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BURNS LAKE REGION: RAINBOW
TROUT SAMPLING "SUMMARY
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**Burns Lake Region:
Rainbow Trout Sampling
"Summary Report"**

By

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SUMMARY

Ten small lakes between Burns Lake and Houston, British Columbia (Bulkley River headwaters) were surveyed: Bulkley Lake, Watson Lake, Day Lake, Elwin Lake, Gilmore Lake, Sunset Lake, Swans Lake, Lars Lake, Old Man Lake, and one unnamed lake. The objectives were to provide useful information on existing freshwater habitats and fish communities, and to define possibilities or necessities for enhancement at these ten lakes.

Beaver dams appeared to be the primary cause for the varying rainbow trout recruitment at the ten lakes surveyed. Recommendations for dealing with beaver activity include new experimental designs for potentially permanent or long term solutions to this impact on rainbow trout stocks. Previous logging activities have also had negative impacts on some lakes, and their inlet and outlet streams. Other recommendations are for the maintenance of available spawning habitat at these lakes, with requests for immediate rehabilitation at certain locations.

The three recommendations of highest priority were:

1. Installation of a culvert or bridge for the road crossing at the Lars Lake inlet stream is the most important recommendation in this report. Ministry of Forests should be notified and the site should be inspected when habitat rehabilitation is completed. In addition, it is recommended that fast growing riparian vegetation (willows, alder) be planted along stream banks above this road crossing where there is currently a lack of vegetation.

2. It is suggested that the beaver dam on the outlet creek from Day Lake be removed. This outlet creek drains into Elwin Lake, but is dammed in several locations. Removal of the large dam at the Day Lake outlet should clear the stream from other downstream dams. Due to the adequate gradient and good water flow in this stream, it appears that rebuilding of dams will take time. It is recommended that this project be performed on trial basis, to discover its efficiency and effectiveness toward increasing trout recruitment at these two lakes.

3. There is a necessity for an attempt to mitigate the effects of beavers on rainbow trout at Sunset Lake. This lake has easy road access, is frequently used for recreational activities, and has possibilities for local volunteer projects. Complete removal of the beaver dam at the outlet to Sunset Lake does not appear to be practical. However, this site presents the opportunity to test alteration of the existing dam in attempt to allow fish passage. The installation of a long culvert through this dam may be feasible with community assistance.

All recommendations listed in this report will be considered and dealt with in order of priority and finance. It is suggested that future enhancement opportunities identified in this report be re-evaluated in the spring (1994), when discharges are higher. In all cases, it may be necessary to better define the present use of spawning habitat and existing recruitment before increasing the existing rainbow trout density of a specific lake.

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1.0 INTRODUCTION

Reports have recently been made of serious declines of the rainbow trout sport fishery in several small lakes in the Bulkley Region. These declines are thought to result from low and inconsistent recruitment. Gilmore, Sunset, Lars, Old Man, Elwin, Watson, Day, and Bulkley lakes and one unnamed lake were selected for assessment of their relative species compositions and present availability of spawning habitats. It is believed that increased beaver density in the area of these ten lakes is the primary cause of what has been reported as low rainbow recruitment in this area. Because these lakes are small, and inlet and outlet streams are shallow with low gradients, annual recruitment is largely threatened by beaver activity. However, removal of actively maintained beaver dams is not the solution to increasing spawning habitat as dams are frequently reconstructed within months. Removal of natural log jams, and mitigation of logging impediments are the more feasible types of requests for enhancement work in this area.

The primary objectives at each of the ten lakes of this study were:

1. to document fish inventory and the necessity for spawning habitat,
2. to identify the locations of available spawning habitat,
3. to evaluate the quantity of usable spawning habitat,
4. to identify the problems which may reduce rainbow trout recruitment,
5. to recommend necessities and possibilities for rainbow trout enhancement.

