Fisheries Projects and Related Watershed Initiatives, and Resource Opportunities in the Quesnel River Watershed

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FISHERIES PROJECTS AND RELATED WATERSHED INITIATIVES, AND RESOURCE OPPORTUNITIES IN THE QUESNEL RIVER WATERSHED

by

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ABSTRACT

The broad purpose of this study is to compile, synthesise and document information on the Quesnel River watershed as it pertains to fisheries and fish management activities. The information is intended to provide assistance in co-ordinating watershed planning and management efforts in the future. Specific objectives of the study are to review the fisheries information submitted to the Cariboo-Chilcotin Land Use Planning process, review DFO's criteria for ranking watersheds within management categories, and to document the status of current and proposed watershed initiatives. The study is intended for use by local community as well as government agencies involved in watershed management and planning.

The information was obtained from existing reports and through personal contacts with knowledgeable individuals in and around the Quesnel River watershed.

RÉSUMÉ

Cette étude a pour principal objectif de compiler, de synthétiser et de justifier l'information portant sur le bassin hydrographique de la rivière Quesnel en ce qui a trait à la pêche et à la gestion halieutique. L'information pourrait aider à coordonner pour l'avenir les efforts de planification et de gestion du bassin hydrographique. Cette étude a pour objectifs précis d'examiner l'information sur les pêches soumise dans le cadre du processus de planification de l'aménagement des terres de Cariboo-Chilcotin, de revoir les critères du MPO servant à classifier les bassins hydrographiques dans des catégories en fonction de la mise en valeur et de recueillir des informations sur la situation des initiatives actuelles et projetées en matière de bassins hydrographiques. L'étude est destinée à la collectivité locale ainsi qu'aux organismes gouvernementaux impliqués dans la planification et l'aménagement des bassins hydrographiques.

Cette information a été obtenue dans des rapports existants et par le biais de contacts personnels avec des personnes bien informées du bassin hydrographique de la rivière Quesnel et des alentours.

1.0 Introduction

The Quesnel River is an important Fraser Basin watershed which supports important runs of anadromous and resident fish stocks and provides a large timber base for the B.C. logging industry. Indeed, the significant investment of human and financial resources by government, industry, interest groups, and the local communities throughout the watershed underlines the watershed's importance for both natural and human values. Increasing community and government involvement throughout the watershed has occurred in recent years, as perhaps best exemplified by the activities of the Commission on Resources and Environment (CORE) and the Cariboo-Chilcotin Land Use Plan, and by community and grass roots organizations such as the Quesnel River Watershed Alliance which have been created since CORE's inception.

These and other activities in the Cariboo-Chilcotin have moved consideration of the natural environment in local and regional decision-making forward considerably, and it is important that this momentum be maintained. By assembling a document which reviews the nature and status of fisheries projects and related management activities in the Quesnel River watershed, and by identifying resource issues as perceived by the Quesnel River Watershed Alliance, a useful information package and planning tool can be provided to inform future decision making processes.

This report is divided in four subsequent sections. The first section provides background information on the purpose of this study, and includes a overview of the characteristics of the Quensel River watershed and some comments on previous studies which have been completed in the watershed. A summary of the CORE process and the Government of B.C.'s Final Land Use Plan Report for the Cariboo-Chilcotin, particularly as it applies to the fishery resource and fisheries issues, as well as a brief description of the Quensel River Watershed Alliance (QRWA) are also included in this section. The second section identifies the resource issues in the Quesnel River watershed as perceived by the QRWA, as we understand them following a meeting and subsequent communication with some members of the Alliance. These issues are discussed in the context of the Land Use Plan. The third section includes an overview on the status of fisheries projects and related watershed initiatives underway and proposed in the Quesnel River watershed, and is accompanied by a map sheet. The final section of this report consists of some concluding remarks and identifies some potential opportunities for public involvement by the QRWA in the watershed. A list of individuals who were contacted during the course of this study is included as Appendix I to this report.

1.1 Purpose of the Study

The broad purpose of this study is to compile, synthesize, and document information obtained in available reports and though personal contacts with knowledgeable individuals in the vicinity of the Quesnel River watershed as it pertains to fisheries and fish management activities. It is intended that this information will be useful for coordinating watershed planning and management efforts in the future. More specifically, the purpose of the present study it to:

1) Review the fisheries information (DFO and MELP) submitted to the CORE process;
2) Review DFO's criteria for ranking watersheds with respect to management categories;
3) Prepare an overview on the status of fisheries projects and related watershed initiatives underway and proposed by DFO, MELP and MAFF;

4) Meet with the Quesnel River Watershed Alliance to identify resource issues, questions and potential opportunities for public involvement in specific fisheries enhancement/restoration projects; and,
5) Based on steps 1-4 above, compile the above information into an easy to understand template which can be used by the local community as well as by government agencies involved in watershed management and planning.

1.2 Description of the Study Area

The Quesnel River is a major tributary of the upper Fraser River, British Columbia (see Figure 1). The Quesnel River flows from the Cariboo Mountains across the Quesnel Highlands, the Fraser Plateau, and the Fraser Basin to join the Fraser River at the City of Quesnel, and drains an area which drops in elevation from its headwaters as high as 2,000m to its confluence with the Fraser at 485m above sea level. The system encompasses a drainage area of approximately 11,400 km^2, and is composed of several river and lake complexes which include the Cariboo, Horsefly and Mitchell Rivers. Many of the streams tributary to the Quesnel River mainstem fall steeply to the valley floor from their sources, and are from three to nine kilometres in length. The Quesnel River watershed is in the semi-arid Southwest Interior region of B.C. and receives between 380mm and 600mm of precipitation per year, 30-50% of which falls as snow. Mean monthly temperatures range from -12°C to -6°C in January and from 13°C to 16°C in July (Helm et al., 1980; Berry and Kahl, 1982).

The economy in the watershed and surrounding region is dominated by forestry and related industries, although mining, agriculture, and tourism also contribute significantly to economic activity in the area. Quesnel and Likely are the two largest settlements in the watershed which supports a population in excess of 50,000 people (Helm et al., 1980). Most settlement is concentrated in the Quesnel Lake/Horsefly complex and along the Quesnel River mainstem. Some backcountry areas remain in a pristine condition.

Although the Quesnel River watershed supports a diversity of wildlife species, including large mule deer and moose populations, it is perhaps better recognized for its significant populations of resident rainbow trout, Dolly Varden and Kokanee populations and its important contributions to anadromous salmonid production.

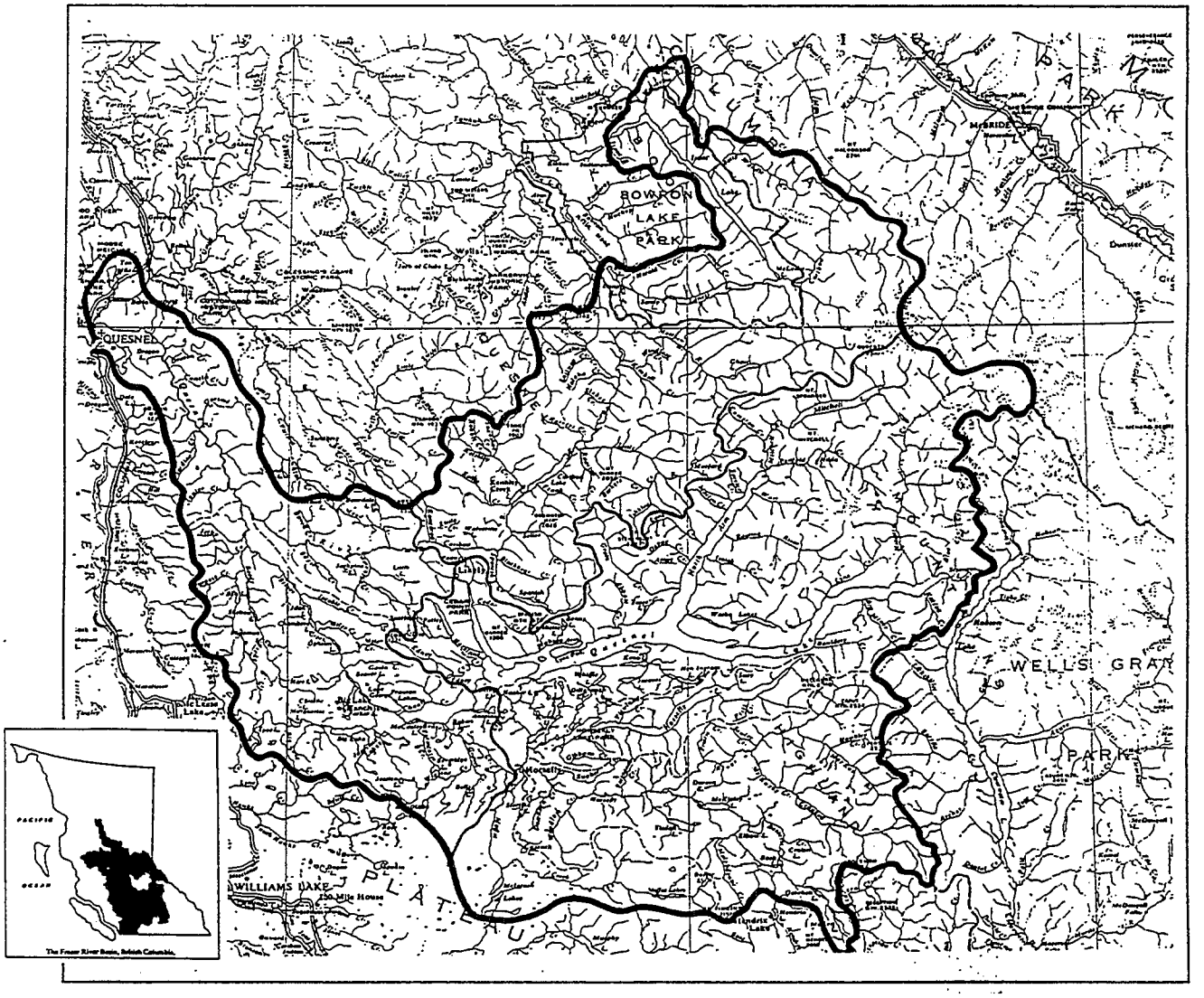

Figure 1: Quesnel River Watershed (from QRWA, n.d.)

