrid larger fish seen in shallows.

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1991 LAKE	DRAINAGE	CODE	SPECIES	STATUS	LAST STOCKED	SAMPLE DATE	NO. OF FISH	LENGTH RANGE (in)	MEAN LENGTH (in)	COMMENTS
Comet Lake	SR	79		Barren	Never					Maintain GT fishery in this chain of lakes.
Dryad Lake	SR	84	GT	?	1982	7/24	0			Maintain GT fishery in this chain of lakes.
Jay Lake	SR	93	CT	SS	1977	7/24	20	11.6-14.7	13.4	Continue present management. CT actively spawning in outlet.
Lower Basin	West Fork RC	41		Barren						EB apparently winter-killed. Restock with CT at 100/acre every 6 years.
Senal Lake	WFRC	66	EB	SS	?	8/2	16	9.5-14.6	12.4	Continue present management. EB fat. CT drift down from Dude Lake.
			CT	(SS)	?		2	6.4-12.4	9.4	
Upper Basin	WFRC	42	EB	SS	?	8/28	22	6.0-11.5	8.1	Shallow lake but supports a population of EB.
Island Lake	WR	14	RB	SS	1950	8/5	4	6.5-11.5	8.5	Continue present management. Fish concentrated at the inlet and outlet.
Nemedji Lake	WR	29	CT	ST	1989	8/7	9	9.3-14.0	12.5	Reduce stocking rate from 4100 to 1400 in 1994 to manage for a trophy fishery.
Silver Lake	WR	15	RB	SS	1949	8/5	3	13.0-18.0	14.8	Continue present management.
			RB/CT	SS	?		3	14.0-17.5	16.3	
Star Lake	WR	16	GR	?	1980	8/8	0			Maintain grayling fishery. Restock when GR are available.
Weelana Lake	WR	30	CT	ST	1989	8/7	10	7.9-15.9	11.7	Reproduction may be taking place. Reduce plant to 100/acre.

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Camp Lake	BR	3	CT	SS	?	8/18	21	7.2-15.3	9.5	Needs more fishing pressure.
Kaufman Lake	BR	76	CT GR	SS ST	1979 1985	8/11	14 0	13.1-18.3	15.3	No sign of GR. Continue stocking GR.
Silver Lake	BR	42	RB	SS+	1989	8/12	12	10.0-18.0	12.6	Discontinue RB plants. Switch to CT 100/acre to protect CT population in Meatback Creek.
Speculator Lake	BR	45	CT	ST+	1984	8/11	16	9.3-15.4	13.8	Continue present management.
Abandoned Lake	CF	243	EB	SS	?	8/4	52	5.9-13.3	8.5	EB stunted. Could use more fishing pressure.
Alpine Lake	CF	87	EB CT	SS ST+	? 1987	8/5	30 3	6.6-9.9 7.8-14.3	7.9 10.8	EB stunted. CT have limited reproduction, but fish are thin.
Amphitheater Lake	CF	101	EB	SS	?	7/7	9	5.8-10.4	7.8	Hook and line sample. No fish in gill net.
Cloverleaf Lakes	CF	215 216 217 223	CT CT CT CT	SS SS SS SS	1975	8/5 8/6 8/6 8/5	33 81 35 21	7.1-15.8 6.8-14.7 5.9-13.9 6.2-16.0	13.1 10.5 9.8 11.9	Change status from ST to SS. Area has become a destination area for hikers.
Dollar Lake	CF	61	GR CT	SS SS	?	7/21	15 18	9.6-13.7 6.2-11.5	11.9 8.5	GR & CT drifted downstream from Aquarius and are now SS.
Felis Lake	CF	204	CT	SS	X	85	14	9.5-17.5	14.0	Fish spawning in outlet. Took fish with hook and line up to 20". Continue present management.
Hipshot Lake	CF	158	CT	ST	1987	8/22	10	11.1-14.5	12.7	No evidence of reproduction. Continue present management.
Jorden Lake	CF	121	CT	SS	1981	7/9	29	8.0-14.5	11.1	Good reproduction. Continue present management.
Melody Lake	CF	119	CT	SS	X	7/7	2	7.8-11.6	9.7	Continue present management.
Picasso Lake	CF	84	GT	ST	1984	7/9	7	17.5-19.1	18.3	Restock with GT when available. Lake gets considerable fishing pressure.