2.0 MATERIALS AND METHODS

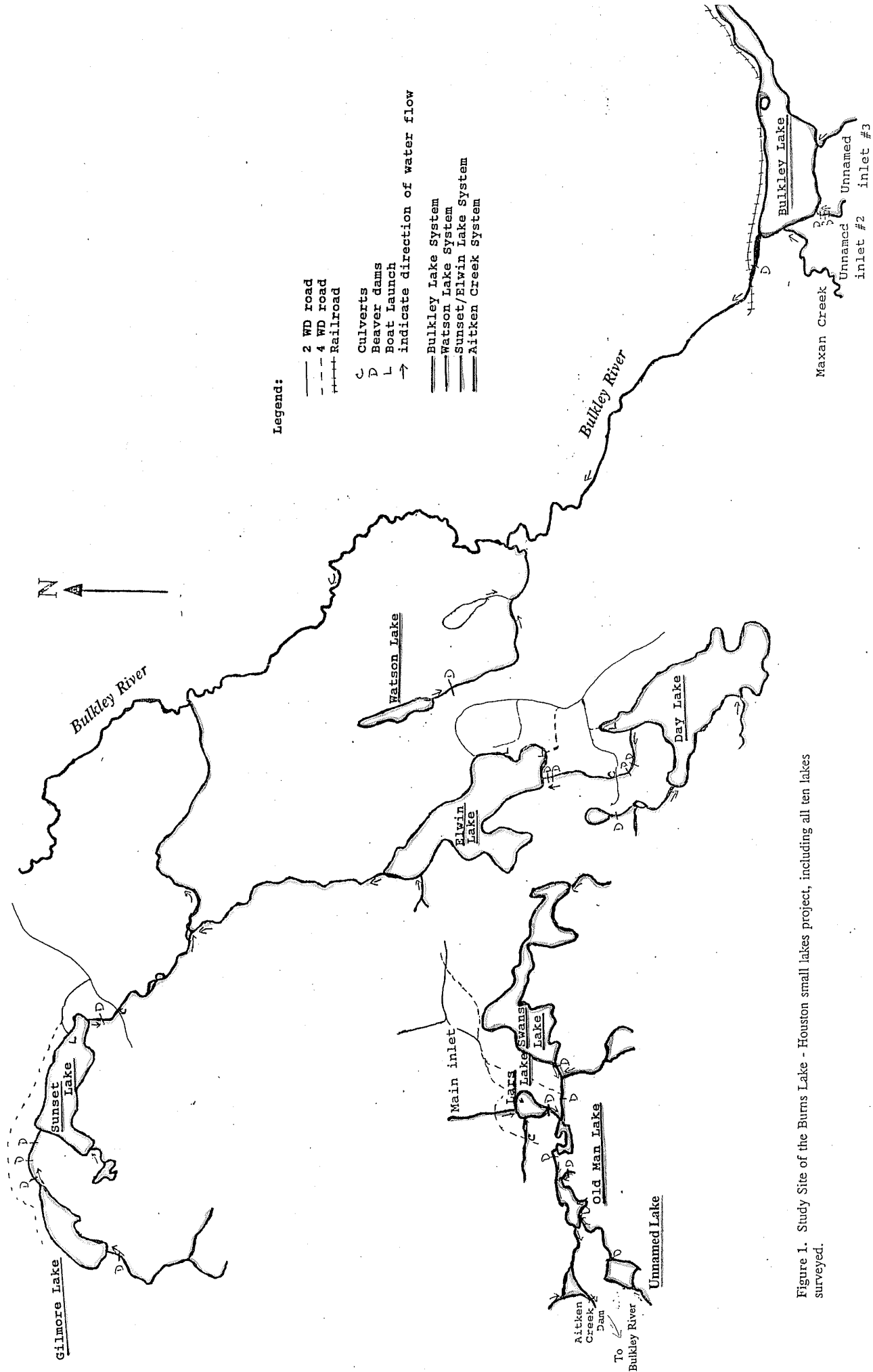
2.1 STUDY SITE

All ten lakes surveyed for this project are located between Burns Lake and Houston within 20 km² south of Highway 16, and most have access for 2WD vehicles. The area consists primarily of rolling hills, with a mixed forest of spruce, birch, aspen and cottonwood. Much of the area has been clear cut and replanted, although many of the plots are not replanted satisfactorily. Wildlife is still common. During the survey blackbear, deer, beavers and several bald eagles were seen. Signs of wolves, moose and porcupine were also noted. The area is presently used for both hunting and fishing.

The ten lakes surveyed are divided into four groups, based on their drainage patterns. Bulkley Lake drains into the Bulkley River and is referred to in the Bulkley Lake system for this report. Watson Lake flows into the Bulkley River and is referred to as the Watson Lake system. Gilmore, Sunset, Elwin and Day Lakes drain into the Bulkley River via the Sunset Lake and Elwin Lake outlet streams, which join about 5 km above the Bulkley River (Fig. 1). These four lakes are collectively referred to as the Sunset/Elwin Lake system. Swans, Lars, Old Man Lakes and the unnamed lake drain into Aitken Creek (Fig. 1) which joins the Bulkley River near Houston. Lakes draining into Aitken Creek are included in the Aitken Creek System.

