MONTANA FISH, WILDLIFE AND PARKS

FISHERIES DIVISION
JOB PROGRESS REPORT

STATE:	MONTANA	PROJECT TITLE:	STATE-WIDE FISHERIES INVESTIGATIONS
PROJECT NO.:	F-78-R-1	STUDY TITLE:	SURVEY AND INVENTORY OF COLDWATER LAKES
JOB NO.:	_____	JOB TITLE:	NORTHWEST MONTANA COLWATER LAKES INVESTIGATIONS

PROJECT PERIOD: JULY 1, 1995 THROUGH JUNE 30, 2000

ABSTRACT

We collected fish population data for 29 lakes in the Kootenai River drainage between June, 1995 and December 1999. The lakes ranged in size from 9 surface acres to 1328 surface acres. These surveys are part of a continuing effort to monitor stocking success and illegal introductions.

In an effort to create a more successful rainbow trout (*Oncorhynchus mykiss irideus*) fishery at McGregor Lake, which has a high density of lake trout (*Salvelinus namaycush*), MFWP began boating the 2 to 4 inch fingerlings to sites throughout the lake. The technique looked promising so in 1997 we formed a "regatta" of boats to distribute stocked trout more evenly throughout the lake. In 1998 we requested that rainbow trout destined for McGregor Lake be held until at least early June. The combination of "regatta stocking" and later stocking date appears to have produced a successful spring/fall rainbow trout fishery. Since 1998, anglers have commented that rainbow trout fishing like they have now has not been enjoyed since the 1960's. The limit on rainbow trout in McGregor Lake was reduced from 10 daily to 5 daily with only one greater than 22 inches. MFWP will use spot creel surveys and gillnetting to further monitor the success of this stocking strategy in McGregor Lake.

There is evidence (both historic reports and genetic testing) to suggest that Kilbrennan Lake historically contained native Columbia Basin redband trout (*Oncorhynchus mykiss gairdneri*). Montana Fish, Wildlife and Parks personnel initiated discussion about chemical rehabilitation and re-stocking of Kilbrennan Lake, a very popular brook trout fishery, with redband trout in 1984. Kilbrennan Lake would make an ideal spot for a brood lake as part of a basin-wide recovery effort. The most prevalent comment gotten from public scooping was that MFWP should poison the lake but re-stock with brook trout and redband trout. This may be contrary to MFWP's policy of protection of native species. The project is at an impasse until

agreement can be made and meanwhile the fishery declines due to illegal introductions of black bullheads and yellow perch.

Since 1997 MFWP has partnered with Bonneville Power Administration to mitigate for the construction and operation or Libby Dam. As part of that mitigation MFWP have identified through public and internal scooping and management plans, several lakes for rehabilitation. We rehabilitated four lakes since 1995 that were illegally stocked with non-game species. To date all projects are non-game fish clean and growing healthy catchable westslope cutthroat trout and rainbow trout.

There is evidence from historic stocking records and personal observations that the kokanee lakes in the Kootenai drainage support at least some natural reproduction. Beginning in 1994, MFWP fed kokanee tetracycline laced feed to lay a mark in bony structures. Unfortunately, we have had no success with identifying the tetracycline marks from kokanee captured at any of the lakes. Either the marks are not strong enough to be seen in adults three years after the marking; kokanee are stocked into the lakes at a small enough size that there is not enough pigmentation in the skin to keep sunlight from destroying the mark or we captured the progeny of kokanee that spawned in the lakes. We are working with the hatchery system to treat eyed eggs with alternating cold and warm water to create unique daily growth rings on the otoliths in 2001

BACKGROUND

The project area is located in northwest Montana and includes all of Flathead, Lake, Lincoln and Sanders counties and portions of Missoula and Powell counties. Region one encompasses all of the Montana portions of the Flathead and Kootenai River drainages and the lower portion of the Clark Fork of the Columbia River drainage.

There are approximately 500 coldwater lakes and reservoirs in northwest Montana exclusive of Flathead lake that consistently provide more than 250,000 angler days of fishing for trout and salmon. Common introduced game fish are coastal rainbow trout (*Oncorhynchus mykiss irideus*), brown trout (*Salmo trutta*), kokanee salmon (*Oncorhynchus nerka*), arctic grayling (*Thymallus arcticus*), brook trout (*Salvelinus fontinalis*), lake trout (*Salvelinus namaycush*) and lake whitefish (*Coregonus clupeaformis*). Native gamefish include westslope cutthroat trout (*Oncorhynchus clarki lewisi*), Columbia River basin redband trout (*Oncorhynchus mykiss gairdneri*), mountain whitefish (*Prosopium williamsoni*), and bull trout (*Salvelinus confluentus*). Redband trout, westslope cutthroat trout and bull trout are species of special concern in Montana because of their limited distribution. The U.S. Fish and Wildlife Service (USFWS) received petitions to list redband trout and westslope cutthroat trout; neither was listed. They listed bull trout as threatened in 1998.