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Recruitment Lake	CF	45	EB	SS	X	7/23	3	11.9-20.0	16.4	No reproduction. EB move down from upstream lake. Continue present management.
Schoolmarm Lake	CF	5	CT	ss	1977	7/22	0	-	-	Reproduction limited. May need supplemental plant in future.
Sedge lake	CF	62	CT GR	SS ?	? ?	7/21	30 0	6.5-13.0 -	9.1 -	CT have taken over lake. No GR taken in '92 gill net.
Silver Lake	CF	48	EB	SS	X	7/23	24	6.8-10.5	9.2	EB stunted. Lake could use more fishing pressure.
Triangle Lake	CF	110	CT	ST	1987	7/7	23	8.5-10.5	9.5	Continue present management.
Billy Lake	ER	30	EB	SS	X	8/4		VISUAL OBSERVATION		Continue monitoring downstream movement of EB. Set multiple nets to eliminate EB and prevent downstream movement.
Brent Lake	ER	50	CT	SS	X	7/16	4	12.9-20.5	18.0	Continue present management. Large CT present 20"+ fish.
Lost Lake	ER	45	CT GR	ST ?	? 1984	7/14	0 0	- -	- -	Replant with GR. Spawning marginal. Probably not adequate to maintain population without stocking.
Lower Snow Lake	ER	5	RB	ST	1989	7/13	9	10.3-13.9	12.1	Received RB plant in 1989 intended for Upper Snow Lake.
Oly Lake	ER	28				8/4		VISUAL OBSERVATION		No fish observed in lake or stream to the falls. No movement of EB into this lake so far.
Shadow Lake	ER	44	EB	SS	?	7/14	44	6.0-8.3	7.0	Stunted EB. No management change. Could use more fishing pressure.
Turgulse Lake	ER	49	CT	SS	1978	7/16	36	6.5-15.5	11.7	Fish doing well.
Upper Snow Lake	ER	5	RB	ST	X	7/13	0	-	-	1989 RB plant went into Lower Snow Lake.

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Aufwuchs Lake	SR	54	CT	SS	1969	7/29	4	8.9-20.3	14.6	Continue present management. 50 CT taken with hook and line.
Incisor Lake	SR	18	GT	SS	1984	7/25	6	9.6-16.2	12.3	Limited GT reproduction in outlet. May need supplemental plant in future.
Jeff Lake	SR	48	EB	SS	X	?	7	3.9-6.1	5.1	Could use more fishing pressure. Hook and line sample.
Mouse Lake	SR	84	CT	ST	1984	7/30	0	-	-	Continue present management.
Mutt Lake	SR	47	EB	SS	X	?	9	3.1-6.2	5.1	Could use more fishing pressure. Hook and line sample.
Sundown Lake	SR	61	CT	ST	1987	7/31	0	-	-	Continue present management.

