SKATEBOO REACH SPAWNING ENHANCEMENT PROJECT

A

TECHNICAL RLPORT

BY

RANDY PRICE

FOR

W.R. 271

APRIL 26,1985

SUMMARY

Rainbow trout require a spawning channel with a 1-2% slope and a gravel bed of 1/2-3 inch diameter gravel. The study area at Skateboo Reach at the present time is not capable of supporting suitable spawning habitat for rainbow trout. If spawning is expected to take place, then I recommend that two of these creeks, Glade and Mcphee, flowing into the Reach be developed into spawning channels to enhance the spawning potential of Skateboo Reach, thus increasing the success of the newly stocked species.

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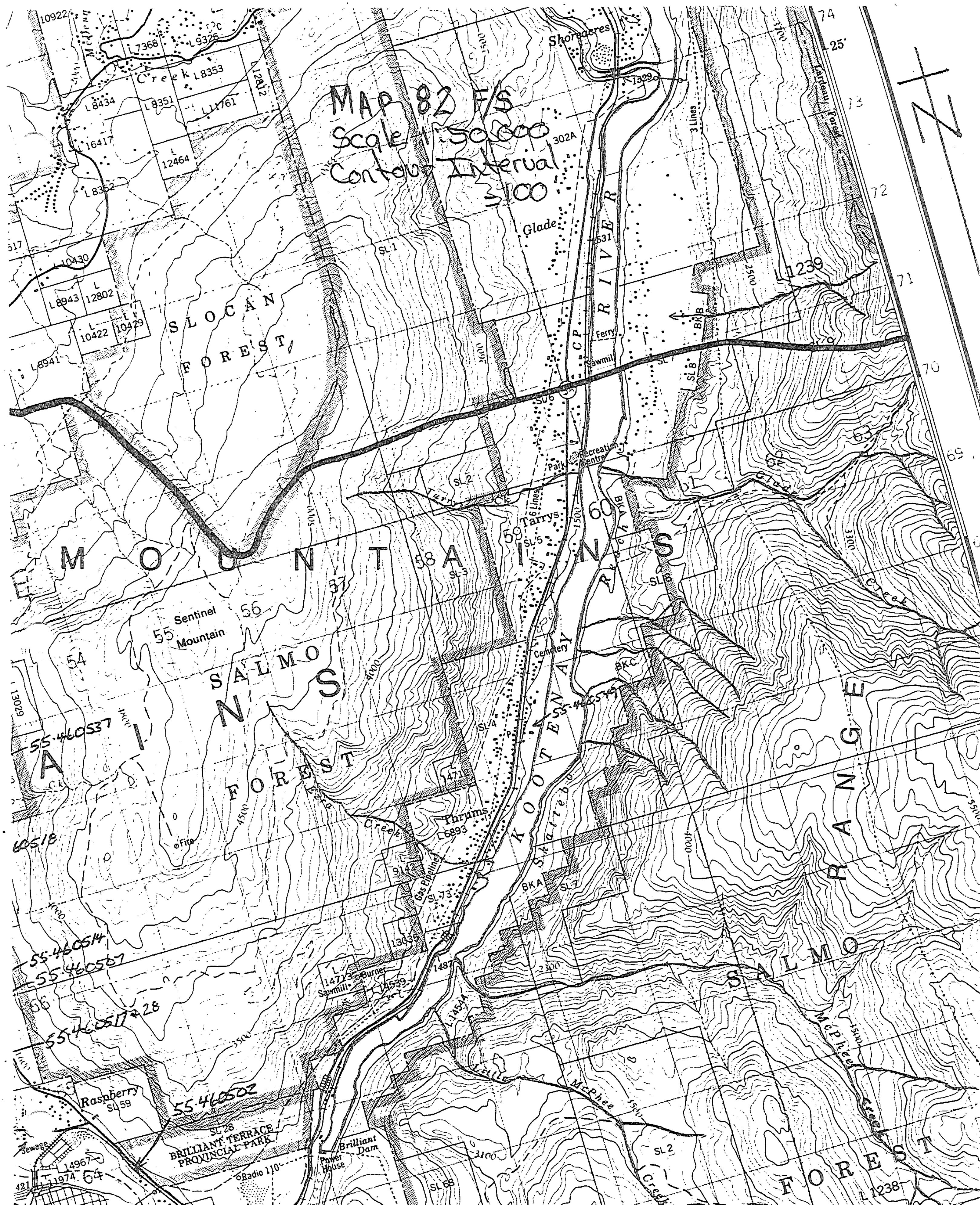
MAP 82 F/S
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SLOCAN FOREST
MOUNTAINS
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Shoreacres
Glade
Ferry
Sawmill
Park
Recreation Centre
Tarrys
Cemetery
Thrums
Gas Pipeline
Burner
Sawmill
Raspberry
BRILLIANT TERRACE PROVINCIAL PARK
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Power House
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SKATEBOO REACH SPAWNING ENHANCEMENT PROJECT

