# Babine River Interim Local Resource Use Plan


**MINISTRY OF FORESTS**
**Prince Rupert Forest Region**
**Bulkley Forest District**
**Kispiox Forest District**

**MINISTRY OF ENVIRONMENT, LANDS AND PARKS**
**Skeena Region**

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# Preface

This plan describes the management consensus option and resource management issues for the Babine River area. It includes the watershed management prescriptions developed to meet the objectives of the consensus option.

**Note: This plan represents one set of strategies for managing the resource in the Babine River watershed. Alternatives will be identified and analysed as part of the Bulkley and Kispiox Land and Resource Management Planning processes.**

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# Executive summary

The Babine River watershed is an area containing an abundance of natural resources. Important resource values are timber, fish, water quality, recreation, biodiversity, and wildlife. To manage for the various values in the watershed, areas were designated for specific resource uses. These included a protected wilderness zone along both sides of the Babine River. The Babine River Local Resource Use Plan presents the management direction for that portion of the Babine River watershed outside the wilderness zone. The LRUP outlines prescriptions for eight treatment units and four management units in the Bulkley and Kispiox Forest Districts. The treatment units cover integrated resource management and riparian areas, forest ecosystem networks and their linkages across a landscape, as well as grizzly bear habitat. The four management units were identified to address forest development activities, primarily road access. A detailed Coordinated Access Management Plan (CAMP) is currently being developed.

The plan makes provision for the establishment of a joint monitoring committee. Annual reports of their findings will be published.

The public has provided direction and input throughout the Babine River planning process, including a review of the draft version of this plan. Public input will continue to be an important part of the process through monitoring committee reports. A major review of the plan will be conducted at least every five years with public input on any proposed plan revisions. This is recognized as a dynamic planning process which will address issues as they arise.

# Background information

The Babine River flows from Babine Lake running for approximately 100 kilometres to the Skeena River (see Figure 1). This watershed is largely undeveloped and has particularly high salmon and wildlife resources. As a result this area supports significant recreation, tourism, hunting, trapping and related resource-use interests. In addition, there are significant timber values within the area.

The Babine River planning process was initiated in response to a conflict between access for timber harvesting and conservation of recreation and wildlife values. Competing land use interests in the Babine River Drainage created pressures that required an overall land use plan be formulated. This process began in 1988 and was jointly coordinated by the Ministry of Forests and Ministry of Environment, Lands and Parks. A Technical Advisory Committee (TAC) was established to identify and resolve conflicting issues and develop options for this land base.

In 1991, the TAC issued the *Options for the Babine River Area* report. It detailed three land management options and three road access options. A consensus option (land management option 2 and access option B) was recommended and supported by the public and the TAC. This management option retains wilderness values along the river while allowing access for timber extraction outside the proposed wilderness zone. Option B accesses the area north of the Babine River via Shenismike Creek.

In 1992, the resource agencies issued the document *Public Review Summary of Options for the Babine River Area.* An information bulletin was also issued. It committed the agencies to develop an integrated plan for that portion of the Babine River Watershed downstream of Nilkitkwa Lake.

The Babine River Local Resource Use Plan (LRUP) area is located within two Timber Supply Areas (TSA), the Bulkley and the Kispiox. The TSAs differ in their levels of access development and management planning. The Kispiox portion of the LRUP is virtually undeveloped. Development will be subject to the Kispiox Land and Resource Management Plan (LRMP) and the LRUP. The Bulkley portion is partially developed and this plan will be used to prepare development plans pending completion of the Bulkley LRMP.

**Adjustments to the plan may also be required to address site specific conditions noted in total chance plans. However, these changes will not compromise sub-drainage objectives identified in the Babine LRUP.**

To meet the overall management objectives for the Babine River watershed, the area was sub-divided into zones. These include a wilderness zone centered on the Babine River and a special management zone adjacent to this. The rest of the watershed flowing into the Babine River system was divided into sub-drainages, within which treatment units based on habitat type were outlined. The LRUP considers wildlife habitat, particularly grizzly bear habitat, fisheries, timber, recreation and biodiversity resource values. The wilderness zone protects the resource values associated with the Babine River. Grizzly bear habitat will be managed outside the wilderness zone to meet cover, feeding and denning requirements.