Habitat loss is a primary concern in Region one. A large portion of the workload and monitoring is aimed at addressing the impacts of development of resources such as timber and minerals, poorly planned lakeshore development, reservoir fluctuations and declines in water quality with special attention to excess nutrient and sediment loading. Declines in species of special concern have been caused in some cases by hybridization or competition with non-native species, angling harvest and habitat losses due to development of other resources.

Angling use on coldwater lakes and reservoirs in Region one increases every year, putting additional pressure on some waters that already show the effects of over-use and over harvest. Natural reproduction is not sufficient to meet angling demands in many waters or is non-existent. The angling public wants a variety of new species or strains of trout and salmon introduced, but these fish may compete with existing fish species and threaten species of special concern. The establishment of *Mysis* relicta is some waters caused changes in salmonids populations. Anglers also want increased opportunities to catch large trout and salmon. This requires changes in stocking and management strategies. More complex regulation are required to maintain or improve existing fisheries and provide diversity of fishing experiences.

Additional access will be needed to medium sized lakes to accommodate the growing numbers of anglers. Montana Department of Fish, Wildlife and Parks (MFWP) will also have to increase coordination efforts with other agencies, local governments and the public to create increased opportunities for urban fisheries.

OBJECTIVES AND DEGREE OF ATTAINMENT

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

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

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

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

PROCEDURES

We accomplished general lakes surveys using standard experimental floating and sinking gill nets set overnight. Experimental nets are constructed of nylon, measure 6 feet by 125 feet and consist of five 25 feet panels measuring ¾ inch to 2-inch bar mesh. Additionally, we surveyed several lakes by hook and line. We identified fish caught to species, recorded length and weights when appropriate and gathered scales from gamefish when appropriate for age-growth determination. We captured kokanee with standard gill net sets or by seining or electrofishing during spawntaking operations. We measured mature male and female kokanee separately and collected otoliths when appropriate for aging. In some lakes we removed vertebrae from a sample of kokanee to assess tetracycline-marking techniques.

We selected several lakes for zooplankton analysis. We collected samples of Mysis relicta during dark phases of the moon in June. We used a conical, Wisconsin-style, one meter diameter, 1350 micron mesh net. We collected samples from the entire water column at approximately 0.35 meters/second. We collected cladoceran/copepod samples in much the same way except that the Wisconsin net was generally 0.35meter diameter.

There were additional procedures for special projects. When that was the case, we added a procedures section or methods section.

FINDINGS

KOOTENAI RIVER DRAINAGE

We collected fish population data for lakes in the Kootenai River drainage, Flathead River drainage and Clark Fork River drainage between June 1995 and December 1999. The lakes data were separated by major drainage (Kootenai, Flathead, Swan), by lake type (mountain lake, valley lake) and by special projects. The lakes ranged in size from 9 acres surface acres to approximately 5,000 surface acres.

Valley Lakes Monitoring

We collected fish population data for 29 lakes in the Kootenai River drainage between June 1995 and December 1999. The lakes ranged in size from 9 surface acres to 1328 surface acres. These surveys are part of a continuing effort to monitor stocking success and illegal introductions. Results of gillnetting surveys are presented in Table 1.

Table 1. Summary of gill nets set for Valley Lakes in the Kootenai River drainage between July, 1995 and June 2000.

Lake (water code)	Date	Species	Number per net	Mean Length (mm)	Range (mm)	Mean Weight (gms)	Range (gms)	Other Species (number per net)
Fish Lake (07-6385)	8/9/95	EBT	50.8	264	151-404	246	32-890	RSS(10.3)
Bull Lake (07-5540)	8/9/95	WCT	0.3	361		520		PS(28.4) RSS(0.2) CRF(2.25)
Smokey Lake (07-8745)	8/10/95	No Fish Captured						
Fire Lake (07-6360)	8/10/95	EBT	5.0	339	305-380	428	306-540	
Wee Lake (11-9980)	8/1/95	IRB	Hook and Line	234	158-320	159	28-370	
Baree Lake (11-7855)	8/3/95	WCT	13.0	272	223-310	251	138-344	
Spar Lake (11-9640)	6/18/96	LT	2.33	380	270-498	449	152-962	
Glen Lake (11-8380)	10/4/96	DV RBT	4.25 0.5	552 270	460-825 262-278	1329 214	848-2328 200-228	
Little Therriault Lake (11-8920)	7/17/96	HWCT DV HYB	19.0 1.5 4.5	235 299 264	163-290 217-412 236-325	146 431 200	50-320 100-726 134-340	
Little Spar Lake (11-8900)	7/24/96	WCT	2	198	166-230	72	34-110	
McGregor Lake (05-9216)	06/17/96	LT EBT	25 0.5	368 231	184-559	450 140	74-1362	
Blue Lake (07-5420)	6/16/97	EBT RBT	15.33 0.33	201 191	155-301	108 238	40-272	PS(3.33)
Martin Lake (11-9140)	6/16/97	EBT	2.5	222	175-242	135	62-168	CSU(0.5) FSU(0.5)
Track Lake (07-9110)	6/16/97	KAM	5.5	252	200-287	193	10-260	
Hidden Lake (07-6722)	6/16/97	NP	1	432	415-449	540	508-572	
Middle Thompson Lake (05-9232)	9/15/97	NP EBT KOK	0.75 0.25 2.75	667 400 382	576-835 193-445	1651 894	1317-1920	MWF(1.5) PS(0.5) CSU(0.25) NSQ(6.0)
Cad Lake (11-8050)	9/10/97	RBT WCT	0.67 8.67	348 243	345-350 219-336	442 139	438-446 102-314	
Cibid Lake (11-8130)	9/10/97	RBT YP	6.67 8.67	236 212	166-415 143-320	158 182	50-820 32-452	PS(3.67)