A review of information submitted to the CORE process by DFO, in addition to other available references (Whelen et al., 1981; Slaney, 1988; SISS, 1990, 1991; Triton, 1991; Government of B.C., 1995) indicates that the Quesnel/Horsefly complex is a significant contributor to the Pacific salmon fishery. The species which utilize the watershed for spawning and/or rearing include:

1) Sockeye

The Horsefly system is one of the most important sockeye producers in the Fraser basin. The DFO escapement goal for the Horsefly is over 2 million fish in the dominant cycle, and actual escapements of 1.6 million were recorded in 1989. Major spawning areas for the Horsefly sockeye stocks are:

- Horsefly River from the falls to the confluence with Wilmott Creek, between the confluences of Deerhorn and Moffat Creeks, and for 2km upstream of confluence with the Little Horsefly River;
- McKinley Creek from McKinley Lake downstream to the confluence with the Horsefly River;
- Little Horsefly River between Gruhs and Little Horsefly Lakes; and,
- Mitchell River for 0.5km downstream and 2.5km upstream of the confluence with Cameron Creek.

Sockeye also rear in the lakes on the Horsefly system for one or more years before they migrate to the ocean.

2) Chinook

Chinook salmon also utilize the Quesnel River watershed for spawning and rearing, although they are not found in the numbers that sockeye are. Major chinook spawning areas include:

- Quesnel River from Quesnel Forks downstream for 5km, and from Quesnel Lake outlet downstream for 4km;
- Horsefly River from the falls to the confluence with Wilmott Creek, between confluences of Deerhorn and Moffat Creeks, and for 2km upstream of the confluence with the Little Horsefly River;
- McKinley Creek from McKinley Lake downstream to the confluence with the Horsefly River;
- Mitchell River for 0.5km downstream and 2.5km upstream of the confluence with Cameron Creek; and,
- Cariboo River from the falls to Kimball Lake and from Cariboo Lake to Quesnel Forks.

Chinook also rear in the higher order streams and rivers of the Quensel River watershed for one or more years before they migrate to the ocean.

3) Pink

Pink salmon do not utilize the Quesnel River watershed to a large degree, although they do spawn in the lower end of the Quesnel River mainstem. Pink salmon begin their migration to the ocean shortly after they emerge from the gravel.

4) Coho

Coho salmon have been reported in the last 10 years in the tributaries of the Quensel River (McKinley, Summit and Cameron Creeks). Although their distribution and abundance is not well understood, they do not occur in large numbers. Coho rear in small streams of the Quesnel River watershed for one or more years before they migrate to the ocean.

The Quesnel River watershed is also utilized by several species of resident freshwater fish, which are important game fish for the sport fishery. These stocks include (Dolighan, pers. comm.):

5) Rainbow Trout

The Quesnel River watershed supports a provincially and nationally significant population of rainbow trout whose bodysize is probably second largest in the world. Rainbow trout production in Quesnel Lake is almost entirely based upon natural reproduction from larger tributary streams. The Horsefly River is the most important spawning stream and contributes approximately 75% of the total annual recruitment of rainbow trout. The Mitchell and Quesnel Rivers are assumed to produce at near equal values and account for a combined estimate of 20% of the total production. Additional trout recruitment is derived from select smaller tributary streams which flow directly into Quesnel Lake.

6) Kokanee

Kokanee are also found in Quesnel Lake in significant numbers. In addition to contributing to the sport fishery, kokanee are the main prey item for rainbow trout. Kokanee rely on streams which drain into Quesnel Lake and shoals along the shoreline of Quesnel Lake for spawning.

1.3 Previous Studies

There have been several studies completed by DFO, MELP, and other agencies or groups that focus to the Quensel River watershed. Most of these efforts have focused on the Quesnel River mainstem, Quesnel Lake, or the Horsefly system, presumably because of the importance of these systems for salmonid and resident fish production. A selected bibliography of published reports that relate to fisheries and fisheries related issues in the Quesnel River watershed is included below.

Aquatic Resources Ltd. 1988. Biophysical Sampling in the Horsefly and Seymour Watersheds. 57 pp. + appendices.

B.C. Ministry of Environment. 1983. Quesnel Lake Fisheries Study. Technical Report F-84-3. Prepared for the Fish and Wildlife Branch, Williams Lake, B.C.

B.C. Ministry of Environment. 1984. Quesnel Lake Kokanee Study. Technical Report F-85-2. Prepared for the Fish and Wildlife Branch, Williams Lake, B.C.

B.C. Ministry of Environment. 1989. Size Selective Predation by Rainbow Trout on Two Lacustrine *Oncorhynchus nerka* Populations. Fisheries Management Report No. 94. Vancouver, B.C.

B.C. Ministry of Lands, Parks and Housing. 1983. Horsefly Crown Land Planning Report. Williams, Lake, B.C.

B.C. Ministry of Lands, Parks and Housing. 1985. An Evaluation of Agricultural Land Use in the Cariboo Region. Prepared for the Regional Operations Division, Cariboo Region, Williams Lake, B.C.

Berry, F.C. and A.L. Kahl. 1982. Catalogue of Selected Fraser and Thompson River Tributaries Important to Chinook and Coho Salmon and a Preliminary Assessment of Their Enhancement Potential. Prepared for the Department of Fisheries and Oceans, Fraser River, Northern B.C & Yukon Division, Vancouver, B.C.

Bioquest International Consulting Ltd. and Ethos Consulting Ltd. 1990. The Cariboo Commercial Backcountry Recreation Study. Prepared for the B.C. Ministry of Crown Lands, Williams Lake, B.C.

Department of Fisheries and Oceans, Fraser River, Northern B.C. & Yukon Division. 1990. Stream Summary Catalogue: Sub-District #29H, Quesnel. Prepared for the Fish Habitat Inventory & Information Program.

Department of Fisheries and Oceans, Fraser River, Northern B.C. & Yukon Division. 1991. Stream Summary Catalogue: Sub-District #29G, Williams Lake. Prepared for the Fish Habitat Inventory & Information Program.

E.V.S. Consultants Ltd. 1980. Chinook salmon (*Oncorhynchus tshawytscha*) Fry and Smolt Enumeration/Marking Project, Nechako and Quesnel/Horsefly Rivers, B.C. Prepared for the Department of Fisheries and Oceans, Vancouver, B.C. 126 pp. + appendix.

E.V.S. Consultants Ltd. 1980. 1979 Investigations of Fall-spawning Chinook Salmon (*Oncorhynchus tshawytscha*), Nechako and Quesnel/Horsefly Rivers, B.C. Prepared for the Department of Fisheries and Oceans, Vancouver, B.C. 86 pp. + appendix.

E.V.S. Consultants Ltd. 1981. 1980 Investigations of Fall-spawning Chinook Salmon (*Oncorhynchus tshawytscha*), Quesnel, Horsefly, Blackwater (West Road) and Cottonwood River Drainages, B.C. Prepared for the Department of Fisheries and Oceans, Vancouver, B.C. 87 pp. + appendices.

E.V.S. Consultants Ltd. 1981. Studies of Juvenile Chinook (*Oncorhynchus tshawytscha*) and other Salmonids in the Quesnel River Drainage during 1980. Prepared for the Department of Fisheries and Oceans, Vancouver, B.C. 105 pp.

E.V.S. Consultants Ltd. 1981. Studies of Juvenile Chinook Salmon (*Oncorhynchus tshawytscha*) Quesnel River Draining During 1980. Appendices.

Government of B.C., 1994. The Cariboo-Chilcotin Land Use Plan. Released October, 1994.

Government of B.C., 1995. The Cariboo-Chilcotin Land Use Plan 90-Day Implementation Process Final Report. Released February 15, 1995.

Helm, R.K. et al. 1980. A Review of the Quesnel River Watershed. Internal Report, Department of Fisheries and Oceans, Vancouver, B.C. 72pp. + appendices.

Imperial Metals Corporation Ltd. 1990. Mount Polley Project: Stage I Environmental and Socio-economic Impact Assessment, Volume I. Prepared for the B.C. Mine Development Steering Committee, Vancouver, B.C.

International Pacific Salmon Fisheries Commission (IPSFC). 1966. Problems in Rehabilitating the Quesnel Sockeye Run and their Possible Solution. New Westminster, B.C. 85 pp.

Lamont, Carol A. 1991. A Preliminary Review of Enhancement Opportunities for the Thompson River and Quesnel River Drainage Basins. Prepared for the Fraser River Environmentally Sustainable Development Task Force, Vancouver, B.C. Unpublished.

MacDonald, L.B. 1988. A Review of Placer Mining-Fish Habitat Concerns in the Cariboo Placer Mining Region of British Columbia 1987-1988. Prepared for the Department of Fisheries and Oceans, Habitat Management Unit, Fraser River/N.B.C. Division, Prince George, B.C.

Morton, K. F. and I.V. Williams. 1990. Sockeye Salmon (*Oncorhynchus nerka*) Utilization of Quesnel Lake, British Columbia. Canadian Technical Report of Fisheries and Aquatic Sciences No. 1756.

Piteau and Associates. 1980. First Stage Ground Water Evaluation for Water Supply to Proposed Quesnel Salmon Hatchery at Likely, B.C. pp. 79-206.

Rescan Environmental Consultants Ltd. 1989. Quesnel River Gold Project: Environmental Assessment, Stage I Report. Prepared for QPX Minerals Inc., Vancouver, B.C.

Rescan Environmental Consultants Ltd. 1990. Quesnel River Gold Project: Environmental Assessment, Stage I Addendum Report. Prepared for QPX Minerals Inc., Vancouver, B.C.

Schubert, N.D. 1988. An Assessment of Four Upper Fraser River Chinook Salmon Sport Fisheries, 1986. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1890. Department of Fisheries and Oceans, New Westminster, B.C.