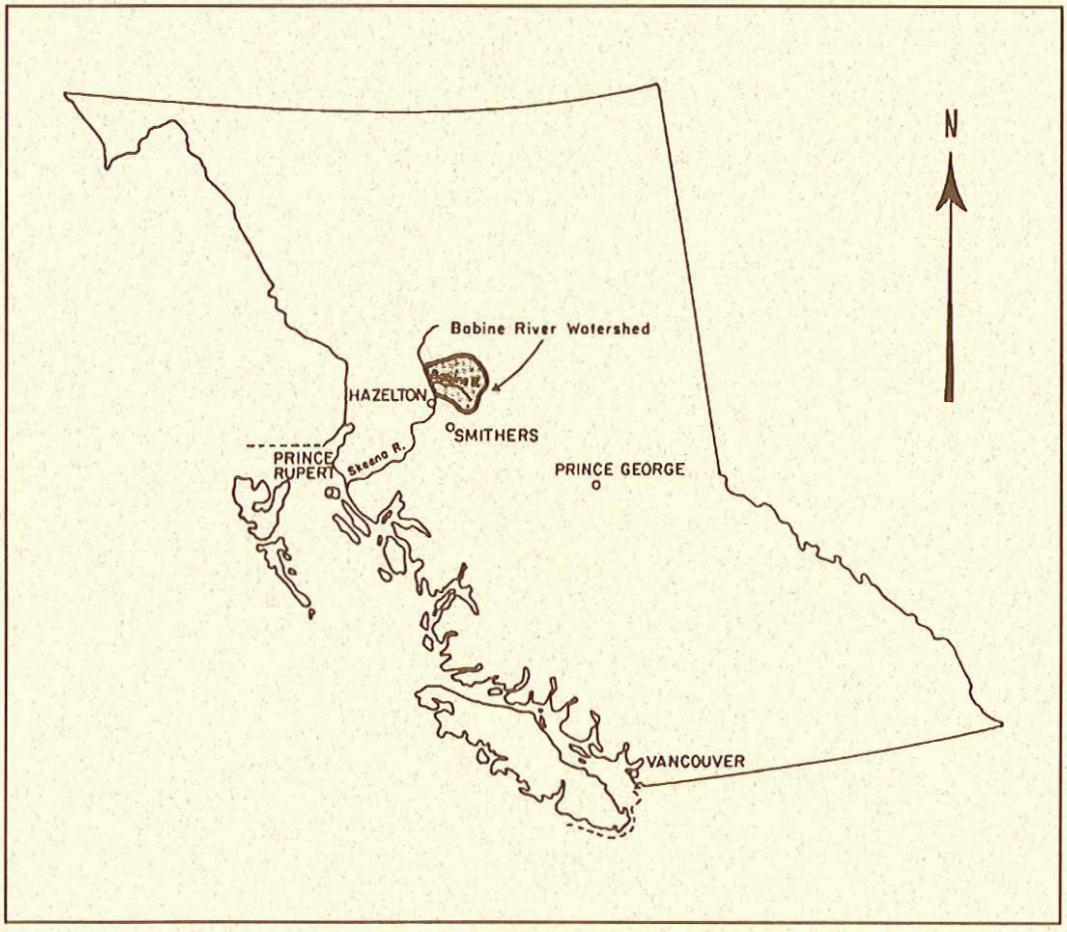


Figure 1. Babine River Watershed - general location map

# Part A: Management Zones

## Wilderness Zone

As a result of the Babine LRUP a corridor (wilderness zone) has been reserved from logging along both sides of the river. Its outer boundary is largely based on the extent of high-value grizzly bear habitat located in close proximity to the river.

The wilderness zone (see Figure 2) consists of forested and non-forested habitat beside the river. This zone plays an important role in maintaining the riparian area intact along the Babine River, protecting water quality, fish habitat, tourism, guiding and recreation activities and grizzly bear habitat.