McGregor Lake (05-9216)	5/27/97	LT	13.25	421	314-555	634	238-1522	
Upper Sunday Lake (07-8980)	4/21/98	WCT	8	261	221-300	197	135-292	
Lower Sunday Lake (07-8079)	4/21/98	YP	161.5	152	122-247	40	25-138	PS(1.5) LNSU(3)
Louis Lake (07-7495)	5/5/98	RBT	8	259	238-305	188	130-287	
Little McGregor Lake (05-9096)	4/30/98	RBT YP	1 59	219 203	190-240 130-270	110 91	63-163 35-188	
Middle Thompson Lake (05-9232)	9/28/98	NP EBT KOK	0.75 0.25 18.5	625 300 380	600-640 260-465	1897	1584-2320	
McGregor Lake (05-9216)	6/11/98	RBT LT	1.75 3.25	329 431	230-360 357-519	418 621	92-556 386-1156	
Glen Lake (11-8380)	9/29/98	RBT DV KOK	0.25 1.75 2.75	511 502 351	 260-646 236-479	1600 1255	 150-2010	YP(7.0) MWF(3.75) PS(12.75) FSU (48)
Middle Thompson Lake (05-9232)	10/4/99	NP EBT KOK	1.75 0.25 18.5	557 320 387	513-627 330-485	1392 444	896-2240	YP(2.25) NSQ(3.75) FSU(0.5) CSU(0.5) MWF(0.25)
Island Lake (11-8580)	9/10/99							YP(14) FSU(3) NSQ(10) CRC(5)
Loon Lake (11-8940)	7/6/99	YP	6.17	179	146-239			MWF(2.67) NSQ(1.0) FSU(1.33) CRC(0.5) PS(0.17)
Cibid Lake (11-8130)	6-8-99	WCT	8	244	200-285	153	58-284	
Boot Jack Lake (11-7980)	6/7/99	RBT WCT	10 2	316 313	165-347 312-313	433 387	38-532 386-388	
Banana Lake (11-7852)	6/8/99	RBT YP	1 9.5	271 187	211-331 153-255	223 98	98-348 36-244	PS(3.5) FSU(4.5) CSU(0.5) NSQ(1.5)
Topless Lake (11-9830)	6/7/99	No Fish						
Spar Lake (11-9640)	10/13/99	LT EBT KOK	12.5 2.75 2.0	400 337 180	320-570 272-441 171-187	535 466	290-1332 244-962	RSS(0.75)

SPECIAL PROJECTS

McGregor Lake

McGregor Lake is a large, deep lake 35 miles west of Kalispell, Montana. The lake has small inlets and one small outlet (McGregor Creek) that connects it to the Clark Fork River through the Thompson River. The maximum depth is 220 feet and approximately 80 percent of the depth of the lake is greater than 100 feet. McGregor Lake has a surface area of 1328 acres. A small impoundment structure at the west end of the lake controls the upper three feet of the lake.

The historic species constituency of McGregor Lake included native westslope cutthroat trout, mountain whitefish, longnose suckers, northern pike minnows and redside shiners. Various species of fish including cutthroat trout, arctic grayling, coho salmon were stocked in the lake with poor results. Brook trout did manage to establish a small, self-reproducing population from a single plant of 4,000 fish in 1947. Yellow perch were also established through illegal introductions in the 1960's.

In 1942, the initial stocking of lake trout occurred and subsequent stocking from 1948 through 1953 established a self-reproducing population. Beginning in 1965, FWP began stocking kokanee salmon in McGregor Lake to produce a fishery similar to the very popular Flathead Lake and Whitefish Lake fisheries. FWP also continued to stock rainbow trout to produce a "three-tiered" effect that included a consumptive kokanee/rainbow trout fishery and a trophy lake trout fishery. McGregor Lake produced relatively good numbers and sizes of rainbow trout (14 inches and occasionally up to 10 pounds), kokanee (11 inches to 20 inches) an lake trout (average 18 inches to 25 pounds).