Schubert, N.D. 1989. An Assessment of Five Upper Fraser River Chinook Salmon Sport Fisheries, 1987. Canadian Manuscript Report of Fisheries and Aquatic Sciences No. 1983. Department of Fisheries and Oceans, New Westminster, B.C.

Shepherd, B.C. 1983. Quesnel River Hatchery Review of Biological Criteria and Suggested Operational Strategies. Internal Report, Department of Fisheries and Oceans, Vancouver, B.C. 134 pp.

Talisman Land Resource Consultants Ltd. 1984. Agricultural Land Use in the Cariboo Region. Prepared for the B.C. Ministry of Lands, Parks and Housing.

Talisman Land Resource Consultants Ltd. 1984. Agricultural Land Use Suitability and Status in the Cariboo Region: Method and Findings. Prepared for the B.C. Ministry of Lands, Parks and Housing.

Talisman Land Resource Consultants Ltd. 1984. Cariboo Agricultural Program Plan: Land Use Pilot Project. Phase 1 Report. Prepared for the B.C. Ministry of Lands, Parks and Housing.

Talisman Land Resource Consultants Ltd. 1984. Evaluation of Land Characteristics for Selected Areas of the Cariboo. Prepared for the B.C. Ministry of Lands, Parks and Housing.

Triton Environmental Consultants Ltd.. 1991. Quesnel Habitat Management Area Resource Assessment. Vols. 1 and 2. Prepared for the Department of Fisheries and Oceans, Vancouver, B.C.

Although studies with a variety of foci have been completed for the watershed, most studies have focused on the assessment of the Quesnel River system for salmonid production, or on documenting the biophysical characteristics of the system. There have been a limited number of studies which have focused on enhancement and restoration opportunities/potential for the Quesnel River system despite the fact that impacts of logging, mining, and agricultural activities are believed to have been significant in some areas of the watershed. It is noteworthy that identification of potential restoration sites on the Horsefly system is currently being undertaken with funding from the Watershed Restoration Program (see Section 3.0).

The environmental agencies (primarily DFO and MELP) have completed several enhancement and restoration projects in the watershed since the 1970s. Of particular note are two Salmonid Enhancement Program (SEP) facilities which are, at the time of this writeup, still operational. These include the hatchery at Likely and its associated rearing channel, and the spawning channel at Horsefly. The Likely hatchery is due to close in the coming fiscal year (1995) due to budget constraints.

1.4 Overview of the CORE Process

Forestry, ranching and mining are all deeply rooted in the historical development of the Cariboo-Chilcotin (Government of B.C., 1995). In recent decades as resource harvesting and use has become more intensive in the Cariboo, some negative impacts of these activities have begun to manifest themselves. For example, fish and wildlife habitat has been destroyed or altered and the aesthetic or visual quality of the landscape has begun to deteriorate in some areas where resource extraction activities have occurred most intensively.

Due in part to resource management concerns and the deterioration, either perceived or real, of resources in the Cariboo-Chilcotin, in 1992 the British Columbia government created the Commission on Resources and Environment (CORE) and gave it the legal responsibility to "develop for public and government consideration a British Columbia-wide strategy for land use

and related resource and environmental management" (CORE Act, s. 4(1)). The work of the Commission is significant and probably represents the most important resource planning and management initiative ever undertaken in the Cariboo-Chilcotin. The Provincial Government recently released its Land Use Plan and Final Report (Province of B.C., 1994, 1995).

The Land Use Plan provides a framework for zonal targets for the resource sectors and sets broad access targets for forestry, mining, agriculture, tourism, wildcraft/agroforestry, fish and wildlife, and recreation. For the purposes of resource planning and management, CORE divided the Cariboo-Chilcotin Region into sub-regional units or 'polygons' based on ecological, physical, and administrative criteria. Each of these was classified as a Protected Area, or as Special, Integrated, or Enhanced Resource Development Zones (RDZ) (see Figure 2).

The characteristics of the Protected Areas and RDZs as described in the Cariboo-Chilcotin Land Use Plan (Government of B.C., 1995) are:

1) Protected Areas

- 17 Protected Areas were created which cover 12% of the land base (0.25% still to be designated) (two Protected Areas are located in the Quesnel River watershed (Cariboo River Protected Area, Mitchell Lake/Niagara Protected Area));
- logging and resource extraction is prohibited in Protected Areas; and,
- existing grazing will continue to be permitted in the new Protected Areas except the Junction Sheep Range.

2) Special RDZ

- 16 Special RDZs were created which cover 26% of the land base (three Special Resource Development Zones are in the Quesnel River watershed (Boss/Deception SRDZ, Quesnel Highlands SRDZ, Quesnel Lake SRDZ));
- resource development activities will be carried out in a manner which respects sensitive natural values;
- resource development access targets will be consistent with the Forest Practices Code;
- the forest industry will have access to 70% of the timber from the productive forest land base averaged over time;
- mining, agriculture, tourism, recreation, wildcraft/agroforestry, fishing, trapping, and hunting will have full access to this zone;
- activities to enhance forest productivity, grazing, fish and wildlife resources, and tourism opportunities will occur in this zone on a site specific basis.

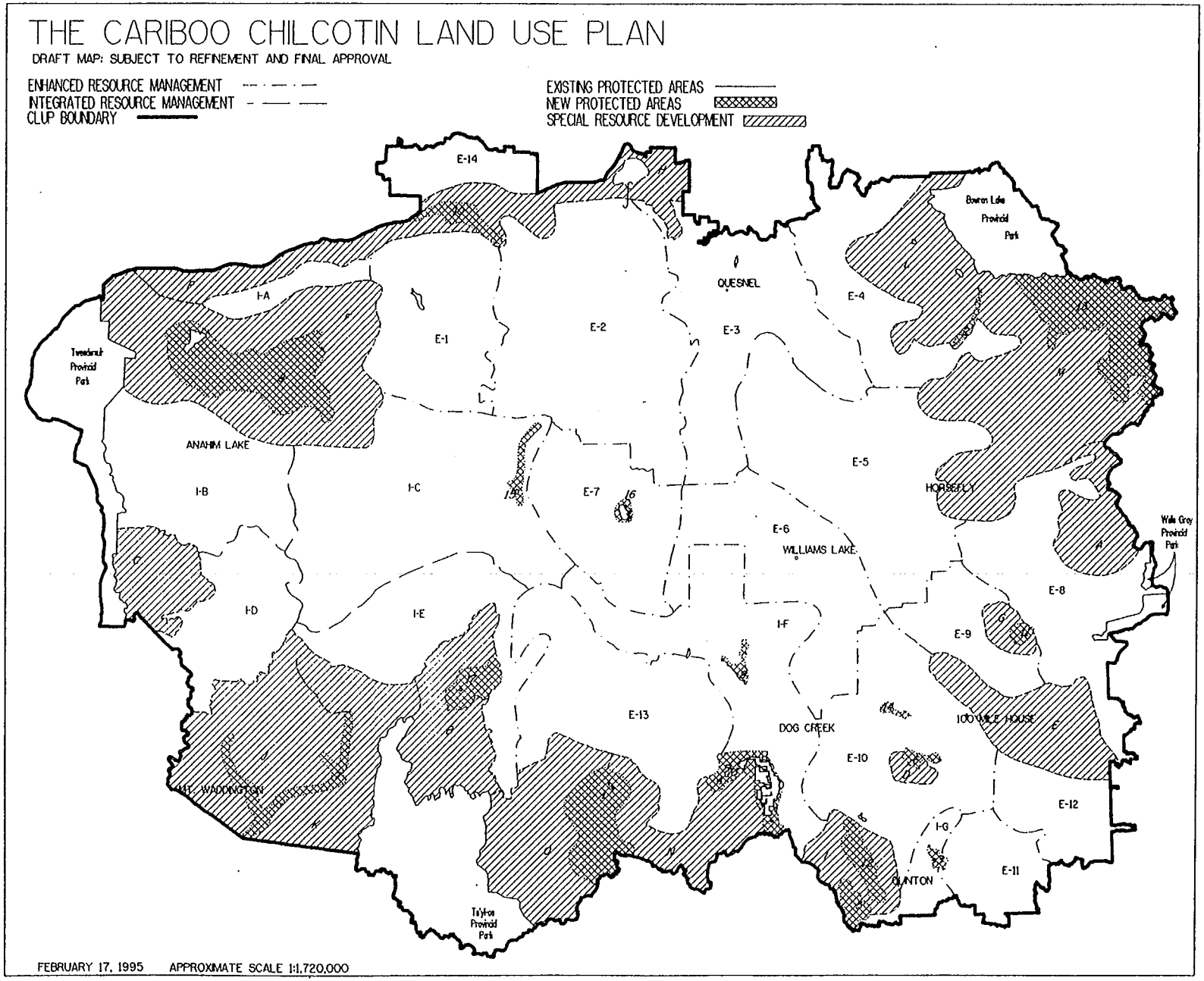

Figure 2: Cariboo-Chilcotin Land Use Plan (from CORE, 1995)

3) Integrated RDZ

- 7 Integrated RDZs were created which cover 14% of the land base (no Integrated Resource Development Zones are located in the Quesnel River watershed);
- some specific sites within this zone will be appropriate for enhanced resource use;
- forestry, mining, cattle grazing, tourism, recreation, wildcraft/agroforestry, fishing, trapping, and hunting are appropriate activities; and,
- management objectives for this zone will aim to integrate all values: social, environmental and economic.

4) Enhanced RDZ

- 14 Enhanced RDZs were created which cover 40% of the land base (four Enhanced Resource Development Zones are located in the Quesnel River watershed (Quesnel ERDZ, Cottonwood ERDZ, Beaver Valley ERDZ, Canim ERDZ));
- forestry, mining, cattle grazing, tourism, recreation, wildcraft/agroforestry, fishing, trapping, and hunting are appropriate activities;
- the initial focus of enhancement activities will be aimed at creating new jobs in all sectors; and,
- forest productivity will be maintained and enhanced through intensive reforestation, spacing, pruning, thinning, and new harvest practices.