To maintain the wilderness quality of this zone no commercial harvesting will take place, however cutting of trees may be permitted where fire, safety, and pest management are of concern. (See Appendix 1 for mountain pine beetle pest and fire management direction in the wilderness zone.) Other features of a provincial forest wilderness area include restricted motorized access, no public roads, regulated mineral resource use, and an allowance of existing trapping activity (*Options for the Babine River Area*, 1991).

The wilderness zone has been advanced as a candidate wilderness area under Section 5.1 of the *Forest Act* (Information Bulletin, July 27, 1992) and has been referred to the Protected Areas Strategy process for a decision. If the proposal is approved this zone will require a wilderness management plan.

A study is underway to determine wilderness, recreation and tourism objectives the wilderness zone could support and still remain within limits of acceptable change.

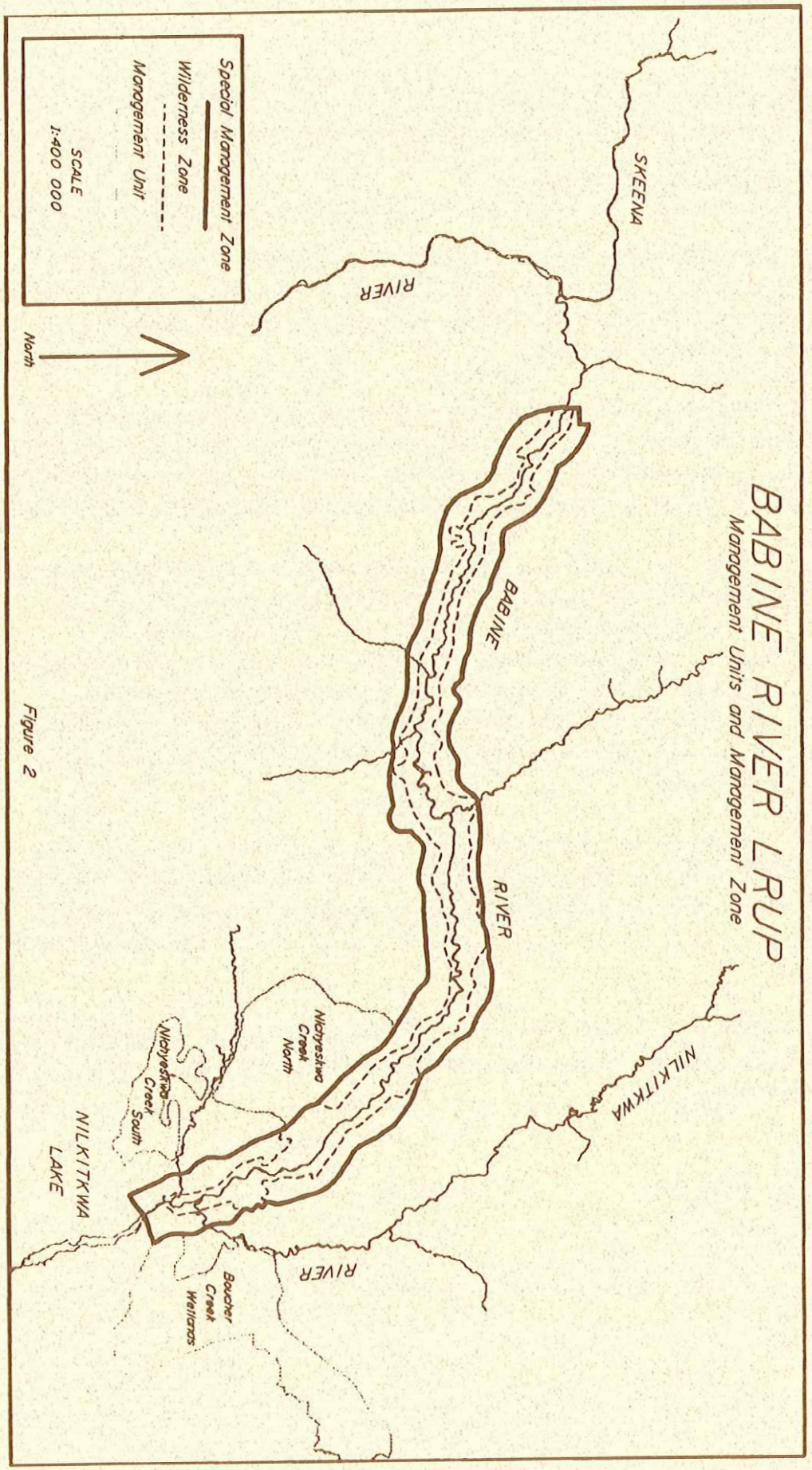


Figure 2

Figure 2. Babine River LRUP-Management Units and Zones

## Special Management Zone

The special management zone (see Figure 2) adjoins the wilderness zone. This area contains a variety of habitat types, some of which are rated as high and moderate value for grizzly bears. The primary objective in this zone was to protect and buffer the river-based resource values within the wilderness zone. Logging will be limited to selective harvests or small clearcuts up to 15 hectares. Temporary roads and a slower rate of cut will be emphasized (*Options for the Babine River Area*).

Management guidelines for this zone are presented in the management unit 4 description and Appendix 1. These prescriptions largely reflect the objectives outlined in *Options for the Babine River Area* for this zone.