In 1968, FWP introduced the opossum shrimp (*Mysis relicta*) in McGregor Lake. The desired effect was to create a large kokanee (up to 5 pounds) similar to those being captured in Kootenai Lake, British Columbia. The result was not expected. We found that in deep lakes like McGregor Lake, *Mysis* tended to live near the lake bottom during the daylight hours and rise to the surface to feed at night. Two major outcomes resulted from the *Mysis* introduction.

Because the kokanee fed mainly near the thermocline (15 to 45 feet) during daylight hours, they rarely got the opportunity to feed on *Mysis*. Additionally, Mysis tended to feed on the same prey (*Daphnia pulex*) that kokanee and rainbow trout preferred. Second, and probably most important was the effect of *Mysis* on lake trout. Prior to Mysis introduction, juvenile lake trout had to survive on relatively small numbers of aquatic invertebrates and zooplankton to get to the size where they could effectively capture the other fish species in the lake. The introduction of Mysis removed this "bottleneck" and the juvenile lake trout population increased dramatically. Lake trout population increased to high enough numbers to create a predator trap that kokanee could not escape. Angling success for small (12 inches) to medium (28 inches) sized lake trout was excellent but angling success for kokanee was reduced to such low levels that by 1985, FWP discontinued stocking kokanee in McGregor Lake.

The rainbow trout fishery also suffered. Since 1982 MFWP stocked between 50,000 and 95,000 rainbow trout annually with virtually no success. Interviews with anglers indicated that rainbow trout were caught only rarely. When we analyzed stomach contents of lake trout caught in gillnets set 1 to 2 days after stocking we found between one and 30 rainbow trout

fingerlings in individual lake trout stomachs and rainbows were found in in 80 percent of the lake trout stomachs.

In an effort to create a more successful rainbow trout fishery MFWP discontinued the typical stocking at boat ramps and began boating the 2 inch to 4 inch fingerlings to sites throughout the 1328 acre lake. In subsequent gillnet sets we found no newly stocked rainbow trout in stomachs of lake trout. The technique looked promising so we contacted local anglers and in 1997 formed a "regatta" of 8 boats to distribute stocked trout more evenly throughout the lake. Additionally, from historic plankton we determined that the highest densities of Daphnia occurred in mid-June. In 1998 we requested that rainbow trout destined for McGregor Lake be held until at least early June.

One of the difficulties of holding fish for later stocking is space limitations. In this case we determined that we did not need a larger fish for stocking, just a later stocking date. The lot of rainbow trout destined for McGregor Lake are given reduced feed and/or removed from feed for the extra time they are held at the hatchery so they don't grow any furher. We felt that this strategy helped to reduce the stress on the hatchery system and on trout destined for other systems caused by the special request.

The combination of "regatta stocking" and later stocking date appears to have produced a successful spring/fall rainbow trout fishery. Since 1998, anglers have commented that rainbow trout fishing like they have now has not been enjoyed since the 1960's. The limit on rainbow trout in McGregor Lake was reduced from 10 daily to 5 daily with only one greater than 22 inches. The limit was created because of the large number of comments from anglers that expressed their willingness to reduce their take of trout to help maintain this fishery. MFWP will use spot creel surveys and gillnetting to further monitor the success of this stocking strategy in McGregor Lake.

Kilbrennan Lake

Kilbrennan Lake medium sized lake 25 miles northwest of Libby, Montana. The lake has a small inlet (Feeder Creek) and one outlet (Kilbrennan Creek) that connects it to the Kootenai River through the Yaak River. The maximum depth is approximately 60 feet and the surface area 57 acres. Beaver periodically dam the outlet of Kilbrennan Lake and cause flooding on the forest road along the eastern shore of the lake.

There is evidence (both historic reports and genetic testing) to suggest that Kilbrennan Lake historically contained native Columbia Basin redband trout (*Oncorhynchus mykiss gairdneri*) (MFWP, unpublished report). From the 1930's to the 1960's MFWP and private hatchery personnel took eggs from trout, although mostly brook trout (*Salvelinus fontinalis*). Between 1934 and 1954 MFWP stocked nearly 700,000 brook trout in Kilbrennan Lake. Brook trout established a self-reproducing population and stocking was halted.

Kilbrennan Lake became an exceptional brook trout fishery. It was considered to be the most popular small lake fishery in northwestern Montana. As many as 357 anglers were creeled on opening day on this 57 acre lake (Figure X.)