Details on the polygons located in the Quesnel River watershed and the sectoral targets which directly relate to fisheries values (Fish and Wildlife and Timber) are summarized in Appendix II.

Highlights of the polygon targets which pertain to the fishery resource within the Quesnel River watershed include:

- maintaining riparian habitat quality for identified salmon-rearing watersheds;
- applying the Forest Practices Code, including riparian buffers, biodiversity conservation targets and wildlife areas, across all zones. The development and implementation of a biodiversity conservation strategy for the region is a key requirement;
- maintaining habitat requirements for key regional species, including Dolly Varden trout;
- maintaining quality lake and stream fisheries through road access restrictions and visual quality management;
- maintaining environmental values through improved access management; and,
- developing a comprehensive water management strategy which focuses on both water quality and quantity concerns.

The importance of managing anadromous salmonids in the Quesnel River watershed was emphasized throughout the CORE process by DFO. Indeed, DFO summarizes its concerns in an appendix to the Land Use Plan (see Government of B.C., 1995) entitled "Objectives and Strategies for Salmon Resources". That appendix captures the spirit and intent of DFO's previous submissions which were provided to CORE and the Implementation Committee during the Land Use Plan formulation process, and includes:

1) an overview of salmon resources;
2) an overview of DFO's fisheries goals;
3) a rationale for using the watershed as the basic planning unit;
4) general objectives and strategies for salmon streams; and,
5) division of specific watershed units in the Cariboo-Chilcotin region into baseline or enhanced watersheds based on an assessment of potential land and resource use impacts on hydrology and fish habitat. Baseline watersheds include important salmon producing streams although the system does not require special management attention at this time. Standard management practices should be applied to these systems to protect salmon habitat, which assumes an acceptable level of protection will be provided to stream habitat and water quality through application of existing measures (e.g., Forest Practices Code and field guidelines, DFO/MELP's Land Development Guidelines for the Protection of Aquatic Habitat, Stream Stewardship Series, etc.). Watersheds are classified as enhanced when the development activity and/or sensitivity of the watershed is high and the salmon populations are at risk from cumulative impacts. Management objectives/strategies in these watersheds should emphasize watershed level analysis in order to assess past impacts and to avoid cumulative impacts from future development activities. In addition to the application of standard development practices (see above), specific requirements including planning (detailed watershed plans e.g., LRUP's, water management plans, watershed restoration plans), assessment (watershed cumulative effects analysis, terrain hazard analysis, instream flow assessments, aquatic habitat inventories, etc.), management actions (rate of cut adjustments, wider streamside management zones, provisions for fisheries resource maintenance flows, etc.), and monitoring (effectiveness auditing, etc.) should be implemented.

Many of the concerns raised by DFO throughout the CORE process were incorporated into the polygon specific resource targets, as presented in the Land Use Plan (Government of B.C., 1995) and summarized in Appendix II of this document.

Resource targets for the Land Use Plan were developed and are to be applied in the context of existing resource management legislation and regulations (Forest Act, Forest Practices Code, Fisheries Act, Mines Act, Wildlife Act, etc.). As such, the Land Use Plan is a higher level plan which provides specific objectives and guidelines for integrated resource management across all zones, and will be used to guide subsequent planning, management, and development of natural resources in all regions of the Cariboo-Chilcotin, including the Quensel River watershed.

The designation of the Land Use Plan as a higher level plan ensures that the Plan can provide clear direction to the resource agencies regarding (among other things) logging activities (areal distribution and location of cut blocks, rate of cut, logging methods, etc.) and the management of fish and wildlife populations and habitat in the Quesnel River watershed. This is significant because it potentially provides one mechanism for ensuring that natural resource values are incorporated into the resource harvesting equation at regional and sub-regional planning levels. In this way, the Land Use Plan has helped to resolve the issue of 'whether' and 'where' resource harvesting and other activities can occur. It leave open the issue of 'how' future resource harvesting should be carried out.

Implementation of the Land Use Plan is ongoing. Our review of CORE documents and discussions with government agency representatives from the line agencies, CORE office and the

Land Use Coordination Office (LUCO) indicates that the structure and responsibilities of the implementing bodies is evolving. However, implementation responsibilities will reside largely with two groups which will initially focus on implementation of the Land Use Plan at a regional scale:

1) Inter Agency Management Committee (IAMC): The IAMC is a regional interministerial committee consisting of senior government representatives from:

   Ministry of Environment, Lands and Parks
   Ministry of Forests
   Ministry of Agriculture, Fisheries and Food
   Ministry of Energy, Mines and Petroleum Resources
   Ministry of Small Business, Tourism and Culture
   Heritage Canada
   Department of Fisheries and Oceans

   The general role of the IAMC is to review and resolve interagency land and resource use issues. The IAMC will be responsible form managing and coordinating the ongoing implementation of the Land Use Plan. The IAMC will be assisted by LUCO.

2) Regional Resource Board (RRB): The RRB will be established in the coming months and is intended to function as a non-technical advisory body to the IAMC. The RRB will likely consist of several (12-20) sectoral representatives, and therefore will utilize the sectoral representation model which was used in for the formulation of the Land Use Plan. The RRB is to assist in implementation of the resource objectives (rate of cut adjustments, preservation of important fish and wildlife habitat, etc.) of the Land Use Plan, to provide guidance to sub-regional plans and planning processes in the Cariboo-Chilcotin region, and to ensure that the public can participate meaningfully in implementation of the Land Use Plan. The RRB will also ensure the overall integrity of the implementation process.

There are not currently any plans to establish sub-regional plans or planning processes in the CORE area (Mitchell, pers. comm.). However, it is anticipated that sub-regional planning activities will occur once the role and function of the regional implementing bodies has been established and is underway.

1.5 Overview of the Quesnel River Watershed Alliance

As indicated in an earlier section of this report, one objective of this study is to work with the Quesnel River Watershed Alliance (QRWA) to identify resource issues in the Quesnel River watershed and to identify public involvement opportunities in fisheries projects. This requires that a brief description of the QRWA be included, as presented below.

The Quesnel River Watershed Alliance (QRWA) was formed in the fall of 1994 and is an umbrella organization representing groups and individuals working to maintain, restore and enhance the overall health of the Quesnel River watershed. The QRWA advocates protection and ecologically sustainable use of the natural resources within the Quesnel River watershed, and

promotes land use and management decisions which enhance the quality of life, long term stability, and economic viability of communities in the watershed (QRWA, n.d.). The QRWA currently has 54 members and counting, and is expects to complete its business plan early in April, 1995 (C. Blake, pers. comm.).

In order to apportion the overall goal of the Alliance into manageable sized tasks, the Alliance divided the Quensel River watershed into seven sub-basins (Lower Quensel River, Beaver Creek, Cariboo River, Quesnel Lake, Horsefly Lake, Horsefly River, Moffat Creek). Working groups for each sub-basin have been established to organize specific tasks and initiatives within their sub-basin. The QRWA's function is to provide support and direction to the sub-basin groups and act as a central 'voice' for these groups.

Although the role and function of the QRWA is evolving, it is our understanding that at a general level the QRWA ultimately hopes to:

- establish and maintain communication with the environmental agencies (DFO, MELP, MAFF, MOF);
- contribute to the setting of priorities for fisheries and resource projects; and,
- and assist in the formulation and implementation of prioritized projects, i.e. to get things happening 'on the ground'.

More specific goals and objectives of the group can be inferred from an official submission the QRWA made to John Allen, Chair, Cariboo-Chilcotin Implementation Team on December 17, 1994. In this submission the QRWA indicated that it is interested in contributing to implementation of the Land Use Plan through several specific activities. These include:

- Subregional Planning - the Alliance feels that detailed sub-regional planning is necessary to ensure that habitat and other values of particular sub-regions are protected. Furthermore they believe that consultation with local people is essential to developing a long term plan;
- Watershed Planning - The Alliance believes that the watershed is the best unit for sub-regional planning activities, and is the unit that should be used in future planning activities for implementation of the Land Use Plan;
- Research - The Alliance recommends that a scientific panel be established for the Cariboo-Chilcotin, and that this panel provide expert advice and direction for the implementation of resource plans in the region. Furthermore, research must come to rely more on local expertise in the gathering of their data; and,
- Public Participation and Education - The QRWA proposes that a group be established to develop a public education and participation strategy for the implementation of the Land Use Plan. The Alliance believes that all residents in the Cariboo Chilcotin must be provided with opportunities to provide meaningful input throughout the implementation process.

Resource issues as identified by the QRWA are discussed in Section 2.0 below.

2.0 Resource Issues Identified by the QRWA

As previously indicated, the Quensel River watershed supports an array of resource uses, ranging from passive uses (e.g., backcountry hiking and guiding), to low intensity harvesting or resource uses (e.g., sport fishing, ranching and wildcrafting), through to high intensity harvesting activities (e.g., commercial forestry and mining operations). Although in the past these activities have occurred together, more recently conflict amongst resource users have arisen as resource harvesting activities have escalated and overall use of the watershed by humans has increased to a point where frequently no one resource use can be carried out in isolation of another.

Underpinning these conflicts is a whole series of resource issues: how resources should be used, and where and by whom, for example. Because these resources issues are perceived, what one individual or community perceives as an important resource issue may not necessarily even be included on another's list. This makes characterizing the resource issues in the Quesnel River watershed difficult, because no one account can adequately characterize all the watershed's residents' thoughts on the subject. However, what we are able to do is to identify the resource issues, as they are understood by us at this time, in the Quesnel River watershed as perceived by the QRWA. These issues are discussed below in the context of the recent Cariboo-Chilcotin Land Use Plan 90-Day Implementation Process Final Report (Government of B.C., 1995). It is our intention that documenting these issues will assist the QRWA in establishing a direction for future efforts of the group in the watershed.