## Sub-drainages

To ease planning and to manage for biodiversity, the portion of the Babine River watershed within the Bulkley Forest District was sub-divided into four sub-drainages: Boucher, Horetsky, Nichyeskwa North and Nichyeskwa South (See Figure 3). These areas include both minor and major tributaries of the Babine River system. The sub-drainages were based on an amalgamation of planning cells within the Forest Inventory Planning (FIP) database for the Bulkley Forest District. The Kispiox portion of the Babine River watershed was also subdivided into the following sub-drainages: Shenismike, Gail, Shelagyote North and Shelagyote South, and Shedin.

Harvesting will be planned within each sub-drainage to meet the criteria suggested in the Prince Rupert Forest Region discussion paper *Managing for Biodiversity* (Steventon, 1993). As suggested by the discussion paper, early seral (age class) stages (0-20 years) in each sub-drainage should not exceed 50 per cent in the Sub-Boreal Spruce Biogeoclimatic Zone (SBS) and 30 per cent in the Englemann Spruce-Subalpine Fir Biogeoclimatic Zone (ESSF). To address other wildlife and resource values, a minimum of 30 per cent should be maintained as mature forest (80+ years) in the SBS and greater than 50 per cent in the ESSF. The seral stage percentages for biogeoclimatic zones are preliminary and subject to change as we improve our understanding of what is typical for these biogeoclimatic zones. Protected areas containing mature forests can be included in these percentages. Structural features characterizing mature stands in each of these biogeoclimatic zones or subzones are described in Appendix 2.

