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PRELIMINARY EVALUATION OF ENHANCEMENT OPPORTUNITIES ON SIX COLUMBIA RIVER TRIBUTARIES

Prepared for:

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COLUMBIA RIVER TRIBUTARIES

ENHANCEMENT OPPORTUNITIES

Triton Environmental Consultants Ltd. conducted basic bio-physical assessments in six tributaries of the upper Columbia River watershed to provide an initial evaluation of fish habitat and fish distributions. The culmination of this field assessment is to recommend potential enhancement opportunities to increase stream carrying capacity. Figure 1 gives the location of five of the more southerly tributaries with locations of the barriers. The sixth, Camp Creek, flows into Canoe River approximately 9 km upstream of the confluence of Canoe River at the north end of Kinbasket Lake.

This one time observation of the tributaries, carried out in October 1991, provides only a limited assessment of these rivers' fisheries potential. Water quality, habitat availability at low water, and stream stability at high flows all have a significant bearing on the type of enhancement opportunities that would result in an increase in stream carrying capacity. While it is possible to create habitat complexes that will be utilized by fish or to do stream fertilization that would increase productivity, it is important to collect detailed, fishery and engineering data before specific enhancement activities are initiated. However, there were a few obvious enhancement opportunities, such as barrier removal, that could be identified and recommended that would not require collecting additional baseline data.

The following is a brief description of each tributary and a preliminary assessment of enhancement opportunities. The order they are listed here indicates a ranking of tributaries in order of preference for receiving further attention. Bobbie Burns Creek, the major tributary to the Spillimacheen River is considered as a separate stream for this report.

#1 BLUEWATER CREEK

- The character of this stream is primarily run/riffle in a fairly confined channel with substrates ranging from gravel to boulder. There is a section of low gradient meandering channel in the top half that contains gravel