In order to identify these resource issues we provided the QRWA with a base map of the Quesnel River watershed for Alliance members to indicate the location of, and briefly describe, the most urgent resource issues as perceived by Alliance members. In this way the QRWA provided us with a summary of 'resource issues', which are discussed below and presented geographically on the map sheet accompanying this report.

2.1 Logging

The Quesnel River watershed is located in portions of the Quesnel, Williams Lake, and Horsefly Forest Districts of the Cariboo Forest Region (MOF, 1989). Several major sawmills, which attest to the economic importance of this industry in the area, are located in Quesnel and Williams Lake (Triton, 1991). Although some selective logging is undertaken on some wood lots, clearcut logging is more commonly practiced, particularly by the large commercial licencees in the watershed. Clearcut logging can effect the watershed's other resource values in several significant ways:

- viewscape and aesthetic qualities of an area;
- destruction or alteration of fish and wildlife habitat; and,
- reduction in fisheries values and instream conditions due to increased stream temperatures and suspended sediment loads.

Triton (1991) assigned watersheds in the Quesnel River watershed values of high, moderate, or low potential for impacts from timber harvesting based on the cumulative total of current and proposed harvest areas, expressed as a percentage of each watershed's forested land base. The values derived for watercourses in the Quesnel River watershed were assigned as detailed below.

Watersheds with a high potential for impacts from forest harvesting include:

- Cariboo River
- Hazeltine Creek
- Killdog Creek
- McKinley Creek

Watersheds with a moderate potential for impacts from forest harvesting include:

- Beaver Creek
- Blue Lead Creek
- Cameron Creek
- Horsefly River
- Mitchell River
- Moffat Creek
- Penfold Creek
- Quesnel Lake area
- Lower Quesnel River
- Wasko Creek

Watersheds with a low potential for impacts from forest harvesting include:

- Little Horsefly River
- Lynx Creek
- Roaring River
- Summit Creek
- Watt Creek

Triton's list is still fairly representative of sensitivities in 1995 because their work included a consideration of 5 year cut plans to the year 1996. However, some watersheds which were unlogged in 1991 when Triton completed its report have been logged since that time. These include Blue Lead Creek, Killdog Creek, Penfold Creek, and Wasko Creek.

Most QRWA members identified commercial logging of forests as the most urgent resource issue in the watershed. Members identified several sites or sub-regions in the watershed which are currently being commercially logged or are due to be logged, and these are discussed below. We wish to emphasize that regarding our discussion of these forest resource issues it is not our intention to adopt a pro-industry nor a pro-conservation perspective. Rather, we attempt to present the issues in a manner which explicitly considers the direction provided by the Land Use Plan and which emphasizes the opportunities for involvement of the QRWA. Specific opportunities for involvement, some of which are identified below, are discussed more fully in Section 4.0 of this report.

Specific sub-regions within the Quesnel River watershed which have been identified by the QRWA as 'hot spots' for logging, and the management direction established by the Land Use Plan for these areas, include:

Blue Lead Creek

Logging has been ongoing in the Blue Lead Creek watershed since the early 1990's, and several proposed cut blocks are included in the 5 year cut plan for the Horsefly Forest District. This watershed is in the Quesnel Lake Special RDZ which provides for management of 80% of the polygon for salmon stocks, and through controls on the rate of harvest (7% conventional harvest, 60% modified harvest, 33% no harvest). Primary areas of timber development will be in the northern, western, and southern edges of the polygon which suggests that the Blue Lead Creek watershed will not be the focus of forest harvesting in the polygon. The Land Use Plan does not assign the Blue Lead Creek watershed any specific management prescriptions.

Cariboo River

The Cariboo River valley bottom above Cariboo Lake is a new Protected Area where logging is prohibited. The valley sides fall into the Quesnel Highlands Special RDZ which provides for management of 100% of the polygon for salmon stocks through riparian area protection and controls on the rate of harvest (34% conventional harvest, 32% modified harvest, 34% no harvest). However, the primary areas of timber development will be in the lower elevation portions of this polygon, which indicates that the valley slopes are available for logging. The Land Use Plan also identifies the Cariboo River as an area to receive special management attention for hydraulic stability through watershed assessment, restoration work, and monitoring programs.

The southeastern valley slopes of the Cariboo River above Cariboo Lake, and most of the Cariboo River below Cariboo Lake, are areas which have been intensively logged in the past (Triton, 1991). These areas fall into the Cottonwood Enhanced RDZ. This RDZ requires that riparian habitats are maintained through application of the Forest Practices Code, and identifies the Cariboo River as an area to receive special management attention for hydraulic stability through watershed assessment, restoration work, and monitoring programs. Controls on the rate of harvest (79% conventional harvest, 10% modified harvest, 11% no harvest) will primarily be in the central portion and southern edge of the polygon, which does include the lower Cariboo River.

Our meetings and telephone communications with resource agency representatives in the Cariboo indicates that the Cariboo River has been selected as a priority site for completion of a Landscape Unit Plan.

Penfold Creek

Penfold Creek watershed is currently unlogged, although a significant number of cut blocks are proposed for this watershed in the 5 year cut plans. The watershed falls into the Quesnel Lake Special RDZ which provides for management of 80% of the polygon for salmon stocks, and through controls on the rate of harvest (7% conventional harvest, 60% modified harvest, 33% no harvest). Primary areas of timber development will be in the northern, western, and southern edges of the polygon, which presumably includes the Penfold watershed which falls into the northern portion of the watershed.

Although the Land Use Plan does not assign the Penfold Creek watershed any specific management prescriptions, the Penfold Landscape Unit Plan formulation process has been initiated (see Table 1).

Beaver Creek

Beaver Creek has been logged in the past, although logging has not been intensive in this watershed (Triton, 1991). We are not aware of the specific status of proposed logging in this watershed, although we understand some cut blocks are proposed. The watershed is located in the Beaver Valley Enhanced RDZ which provides for management of 70% of the polygon (including the Beaver River watershed) for salmon stocks, and through controls on the rate of harvest (62% conventional harvest, 32% modified harvest, 6% no harvest). Primary restrictions to timber development will be in the more populated areas of the polygon, which presumably includes the Beaver Valley because of its importance as an agricultural area supporting working farms.

Jumeaux Lakes complex

Satellite imagery indicates that the Jumeaux Lakes area has been logged in the past, although we are not aware of the status of proposed logging in the watershed. The watershed is located in the Beaver Valley Enhanced RDZ which provides for management of 70% of the polygon for salmon stocks, and through controls on the rate of harvest (62% conventional harvest, 32% modified harvest, 6% no harvest). Primary restrictions to timber development will be in the more populated areas of the polygon. It is unclear whether this includes the Jumeaux Lakes complex. The Land Use Plan does not assign the Jumeaux Lakes watershed any specific management prescriptions.

Headwater Areas

More generally, the QRWA is concerned about logging is the sensitive headwaters areas of many of the systems in the Quensel River watershed not specifically discussed above (e.g., Blue Lead and Penfold Creeks). These areas comprise much of the eastern portion of the watershed, and include the headwater areas of the Horsefly River and the source areas and drainages of Quesnel and Horsefly Lakes. Although some of these areas are currently being logged and include planned cutblocks in the 5 year cut plans, most of these areas fall within the Mitchell Lake/Niagara Protected Area or the Special RDZs and as such are afforded some protection under the guidance of the Land Use Plan and the Forest Practices Code. This is particularly true in the following headwater areas:

- the Summit Lake, Cariboo River, and Mitchell Lake areas which fall into the Mitchell Lake/Niagara Protected Area where logging is prohibited;
- the headwater areas of Quesnel Lake and Horsefly Lake, and portions of the Horsefly River watershed, are in the Quesnel Lake Special RDZ. The Land Use Plan provides for the maintenance of visual quality in the viewshed surrounding Quesnel and Horsefly Lakes and the Horsefly River, management of the Horsefly River watershed for salmon stocks, and management of the Horsefly River watershed for hydrologic stability through watershed assessment, restoration work, and monitoring programs. Watershed assessment work and monitoring programs are currently underway in the Horsefly watershed, as

indicated in Table 1. Some portions of the Horsefly River watershed are in the Boss/Deception Special RDZ and the Canim Enhanced RDZ. The Boss/Deception Special RDZ provides for management of the Horsefly River watershed for salmon stocks (90% of the polygon), and management of the Horsefly River watershed for hydrologic stability through watershed assessment, restoration work, and monitoring programs. Watershed assessment work and monitoring programs are currently underway in the Horsefly watershed, as indicated in Table 1. The Canim Enhanced RDZ provides for management of the Horsefly River watershed for salmon stocks (35% of the polygon), although it does not assign the Horsefly River watershed any specific management prescriptions.

In summary, the Land Use Plan and the Forest Practices Code provide a mechanism to ensure that an adequate level of protection for many of the sensitive headwater areas in the Quesnel River watershed exists, although logging is a resource use which can occur in many of the headwater regions. This is not meant to imply that all is well in the Quesnel River watershed. Rather, we wish to suggest that existing resource management and planning tools, including new initiatives like the Land Use Plan and Forest Practices Code as well as existing permit and licence application review processes, may provide an effective framework for addressing forest resource issues.

2.2 Mining

Hardrock and placer mining has played an important historical role in the development of the Cariboo, and are activities which continue to this day in the Quesnel River watershed. Although there are currently no active hardrock mines in the watershed (several abandoned mines exist), we are aware of at least two which are in the permitting and approvals process (Mount Polley, and QR Gold in the upper Quesnel River). However, numerous placer mining operations are in production in the Quensel River watershed, particularly in the Quesnel Highlands area (Government of B.C., 1995). These operations can be particularly detrimental to the fisheries resource, and impacts include (from Triton, 1991):

- destruction of riparian leave strips;
- inadequate reclamation of mined areas;
- improper settling pond construction and maintenance;
- improperly screened pump intakes;
- poor road and/or bridge construction;
- work below the high water mark; and,
- improper fuel storage and refuse disposal.

