SC795

Gilmore Lake

AN INVENTORY OF GILMORE LAKE AND ITS OUTLET AND INLET STREAMS

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October 1993

1.0 SUMMARY

Gilmore Lake, its only inlet, and its only outlet were surveyed for description of present conditions and possibilities of habitat enhancement for support of rainbow trout. Some ideal rainbow trout spawning habitat was discovered at the Gilmore Lake outlet stream, although it appeared inaccessable to fish at this time of survey. Other suitable habitat may occur at regions well above the beaver dam at the inlet stream. Also, the gill net setting (22 hours) caught only two size classes of rainbow trout (12 cm and 45 cm) which indicates some instability of annual recruitment. However, the respectable length and relative weight of captured rainbow trout implies that the presently low competition is complementary to the sport fishery. It appears that limited recruitment at this lake is assisting in the generation of a desirable stock of rainbow trout. Habitat enhancement of spawning sites for rainbow trout of Gilmore Lake may increase the stability and productivity of recruitment, but will also likely have a negative effect on the quality and desire for this presently attractive fish stock.

2.0 INTRODUCTION

Gilmore Lake was surveyed as part of the Burns Lake-Houston small lakes project in which a total of 10 lakes were examined. All of the lakes historically supported rainbow trout sport fisheries, but the fishery has declined over the last five to ten years. This decline has primarily been attributed to poor recruitment of rainbows due to a lack of suitable and accessible spawning habitat. This small lakes project was concerned with the evaluation of rainbow trout spawning habitat for these lakes to give recommendations for possible enhancements of rainbow spawning sites.

3.0 MATERIALS AND METHODS

3.1 Study site

Gilmore Lake (lat:54°20′, long:127°20′) is situated 9.5 km southwest of Topley and is only accessible by 4WD (for directions see Appendix 1). There are no provisions for campsites and there is no boat launch. A meadow at the North East shore (near the outlet) of the lake can be used as a launching area. There are no residences or cabins on the lake shore. Some of the shoreline of the lake appears to be used for cattle grazing. There are no previous surveys on file for this lake.

Gilmore Lake has one inlet and one outlet (Figure 1). The inlet enters Gilmore Lake on the South West shore of the lake. Gilmore Lake drains into Sunset Lake (also surveyed in this project) via a 1400 m long outlet stream on the East side of Gilmore Lake. Sunset Lake in turn drains into the Bulkley River.