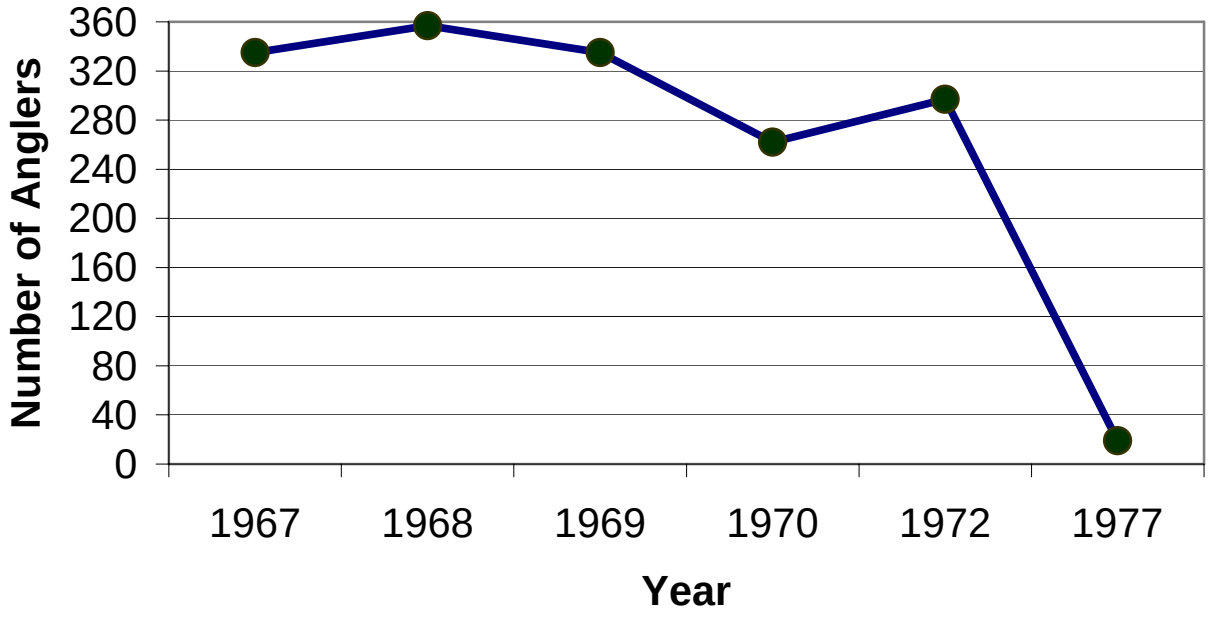

Figure X. Number of anglers creeled on opening day at Kilbrennan Lake, Montana 1967 – 1977.

Black bullheads (*Ameiurus melas*) were illegally introduced in Kilbrennan Lake in the late 1960's or early 1970's. By 1977 black bullheads dominated the gill net catches (Figure Y.). The number and size of trout in Kilbrennan Lake declined (Table X) and recreational angling declined dramatically as seen by opening day creel surveys (Table X.). Catch rates decreased so dramatically that the angling public no longer requested a winter closure. To add to the problem yellow perch (*Perca flavescens*) were illegally introduced probably in 1994 and by 1999 they dominated the net catch.

Table X. Results of gill netting surveys on Kilbrennan Lake, Montana 1995 – 1999.

Date	Species	Number per net	Mean Length (mm)	Range (mm)	Mean Weight (gms)	Range (gms)
5/23/95	RBT	3.3	304	161-362	281	38-468
	EBT	9.0	265	146-380	189	32-488
	BBH	49.7	182	131-220	81	26-178
	YP	0.2	260			
6/18/96	RBT	4	239	160-290	152	45-250
	EBT	15.5	235	153-320	147	39-332
	BBH	76.5	170	132-184	60	32-88
	YP	0.75	195	140-251	121	32-210
6/24/97	RBT	13.25	271	205-338	191	74-332
	EBT	17.5	229	168-305	122	46-268
	BBH	22	170	130-191	74	34-94
	YP	36.75	163	150-204	50	36-98
6/9/98	RBT	4.5	282	155-342	250	40-386
	EBT	23.8	221	150-283	129	42-238
	BBH	11.3				
	YP	29.3		All <200		
6-9-99	RBT	5.75	270	185-328	178	58-310
	EBT	14	220	157-290	97	36-204
	BBH	9.75	185	149-214	92	52-154
	YP	35.25	200	130-229	90	26-124

In northwest Montana lakes, as illegally introduced yellow perch populations expand, larger individuals (>200 mm) many times represent a sufficient enough portion of the population

(25 percent or more) to support a limited fishery. In other lakes we have seen this happen in around 5 years. In almost all cases the perch population stunts as population densities rise. As the number of adult yellow perch greater than 200 mm declines, the angling declines. Lakes that have gill net catches where 200 mm perch represent less than 5 percent of the population get little to no angling pressure (MFWP, unpublished data). In addition, high density yellow perch populations make it extremely difficult for trout species to exist, especially in a lake supported completely by natural reproduction. We have also found that stocking rainbow trout in smaller lakes (less than 100 acres) dominated by pan fish (including pumpkinseeds and yellow perch) is generally unsuccessful due to extreme competition for zooplankton and predation on smaller trout.