Some QRWA members identified hardrock and placer mining, and deactivation of abandoned facilities, as a resource issue in the watershed. Members identified several sites or sub-regions in the watershed which are currently being considered as a hardrock mine site or support existing placer mines. These include (see also accompanying map sheet):

- the abandoned Eureka Gold mine on MacKay Creek;
- the Mount Polly and QR mines, which are currently in the approvals process; and,
- some specific placer mining operations in the Quesnel River watershed.

These areas fall into several of the polygons as delineated in the Land Use Plan. However, each of the polygons ensure access for mining development to 100% of the polygons outside of those areas currently reserved from activity. This indicates that the Land Use Plan does not provide a specific framework for mineral resource management in the Quesnel River watershed, although the B.C. Mines Act and B.C. Waste Management Act, and existing requirements for review of mine development permits, will continue to apply.

2.3 Backcountry, Viewscape, Wildlife, and Fisheries Values

Some QRWA members identified backcountry, viewscape, wildlife, or fisheries values as resource issues of concern. Most of these, however, were raised in the context of forestry concerns, and are therefore not discussed in detail here, the assumption being that the planning activities undertaken to meet the timber resource targets stated in the Land Use Plan will necessarily consider fish and wildlife values, as per the polygon specific fish and wildlife resource targets. In particular:

- one QRWA member indicated that the Cariboo Protected Area is too small. This protected area was initially announced to include 7,000ha although its final area is approximately 3,100ha. Because the size of the Protected Area has been accepted by provincial Cabinet there are no mechanisms for increasing the area of this Protected Area other than contacting political representatives (MLA, etc.); and,
- some QRWA members identified maintenance of the viewscape of Quesnel Lake, Horsefly Lake and the Horsefly River as a priority resource issue. The Land Use Plan has addressed this by directing lower level plans to maintain the visual quality in the viewshed surrounding Quesnel and Horsefly Lakes and the Horsefly River, to maintain 25% of the Quesnel Lake Special RDZ polygon in a backcountry condition, to establish Landscape Units in the polygon, and to apply an access management strategy aimed at restricting the development of permanent road access over approximately 40% of the polygon, in addition to the area to be managed for backcountry experience. In addition, conventional forest harvest must not exceed 7% of the productive forest land base, 60% of the forest land base may be harvested using modified harvest techniques, and 33% cannot be harvested.

Outside of the Protected Areas and Special RDZ one wildlife resource issue has been identified to date by the QRWA:

- The Beaver Creek watershed contains valuable Mule Deer habitat, and there is concern by some Alliance members that these values may not be maintained. This areas falls into the Beaver Valley Enhanced RDZ which specifies that mule deer winter range values must be maintained through modified harvest regimes over approximately 18% of the forest in this polygon.

2.4 Agriculture

Although agriculture and ranching was not identified as a resource issue *per se* by the QRWA, it was acknowledged by the Alliance that water withdrawals for some systems in the Quesnel River

watershed are fully allocated due to large agricultural requirements. Furthermore, agricultural use has been identified by others (e.g., Triton, 1991) as a resource use which contributes to water allocation conflicts, and also one which affects fisheries values through increased water temperatures and sedimentation in the areas where extensive agricultural and ranching activities are occurring. Areas of intensive agricultural activities include (K. Awmack, pers. comm.):

- Dragon Lake area near the mouth of the Quesnel River;
- the area 30km upstream of the mouth of the Quesnel River in the vicinity of Hydraulic; and,
- the Big Lake/Horsefly area.

Agriculture may therefore also be an important resource issue in some subwatersheds of the Quesnel River watershed. In particular, it is acknowledged by the Alliance that a water management plan is required for the Beaver Valley area to address fisheries flow requirements and agricultural needs for competing water uses in this area.

2.5 General

More generally, QRWA identified several overarching issues and concerns in the watershed. These include (from QRWA, 1995):

- to manage and protect all fish species and populations and their habitats, and restore riparian habitats on all lakes, streams, and wetlands in the watershed;
- to protect the water quality and wilderness values of the headwaters of the Quesnel River watershed, with special priority on the undeveloped watersheds;
- to maintain the biodiversity within the watershed through the Biodiversity Conservation Strategy and through future studies and research;
- to identify and respect all native heritage sites within the watershed; and,
- to maintain the wildlife habitat of the caribou, grizzly bear, moose, furbearers, and species at risk through proper management and protection. A major effort to protect low elevation caribou habitat is essential for their long term survival.

3.0 Fisheries Projects Underway or Proposed in the Quesnel River Watershed

As indicated in Section 1.3, several studies have been completed in the past in the Quesnel River watershed. In order to gather a comprehensive and up-to-date list of fisheries projects underway or proposed in the watershed as of March, 1995, we visited several individuals in the Williams Lake and Horsefly areas, and contacted several others by telephone. A list of contacts is included as Appendix I to this report and a summary of our findings in included Table 1 below. Fisheries projects underway and proposed in the Quesnel River watershed are presented geographically on the map sheet accompanying this report.

Table 1: Fisheries Projects and Related Watershed Initiatives Underway or Proposed in the Quesnel River Watershed

Project	Agency[1]	Location	Description	Objective	Funding	Duration	Status	Contact	Remarks
Stock and Habitat Assessment Projects									
Horsefly Habitat Capability and Spawning Assessment	MELP	Horsefly River system	spawner assessment	better management of (kokanee and RB?) stocks	$30,000	fall 1995	ongoing	Rob Dolighan, MELP	annual program
Incubation Environments Study	DFO	Horsefly River system	remote sensing to estimate sockeye capacity	estimate stock abundance	$150,000 over three years	1993-present	ongoing	Ian Williams, DFO	
Horsefly Fry Enumeration	DFO	Horsefly River system	fry assessment	estimate fry abundance	n.a.	spring 1995	proposed	Neil Schubert, DFO	
Sockeye Adult Assessment	DFO	Horsefly River system	adult spawner assessment	estimate spawner abundance	<$10,000	fall 1995	proposed	Neil Schubert, DFO	
Bioreconnaissance Projects									
Horsefly Watershed Monitoring Program	DFO, MELP, MOF, Ranchers, Forest Licencees, First Nations	Horsefly River watershed	temperature, suspended sediment, and gravel movement monitoring	assessment of impacts of logging and related activities	$350,000 over 5 years	1994-present	underway	Pat Teti, MOF Rodger Stewart, MELP	coordinated by the Horsefly Monitoring Committee
Horsefly Sediment Source Study	MELP	Horsefly River watershed	Stage 1 Watershed Restoration Program assessment	identification of sediment source sites in Horsefly system	$105, 000	fall 1994-present	ongoing	Jack Leggett, MELP	
Lakeshore Assessment Program	MELP MOF	throughout Quesnel River Watershed	assessment of all lakes >5ha	viewscape protection and access management	n.a.	1995 fiscal year	proposed	Maurice Lirette, MELP	obligation under the Forest Practices Code
Diet Study of Quesnel Lake RB Trout	MELP	Quesnel Lake	diet study	improved management of Quesnel Lake RB stock	$20,000	1991-1995	ongoing	Eric Parkinson, MELP	
Blue Lead Creek Sediment Budget Study	MOF	Blue Lead Creek	sediment monitoring program	assess impacts of logging in watershed	$15,000	1993-present	ongoing	Pat Teti, MOF	monitoring stations at mouth of creek and 5km upstream from mouth
Habitat Restoration and Stock Enhancement Projects									
SEP Community Project	DFO	throughout Quesnel River watershed	public school incubation boxes	education and stock enhancement	n.a.	1980s-present	ongoing	Roy Argue, DFO	
Sustainable Development Program	Ardcorp. MAFF affiliated	throughout Quesnel River watershed	funding for farm improvements	reduce farming impacts on water quality	n.a.	n.a.	ongoing	Bill Twaites, Ardcorp	up to $4750 funding provided based on a $10000 project
Mitchell Lake Weir Improvements	DFO MELP	outlet of Mitchell Lake	installation of by-pass channel	improved RB trout migration	$40,000	summer 1995	proposed	Ed Woo, DFO	funding provided by DFO
Likely Hatchery and Rearing Channel	DFO	Quesnel River at Likely	chinook hatchery	stock enhancement	n.a.	1980s-present	ongoing	Rick Holmes, DFO	hatchery due to close in 1995
Horsefly Spawning Channel	DFO	Horsefly River at Horsefly	sockeye spawning channel	stock enhancement	$75,000	1980s-present	ongoing	Ed Woo, DFO	expenditures are for maintenance only
Planning and Training Projects[2]									
Penfold Landscape Unit Planning Strategy	MOF MELP	Penfold Creek watershed	integrated watershed management plan	protection of sensitive environmental features in watershed	$10,000	1995	proposed	Rodger Stewart, MELP	other Landscape Unit Plans are anticipated for Quensel River watershed
Best Waste Management Plans	MAFF	Quesnel and Horsefly systems	best waste management practices for working farms are formulated	minimize impacts of farming on nearby watercourses	n.a.	1992-present	ongoing	Ken Awmack, MAFF	many informal, ad hoc changes in farming practices have also occurred
Kokanee Harvest Planning Project	MELP Cariboo Tribal Council			kokanee management	$6,300	fall 1995	proposed	Jack Leggett, MELP	program was supposed to proceed fall 1994
One Year Fisheries Agreement	MELP Cariboo Tribal Council			fisheries management, habitat management and training	$150,000	1994-1995	ongoing	Jack Leggett, MELP	program may be extended to 1995 fiscal year

[1] MELP Ministry of Environment, Lands and Parks
MOF Ministry of Forests
MAFF Ministry of Agriculture, Fisheries and Food
DFO Department of Fisheries and Oceans

[2] There are no Local Resource Use Plans (LRUP) or Land and Resource Management Plans (LRMP) in the Quesnel River watershed

4.0 Conclusions and Opportunities for QRWA Involvement

Research undertaken during the course of this study, including extensive contact with individuals from a range of resource agencies, First Nations, and the private sector, has failed to identify any programs currently underway in the watershed which require immediate volunteer participation. However, there are several initiatives which are due to proceed in the coming months and beyond, and these are presented in this section.