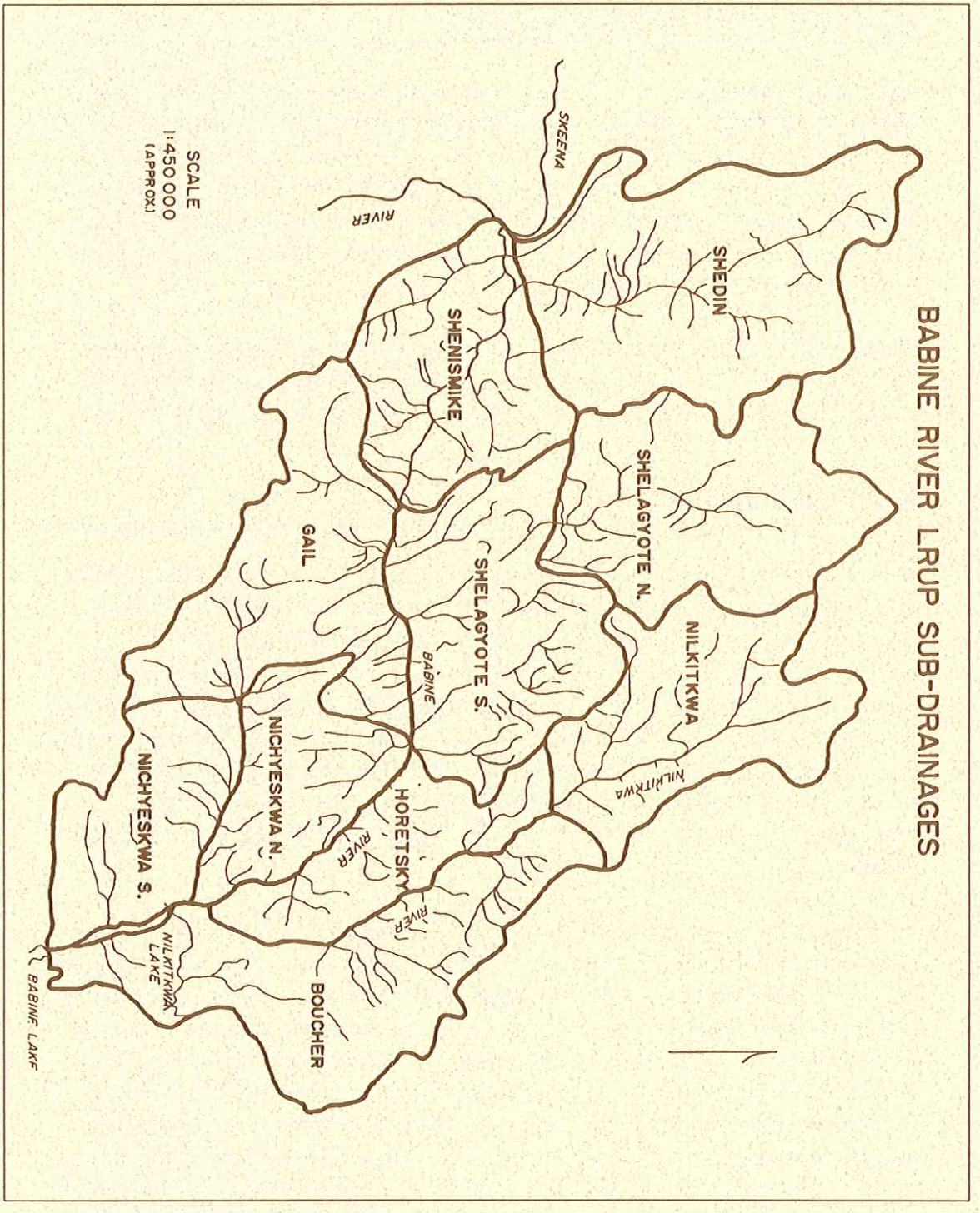


Figure 3. Babine River Local Resource Use Plan (LRUP) Sub-drainages

Details of each biogeoclimatic subzone, habitat type, habitat class and seral stage (age class) distribution within sub-drainages by biogeoclimatic subzone can be found in Appendix 3. To date, this information has only been compiled for the Bulkley Forest District portion of the Babine River Watershed. These habitat types can be used as the basis for total chance planning because they are compatible with the ecosystem site series. Harvesting activity should be planned so that there is proportional development in all forested habitat classes within a sub-drainage during each pass. Further, seral stage distribution should be balanced between the different habitat types.

The integrated management plan features management and Treatment Unit prescriptions within the sub-drainages. The prescriptions provide direction for timber harvesting and guidelines for areas that require special management for the protection of grizzly bears, bear habitat, fisheries, known recreational opportunities and biodiversity.

# Part B: Resource Management Issues

## Recreation

### Landscape

It is recognized that aesthetic quality of the environment is an important component of the outdoor experience for the tourist and recreationist. Expectations vary greatly among users but it is important to ensure economic and social benefits accrue to the people of British Columbia, while including provisions for maintaining the aesthetic integrity of the landscape.

One of the common complaints against forestry operations is the visual impact and resultant loss of opportunities for other resource users. An acceptable balance can be achieved by establishing landscape guidelines that ensure proper field layout and prompt reforestation.

To assist in achieving landscape objectives, visual quality objectives (VQOs) have been established for the Babine River and the west arm of Babine Lake (Ministry of Forests, 1989). When considering development in these areas, recommendations from this study must be addressed (see Figure 4).