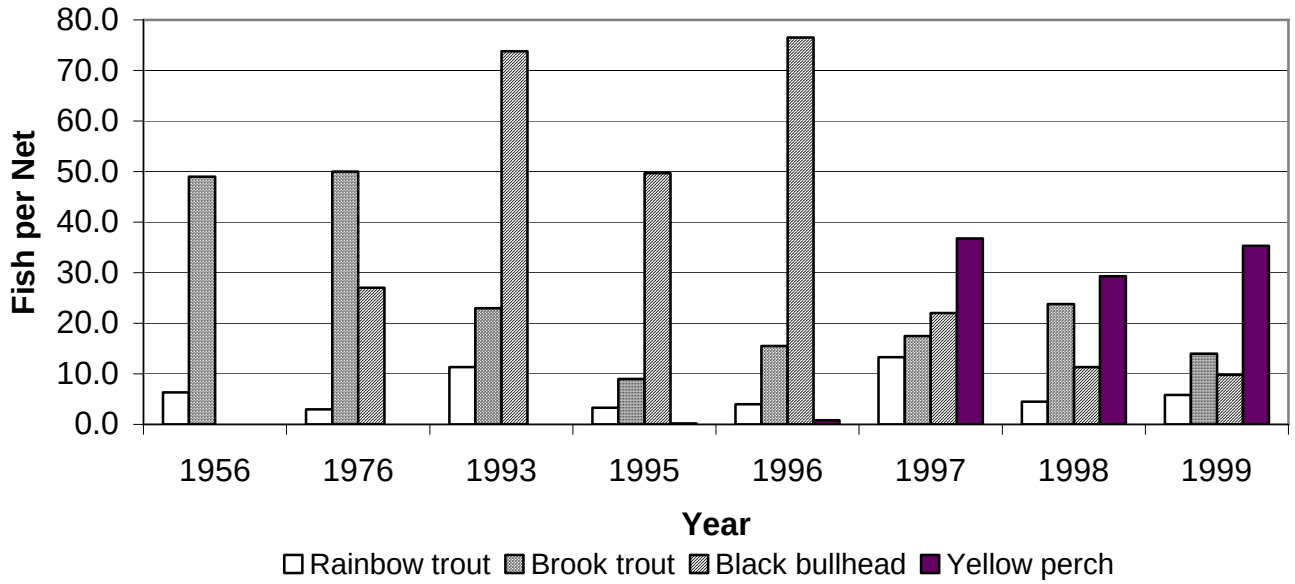

Figure Y. Number fish per net in gill net sets for Kilbrennan Lake, Montana 1956 through 1999.

Montana Fish, Wildlife and Parks personnel initiated discussion about chemical rehabilitation and re-stocking of Kilbrennan Lake with redband trout in 1984. Because Kilbrennan Lake used to support redband trout, it would make an ideal spot for a brood lake as part of a basin-wide recovery effort. The most prevalent comment gotten from public scooping was that MFWP should poison the lake but re-stock with brook trout and redband trout. They felt that Kilbrennan could support both fish and even suggested a catch and release for redband trout along with the standard 20 brook trout limit. Coincidently in 1994, MFWP established a no-stock policy for brook trout in western Montana, especially where bull trout (*Salvelinus confluentus*) are present. The policy was created to help prevent the potential for hybridization between brook trout and bull trout

Bull trout are not present in Kilbrennan Creek or the Yaak River drainage, although, they are present in the Kootenai River and tributaries above and below the confluence with Yaak River. Until a stocking agreement can be reached, recreational angling will continue to suffer due to the current species constituency. Additionally, MFWP will have to search for different brood lake candidates. MFWP will monitor the species constituency and zooplankton populations until a decision is reached.

Lake Rehabilitation

Since 1997 MFWP has partnered with Bonneville Power Administration to mitigate for the construction and operation or Libby Dam. As part of that mitigation MFWP have identified through public and internal scooping and management plans, several lakes for rehabilitation.

Tetrault Lake

Tetrault Lake (also known as Carpenter Lake or Sales Lake) is medium sized lake 4 miles northwest of Eureka, Montana. The lake has no inlets or outlets. The maximum depth is approximately 58 feet and the surface area 94 acres. Management of Carpenter Lake commenced in 1925 when MFWP stocked brook trout, rainbow trout and cutthroat trout in the lake (Table X.). Montana Fish, Wildlife and Parks personnel chemically rehabilitated the lake with Toxaphene in 1961 to remove large scaled suckers (*Catostomus macrocheilus*), pumpkinseeds, kokanee and cutthroat trout. When the lake de-toxified in 1964 MFWP stocked rainbow trout and/or cutthroat trout into the lake annually.