As discussed earlier, the Land Use Plan has moved a long way toward resolving the issue of 'whether' and 'where' resource harvesting and other activities can occur, although it has not resolved the issue of 'how' future resource harvesting should be carried out. On a general and intuitive level, this suggests that the QRWA might best focus its efforts in two ways:

1) Contribute to the 'fine tuning' of the land use and resource harvesting targets as laid out in the Land Use Plan, primarily through participating in the formulation and implementation of lower order or sub-regional plans; and,

2) Participate in the public review process which accompanies applications for resource extraction to ensure that the planned extraction methods are appropriate.

Furthermore, the next 1-2 months will be required for organization of the Regional Resource Board, and marks a period of agency fiscal year renewal. Therefore, the present time may be a suitable one for the QRWA to assign priorities within the group as to where they wish to focus their efforts and to establish conduits of communication with the resource agencies and other groups as appropriate (this recognizes the fact that the QRWA currently has over half a dozen projects underway, and has established contacts with some representatives of the resource agencies). To this end, we recommend that the Alliance meet with one or more agency representatives, and discuss the resource issues presented earlier in this report with the agency representatives. This will hopefully establish a rapport with those individuals which can be developed over time. We also recommend that key members of the QRWA review Volume 3 of the Provincial Land Use Strategy (CORE, 1995), if they have not already done so. This document contains a good account of the rights and responsibilities of a community-based group such as the QRWA, and makes recommendations for a flexible framework of community resource boards that are voluntary, inclusive of all interests, accountable to the public, purpose-driven, advisory, and consensus-seeking.

Some more specific opportunities for involvement of the QRWA in the Quesnel River watershed are included below.

4.1 Polygon Specific Projects

There are several planning initiatives which will be required as a result of the higher level planning direction provided by the Land Use Plan. Because most of these will include and encourage opportunities for public involvement, the QRWA may wish to participate in those it deems most important. The resource agencies should be contacted directly for information on the timing and exact nature of these initiatives.

Boss/Deception Special RDZ

1) Landscape Units are to be established in this polygon;
2) this polygon is a priority area for Lake Management Planning and approximately 7 lakes are to be managed as quality lakes for wilderness fisheries; and,
3) the Horsefly River watershed is to be managed for hydrologic stability through watershed assessment, restoration work and monitoring programs (this work is underway; see Table 1).

Quesnel Highlands Special RDZ

1) Landscape Units are to be established in this polygon; and,
2) the Cariboo River watershed is to be managed for hydrologic stability through watershed assessment, restoration work and monitoring programs.

Quesnel Lake Special RDZ

1) Landscape Units are to be established in this polygon (the Penfold Landscape Unit Plan has been initiated in this polygon; see Table 1 and below);
2) an access management strategy aimed at restricting the development of permanent road access over approximately 40% of the polygon is to be developed;
3) this polygon is a priority area for Lake Management Planning and approximately 5 lakes are to be managed as quality lakes for wilderness fisheries; and,
4) the Cariboo and Horsefly River watersheds are to be managed for hydrologic stability through watershed assessment, restoration work and monitoring programs (this work is underway in the Horsefly River watershed; see Table 1).

Quesnel Enhanced RDZ

1) approximately 3 lakes are to be managed as quality lakes for wilderness fisheries; and,
2) water allocation planning is to be initiated to address high population and competing water uses in this area.

Cottonwood Enhanced RDZ

1) Landscape Units are to be established in this polygon;
2) water allocation planning is to be initiated to address stream flow requirements in late summer and placer mining; and,
3) the Cariboo River watershed is to be managed for hydrologic stability through watershed assessment, restoration work and monitoring programs.

Beaver Valley Enhanced RDZ

1) approximately 2 lakes are to be managed as quality lakes for wilderness fisheries; and,
2) water allocation planning is to be initiated to address fisheries flow requirements and agricultural needs for competing water uses in this area.

1) Landscape Units are to be established in this polygon; and,
2) approximately 10 lakes are to be managed as quality lakes for wilderness fisheries, although most are to be in the Pendleton Lakes area.

4.2 Other Resource Projects

There are other projects which are being initiated as a response to the Forest Practices Code, or because a need for them has been identified, which include public participation components. Other opportunities exist as part of ongoing annual monitoring programs. These include:

1) The Penfold Landscape Unit Plan has been initiated and there will be a Stakeholder Advisory Group struck for that planning process in the next 1-2 months (contact Mike Lloyd, MOF or Rodger Stewart, MELP); and,

2) Ongoing or proposed monitoring programs in the Quesnel/Horsefly complex may be able to incorporate volunteer components, although they currently do not. These include:

   - the McKinley Lake outlet flow control structure may be affecting resident fish stocks, and migration monitoring may be required at this site (contact Rob Dolighan, MELP);
   - the Horsefly Monitoring Program gravel quality monitoring component may benefit from volunteer participation (contact Jim Roberts, DFO); and,
   - the Blue Lead Creek Sediment Budget Study may benefit from volunteer participation (contact Pat Teti, MOF).

4.3 Higher Level Planning Initiatives

There are several Cariboo-Chilcotin wide initiatives which can be expected to move forward as a result of the Land Use Plan.

1) Regional Resource Board (RRB)

The RRB will be selected in the coming months. This non-technical group will consist of representatives from several resource sectors, and are expected to act in an advisory capacity to the Inter Agency Management Committee (IAMC). Our conversations with resource agency representatives indicates that it will probably take most of the rest of the calendar year for the role and function of the RRB, and its relationship to the IAMC, to become clearly established.

Although our research indicates that there are not currently any plans to establish sub-regional planning processes or planning boards in the short term (i.e., 1995), it is likely that eventually these boards and processes will be established, initially on a pilot project basis. Although it is unclear at this time how the QRWA might 'fit' into the sub-regional model, once it is developed, there are some issues which the Alliance may wish to consider:

- it is currently held that any sub-regional planning processes will most appropriately be configured at existing administrative boundaries, for example the forest district level (CORE, 1994). Because the QRWA uses watershed boundaries to define its area of interest, it does not represent an entire forest district, but rather parts of three forest districts (Quesnel, Horsefly, and Williams Lake); and,
- as discussed in CORE (1995) open, inclusive, and balanced representation of sub-regional boards will be essential. Negotiations between a group of individuals representing like interests increases the likelihood of agreement, but it generally produces an agreement that is unstable, unrepresentative, and is difficult to implement. Agreements reached between a group of individuals representing a variety of interests, conversely, often achieve implementation and affect substantial change.

Timber Availability Plan

During the short term implementation of the Land Use Plan a need to resolve remaining uncertainties regarding the immediate availability of timber has been identified. To address this issue, the Land Use Plan calls for preparation of a Timber Availability Plan for the Cariboo-Chilcotin by December 31, 1995. Although the Plan formulation process is still evolving, the forest industry will take a lead role in the development of this Plan, with the support of the provincial resource agencies. Furthermore, it is likely that a multi-stakeholder review of the proposed plan generated by the forest licencees will be completed. The QRWA may wish to investigate how it might contribute to this review.

Biodiversity Conservation Strategy

Concurrent with formulation of the Timber Availability Plan, but with no reporting deadline specified, a Biodiversity Conservation Strategy for the Cariboo-Chilcotin must be prepared. A central focus of this Strategy will be the establishment of Landscape Units and objectives for environmental components (seral stage distribution, retention of wildlife trees, etc.). Although opportunities for formal public input to this Strategy have not yet been determined, the QRWA may wish to investigate how it might contribute to this initiative.

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APPENDIX I

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APPENDIX II

LAND USE PLAN RESOURCE TARGETS FOR THE QUESNEL RIVER WATERSHED

A) Protected Areas

There are two Protected Areas in the Quesnel River watershed:

1. *Cariboo River Protected Area*
2. *Mitchell Lake/Niagara Protected Area*

- no resource extraction is permitted in Protected Areas, although cattle grazing is permitted in all Protected Areas except the Junction Sheep Range.

B) Special RDZ

There are three Special RDZs in the Quesnel River watershed. Grazing targets for all Special RDZs located in the Quesnel River watershed are to maintain current authorized levels of animal unit months in each polygon, and mining targets for all Special RDZs located in the Quesnel River watershed are to maintain access to 100% of each polygon outside of those areas currently reserved from activity.

1. *Boss/Deception Special RDZ*

Fish and Wildlife targets include:

- to manage the Horsefly River watershed for salmon stocks (approximately 90% of the polygon) through riparian area protection and controls on the rate of harvest;
- to manage for the biodiversity targets that will be developed in the Regional Biodiversity Conservation Strategy, including specific seral stage targets;
- to maintain riparian habitats through the establishment of riparian management zones on all streams, lakes, and wetlands as specified under the Forest Practices Code Riparian Guidelines;
- to establish Landscape Units which include both the Special RDZ and adjacent Protected Area and to manage in conjunction with the Protected Area to maintain representational values;
- to apply and access management strategy aimed at restricting the development of permanent road access over approximately 30% of the polygon, in addition to the area to be managed for backcountry experience;
- to manage approximately 7 lakes as quality lakes for wilderness fisheries; priority area for Lake Management Planning; and
- to manage the Horsefly River watershed for hydrologic stability through watershed assessment, restoration work, and monitoring programs.

Timber targets as applied to the productive forest land base include:

- conventional harvest 12%;
- modified harvest 51%;
- no harvest 37%; and,
- the primary areas of timber development will be in the western, lower elevation portions of each drainage.

2. *Quesnel Highlands Special RDZ*

Fish and Wildlife targets include:

- to manage the Cariboo, Bowron, and Cottonwood River watersheds for salmon stocks (approximately 100% of the polygon) through riparian area protection and controls on the rate of harvest;
- to manage for the biodiversity targets that will be developed in the Regional Biodiversity Conservation Strategy, including specific seral stage targets;
- to maintain riparian habitats through the establishment of riparian management zones on all streams, lakes, and wetlands as specified under the Forest Practices Code Riparian Guidelines;
- to establish Landscape Units which include both the Special RDZ and adjacent Protected Area and to manage in conjunction with the Protected Area to maintain representational values;
- to apply and access management strategy aimed at restricting the development of permanent road access over approximately 30% of the polygon, in addition to the area to be managed for backcountry experience; and,
- to manage the Cariboo River watershed for hydrologic stability through watershed assessment, restoration work, and monitoring programs.