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Bald Knob Lake	CF	81	EB	SS	?	H&L 8/7	9	6.2-9.5	7.4	Continue present management.
Curl Lake	CF	22	EB	SS	?	?	8	6.8-10.1	7.9	Monitor continuing affects of 1988 fires.
Heidi Lake	CF	229	EB	SS	?	8/9	69	5.7-8.5	7.5	Would be good CT lake if we could rehabilitate to remove EB.
Indian Knife Lake	CF	113	GR	SS?	1985	7/8	9	10.6-16.7	13.8	Grayling population appears to be SS, but survey in 1998 to determine status.
Kidney Lake	CF	227	EB	SS	?	8/10	18	6.8-12.5	9.2	Continue present management. EB ar stunted but healthy.
Lady of the Lake	CF	6	EB	SS	?	7/13	26	4.3-12.1	8.1	Continue present management.
Leo Lake	CF	79	CT	SS?	68	H&L 8/7	0			Yellowstone cutthroat (YCT) stock SS since 1968. We should keep this population pure. Could use supplemental stocking of YCT.
Lillis Lake	CF	67	EB CT	SS ST?	 1989	7/21	15 2	6.6-13.3 14.2-15.1	10.9 14.7	Errant plant of CT in 1989. Plant with CT on 4 year cycle at 50/acre.
Little Falls Lake	CF	209	EB	SS	?	8/11	12	6.0-10.1	8.5	Continue present management. Fish thin, stunted.
Margaret Lake	CF	66	CT	ST	1990	7/21	7	12.5-14.6	13.8	Continue present management. Fish fat and healthy.
Martin Lake	CF	211	EB	SS	?	8/11	10	7.4-10.3	8.8	Fish are thin. Could use more fishing pressure.
Mutt Lake	CF	47	EB	SS	?	H&L 7/13	14	3.9-7.0	5.7	Stunted fish. Could use more fishing pressure.
Ovis Lake	CF	11	EB CT	SS ST	 1991	7/29	10 0	6.9-13.1	10.0	Continue stocking with McBride CT. Limited EB spawning in outlet.
Renie Lake	CF	228	EB	SS	?	8/10	3	7.3-11.1	9.8	Fish appear less stunted than those from lakes located downstream.
Robin Lake	CF	207	EB RB	SS SS?	? ?	8/11	9 0	6.0-11.5	8.4	Healthy EB population. Status of RB in question.

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Rough Lake	CF	36	EB GR	SS SS?	 1992?	8/4	20 0	8.2-10.9	9.9	No sign of grayling. Status questionable.
Russel Lake	CF	77	EB	SS	?	7/7	54	6.5-11.3	8.8	Continue present management. Good fishery for hikers on main trail.
Ship Lake	CF	61	EB	SS	1934	7/28	28	7.1-12.3	9.8	Stunted. Healthy EB. Continue present management.
Skull Lake	CF	82	EB	SS	?	7/22	6	7.0-9.6	8.1	EB thin, stunted. Could use more fishing pressure.
Sky Top Lake #37	CF	37	GR	SS	1955	8/4	0			Grayling population has apparently aged out. Restock with grayling.
Sky Top Lake #38	CF	38	GR	SS	1955	8/4	0			Chain would also be a good location to introduce GT.
Sky Top Lake #39	CF	39	GR	SS	1955					Same as 37 and 38.
Sky Top Lake #40	CF	40	GR	SS	1955					Same as 37 and 38.
Sky Top Lake #41	CF	41	GR	SS	1955					Same as 37 and 38.
Sodalite Lake	CF	57	EB	SS	1959	7/22	4	6.6-9.6	8.7	Stunted EB population. LT plant would help control EB.
Tiel Lake (Thiel)	CF	232	EB	SS	?	8/9	36	6.5-12.0	8.0	Continue present management.
Trail Lake	CF	208	CT	ST+	1987	8/11	17	9.8-18.5	11.6	3 age classes present. Probably SS. Re-evaluate stocking status.
Upper Aero Lake	CF	31	CT	ST	1988	8/3	0			Change to 8-year rotation or reduce stocking rate to 50/acre.
Windy Lake	CF	85	EB	SS	?	7/22	13	6.5-9.8	8.0	Stunted EB. Should introduce LT to help control EB.
Wright Lake	CF	210	EB	SS	?	8/11	50	5.4-10.4	8.1	Stunted EB population. Could use more fishing pressure.