Year	Species	Number	Length
1925 -1964	Brook trout	130540	
1933 - 1941	Coho salmon	134850	
1925 - 1964	Cutthroat trout	209984	
1925, 1935	Rainbow trout	40000	
1964	Rainbow trout	40000	4.0
1965	Rainbow trout	40950	3.0
1966	Rainbow trout	41553	4.0
1967	Rainbow trout	20420	2.0
1968	Rainbow trout	10550	5.0
1969	Rainbow trout	10013	5.0
1970	Cutthroat trout	12060	5.0
1971	Rainbow trout	23790	4.0
1972	Rainbow trout	23000	5.0
1973	Rainbow trout	15000	4.0
1974	Rainbow trout	15000	5.0
1975	Westslope cutthroat trout	8083	5.0
1976	Westslope cutthroat trout	20196	5.0
1977	Westslope cutthroat trout	20010	4.0
1978	Westslope cutthroat trout	19090	4.0
1979	Westslope cutthroat trout	19600	4.0
1980	Westslope cutthroat trout	25280	4.0 – 11.0
1981	Westslope cutthroat trout	33580	4.0 – 12.0
1982	Westslope cutthroat trout	20058	4.0
1983	Westslope cutthroat trout	25357	5.0 – 13.0
1984	Westslope cutthroat trout	24240	5.0 – 12.0
1985	Westslope cutthroat trout	22197	5.0 – 14.0
1986	Westslope cutthroat trout	25452	5.0 – 14.0
1987	Westslope cutthroat trout	20025	5.4
1988	Westslope cutthroat trout	19817	4.5
1989	Westslope cutthroat trout	20000	3.3
1990	Kamloops rainbow trout	12445	5.7 – 8.5
1991	Arlee rainbow trout	20050	4.3
1992	Arlee rainbow trout	21026	4.0
1993	Arlee and Kamloops rainbow trout	21050	4.0 – 6.5

1994	Arlee and Kamloops rainbow trout	11273	4.0 – 6.7
1995	Arlee and Kamloops rainbow trout	11118	2.4 – 7.0
1996	Arlee and Kamloops rainbow trout	8632	2.4 – 7.0
1997	Arlee rainbow trout	18015	6.0

We measured angling success at Tetrault Lake from warden creel surveys collected periodically. Information from the surveys indicated that fishing was excellent at Tetrault Lake. A composite of 59 anglers creeled in spring and winter of 1967 showed that 133 trout were captured in 111 hours of angling effort (1.2 fish/hour). A survey of 10 anglers in spring 1974 showed a catch rate of .78 trout per hour and 2.8 trout per angler. The lengths of trout caught ranged from 11 inches to 17 inches.

Sometime between 1975 and 1979 largemouth bass (*Micropterus salmoides*) were illegally introduced into Tetrault Lake and in or around 1982 bluegill sunfish (*Lepomis macrochirus*) were also introduced. By 1989 warm water species dominated the lake. We gillnetted the lake in 1997 and captured northern pike (*Esox lucius*) in addition to the bluegills and largemouth bass. Both bluegill and bass populations became stunted (6 inch bass were 6 years old). The fishery was reduced to mostly spring bass angling and although MFWP continued to stock trout, they were rarely caught.

The majority of public sentiment was for returning Tetrault Lake to a trout fishery so in fall 1998 MFWP chemically rehabilitated Tetrault Lake with 1830 gallons of Rotenone. We felt that it was important to establish a catchable trout fishery in the lake as soon as possible to keep the angling public satisfied and reduce the likelihood of illegal introductions. In early spring 1999 we stocked retired rainbow trout cutthroat trout brood into the lake. We also established a yearly stocking rate of 85 fingerling (2 – 4 inches) arlee rainbow trout per acre and 43 fingerling (1.5 – 3 inches) westslope cutthroat as well as up to 4,000 unallocated larger fish.

Anglers reported that fishing in Tetrault Lake was excellent in the fall of 1999 and so far in spring 2,000. There was an unconfirmed report that small mouth bass (*Micropterus dolomieu*) were seen in the lake and one captured. We will monitor the lake to determine the success of this project.

Bootjack Lake/Topless Lake/Cibid Lake

Bootjack, Topless and Cibid Lakes are small, closed-basin lakes, 45 miles south of Libby, MT. The maximum depth of Bootjack Lake is 41 feet and surface area is 10 acres. Topless lake is 24 feet deep and has a surface area of 15 acres of which 8 acres are suitable for trout. Cibid Lake is largest (11 acres) and deepest (60) of the three lakes. Historic game warden creel surveys indicate that all three lakes produced quality summer/winter put-grow-and-take trout fisheries with catch rates greater than 1.0 per hour and sizes ranging from 12 inches to 20 inches. Since 1970, all three lakes had been stocked with arlee rainbow trout or westslope cutthroat trout depending on availability at approximately 200 fish per acre. We stocked the lakes on a two-year rotation to maximize growth.

By 1980 all three lakes had been illegally stocked with non-game fish (Bootjack Lake: pumpkinseeds and yellow perch; Topless Lake: pumpkinseeds, yellow perch and black bullheads; Cibid Lake: pumpkinseeds, largemouth bass and yellow perch). By 1995 angling success in the lakes had declined dramatically. Public sentiment as expressed through the Thompson Chain of Lakes Fisheries Management Plan (MFWP, 1997) was to re-gain the trout

fishing in the lakes. In 1997 MFWP chemically rehabilitated all three lakes with rotenone. Subsequent netting in 1998 indicated that the rehabilitation was successful.