INTRODUCTION

This report is the result of my investigation of Skateboo Reach for the purpose of enhancing the spawning potential for rainbow trout. The study was commissioned by the Wildland Recreation Technology 271 instructors. Skateboo Reach was chosen as a study site for this report because the fishing oppurtunities now offered in the West Kootenays seem to be very limited unless one travels a great distance. Skateboo Reach is an easily accessible fishing area and at present is being considered for stocking. This study was to find out what the condition of the Reach is, and what could be done to allow sport fish to spawn there. This report will provide information on Skateboo Reach to the British Columbia Fish and Wildlife Branch (B.C.F.&W.B.) when they are doing future rehabilitative work in the area.

1.0 LOCATION

Skateboo Reach is located approximately five kilometers north of Castlegar towards Nelson. Skateboo Reach is the area on the Kootenay River between the Brilliant Dam and the Slocan River (see key map). It is in the Bonnington Mountain Range at an elevation of 2000 feet. Highway 3A runs parallel to the western shore of Skateboo Reach.

2.0 HISTORY

The Brilliant Dam was constructed in 1923. Ever since then, fishing throughout the Reach has declined. This was confirmed by interviewing locals in Glade and Thrums and by biologist Bob Dooley (1984).

3.0 DESCRIPTION OF AREA BORDERING REACH

The area surrounding the Reach includes highway 3A running along the west side of the river and part of the Bonnington Range on the east side. Also on the east side is a small sub-division and farming community called Glade. The spread out village of Thrums is located on the west side of the Reach. The majority of the fishermen using the Reach come from these two areas. There are also several creeks flowing into Skateboo Reach. These include Glade Creek, Mcphee Creek, Little Mcphee Creek, Ezra Creek, Tarry's Creek, and four other un-named run-off streams. These will be discussed in greater detail when the report deals with spawning potential. The Reach also provides a home for a number of different bird species. As well, there are several picnic sites and tables just off the highway for public use.

4.0 SPAWNING

The female salmonid typically spawns at the crest of the riffle, and deposits her eggs in several seperate pockets. The redd (eggs deposited) covers an area

from two or three square metres. The survival of allevin, if not scoured out or eaten by coarse fish, will depend on the velocity of the water, the dissolved oxygen level in the redd, and sufficiently large pore spaces to allow the allevin to swim up. These conditions are largely governed by the amount of fine sand and silt in the water and spawning gravel. A reasonable inter-gravel water speed is from 5-10 cm/hour, a velocity that is much lower than the above ground speed. Slope and depth of the gravel govern the interchange of water between the stream and gravel and influence the velocity of flow within the redd. In an area of increasing slope (between a pool and riffle) the water tends to move down deep into the gravel. In an area of decreasing slope the opposite happens. The water moves up from the gravel and back into free flowing sections of the stream. These factors must be considered when building the channel (see Recommendations). If the gravel size is too big, alevins may be swept away as they have no support and would waste too much energy trying to stay upright. This may also result in poor yolk conversion efficiency (stunted growth). If the gravel size is too small, the perculation is small and results in poor oxygenation causing the eggs to die, and silts may trap young fish from rising (Stream Enhancement Guide,1980).

5.0 VISITOR USE AND MARKET ANALYSIS

At present, there are very few people using the Reach. These users may include canoeists, bird watchers, picknickers (off the highway), fishermen, and hunters. I wish to change this by improving the Reach for fishing and to have an adequate supply of fish available for fishermen of the area.

6.0 REQUIREMENTS FOR TROUT SPAWNING CHANNEL

Form: Preceding initial construction of a spawning channel, the overall lay of the site may have to be modified. The slope of the spawning channel must be from 1-2%. The channel should run in regular meandering formation to make maximum use of land available. Initial channel depth should be six feet. Bottom and top width may be variable. A 25% bank slope is optimal. This will give maximum side bank strength. Even loose material should be relatively stable at such a slope. All arganic matter and top soil should be cleared from the channel bottom.