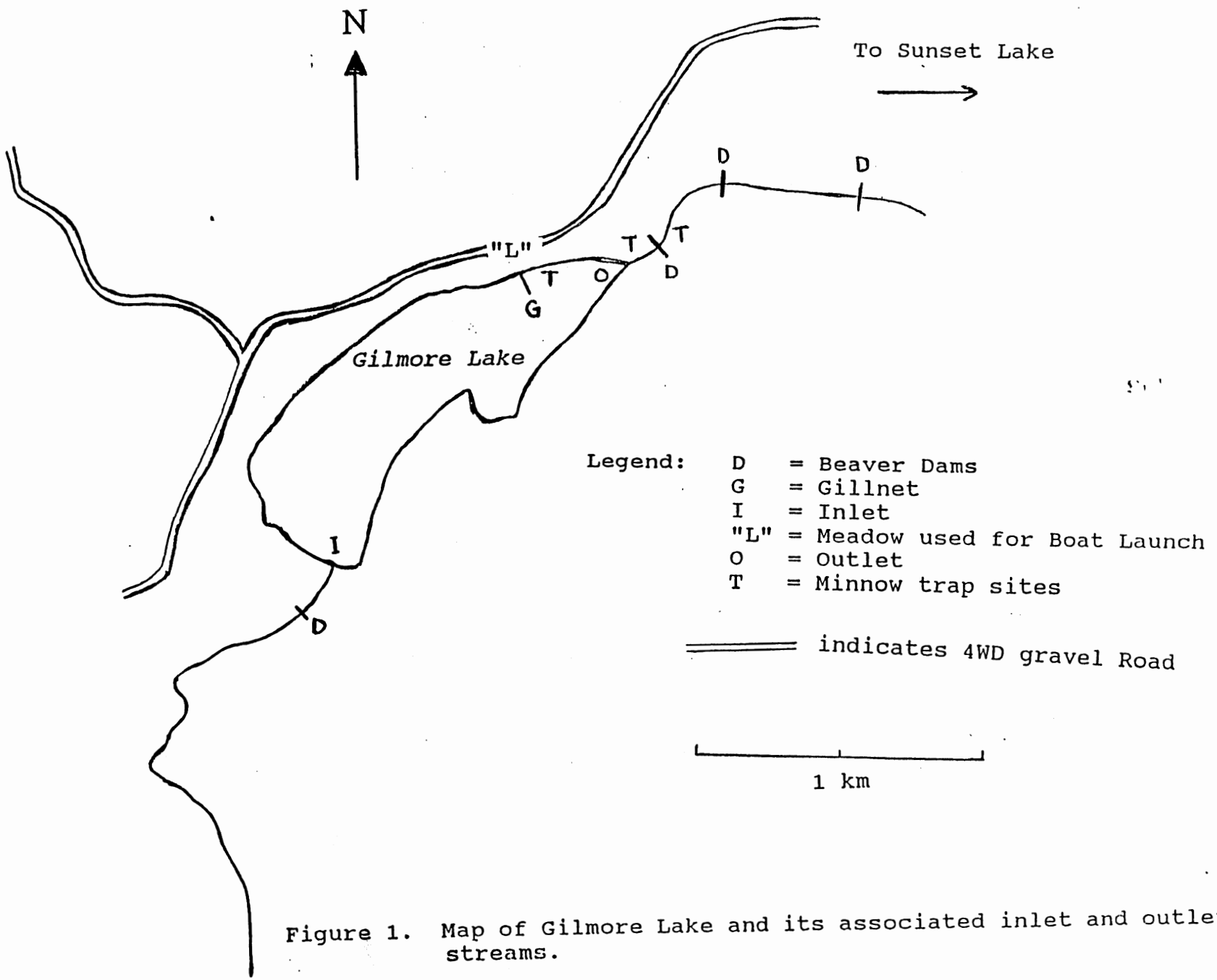

Figure 1. Map of Gilmore Lake and its associated inlet and outlet streams.

3.2 Evaluation of inlets and outlet

The inlet and outlet were surveyed by visual observations while walking along the streams for as far as seemed necessary for the purpose of this project. Photographs were taken to represent general characteristics of the streams and to illustrate any obstructions to migration. The streams were sampled for the presence of small fish (25 - 100 mm) by minnow trapping (baited with cheese) where appropriate. Fish captured in the minnow traps were measured to the nearest mm and released.

3.3 Evaluation of lake

Photographs of the lake were taken to indicate the general characteristics of the lake. Visual observations were made on the lake, and minnow traps (baited with cheese) were set in the lake to evaluate the presence of any small fish. Fish captured in the traps were measured to the nearest mm. A 30 m gill net was also set in the lake to examine the presence of any larger fish, including adult rainbows; the gill net consisted of two 15 m sections with different mesh sizes (3 cm and 5 cm). Captured fish were measured to the nearest mm, and released when possible. Rainbow trout were also weighed, and scale samples were taken if release was not possible.

4.0 RESULTS

4.1 Gilmore Lake inlet (Fig. 2)

Gilmore inlet is a small stream. There are two beaver houses in the near vicinity of the inlet (Fig. 3). The area appears to be well used by beavers due to large numbers of well used trails and freshly cut willows and birch. The stream has little flow (one long pool) for the first 20 m and is well confined by steep banks (1 m above current water level). This section of the stream is approximately 1.5 m wide and at least 60 cm deep (Fig. 4). The water is turbid and the bottom is muddy. 20 m above the lake, the inlet stream is blocked by a beaver dam. The beaver dam is small (width = 3 m, depth = 2 m) but is presently well maintained (Fig. 5). The pool immediately above the dam is *ca.* 4 m wide, 5 m long, 1.5 m deep (max.), and is well confined by well defined banks (0.5 - 1.0 m above water level). The banks are also lined by tall grasses and willows on both sides of the stream, providing good cover (40%). The dam appears to back up water for at least 100 m (no flow). Most trees within 30 m of this lower stretch of the inlet stream are dead. Two deep arms of still water meet with the pool above the dam. The arms are *ca.* 1 m wide and 50 cm deep. No traps were set in this inlet due to the lack of signs of fish and because the dam appeared to be impassable for fish. Both below and for 100 m above the dam, the stream substrate appeared inadequate for rainbow trout spawning habitat.