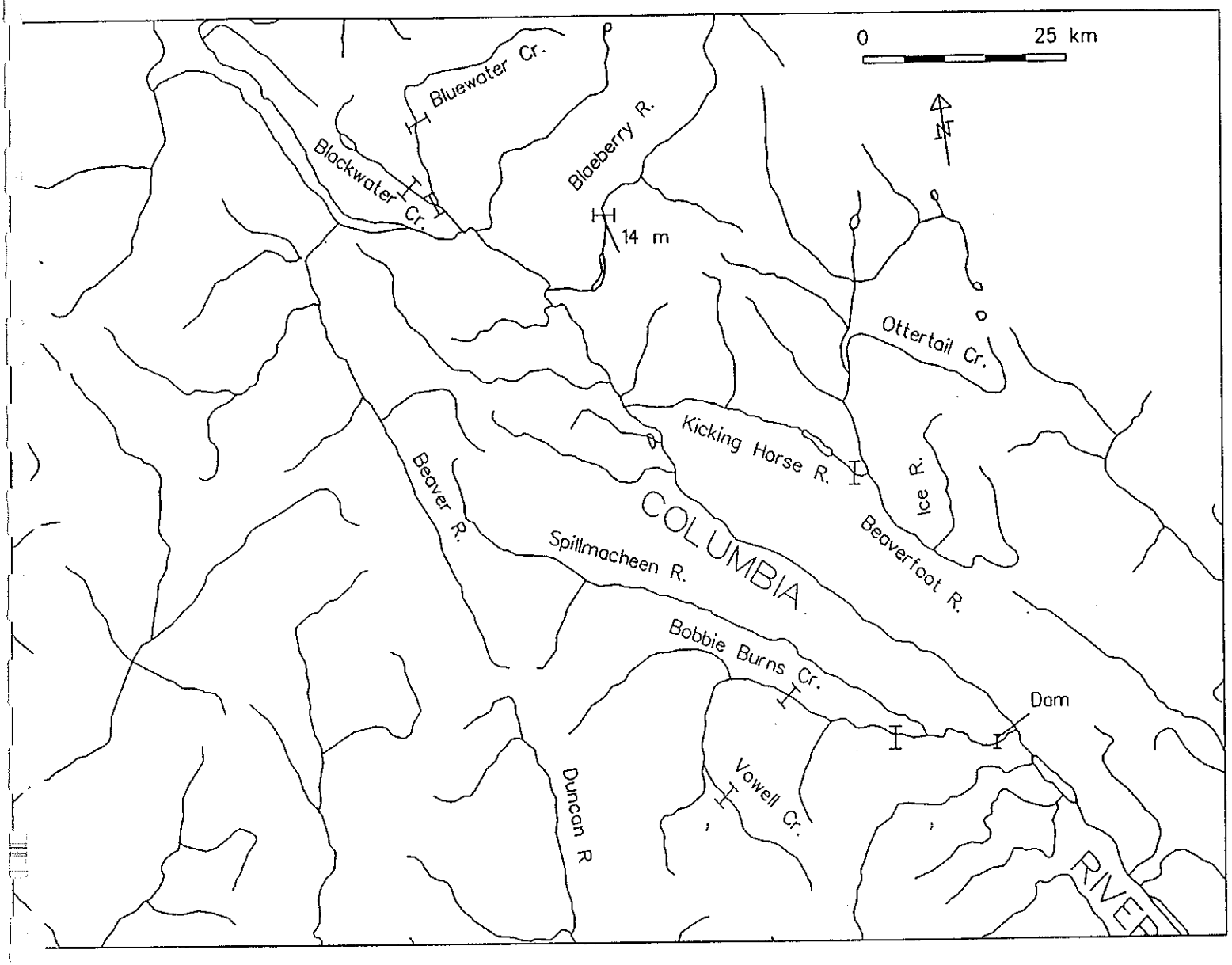

Figure 1. Location of Upper Columbia Tributaries (excluding Camp Cr.)
⊢⊣ = Location of barriers

and LOD. Large numbers of kokanee spawners where moving upstream at the time of the study and bull trout, rainbow trout, and sculpins were captured.

- Reduction of a falls at 13 km and potentially a chute at 16 km which maybe a velocity barrier would allow kokanee access to more potential spawning areas upstream.
- Habitat complexing in some stretches of the middle reaches for resident trout, this would require further study before implementation.

#2 BLACKWATER CREEK

- Blackwater is the main tributary to Bluewater Creek. Near its headwaters there is a small lake below which there is a long section of low gradient, meandering channel, with primarily fine substrates and areas of active deposition and decomposition. The lake has been stocked with rainbow trout since 1939 and in 1991 was stocked with 2,000 yearlings. There is a large debris jam/beaver dam at the downstream end of this section followed by a chute that appears to be the upstream extent of kokanee. There is also a 1.5 m high falls at the mouth of Blackwater Creek which kokanee are able to pass over.
- Removal or reduction of the barrier at the confluence with Bluewater Creek would improve access for kokanee spawners. This would be particularly beneficial if existing kokanee spawning areas in Blackwater Creek are under untilized. In the mid-1980's MOE did some blasting to reduce this barrier in conjunction with stocking (in 1985, 86, 87, 88, and 89) of yearling and fall fry Gerrard rainbow trout.
- Stabilize spawning habitat downstream of Blackwater Lake to improve spawning and rearing success for lake populations of rainbow trout.
- Potential for barrier and log jam removal to allow kokanee passage but there is limited habitat for spawning above these barriers.
- The character of the upper sections of this stream would probably prove suitable for brook trout production.

#3 BEAVERFOOT RIVER

- A predominantly low gradient stream that meanders through a wide valley bottom. Approximately 12 km of the lower end of the river is boardered by Yoho National Park where there is no logging. Moose Creek is the

main headwater creek to this river and apparently bull trout spawn in this creek. Besides bull trout, brook trout and whitefish were sampled and according to the local guide-outfitter rainbow trout also exist in the river.

- Productivity of resident species in this river seems low, however, there is an existing, but small, sport fishery promoted by the local guide outfitter. There is no "quick fix" recommendation that can be made for enhancing fish populations in this river. More study is needed to identify limiting factors including the potential impact of a proposed mine in the Moose Creek area.

#4 CAMP CREEK

- The lower 18 km is accessible to migratory species. This lower section is relatively low gradient with run-riffle sections separating slower, meandering glide-pool sections. Substrate is gravel to large cobble, however in the slower sections there is a considerable amount of fines with the gravel. Kokanee spawners were observed throughout the first 14 km of the stream. This study found rainbow trout, bull trout and cutthroat trout in the system.
- Again there is no easy enhancement activity to recommend. The creek contains areas of spawning (kokanee where observed spawning) and rearing habitat and there does not seem to be any significant changes in the stream since the last study in 1977.
- Outplanting Gerrard strain rainbow trout is an option, there is suitable habitat for rearing based on the October assessment. The important factor to be considered is the reservoir's ability to support the fish.
- Enhancement of resident and migratory fish through habitat complexing may be an option but further studies are necessary to determine factors limiting fish production in this system.

#5 SPILLIMACHEEN RIVER

- The hydroelectric dam is located 6 km upstream from the Columbia River. This would be the only section that could be used to enhance migratory Columbia River fish, however, most of this lower section is slow moving, meandering channel with a predominantly fine substrate. Enhancement in this area may result in increases of coarse fish rather than

migratory sport fish. Fish observed in this area included brook trout, burbot, and spawning mountain whitefish.

- Above the dam resident species could be targeted. During this survey brook trout, rainbow trout, bull trout, and whitefish where found. There are areas that would benefit from increased habitat complexing and there is a falls that could be removed. However, there is trout habitat above and below the falls and removal would probably not have an enhancement effect on resident fish.
- Again further study is required to identify limiting factors and the appropriate enhancement opportunities to over come them.