Genetic Material: After clearing of debris, an impervious layer of materials is laid down. The purpose of this layer is to prevent the passage of water which could degrade the bottom structure of the channel. The genetic makeup of this layer is well graded sand and gravel, of which between 15 and 50% will pass through a number 200 sieve. This layer

is to be no less than 12 inches deep and, before it is tamped, must be wetted to within 2% of the optimum moisture content. The moisture content must be such that the maximum compaction may be achieved. Compaction should be done with a power driven tamper capable of delivering compaction equal to that of a ten ton vibratory roller. Filter gravel is spread on the banks to a depth of at least 12 inches. No filter gravel is to be laid in the bottom of the channel. Filter gravel is laid on top of filter gravels only on the sides of the spawning channel. This 6-12 inch rock fill is spread to a depth of at least one foot. It serves the purpose of protecting the underlying layers from water erosion. The filter layer slows down running water and, to some extent, keeps it from saturating the compaction layer. Spawning gravel is spread only on the bottom of the channel, and consists of 1/4-2 inch gravel to a depth of at least 12 inches. Two inch gravel may be of use in manipulating the species which will be spawning (eg: Kokanee need a spawning gravel size of 1/4-1 1/2 inch). This will help to ensure that other species do not utilize the same spawning habitat, thus disturbing the eggs of the species that has spawned earlier. Boulders of 18 inch diameter may be placed 3 feet appart on each side

of the stream bank to cut down on the erosional speed of the water at high water. These boulders should be partially above the water line. (B.C.F.&W.B. Lindsay).

7.0 PROBALITY OF RAINBOW TROUT SPAWNING

i) Optimum water velocity is 1.4 to 1.9 feet/second. Some spawning will take place when the water velocity is between 0.5 and 3.2 feet/second. Above and below these depths, the use-quotient approaches zero.

ii) Optimum water depth for spawning trout is 0.8 feet. Spawning will take place from depths of 0.25 feet to 3.2 feet. At other depths, trout are unlikely to spawn.

iii) Prime substrate for trout spawning is 5 on the probability curve. Gravel is the optimum substrate for spawning. Some spawning will take place in any substrate from sand to rubble. Success in such conditions will, however, be limited as eggs will be silted over or swept away. Substrate refers to the form of base material (eg:1-plant detritus 2-mud 3-silt 4-sand 5-gravel etc).

iv)The optimum temperature at which trout will spawn is 52 degrees farenheit. Trout spawning will take place from 42-60°F.

By developing the channel for use strictly by rainbow trout, survival of offspring and eggs should be as high as is possible(Bovee and Coshnaur,1977).