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Diaphanous Lake	SR	73	RB	SS	1980	7/15	7	11.8-15.0	13.6	Continue present management.
Huckleberry Lake	SR	46	EB	SS	?	7/29	40	6.6-9.4	8.1	Fish are stunted but appear healthy.
Jasper Lake (Tumble)	SR	100	CT	SS	74	8/22	20	9.6-13.6	11.9	Lake is over-populated with CT and fish are in poor condition.
Jeff Lake	SR	48	EB	SS	?	H&L 7/13	10	3.9-8.0	5.0	Continue present management. Could use more fishing pressure.
Lightning Lake	SR	102	GT	SS	56	H&L 8/23	0			Continue present management.
Little Lightning Lake	SR	102	GT	SS	?	H&L 8/22	10	7.8-13.2	8.8	continue present management.
Owl Lake	SR	71	RBCT	SS	?	7/14	8	7.0-12.3	10.0	RB/CT hybrids. Continue present management.
Lake Pinchot	SR	91	RB	SS	1939	7/15	7	10.8-14.5	12.3	Continue present management. Many hybrid fish.
			CT	SS			1	8.8-8.8	8.8	
			RBCT	SS			7	11.2-14.8	12.7	
			RBGT	SS			10	6.1-10.0	7.7	
			Mix	SS			5	6.4-14.3	9.8	
Pipit Lake	SR	70	RBCT	SS	?	7/14	4	12.8-16.2	14.5	Hybrids healthy. Continue present management.
Kookoo Lake	RC	58	CT	ST	1985	6/30	7	13.4-16.1	14.5	Graduate student special study lake.
Marker Lake	RC	62	CT	ST+	1986	8/19	5	12-15"		Continue present management. Observed at least 2 year classes.
Triangle Lake	RC	60	CT	ST	1985	7/28	1	21.0-21.0	21.0	Continue present management. Two to eight year old fish observed.
Chickadee lake	BR	15	CT	SS	1978	7/13	22	7.0-17.3	13.1	Fish doing well. Continue present management.
Mirror Lake	BR	16	RB	SS	?	7/13	11	6.1-11.5	9.0	Continue present management. Fish small but healthy.

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Anchor Lake	CF	124	GT	?	1982	7/20	0			Maintain GT fisheries in this chain of lakes.
Astral Lake	CF	24	EB	SS	?	7/23	12	4.6-10.1	6.4	Fish stunted. Needs more fishing pressure.
Big Butte Lake	CF	125	GT	?	1992	7/20	1	6.2-6.2	6.2	Maintain GT fishery in this chain of lakes.
Cliff Lake	CF	50	EB	SS	?	8/9	5	7.5-16.5	12.9	Continue present management.
Copeland Lake	CF	151	EB	SS	?	7/21	58	5.9-10.1	7.8	Stunted EB population. Continue present management.
Desolation Lake	CF	127	GT LL	? ?	1992	7/29	5 1	5.8-13.4 21.5-21.5	11.1 21.5	Maintain GT fishery in this chain of lakes.
Estelle Lake	CF	172	EB	SS	?	7/13	66	5.8-17.4	8.8	Continue present management. Some large EB present.
Farley Lake	CF	167	EB	SS	?	7/19	70	6.4-13.0	10.3	Continue present management. Good EB lake.
Gallery Lake	CF	96	RB	ST	1989	8/11	4	12.7-13.5	13.0	Continue present management. Several size classes. Some reproduction.
Green Lake	CF	25	EB	SS	?	7/23	19	3.8-13.3	8.5	Continue present management.
Hunger Lake	CF	47	EB	SS	?	8/9	20	6.4-8.7	7.7	Continue present management.
Jeff Lake	CF	48	EB	SS	?	7/22	10	3.8-7.8	5.6	Possible rehab to remove EB from Goose Creek Drainage.
Lillis Lake	CF	67	EB CT	SS ST	 1989	8/9	5 1	8.1-13.3 15.5-15.5	10.8 15.5	Plant with CT on 4-year cycle at 50/acre.
Lower Aero Lake	CF	29	EB CT	SS ST	?	8/11	2 0	13.9-15.5	14.7	Fish kill wiped out most of fish in 1994. Cause unknown.
Midnight Lake	CF	164	EB	SS	?	7/19	55	6.7-10.3	8.1	Continue present management. Pretty lake, fish stunted.
Moccasin Lake	CF	52	EB	SS	?	8/9	7	6.3-9.8	8.4	Continue present management.
Mutt Lake	CF	47	EB	SS	?	7/22	15	3.4-9.2	5.9	Possible rehab to remove EB from Goose Creek Drainage.
Skeeter Lake	CF	149	GR	ST	1992	7/14	3	10.1-11.3	10.8	Restock with GR when available.