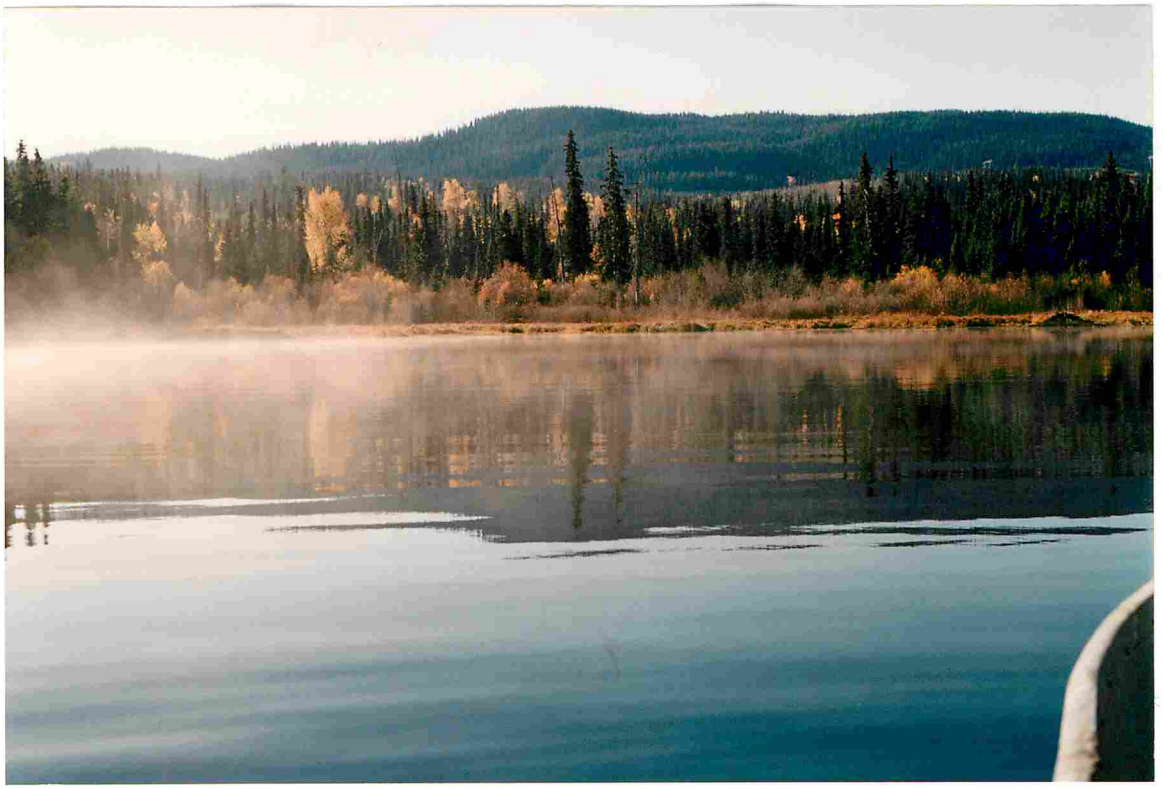

Figure 2. The Gilmore Lake Inlet.

Figure 3. One of two beaver houses near Gilmore Lake inlet.

Figure 4. (above) Narrow inlet stream to Gilmore Lake.

Figure 5. (left) Beaver dam on inlet stream approx. 20 m from lake.

4.2 Gilmore Lake outlet (Fig. 6)

The only outlet of Gilmore Lake is located on the east side of the lake. The outlet stream ranges from 4 - 6 m wide, with no flow at the time of survey (Fig. 7). The substrate is very muddy and the surrounding shoreline is marshy. The stream is not confined and the flood plain extends for 15 - 20 m on either side of the stream. Vegetation around the outlet stream is mainly sedge grass and horsetail. The cover for this part of the stream is consequently low; woody debris gives about 5 % cover, sedges 2 %, and water lily in outlet near the lake approximately 5 %. The mean depth of this outlet stream ranges from 30 - 50 cm. This stretch of stream reaches 100 m below the lake where it forms a large pool due to a large beaver dam; the dam stretches approximately 50 m across. The dam pool is surrounded by a grassy area, and has a muddy bottom. The water here was turbid (beaver disturbance), and the pool was 20 m long, 40 m wide, and approximately 1 m deep. The dam appeared to be seasonally stable with terrestrial vegetation growing on top of it over its entire length. There were very few fresh beaver cuts visible in the area, but beaver activity was heard near this dam. Three parts of the dam allowed notable pass for water but did not appear to allow pass for fish at this time. The three leaks in the dam form three small streams with rocky (60 %) and gravel (40 %) bottoms ((Fig. 9). These streams varied in width from 1 - 2 m and consisted of a series of small pools and riffles; they ranged in depth from 2 -5 cm (riffles) to 15 - 25 cm (pools). These three streams combine 15 m below the dam to form a

single stream that flows approximately 2 km into the Sunset Lake. This part of the stream was observed for 200 m down-stream and also consisted of a series of small pools and riffles; stream width ranged from 3 - 4 m (Fig. 10). This section of stream also consists of rock (60 %) and gravel (40 %) bottom and appeared to be a suitable spawning habitat for rainbow trout.