RAINBOW TROUT

11110 SPAWNING 78/01/24.

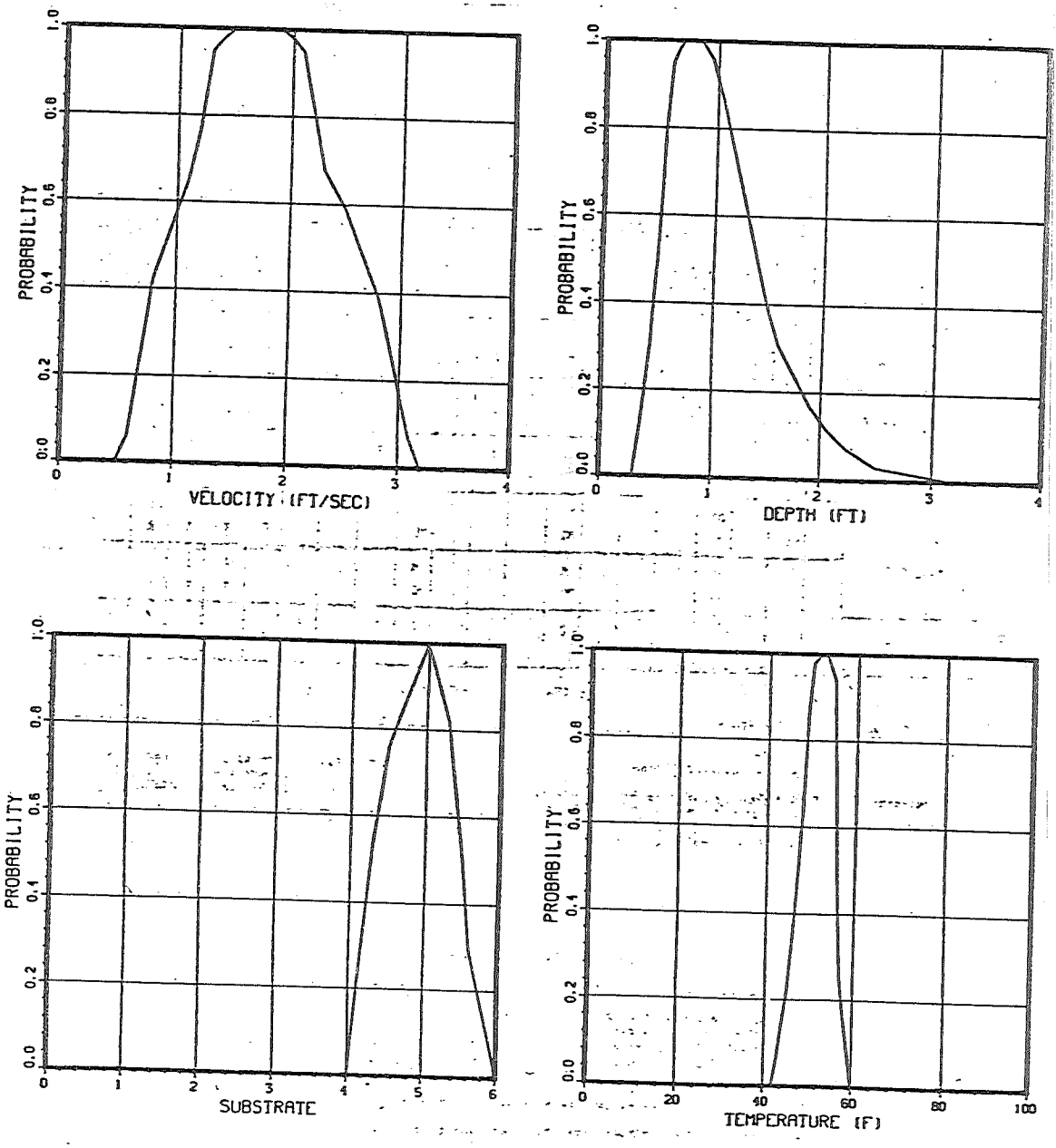

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FIGURE 1 - TROUT SPAWNING PROBABILITY USE CURVE.

8.0 CHOOSING A SITE

Before starting the construction of a spawning channel, it is important to take certain factors into account. One must ask oneself five questions:

i) Is it feasible to develop that particular site? If the physical limitations of the study area limit spawning channel developement, there is no point in planning the project.

ii) Is it economically advantageous to develop the area? Although many may say that economics must be regarded when it comes to the saving of our Fish and Wildlife species, the most economically safe projects will generally get the funding for developement.

iii) Will the channel be of use to spawning fish? If the channel will not be utilized by the native species, then once again the project should not be started.

iv) Is the area accessible?

Is it practical to put access into an area to enhance spawning? Costs, priorities, and feasibility of such projects must be thoroughly discussed before plans are made. We must remember that equiptment must be moved into and out of the spawning area.

v) Will present spawning values be destroyed or disrupted by spawning channel development? One must consider the season of the year when the development can occur with the least damage to species.

Once these and other important questions have been considered and resolved, one can begin to enlist the help of various organizations to begin the planning stage.

9.0 PROJECT PLANNING

Before beginning the project, one must consult various government agencies to obtain licences pertaining to the developement. In some instances, a licence may not be aquired, but certain agencies like to be informed of any activity which takes place that may affect their Ministry. The Water Rights Branch can issue a permit to allow activities to be conducted in a stream. Other agencies that one might wish to consult are: Land Registry, Forest Service, Pollution Control Branch, municipal and regional governments, and the Fish and Wildlife Branch.

10.0 STREAMSIDE VEGETATION

When developing a spawning channel one must consider planting streamside vegetation for the following reasons:

i) Streamside vegetation maintains a cool temperature of the water which is very important in summer. A section with no vegetation can rise to a temperature of 31 degrees centigrade as compared to 16°C increase in a non-cleared section. The effects of warm water on fish may include increase in disease(fungus,mold),

increased aggression, increased rate of metabolism and may alter yearly events in the life cycle (migration, sexual maturity).

ii) Streamside vegetation provides nutrient energy for the stream in the form of leaf fall, insect drop, and dissolved nutrients.

iii) Streamside vegetation provides protective cover for fish to hide under, protected from the sun and from predators.

iv) Streamside vegetation protects banks from erosion from high flows in the stream channel by using the roots to hold the soil in place.

For these reasons, it is necessary to consider the important role that streamside vegetation plays in the life of the stream (Burns,1970).

11.0 ASSESSMENT OF PRESENT SITUATION

11.1 Skateboo Reach

Skateboo Reach is at the present time capable of sustaining a good population of fish. The water temperature is quite warm which would allow fast growth. The oxygen level is adequate to sustain a large population of fish and the amount of food available is very high because of the high amount of litoral zone around the reservoir. The species of fish which are known to occupy Skateboo Reach include Rainbow Trout, Mountain Whitefish, Largescale Suckers, Sculpins, Northern Squawfish, Long-Nosed Dace, Peamouth,

and Red Sided Shiners(B.C. Hydro,1985).

11.2 Need For Rehabilitation

In order to think about rehabilitation of Skateboo Reach, a need must first be shown. In the West Kootenays there are not many fishing oppurtunities in low elevation areas that are near to the public corridors. Skateboo Reach would be a good fishing area for all the population centers of the West Kootenays. As well, Skateboo Reach is a low elevation reservoir that would provide a longer season for fishing than other areas in the region. Through a series of interviews carried out in Glade and Thrums, I have found out that fishing along the Reach has declined over the last 10 years since the construction of the Brilliant Dam, and, for this reason, something should be done to change this. These interviews consist of a series of questions(See APPENDIX A) which tell me:

1) How the fishing is in general.
2) When the fishing began to decline.
3) When fishing is at its climax.
4) Average size of fish being caught.
5) Number of sport fish caught compared to number of coarse fish.
6) What tackle is most successful.