2.2 Lake Sampling

The ten lakes and their associated inlet and outlet streams were surveyed between October 5th and October 24th 1993. The lakes were described either by walking along the shore or by boat where possible. Descriptions were recorded and photographs were taken to illustrate general characteristics of the lakes. Minnow traps were set in all lakes except



Legend:

- 2 WD road
- - - 4 WD road
- + + + Railroad

- C Culverts
- D Beaver dams
- L Boat launch
- indicate direction of water flow

- ==== Bulkeley Lake System
- ==== Watson Lake System
- ==== Sunset/Elwin Lake System
- ==== Aitken Creek System

Figure 1. Study Site of the Burns Lake - Houston small lakes project, including all ten lakes surveyed.

Bulkley and Old Man lakes. Fish captured in the minnow traps were identified, measured and released. A 30 m gill net was set in lakes where boat launching was possible (Gilmore, Sunset, Swans, Elwin, Day and Bulkley Lake). Fish caught in the gill net were identified, measured and released when possible. Rainbow trout sampled with the gill net were also weighed when release was not possible.

2.3 Stream Sampling

The inlets and outlets of the lakes were surveyed by visual observation 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 fish migration. Substrate type and cover were recorded, and available spawning and rearing habitats were identified by visual observations. Streams were sampled for any small fish by minnow trapping, except where streams were obviously unsuitable or inaccessible by rainbow trout. Fish captured in the traps were identified, measured to the nearest millimetre and released.

3.0 RESULTS AND DISCUSSION

3.1 BULKLEY SYSTEM

3.1.1 Bulkley Lake

Bulkley Lake was one of the largest lakes surveyed during this project. It was accessible through private property, but no public access was presently available. Maxan Creek, and both the Upper Bulkley and Bulkley rivers offered good rainbow trout spawning and rearing habitat. However, it is not known whether Bulkley Lake rainbow trout are able to access spawning habitat in the Upper Bulkley River. Two distinct size classes of rainbow

trout were present in the gill net sample at Bulkley Lake and parr were found in Maxan Creek, indicating relatively stable recruitment. The mountain whitefish stock in this lake appears to be healthy, since there were three distinct size classes in the gill net sample. Maxan Creek was the prime spawning habitat for salmonids from Bulkley Lake, and does not require habitat enhancement. Only private access is present at this lake, and any enhancement would therefore only benefit residents of the lake and not the general sport fishing community.

3.2. WATSON SYSTEM

3.2.1 Watson Lake

No rainbow trout, or other fish, were caught at Watson Lake. It is not certain that Watson Lake contains no fish, since no gill net was set at the lake. Other sampling methods such as electro-fishing or gill netting are necessary to acquire more accurate assessment of this lake's fish community. The beaver dam at the only stream of Watson Lake was impassable to fish at the time of survey, and there was no suitable rainbow trout spawning habitat upstream. It appears that Watson Lake is not an ideal location for a self-sustaining stock of rainbow trout.

3.3 ELWIN/SUNSET SYSTEM

3.3.1 Day Lake

The low number of fish caught in the gill net at Day Lake is unusual. This catch was the smallest of any lake in which the gill net was set. The low number of fish in the net could be due to the location of setting (near the boat launch), rather than a low abundance of fish in the lake. The gill net sample did catch one adult rainbow trout. However, it is unclear what the present state of recruitment is in Day Lake.

The inlets surveyed at this lake did not present any opportunities for enhancement at this time. The outlet is presently being used by rainbow trout for rearing as was indicated by the catch of rainbow parr. Since it was not possible to assess whether beaver dams in this stream near Elwin Lake and Day Lake are passable in higher flows, a re-examination of this stream during spring floods will be beneficial. In addition, previous logging practices appear to have left this stream vulnerable to siltation and predation. Riparian restoration should lead to a long term improvement in the quality of spawning and rearing habitat in the Day Lake outlet stream.

3.3.2 Elwin Lake

The presence of only one size class of rainbow trout in the gill net sample obtained at Elwin Lake indicates sporadic recruitment at this lake. The impassable beaver dams at the inlet to Elwin Lake presently prevents access to some suitable spawning and rearing habitat. No suitable rainbow trout habitat was found in the outlet stream. However, the number of rainbow trout caught at this location was substantially higher than those caught in a previous survey by Coombes and Jesson (1982, on File). The sport fishery presently applies little pressure to Elwin Lake which is generally considered to be unproductive for game fish (Hodder, pers. com.). However, Elwin Lake is readily accessible, and launching of a boat is possible. To improve annual recruitment of rainbow trout at this lake, it may be necessary to continually remove beaver dams and/or beavers from this area. This would be costly, time consuming and presently impractical.