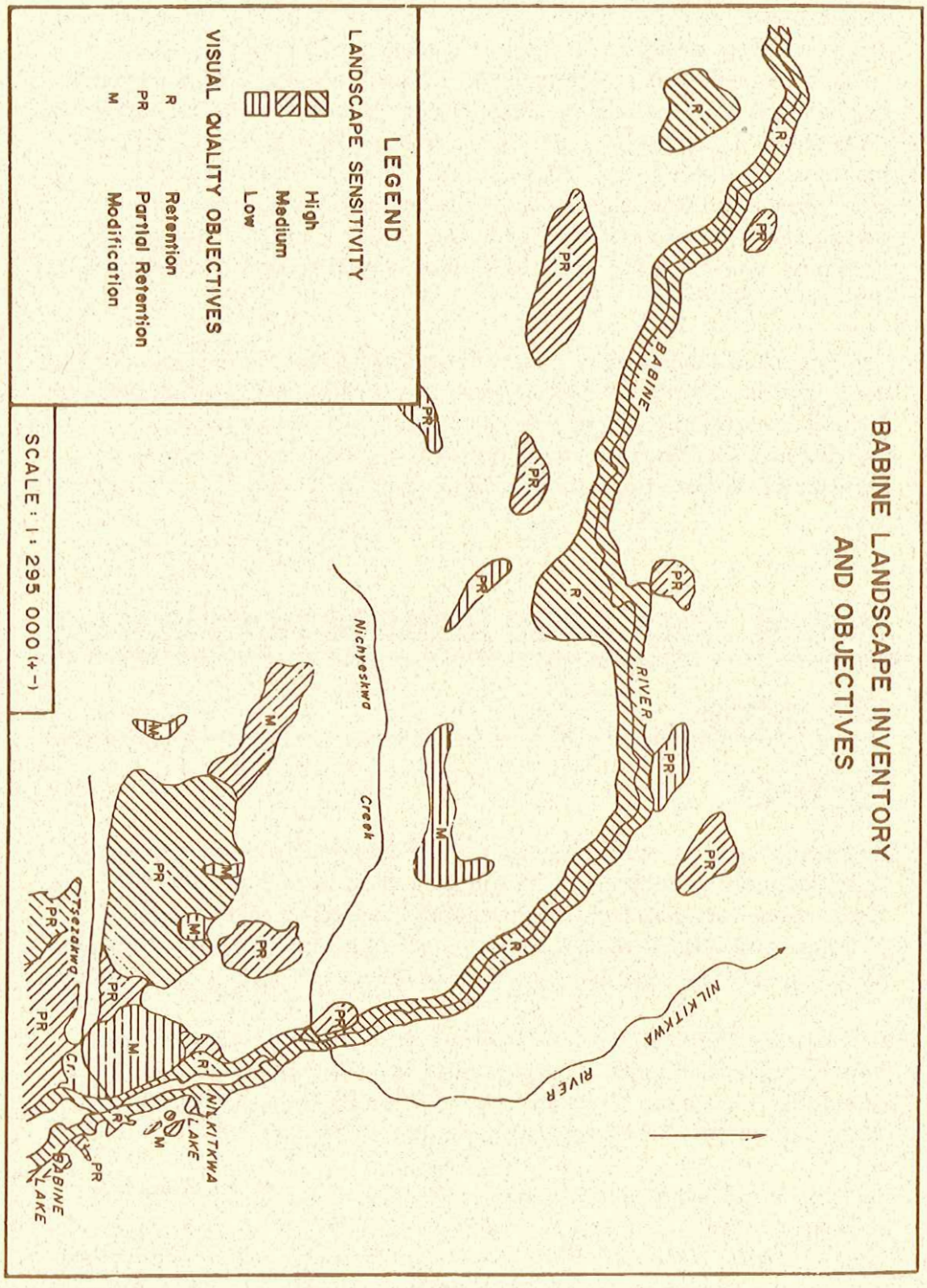


Figure 4. Babine Landscape Inventory and Objectives

## Features of significance

The Bulkley TSA was used as the pilot project in a study, *Natural resource-based tourism in Northwestern British Columbia* (Ethos Consulting, 1991). This report provided information on the probable product quality and diversity possible for the area. The ratings considered factors essential for that product, for example, presence of pristine viewscapes in an alpine/ subalpine setting for backpacking. Product quality was assessed by activity. For example, the quality of the backpacking experience was rated high if it provided dramatic scenery along established trails in an area with high diversity and good wildlife viewing opportunities.