From these interviews I have found out that fishing along the Reach is relatively good in early spring and poor in summer. They also said that fishing has depreciated over the last 10 years since the construction of the Brilliant Dam. The average size of the fish being caught ranges from 10-14 inches. I also found out that there are allot of coarse fish occupying the Reach but are only caught when fishing with bait(float & worm etc). To catch the sport fish, I was informed that trolling a willowleaf, Kamlooper, Deadly dick,and fly fishing are most successful (Campbell,Sterliaff etal).

11.3 Stocking Program

To stock Skateboo Reach with sport fish after rehabilitation is completed would add another much needed fishing area to the West Kootenays. Before stocking the Reach, the creeks must be developed to supply the fish with sufficient spawning ground. If this is not done, the majority of the fish may move into the Slocan River and make use of it and its tributaries for the purpose of spawning. After that, it is likely that they may not return. For this reason, something must be done to keep the newly introduced fish in the Reach, if stocking is to take place.

11.4 Method Of Stocking

When the fish are ready to be stocked in the Reach, the Provincial Hatchery Staff receives from the fisheries biologist a carefully prepared list of the areas to be stocked and number of fish to be planted in each. The hatchery staff counts out, by a system of weighing, the correct number of fish for each area(20,000 fish for this area). For most areas with good road access, a specially equipped tank truck is used to transport and release the fish. For distant and more inaccessible lakes, the fish are placed in small tanks, transported by aircraft, and released into the lake from a height of 200 feet. Many tests have shown that fish suffer no injuries when dropped into the water from this height. With either method of transport the fish are provided with a constant supply of oxygen during the trip. Because of the ease of access to Skateboo Reach, which is adjacent to highway 3A, the transport truck would be used.

11.5 Present Plans for Stocking

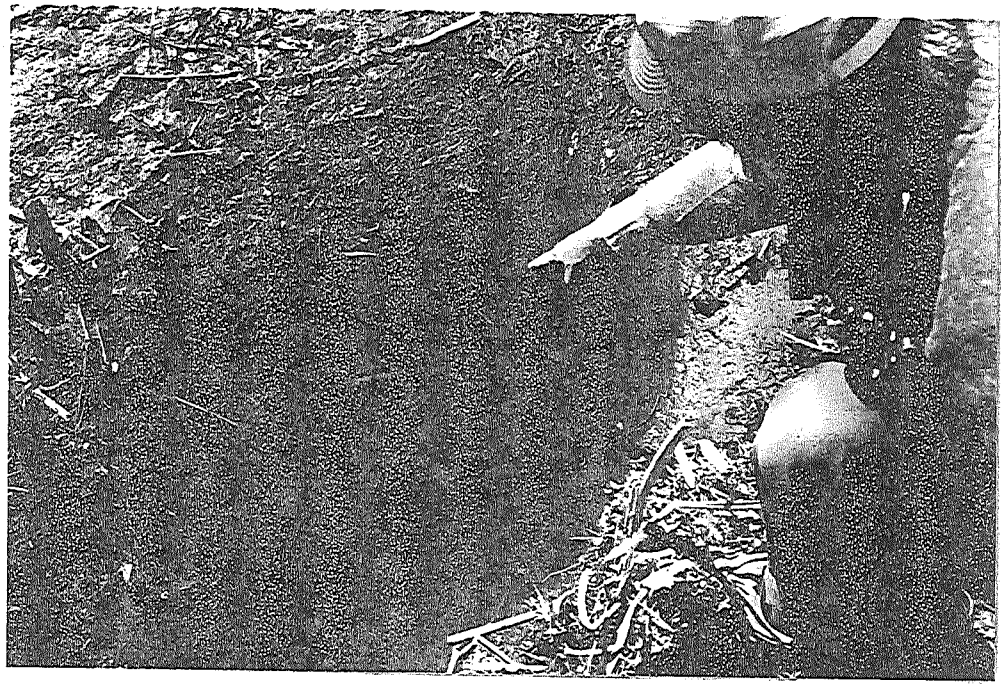
Sometime in the middle of May, the B.C.F.&.W.B. will be releasing 20,000 marked fish into the Slocan Pools which are located on the Kootenay River just upstream from where the Slocan River enters Skateboo Reach. The fish are Rainbow

Trout yearlings, approximately 8-10cm in length. They will be studied over several years to find out exactly where they will be going. It is estimated that the majority will be utilizing the Slocan River and its tributaries. The remaining fish which will be in the Slocan pools and Skateboo Reach are not expected to spawn in any of the Reach's tributaries due to poor spawning potential and nothing will be done to enhance any of these tributaries. The fish are expected to feed on zooplankton throughout the winter months and insects throughout the summer months. The B.C.F.&.W.B. are expecting that any of the marked fish caught will be reported so that they may calculate success of the species (Andersack,1985).