Timber targets as applied to the productive forest land base include:

- conventional harvest 34%;
- modified harvest 32%;
- no harvest 34%; and,
- the primary areas of timber development will be in the lower elevation portions of this polygon.

3. *Quesnel Lake Special RDZ*

Fish and Wildlife targets include:

- to manage the Quesnel, Bowron, and Horsefly River watersheds for salmon stocks (approximately 80% of the polygon) through riparian area protection and controls on the rate of harvest;
- to manage for the biodiversity targets that will be developed in the Regional Biodiversity Conservation Strategy, including specific seral stage targets;
- to maintain riparian habitats through the establishment of riparian management zones on all streams, lakes, and wetlands as specified under the Forest Practices Code Riparian Guidelines;
- to establish Landscape Units which include both the Special RDZ and adjacent Protected Area and to manage in conjunction with the Protected Area to maintain representational values;
- to apply and access management strategy aimed at restricting the development of permanent road access over approximately 40% of the polygon, in addition to the area to be managed for backcountry experience;

- to manage approximately 5 lakes as quality lakes for wilderness fisheries; priority area for Lake Management Planning;
- to manage the Cariboo and Horsefly River watersheds for hydrologic stability through watershed assessment, restoration work, and monitoring programs; and,
- to manage the Lemon Creek watershed to address fisheries flow issues and agricultural needs.

Timber targets as applied to the productive forest land base include:

- conventional harvest 7%;
- modified harvest 60%;
- no harvest 33%; and,
- the primary areas of timber development will be in the western, lower elevation portions of each drainage.

C) Integrated RDZ

There are no Integrated RDZs in the Quesnel River watershed.

D) Enhanced RDZ

There are four Enhanced RDZs in the Quesnel River watershed. Grazing targets for all Enhanced RDZs located in the Quesnel River watershed are to maintain current authorized levels of animal unit months in each polygon, and mining targets for all Enhanced RDZs located in the Quesnel River watershed are to maintain access to 100% of each polygon outside of those areas currently reserved from activity.

1. *Quesnel Enhanced RDZ*

Fish and Wildlife targets include:

- to manage the Quesnel River watershed for salmon stocks (approximately 10% of the polygon) through riparian area protection, controls on the rate of harvest, and careful placer mining;
- to manage for the biodiversity targets that will be developed in the Regional Biodiversity Conservation Strategy, including specific seral stage targets;
- to maintain riparian habitats through the establishment of riparian management zones on all streams, lakes, and wetlands as specified under the Forest Practices Code Riparian Guidelines;
- to manage approximately 3 lakes as quality lakes for wilderness fisheries; and,
- to initiate water allocation planning to address high population and competing water uses in this area.

Timber targets as applied to the productive forest land base include:

- conventional harvest 60%;
- modified harvest 34%;
- no harvest 6%; and,

- the primary restrictions for timber development will be in the central portion of the polygon.

2. *Cottonwood Enhanced RDZ*

Fish and Wildlife targets include:

- to manage the Cottonwood River watershed for salmon stocks (approximately 60% of the polygon) through riparian area protection and controls on the rate of harvest;
- to manage for the biodiversity targets that will be developed in the Regional Biodiversity Conservation Strategy, including specific seral stage targets;
- to maintain riparian habitats through the establishment of riparian management zones on all streams, lakes, and wetlands as specified under the Forest Practices Code Riparian Guidelines;
- to establish Landscape Units which include both the Enhanced RDZ and adjacent Protected Area; manage in conjunction with the Protected Area to maintain representational values;
- to initiate water allocation planning to address stream flow requirements in late summer and placer mining; and,
- to manage the Cariboo and Cottonwood River watersheds for hydrologic stability through watershed assessment, restoration work, and monitoring programs.

Timber targets as applied to the productive forest land base include:

- conventional harvest 79%;
- modified harvest 10%;
- no harvest 11%; and,
- the primary restrictions for timber development will be in the central portion and southern edge of the polygon.

3. *Beaver Valley Enhanced RDZ*

Fish and Wildlife targets include:

- to manage the Horsefly, Beaver, Hazeltine and Edney watersheds for salmon stocks (approximately 70% of the polygon) through riparian area protection and controls on the rate of harvest;
- to manage for the biodiversity targets that will be developed in the Regional Biodiversity Conservation Strategy, including specific seral stage targets;
- to maintain riparian habitats through the establishment of riparian management zones on all streams, lakes, and wetlands as specified under the Forest Practices Code Riparian Guidelines;
- to initiate water allocation planning to address fisheries flow requirements and agricultural water needs for competing water uses in this area; and,
- to manage approximately 2 lakes as quality lakes for wilderness fisheries.

Timber targets as applied to the productive forest land base include:

- conventional harvest 62%;
- modified harvest 32%;
- no harvest 6%; and,
- the primary restrictions for timber development will be in the more populated areas of the polygons due to considerable interactions with the rural public.

4. *Canim Enhanced RDZ*

Fish and Wildlife targets include:

- to manage the Horsefly River watershed for salmon stocks (approximately 35% of the polygon) through riparian area protection and controls on the rate of harvest;
- to manage for the biodiversity targets that will be developed in the Regional Biodiversity Conservation Strategy, including specific seral stage targets;
- to maintain riparian habitats through the establishment of riparian management zones on all streams, lakes, and wetlands as specified under the Forest Practices Code Riparian Guidelines;
- to establish Landscape Units which include both the Enhanced RDZ and adjacent Protected Area; manage in conjunction with the Protected Area to maintain representational values; and,
- to manage approximately 10 lakes as quality lakes for wilderness fisheries, most in the Pendleton Lakes area.

Timber targets as applied to the productive forest land base include:

- conventional harvest 69%;
- modified harvest 18%;
- no harvest 13%; and,
- the primary restrictions for timber development will be in the southeastern portion of the polygon.

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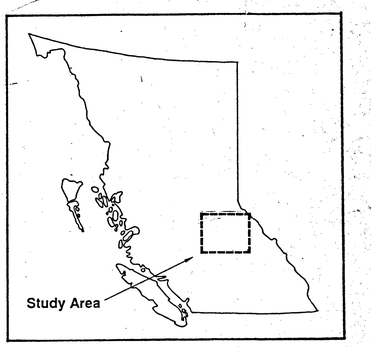

NON-SITE SPECIFIC PROJECTS

LAKESHORE ASSESSMENTS
assessment of all lakes >5ha
MELP and MOF; proposed

SEP COMMUNITY PROJECTS
public school incubation boxes
DFO; annual ongoing

SUSTAINABLE DEVELT PROGRAM
funding for farm improvements
Ardcorp. and MAFF; ongoing

BEST WASTE MGMT. PLANS
waste mgmt. plans for farms
MAFF; annual ongoing

KOKANEE HARVEST PROJECT
not available
MELP and Cariboo T.C.; proposed

ONE YR. FISHERIES AGREEMENT
not available
MELP and Cariboo T.C.; ongoing

Non-Site Specific Issues as Identified by QRWA

Proposed logging in sensitive headwater areas

Protection of viewscape of Quesnel Lake and River and Horsefly complex

Protection of fish and fish habitat throughout the watershed

Protection of water quality throughout watershed

Identification of Native heritage sites

Protection of wildlife habitat throughout watershed

MITCHELL LAKE WEIR IMPROVEMENTS
stock enhancement
DFO and MELP; proposed

Proposed logging in Cariboo R. watershed

PENFOLD LANDSCAPE UNIT PLANNING STRATEGY
integrated watershed management
MELP and MOF; proposed

Proposed logging in Penfold Ck. watershed

QR Gold Mine development

LIKELY HATCHERY AND REARING CHANNEL
stock enhancement
DFO; annual ongoing

Polly Lake Gold Mine development

Proposed logging in Beaver Ck. watershed

Proposed logging in Jumeaux Lakes watershed

HORSEFLY SPAWNING CHANNEL
sockeye spawning channel
DFO; annual ongoing

BLUE LEAD CREEK SEDIMENT BUDGET STUDY
sediment monitoring program
MOF; annual ongoing

Erosion associated with Blue Lead Creek logging road

Proposed logging in Blue Lead Ck. watershed

Proposed logging in sensitive area

DIET STUDY OF QUESNEL LAKE RB TROUT
diet study
MELP;ongoing

Contamination from Eureka Gold mine

HORSEFLY WATERSHED PROJECTS

HORSEFLY HABITAT CAPABILITY AND SPAWNING ASSESSMENT
spawner assessment
MELP; ongoing

INCUBATION ENVIRONMENTS STUDY
remote sensing to I.d. spawning capacity
DFO; annual ongoing

HORSEFLY FRY ENUMERATION
fry assessment
DFO; proposed

SOCKEYE ADULT ASSESSMENT
fry assessment
DFO; proposed

HORSEFLY WATERSHED MONITORING PROGRAM
temperature, suspended sediment and monitoring program
DFO, MELP, MOF, Ranchers, Forest Licencees, First Nations; ongoing

HORSEFLY SEDIMENT SOURCE STUDY
Stage 1 Watershed Assessment Program
MELP; ongoing

KEY

PROJECT NAME
objective of project
AGENCY; project status

Note: refer to Table 1 in report for project specifics

Resource Issue as Identified by the Q.R.W.A.

Horsefly River Watershed Boundary

N

QUESNEL RIVER WATERSHED

FISHERIES PROJECTS AND RELATED WATERSHED INITIATIVES AND RESOURCE ISSUES AS IDENTIFIED BY THE Q.R.W.A.

Scale 1 : 250 000
Contour Interval 500 feet

MAP CREATED FROM NTS BASE MAPS 92-A, 92-B, 92-G, 92-H