Four minnow traps were set in this outlet stream; two below the beaver dam and two above the beaver dam. Three rainbow parr (*Oncorhynchus mykiss*), one lake chub (*Couesius plumbeus*), and 23 longnose suckers (*Catastomus catastomus*) were caught below the dam and 76 longnose suckers and one squawfish (*Ptychocheilus oregonensis*) were caught above the dam (*see* Appendix 2 for FL). It is difficult to predict where the rainbow trout parr were from since the beaver dam above them appeared so stable and impassable.

Figure 6. Gilmore Lake Outlet.

Figure 7. Gilmore Lake outlet stream above the beaver dam.

Figure 8. Beaver dam on outlet stream, 100 m from lake.

Figure 9. One of three leaks in the beaver dam of outlet stream.

Figure 10. View of outlet stream below the stable beaver dam.

4.3 Gilmore Lake

Gilmore Lake appears to have a primarily muddy bottom. Most of the shoreline drops off gently, but there is a rock bluff on part of the south shoreline that drops off quickly. The water is stained and the lake appeared to be quite productive (lots of plankton). The shoreline is lined by about 10 m of sedges and horsetails, followed by a band of willows and then a mixed forest of spruce and birch. Some of the shore is used by cattle (near the outlet), and the lake is probably used as a watering hole by these animals.

The gillnet was set on the north shore of the lake at the meadow which served as a boat launch. The small mesh size of the net was set nearest shore; the net was set for 22 hours. The total catch consisted of 5 rainbows (*O. mykiss*), 33 squawfish (*P. oregonensis*), 17 lake chub (*C. plumbeus*), 1 redside shiner (*Richardsonius balteatus*), 26 large scale suckers (*C. macrocheilus*), and 63 longnose suckers (*C. catastomus*) (Appendix 3). Four minnow traps were set among and near the shoreline sedge grass near where the gillnet was set; 6 longnose suckers were the only fish caught in these traps (Appendix 3).

5.0 DISCUSSION

The rainbow trout from the gill net in Gilmore Lake were notably larger with a deeper body form than those in the adjacent Sunset Lake. Two size classes were caught in the gill net and larger rainbows were observed jumping in the lake on two separate occassions. The accessability of suitable spawning habitat appears

to be a problem but the low recruitment and resultant low intraspecific competition may be responsible for the larger size and good condition of Gilmore Lake rainbow trout. Recruitment appears to be more consistent than at Sunset Lake as indicated by the presence of at least two size classes of rainbows; samples at Sunset Lake only found one size class with two gillnet settings. However, recruitment at Gilmore Lake appears to be sporadic since the two size classes were strikingly different lengths, and because more of the larger size class was captured in the gill net sample. If this is indicative of the size distribution of rainbows in Gilmore Lake, it indicates that rainbow trout recruitment is unstable. The absence of intermediate size classes also suggests this to be the case.

In terms of enhancement, possibilities appear to be low and maybe unnecessary. Beavers form the primary problem here and the removal of dams would probably prove futile; heavy trapping may be the only solution. However, alteration of the dam at the Gilmore Lake outlet may prove feasable; this dam is accessable and may possibly be enhanced with public envolvement. Enhancing the inlet stream is not recommended since removal of the dam would be difficult due to difficult accessability and unsuitable habitat above the existing beaver dam. However, Gilmore Lake is not readily accessable (four wheel drive in dry conditions) and provisions for campers/boaters are not presently made. Also, it should seriously be considered whether enhancing this lake may effect the size and quality of rainbow trout that this lake is

presently producing. Gilmore Lake has a reasonably easy hiking access (60 minutes from the Sunset Lake campground) which may already be allowing an appropriately low fishing pressure on its existing stock.

6.0 RECOMMENDATIONS

1. It will be useful to monitor the Gilmore Lake inlet and outlet streams for spawning by rainbow trout in the spring of 1994. It will be interesting and helpful to better understand how the rainbow trout in this lake are maintaining sufficient recruitment. Since both streams were surveyed at very low water levels, it is difficult to predict to what extent the streams are accessable/usable to rainbow trout of Gilmore Lake.

2. It may be important to monitor the fishing pressure (hours) on this lake to better predict the future outcomes and reasons for change of this presently useful stock of rainbow trout.