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- SS=self sustaining population
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APPENDIX 1. (Cont.) **Summary of Data Collected During 1991, 1992, 1993, and 1994 by Gill Nets and Hook and Line from Alpine Lakes in the Absaroka-Beartooth Mountains.**

1994 LAKE	DRAINAGE	CODE	SPECIES	STATUS	LAST STOCKED	SAMPLE DATE	NO. OF FISH	LENGTH RANGE (in)	MEAN LENGTH (in)	COMMENTS
Spaghetti Lake	CF	150	GR	?	1992	7/14	3	11.8-18.5	14.6	Restock with GR when available.
Swede Lake	CF	235	CT	ST+	1988	7/12	27	6.8-14.1	11.2	Limited reproduction taking place. May need to reduce stocking numbers.
Wade Lake	CF	163	EB	SS	?	7/18	29	6.6-12.3	9.2	Continue present management.
Wall Lake	CF	214	EB	SS	?	7/13	23	6.5-8.4	7.2	Stunted EB. Continue present management.
Weasel Lake	CF	54A	CT	ST	1990	8/10	1	13.5-13.5	13.5	Continue present management.
Billy Lake	ER	30	EB	SS	?	9/1	8	11.4-13.2	12.4	Monitor downstream movement of EB. Set multiple nets to eliminate EB from lake if possible.
Crow Lake	ER	1	EB	SS	?	7/27	34	10.2-13.0	10.2	Continue present management.
Oly Lake	ER	28			not	9/1	0			No EB present yet. CT present in stream 100 yards downstream. Continue present management.
Sylvan Lake	ER	2	GT	SS	1939	7/26	43	4.9-12.1	9.3	Continue present management. Could support more harvest.
Twin Outlets Lake	ER	23	CT GT CTx	SS SS SS	1968	8/31	5 1 1	6.9-13.4 6.9-6.9 6.6-6.6	9.9 6.9 6.6	CT appear to be taking over this lake although a few GT are still present.
First Rock Lake	RC	35	EB CT	SS SS	? 53	7/7	15 10	8.8-11.9 8.1-11.1	10.3 9.8	Continue present management.
Keyser Brown Lake	RC	34	CT EB	SS SS	? ?	7/6	19 16	6.0-9.5 5.8-8.6	8.5 7.3	Continue present management.
Mary Lake	RC	68	EB	SS	?	7/27	11	6.3-12.9	10.3	Continue present management.
Second Rock Lake	RC	36	EB	SS	?	7/8	69	6.3-13.8	9.3	Continue present management.
September Morn Lake	RC	40	EB	SS	?	7/14	21	6.0-11.7	9.5	Continue present management.
Triangle Lake	RC	60	CT	ST	1985	8/17	2	8.8-19.3	14.1	Graduate student study lake.

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Asteroid Lake	SR	80	GT	?	1992	8/3	18	6.0-12.6	8.4	Maintain GT fishery in this chain of lakes.
Dreary Lake	SR	88	GTx RBxCT	SS	?	8/3	18	6.4-12.9	8.5	Continue present management. Fish are hybrids.
Dryad Lake	SR	84	GT	?	1992	8/3	18	6.3-15.5	10.6	Maintain GT fishery in this chain of lakes.
Incisor Lake	SR	18	GT	?	1984	7/22	4	7.8-13.6	10.6	Limited GT reproduction in outlet. May need supplemental plant in future.
Martes Lake	SR	65	CT	ST	1987	8/4	10	14.3-16.1	15.1	Reduce stocking rate to 50/acre to maintain trophy fishery.
Sunken Rock Lake	SR	64	GT	?	1992	8/4	0			Maintain GT fishery in this lake.
Beckworth Lake	WR	26	CT	SS	?	8/31	31	7.0-13.0	10.4	Continue present management.
Frenco Lake	WR	27	CT	SS	?	8/31	20	7.5-13.0	10.1	Continue present management.
Nugget Lake	WR	25	CT	ST	1992	8/31	14	6.8-16.5	9.5	2-age classes sampled. Fish reproducing. Adjust stocking number or cancel plant.

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