11.6 Fluctuating Water Level

Because the water level at Skateboo Reach is capable of rising or dropping in a short period of time, there is the danger that fish may become stranded in small pools, as shown in Figure 2. The opposite may also happen with the water rising and flooding spawning channels and washing away eggs or covering them with silt. For these reasons it is necessary to establish gates along the river (by the spawning channels) so the rising or falling of the water level will have no or little impact on the spawning channels.

Figure 2



11.7 Spawning Options

Natural spawning areas are very limited for fish species in Skateboo Reach. The inlet creeks offer very little spawning areas as the majority of the flow is in the spring when run-off occurs. Besides this, each system (stream) runs down from very steep terrain which is impossible for the fish to ascend without some means of help(fishways). The following is an evaluation of the streams emptying into Skateboo Reach:

11.71 Ezra Creek: Ezra Creek is the first creek, closest to the Brilliant Dam, flowing into Skateboo Reach on the west side of highway 3A. Its slope is in excess of 50% and has absolutely no potential as a successfull spawning area at the present time, and it would not be

feasible to develop it as one (see figure 3).

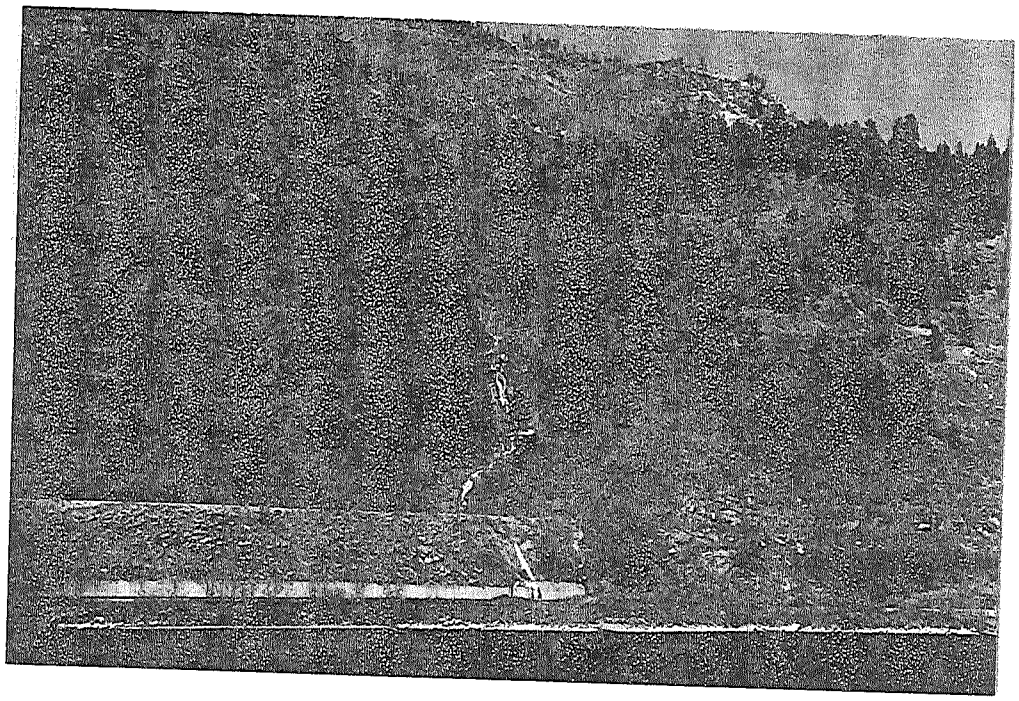
11.72 Little Mcphee Creek: Little Mcphee Creek is the first creek, closest to the Brilliant Dam, flowing into Skateboo Reach on the east side. This creek has good flow and gravel size but again this creek is in excess of 50% which is much too steep for fish to travel without some means of assistance. It is not feasible to develop this creek for spawning because the steep grade runs for nearly one kilometer (See Figure 4).

11.73 Mcphee Creek: Mcphee Creek is located just past Little Mcphee Creek. This creek has good flow and a 2% slope for the first 200 meters. After this, the steepness increases. The area around the base of the incline now has two small channels which both contain small pools and sufficient gravel size for spawning. There is, however, debris in the creek which will have to be cleaned out to enhance spawning potential. By reconstructing this area into a series of meanders and developing them into spawn-channels, it would be utilized as a valuable spawning area for rainbow trout. (See Figure 5).

11.74 Glade Creek: Glade Creek runs into Skateboo Reach on the east side of the river at the southern end of Glade. This creek could also be set up with a series of meanders to enhance the spawning potential for the fish as it has good gravel size and slope for the first 300 meters.