3. Over-enhancement of present spawning sites is not recommended due to possibly detrimental effects on the respectable sized rainbow trout that are presently found in this lake.

APPENDIX 1: DIRECTIONS TO GILMORE LAKE

Turn left off of highway 16 at Topley, and follow the Topley Rd. South across the Bulkley River. The road goes up a steep hill after the bridge, and turns into a gravel road 2 km from the highway. After another 3.9 km on the gravel section of this road, turn right on Strimbold road (there should be a sign directing you to Sunset Lake here). Continue on this road for about 1 km to the Sunset Lake camp ground and launch area. Sunset Lake is on your left. A very rough road turns to the right, off the road to the launch area approximately 500 m before the boat launch. Turn right on this road and follow it to Gilmore lake. There are two cattle fences across the road, and fences run along the road for part of the way. Sunset Lake and the inlet to Sunset Lake / outlet from Gillmore lake is visible from the road for most of the drive. The cattle fence running along the road to Gilmore lake discontinues just before the lake, and it is possible to drive through the grass with sparse birch all the way to the lake at this point. The distance between the turn off from the Sunset boat launch to Gilmore lake is a good 5 km.

Figure 11. Good example of road conditions between Sunset Lake Campground and Gilmore Lake launch area.

APPENDIX 2: FORK LENGTHS OF FISH CAUGHT IN THE OUTLET

Gilmore Lake outlet

Number of Traps set: 4
Date set: Oct. 6 1993 Date retrieved: Oct. 7 1993
Time set: 13:00 Time retrieved: 13:30

Fork Length (mm)						
rainbow parr	lake chub	squawfish	longnose sucker[a]			
103	42	128*	87	68	66*	61*
94			52	52	98*	84*
89			46	64	112*	51*
			67	52	93*	71*
			69	49	96*	72*
			57	64	102*	67*
			61	53	101*	108*
			60	52	110*	92*
			62	49	67*	103*
			49	46	109*	102*
			51	59	132*	89*
			59	97*	52*	63*

a = There were 51 more longnose suckers caught in the traps above the beaver dam which were not measured.
* = indicates fish caught in traps upstream of beaver dam

APPENDIX 3: FORK LENGTHS OF FISH CAUGHT IN GILMORE LAKE

Gillnet sample

Length of net: 30 m Mesh size: 3 cm (shore), 5 cm (off shore)
Date set: Oct. 7, 1993 Date retrieved: Oct. 8, 1993
Time set: 12:00 Time retrieved: 9:45

Fork Length (mm)								
[a] RBT	Squawfish		RSS	LSS	LNS			LC
401	242	220*	114	129*	218	274	230	141*
468	227	220*		118*	242	250	234	140*
451	221	120*	LSS	178*	253	249	248	118*
121*	283	132*	221	138*	243	231	220	166*
479	237	120*	212	132*	212	292	143*	148*
	215	116*	212	123*	236	258	117*	151*
	243	120*	209	117*	258	236	122*	167*
	262	124*	120*	121*	228	222	118*	190*
	212	132*	116*		237	231	110*	185*
	222	220*	114*		199	244	114*	122*
	210	132*	117*		236	227	120*	180*
	241	120*	126*		239	250	110*	174*
	244	222*	123*		244	296	107*	183*
	210	121*	132*		231	263	120*	190*
	231	126*	124*		225	239	110*	140*
	242	173*	120*		208	314	107*	136*
		127*	212*		261	220	120*	130*
			118*		230	260	118*	
			131*		287	238	116*	
			163*		282	228	118*	
			126*		307	332	175*	

a: Abbreviations of species are: RBT= rainbow trout; LC = lake chub; LSS = large scale sucker; LNS = longnose sucker; RSS = redside shiner.
*: indicate fish caught in small mesh of gillnet.

APPENDIX 3 (cont.) : FORK LENGTHS OF FISH CAUGHT IN GILMORE LAKE

Gillnet sample (cont.)

Fork Length (mm) and Weight (g) of Rainbow Trout*					
Fish #	**F.L.**	**Weight**	**Fish #**	**F.L.**	**Weight**
1	450	1200	3	468	1260
2	401	900	4	479	1250

* these are the same fish as were recorded in the previous table for the Gillnet sample of Oct 5/6 1993.

Minnow Trap lake sample

Number of Traps set: 4
Date set: Oct. 5 1993 Date retrieved: Oct. 6 1993
Time set: 16:30 Time retrieved: 11:50

Fork Length (mm)			
Longnose suckers			
91	62	73	68
54	70		