#6 BLAEBERRY RIVER

- This river has been assigned a low priority due to the extensive glacial influence in the headwaters, most of the tributary streams are unstable as is much of the river above the falls (19 km up from the confluence) with significant areas of braided stream. The watershed has also been extensively logged and logging will continuing for at least the next five years.
- The falls are in excess of 10 m high and are the upstream limit of kokanee spawning. Bull trout and whitefish were found above the falls. Below the falls there is also considerable lengths of unstable braided stream channel

#7 BOBBIE BURNS CREEK

- This stream is also a low priority. No fish were seen (at the time of the field study water levels were high and turbid following a day of rain), there are two barriers that restrict movement and comments from locals indicate that this is not a stream known for its sport fishing potential. There are also reports that a tailing pond in a tributary to Vowell Creek washed out dumping cyanide contaminated waters into the system. If this event is responsible for the lack of fish found in the system then the barriers will restrict natural recolonization from the Spillimacheen River.
- There are tributary streams and parts of Bobbie Burns that have suitable habitat for fish. If attempts are made to establish a fishery in this system much more information is needed before any enhancement program is undertaken.

RESOURCE USE:

The primary resource development in these watersheds that could negate enhancement efforts is logging, however, mining is also active in a number of areas. In most cases logging has not resulted in severe long term impacts but there are a few areas where trees have been removed right to the stream edge. Logging roads are probably responsible for increased sediment loadings during snowmelt and rain events but streams in unlogged watersheds also carry a high sediment load after rainfalls. Below is a ranking, from high to low, of the tributaries most affected by logging, based on past and future (next 5 years) logging activity:

1) Blaeberry River
2) Blackwater Creek (mostly past logging)
3) Spillimacheen River
4) Bobbie Burns Creek
5) Camp Creek
6) Beaverfoot River (mostly past logging)
7) Bluewater Creek

Mining activity may not be as pervasive as logging, however, there is potential for mines to produce by-products that are very toxic to aquatic organisms. An accidental release of these substances into streams can have significant impacts. The following is a ranking, from high to low, of streams at risk from the impacts of mining activities:

1) Bobbie Burns Creek
2) Beaverfoot River (proposed mine on Moose Cr.)
3) Spillimacheen River
4) Blackwater Creek (no mining activity)
5) Camp Creek "
6) Bluewater Creek "
7) Blaeberry River "

DETAILED ASSESSMENT PROGRAM:

Prior to initiating habitat modifications or stream fertilization projects it would be necessary to carry out further studies to determine limiting factors and develop a more complete inventory to provide baseline data from which to measure the effectiveness of enhancement activities. These studies would basically require

assessment of water quality, stream hydrology, and more detailed fish and habitat inventories. Observations of instream habitat would be necessary at low and probably high water conditions. Fish inventories of sufficient detail to identify densities and provide a better indication of the number of fish the system currently supports. Water samples should be collected at least seasonally, and ideally once a month, at several sites in the stream determined in relation to tributary inflow. The installation of a thermograph would complete the necessary water quality information. This detail of information is required to determine which lifestage(s) would benefit from enhancement and the type of enhancement that would be appropriate. The cost of this program would be dependent on the tributary or section of tributary chosen for study.

SUMMARY OF RECOMMENDATIONS FOR FURTHER WORK:

Rank	Tributary	Activity	Est. Cost
1	Bluewater Cr.	Barrier removal at 13 km	$20,000
2	Blackwater Cr.	Barrier reduction at confluence	$15,000
3	Beaverfoot R.	Detailed inventory (resident sport fish)	$30,000
4	Bluewater Cr.	Detailed inventory	$25,000
5	Camp Cr.	Detailed Inventory (migratory fish)	$25,000
6	Spillimacheen R.	Detailed inventory (resident sport fish)	$35,000
7	Blaeberry R.	Detailed inventory (for migratory fish) below the falls)	$22,000
8	Blackwater Cr.	Log jam and chute removal at 4 km	$20,000

9	Camp Cr.	Out planting Gerrard rainbow trout	?
10	Blackwater Cr.	Detailed inventory	$25,000
11	Bobbie Burns Cr.	Detailed inventory (resident sport fish)	$35,000
12	Blaeberry R.	Detailed inventory (resident sport fish above the falls)	$30,000
13	Blackwater Cr.	Brook trout stocking	?

The cost of these enhancement activities are only rough estimates based on experiences from MOE's Habitat Conservation Fund and from Lill et al. (1991). Details of these costs are provided in the preliminary assessment report for Revelstoke Tributary Streams. The top ranked activities include the barrier removals because they should realize immediate benefits at least to spawning kokanee and they may also be beneficial to other migratory species such as bull trout.

The estimated cost of a detailed inventory is based on the description of information presented in the "Detailed Assessment Program" section. The costs presented are roughly based on an a one time, intensive habitat and fish inventory at 12 sites and collecting water quality and hydraulic data four times a year.