3.3.3 Gilmore Lake

Gilmore Lake contained the largest rainbow trout caught by gill netting in the ten lakes. Inconsistent recruitment, due to inaccessible spawning habitat (beaver dams),

appeared to be a problem at this lake. This reduction in intra-specific competition may contribute to the better condition of rainbow trout at this lake. The presence of two size classes in the gill net sample indicated that recruitment is more consistent than at some of the other lakes. It will be difficult to control beaver activity due to the limited and difficult access to Gilmore Lake. It should be seriously considered whether enhancement of rainbow trout recruitment would jeopardize the size of the rainbows in this lake. The limited access to this lake, and lack of camping facilities, ensures a relatively low fishing pressure that is unlikely to threaten this stock at this time.

3.3.4 Sunset Lake

The lack of more than one size class of rainbow trout in the gill net sample of Sunset Lake, indicates that recruitment is inconsistent. Spawning habitat in the inlet to Sunset Lake is accessible to rainbow trout, and it would be useful to examine whether this stream is utilized by rainbow trout, since no parr were captured at this location. The prime spawning areas for rainbow trout appear to be located in the outlet of Sunset Lake. However, the beaver dam above the spawning habitat appeared impassable at the time of survey. The presence of rainbow parr downstream of the dam suggests that rainbow trout are able to pass the dam during spring floods. It would be of interest to establish this fact by monitoring this stream in the spring of 1994. It is possible that rainbow parr presently in the creek are unable to migrate into the lake. This would jeopardize the recruitment of rainbows into Sunset Lake. Since this stream is easily accessible for enhancement, this may be an ideal site for experiments with alterations of beaver dams (e.g. Novak *et.al.* 1987).

3.4 AITKEN CREEK SYSTEM

3.4.1 Swans Lake

The gill net sample at Swans Lake contained an overwhelming majority of rainbow trout. The presence of at least three distinct size/age classes in the catch suggests that annual recruitment in this lake is particularly stable. However, trout were notably skinny. More detailed work is required to predict the benefits of enhancement at this lake. The repeated discovery of dead suckers in May 1989 (Notes on File, Ministry of Environment, Smithers) and again in this survey, also warrants further investigation. Suitable rainbow trout rearing and spawning habitat in the outlet is presently accessible. Due to limited road access and the high abundance of rainbow trout, the Swans Lake trout stock does not appear to be threatened by overfishing. However, it is possible that the beaver dam will completely block access to spawning habitat in the near future. The beaver dam at this outlet should therefore be monitored periodically.

3.4.2 Lars Lake

The samples of rainbow trout parr at both inlet streams indicate that the rainbow trout stock in Lars Lake is self sustaining. Annual recruitment is primarily threatened by the results of a negligent clear cut operation across the main inlet stream that contains the main spawning area for Lars Lake rainbow trout. Rehabilitation and improvement of the road crossing this inlet stream, with a culvert or bridge, should be completed before the next hunting season. The culvert at the second inlet should be replaced by two larger ones to improve flow and consistency of fish passage. There is also a need for sufficient forest restocking to protect the stream from further run off and erosion. The beaver dam at the outlet of Lars Lake does not appear to threaten the rainbow trout stock.

3.4.3 Old Man Lake

Although there were no fish caught in Old Man Lake, it is not certain that there are no fish in the lake. However, it has been suggested in the past that this lake is subject to winterkills due to its shallow depth and extremely abundant growth of macrophytes (Edie, 1989. pers. com. on File). The presence of beavers do not seriously threaten rainbow trout at this lake. Although suitable spawning habitat in one of the inlet streams is presently blocked by a beaver dam, the largest inlet stream offers similar habitat and is accessible to fish. It is possible that Old Man Lake also relies on Lars Lake and Swans Lake for some of its annual recruitment. However, fisheries values at this site appear to be low.

3.4.4 Unnamed Lake

The unnamed lake (1 km south of Old Man Lake) is the most beautiful lake surveyed for this project. This lake was previously not part of the Burns Lake - Houston small lakes project, but was noted as a promising lake on our first visit to Old Man Lake. Historic fisheries values of this lake are not known. No rainbow trout were caught in this lake, and it is not known whether rainbows presently exist in the lake. There appears to be adequate spawning and rearing habitat in the inlet and outlet streams. However, the high abundance of large scale suckers in these streams caused concern. Due to the aesthetic value and the location of this unnamed lake, it will be worthwhile to complete a more detailed survey at this location.