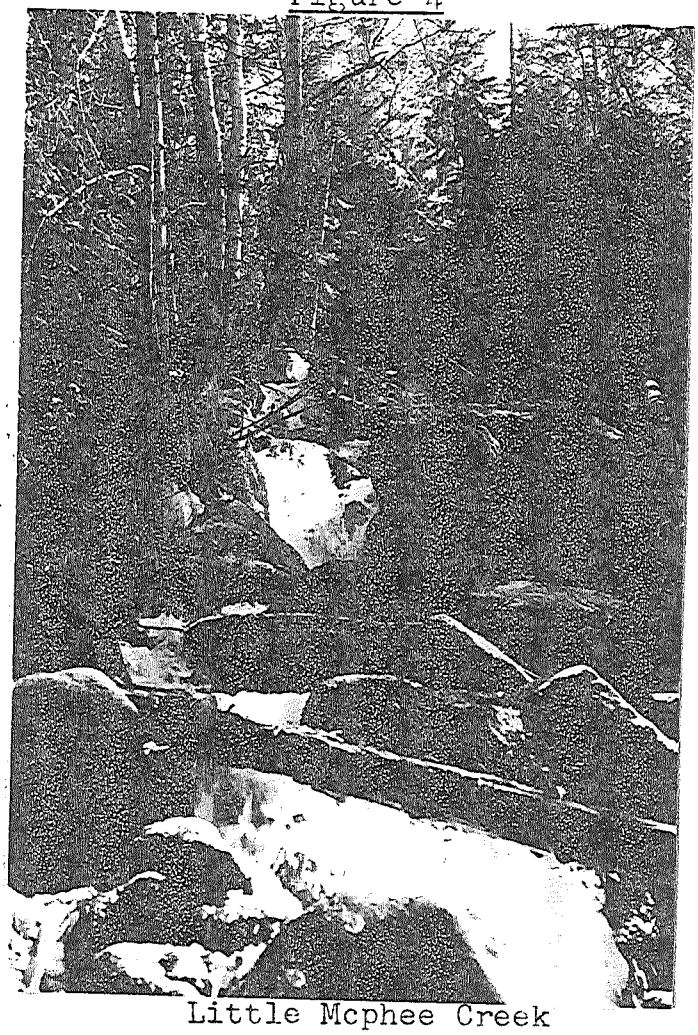
11.75 Un-Named Creeks: The remainder of the creeks flowing into Skateboo Reach have very low spawning potential. They are all either too steep with a series of waterfalls or have pockets of 0% slope running parallel to the river with trees growing throughout them (See Figures 6 & 7). These shown are primarily spring run-off streams and are presently filled with very large pieces of ice.