The lakes are now stocked every year with arlee rainbow trout and westslope cutthroat trout rotated yearly to provide increased and diverse fishing opportunity throughout the year (Table X.)

Table X. Stocking schedule for Bootjack Lake, Topless Lake and Cibid Lake, Montana for 1998 – 2003.

Lake	1998	1999	2000	2001	2002	2003
Bootjack Lake	A001[a] (227/acre)	M012 (91/acre)	A001 (227/acre)	M012 (91/acre)	A001 (227/acre)	M012 (91/acre)
Topless Lake	M012 [b] (182/acre)	A001 (182/acre)	M012 (182/acre)	A001 (182/acre)	M012 (182/acre)	A001 (182/acre)
Cibid lake	A001 (125/acre)	M012 (63/acre)	A001 (125/acre)	M012 (63/acre)	A001 (125/acre)	M012 (63/acre)

[a] A001 = Arlee rainbow trout [b] M012 = westslope cutthroat trout

Anecdotal creel surveys and angler reports indicate that fishing at the lakes is exceptional and anglers are catching 14 inch to 16 inch trout in 1999. We will continue to monitor the effectiveness of this stocking scenario.

Kokanee Lakes

Montana Fish, Wildlife and Parks personnel continued to monitor total length of mature spawning kokanee from lakes in the Kootenai drainage to assess stocking success. A summary of mean lengths for males and females is presented in Table E. There is evidence from historic stocking records and personal observations that all these lakes support at least some natural reproduction. Beginning in 1994, MFWP fed kokanee tetracycline laced feed to lay a mark in bony structures. We remove the atlas and several additional vertebrae from netted kokanee. The vertebra are cleaned and placed under ultra violet light to identify fluoresced bone. The purpose of this strategy was to assess the contribution of hatchery reared kokanee to the lakes.

Unfortunately, we have had no success with identifying the tetracycline marks from kokanee captured at any of the lakes. The marks are checked periodically in the kokanee at the hatchery prior to release. There are three possible reasons for this outcome: 1) the marks are not strong enough to be seen in adults three years after the marking; 2) kokanee are stocked into the lakes at a small enough size that there is not enough pigmentation in the skin to keep sunlight from destroying the mark; 3) we captured the progeny of kokanee that spawned in the lakes. We are working with the hatchery system to treat eyed eggs with alternating cold and warm water to create unique daily growth rings on the otoliths in 2001. We have had some success with this technique with westslope cutthroat trout.

Table E. Mean length of spawning kokanee salmon collected from lakes in Region 1, 1995 – 1996

			Males		Females		
Lake (water code)	**Date**	**Surface Area**	**Mean Length (mm)**	**Range (mm)**	**Mean Length (mm)**	**Range (mm)**	**Number kokanee stocked**
Bull Lake	10/30/95	1250	399	376-426	377	367-386	100,000
(11-8040)	10/24/96		378	345-405	358	345-371	100,000
	9/30/98		350	331-396	334	315-368	100,000
	10/12/99		369	336-395	351	321-380	100,000
Crystal Lake	10/20/95	178	383	342-473	423	322-454	50,000
(11-8180)	10/1/96		403	383-423	383	349-475	50,000
	9/15/97		311	233-330	296	235-333	50,000
	9/28/98		334	305-367	323	290-352	50,000
			430	400-450	410	405-414	
	10/4/99		313	290-363	306	276-345	50,000
			443	405-472	395	386-405	
Dickey Lake	10/19/95	625	282	253-306	265	251-302	30,000
(11-8220)	10/4/96		254	231-266	249	238-260	30,000
	9/29/98		222	205-238	211	206-215	25,000
Glen Lake	10/19/95	340	326	320-332	316	305-327	50,000
(11-8380)	10/4/96		387	356-404	367	335-387	50,000
	9/29/98		349	269-479	359	263-455	50,000
Spar Lake	10/30/95	602	431	386-476			100,000
(11-9640)	11/28/96		403	340-440	399	282-399	100,000
	10/7/98		296	290-301	296		100,000
Middle Thompson lake	10/25/95	600	463	411-558	414	386-514	*
(05-9232)	10/1/96		470	420-530	450	411-495	
	9/15/97		427	415-445	400	385-436	
	9/28/98		388	260-465	387	340-435	
	10/4/99		420	350-485	397	330-426	

* No kokanee were stocked in Middle Thompson Lake, although, 100,000 are stocked in Lower Thompson Lake annually. Lower Thompson Lake is connected to Middle Thompson Lake via a shallow channel.

RECOMMENDATIONS

Recommendations for work items in fiscal year 2001 are listed below

1) Continue to survey small lakes within Region one as the need and opportunity arises
2) Continue to monitor kokanee populations in Region one lakes every one to four years to detect population changes.
3) Establish isolation facility at Libby Field Station for Columbia Basin redband trout.