4.0 GENERAL DISCUSSION

Only Swans Lake, Bulkley Lake and Gilmore Lake contained more than one size class in the rainbow trout caught by gill netting. Only one size class of rainbow trout was

caught at Sunset Lake, Day Lake and Elwin Lake, indicating that recruitment may be sporadic at these lakes. For lakes where the gill net was not set (Watson Lake, Lars Lake, Old Man Lake and the unnamed lake), it is more difficult to conclude whether recruitment is a problem. The absence of any fish from minnow traps in Watson or Old Man Lake, and the lack of rainbow trout in traps in the unnamed lake indicate a recruitment problem at these three locations.

Beaver dams appear to be the primary cause of poor recruitment. However, previous attempts to remove beavers and/or their dams have not been successful. Some of the streams at these lakes have road access, and it may be possible to experiment with dam alteration rather than removal. Community input and volunteer projects may aid in permitting consistent fish passage through existing beaver dams in the future.

It appears that the general ecology of this region gives the majority of small lakes marginal habitat for rainbow trout due to the very small size of creeks which are easily dammed by beavers (Figure 1). The natural distribution of beavers, coupled with the effects of past logging practices limits the success of rainbow trout stocks in the Bulkley River headwaters.

5.0 RECOMMENDATIONS

Opportunities for spawning habitat enhancement identified in this study are limited since one of the primary problems in the area is beaver activity. Recommendation from this study are listed in order of lakes, not in order of priority.

1. **Bulkley Lake.** It is recommended that Maxan Creek be surveyed annually to insure adequate conservation of the existing fish fauna in Bulkley Lake. It may be possible to receive annual, volunteer assessments of Maxan Creek if local residents (e.g. owners of the 7-S ranch) are notified of this necessity. If beaver dams are found in Maxan Creek, volunteer programs should be further organized to either remove or alter the dams to maintain suitable and accessible spawning habitats.

2. **Watson Lake.** Since no fish were caught at this location, it is difficult to suggest any enhancement strategies. It would be useful to attempt to capture fish by electro-shocking or possible setting a gill net from a canoe. It may be possible to launch a lightweight boat, such as a canoe at the lake. However, Watson Lake does not appear to require immediate attention, as it is not presently utilized by sport fishermen.

3. **Day Lake.** A revisit to the Day Lake outlet/ Elwin Lake inlet stream in the spring is recommended to establish which of these stocks has access to suitable spawning and rearing habitat in the stream.

Restoration of the riparian zone at the Day Lake outlet stream by replanting is recommended to reduce further siltation and to increase cover for this area of the stream.

4. **Elwin Lake.** It is unclear whether beaver dams at Elwin Lake inlet are passable to rainbow trout during spring floods. It is recommended that the inlet be surveyed for spawning rainbow trout in the spring to give a better indication of rainbow trout recruitment to this lake.

The inlet of this lake is accessible, and may be a site to consider for experimental alterations of beaver dams.

5. **Gilmore Lake.** It will be beneficial to monitor the Gilmore Lake inlet and outlet streams for spawning rainbow trout in the spring of 1994 to understand if and how rainbow trout are maintaining sufficient recruitment. Enhancement is presently not recommended due to our limited knowledge of possible negative effects on the respectable size of rainbow trout in this lake.

6. **Sunset Lake.** The inlet and outlet of Sunset Lake should be monitored in the spring to better evaluate its use for rainbow trout spawning and rearing.

Provisions should be made to increase water flow and allow for consistent fish passage through the dam at the outlet (e.g. Novak *et. al.* 1987).

7. **Swans Lake.** The density and condition of rainbow trout in Swans Lake is in complete contrast to those in Gilmore Lake. Gilmore Lake rainbow trout are deep bodied and heavy

in comparison to the Swans Lake rainbow trout which are notable skinny. These two lakes present a natural opportunity to examine the cause of variable physical condition of rainbow trout. Such a project would be suitable for a graduate student.

The repeated observation of mortality of suckers in this lake is disturbing and also warrants further investigation.

8. Lars Lake. It is recommended that official requests for restoration be made to the Ministry of Forests for the present environmental damage to Lars Lake and its inlet streams. Sufficient rehabilitation of the area by thoroughly replanting clear cut areas, and by placing culverts of adequate size at both inlet streams should be requested. If culverts are not provided, the logging road should be closed to prevent further 4WD access by hunters which results in increased siltation of the streams. The stream should be re-examined at the completion of the restoration and rehabilitation activities.

9. Old Man Lake. This lake should continue to be managed for its wetland habitat and wildlife value. Presently, stock or habitat enhancement for rainbow trout at this lake is not warranted.

10. Unnamed Lake. It is necessary to ascertain whether rainbow trout presently utilize this lake. This could be accomplished in the spring, during the rainbow spawning season, by walking along the inlet and outlet stream. This is a beautiful lake and is a prime candidate for future enhancement and/or conservation.

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