Figure 3



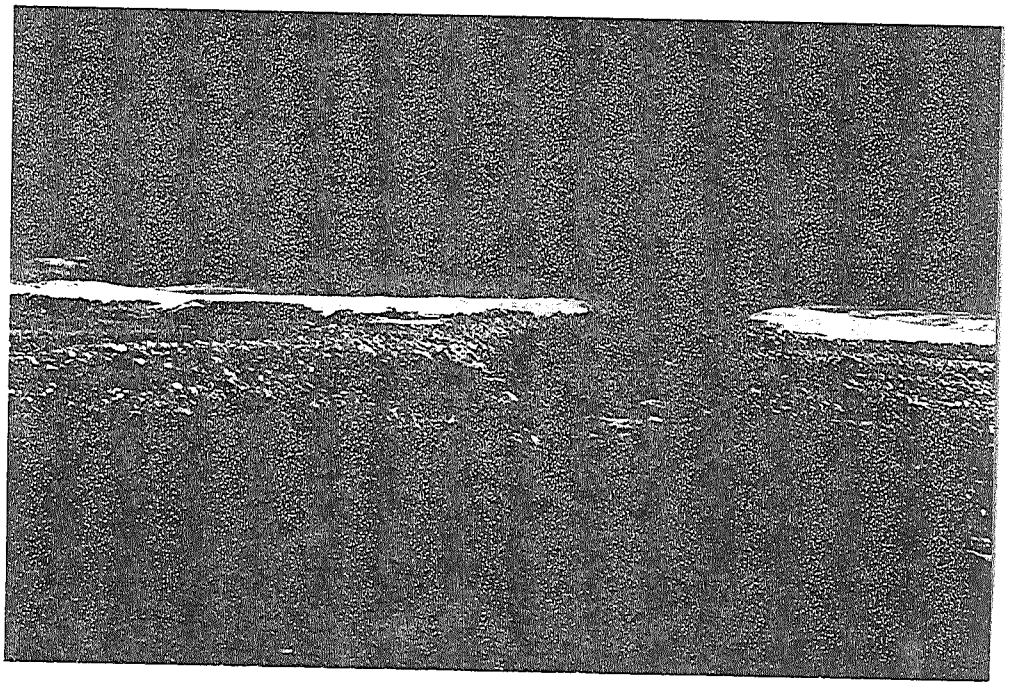
Ezra Creek

Figure 4



Little Mcphee Creek

Figure 5



Mcphee Creek

Figure 6

Un-named Creek

Figure 7

Un-named Creek

12.0 VEGETATION

All of the creeks which are flowing into Skateboo Reach have a variety of vegetative cover surrounding them. Also to be noted is that there is sufficient vegetation to maintain the success of the stream(roots holding soil, insect drop etc). If a series of meanders is to be constructed for the developement of a spawning channel, some type of vegetation must be planted around them. Table one shows a few of the plant species found in the study area.

Table 1

Species List

Major Species List	Abundance
Trees	
Douglas Fir	scattered
Paper Birch	abundant
Hemlock	scattered
Western Red Cedar	small patches on wet sites
Shrubs	
Rattlesnake Plaintain	moderate
False Box	moderate to low
Oregon Grape	moderate
Red Stem Ceanothus	scattered
Willow	scattered
Herbs	
Mosses	abundant
Brachen Fern	abundant
Fern	moderate
Pussy Willow	scattered
Ginger	moderate to low

CONCLUSION

This report looks at Skateboo Reach and the possibility that it would be beneficial to stock the Reach, improve stream beds, and possibly install fishways to enhance the spawning potential for rainbow trout.

A need for an easily accessible fishing area for sport fishing in the West Kootenays is very apparent. All other lakes that are found in the West Kootenays are fished very heavily. By supplying one more good sport fishing area, the pressure would be reduced from other lakes and an added source of recreation would be provided. This is one of the few low elevation fishing areas in the immediate region and because of this will have a longer season for use than most other lakes.

From my studies of the creeks along the reach, it is feasible to provide spawning areas at Mcphee and Glade Creeks and stocking in these areas should keep the fish in the area.

RECOMMENDATIONS

My recommendations which should be sonsidered when undertaking rehabilitative work on the reach include:

1) I recommend that Skateboo Reach be developed into a sport fishing area for the following reasons; there is a great need in the West Kootenays of B.C. for an easily accessible area providing the oppurtunity to catch sport fish, the present lakes are at great distances from major highways and are heavily used,

and this added Reach would provide a means for relieving pressures from ~~this~~ other lakes.

2) Since the creeks emptying into Skateboo Reach do not presently provide adequate potential for spawning Rainbow Trout, due to little flow and steep terrain, I recommend that natural deltas at the base of Mcphee and Glade creek be taken advantage of. Here a series of meanders could be laid out, each approximately 100 feet in length at a grade of 1-2% with gabions placed at fifty meter intervals to supply the spawning fish with resting areas. These would be laid out and constructed as previously outlined in requirements for a trout spawning channel. To ensure that these channels are not flooded by the frequent fluctuating water levels of the Reach, 6-8 foot gates would have to be installed at the edge of the river to accomplish this.

3) Since there is only one public boat launch, located at the Glade Ferry, providing access to the Reach, and as the majority of the land bordering the Reach is on public property, one or two more launches could be developed near the Brilliant Dam and in Thrums. These would each include a small parking lot, garbage cans and toilets.

4) I am not certain if fresh water shrimp are present along the Reach, but if not I recommend that they be introduced to the Reach to provide the fish with more food. This would both increase the size of the fish now and supply any newly introduced (stocked) fish with a greater food supply.

5) After developement, I recommend that Skateboo Reach be maintained and monitored at critical developement periods (August -October) and to check on the fishing pressure, fishing succes, and spawning success.

6) I recommend that this developement be taken on by the second year Wildland Recreation class at Selkirk College. This would be supervised and instructed by biologist Bob Dooley who is now teaching biology courses in the college.

7) That all construction be carried out between the months of June and July to minimize dusturbance to spawning fish, eggs, and fry.

8) That as much cover as is possible be left along the banks of the channel to retain aesthetics and to enhance fish species' survival capacity, and where no plants exist to plant different species along the channel.

APPENDIX A
(Interviewing Questions)

1) How long have you lived here?
2) Do or have you fished the area between the Slocan River and the Brilliant Dam on the Kootenay River (Skateboo Reach)?
3) How do you find the fishing in general?
4) Have you noticed a change in fishing (declined/increased)?
5) When do you find fishing the best (time of year)?
6) What is the average size of the fish you are catching?
7) How does the number of sport fish caught compare to the number of coarse fish being caught?
8) I explain the purpose and importance of my project and try to get some feedback on how they feel about it.

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C to C+
Acceptable with the
new material added!