Several areas within the Bulkley Forest District portion of the Babine River watershed were identified as having tourism capability ranking from very high to low. The Babine River corridor received a very high rating for various types of activities, including trophy fishing, wildlife viewing, rafting and hunting. With the exception of hunting, all activities had a high quality rating. The wilderness zone along the Babine River will provide some protection of the quality of these activities.

Babine Lake received a moderate rating for fishing and the Nilkitkwa area (including the Bait and Sicintine Ranges) had a low tourism capability for guided hunting. The Suskwa Pass had a low capability for snowmobiling, as did the Bait and Sicintine Ranges for backpacking.

Most lakes within this portion of the watershed will be maintained in a semi-primitive setting. Access will be limited to walk-in and any roads will be located at least 200 metres from the shoreline. Buffers around some of these lakes have been identified (refer to Treatment Unit 2a for details). The exception to the semi-primitive setting is Sucker Lake. Access will be improved to this lake and the existing camping site upgraded to Forest Service recreational site standards. Starvation Lake is visible from the Nilkitkwa Road and is easily accessed. There are no plans to establish any facility on this lake. Acorn, Clota, Secret and a number of smaller unnamed lakes in the same area will be maintained as walk-in only for the present. Several other lakes exist southwest of the Babine River within the wilderness zone and special management zone. No further access or facilities are planned for these lakes. Public demand and future road access will determine the establishment of more recreation sites in the watershed.

Popular activities in the Babine River watershed include angling, hunting, rafting and camping. Activities that will become more popular include hiking and backpacking. Two trails already exist within the Bulkley Forest

District portion of the watershed--the Suskwa Pass trail and French Peak trail. Other hiking destinations that presently have no trail access are the Bait Range, which could possibly be reached via a route adjacent to Charleston Creek, Kotsine Lake and the icefields of the Sicintine Range. The features in these areas are not unique. There are numerous hiking opportunities with similar or more spectacular features elsewhere in the Bulkley District. Future recreational opportunities accessible by road will be controlled or restricted in the Bulkley Forest District portion of the Babine River watershed.

Wildlife viewing is becoming more popular in British Columbia. The report *Skeena Region Wildlife Viewing Development Plan* (Mol, 1991) identified four viewing sites within the watershed: the Babine River counting fence; Fort Babine hatchery; Lower Babine River; and, Upper Babine River. The opportunity to view grizzly bears is the main attraction.

Access to the Babine River is limited and no facilities for viewers are available. During late summer, salmon can be viewed at the fish counting weir. Department of Fisheries and Oceans also have an information kiosk detailing the life cycles of the salmon. At Fort Babine there is a small hatchery operation where one can view anadromous fish in floating rearing pens. Grizzly bear viewing is possible particularly during the salmon runs along the Babine River. As indicated previously, limited access prohibits most people from undertaking this activity but commercial operators such as rafters and fishing guides may be able to incorporate this unique feature into their operations.

Kayaking and white water rafting have been increasing in popularity in the area. Steelhead fishing is already recognized to be of world class quality along the Babine River and the Class 1 angling status of this river is in place to protect the quality of the fishing experience.

Harvesting strategies within the LRUP will incorporate new recreation inventory as it is made available either through input from the public and/or Forest Service staff. A recreation inventory was completed for the Kispiox Timber Supply Area in 1993.

## Cultural

First Nations concerns are outlined in the *Options for the Babine River Area* report. The Gitksan, Wet'suwet'en and Na'doet'en peoples are represented in this area. More specifically the Grouse and Frog clan of the Na'doet'en people were the traditional primary resource users of the

Babine River drainage. All animals are regarded as sacred by these people and conservation and protection for fish and wildlife are important goals. Traditional and present activities include hunting, fishing and trapping. The natives residing at Fort Babine want protection of their traplines and areas traditionally used by them such as berry picking sites (*Options for the Babine River Area*).

Trapping records are presented in Appendix 4. Records date back to 1937 for trapline 608T030. For the period where records are available 34 per cent of animals trapped in the Bulkley Forest District portion of the watershed were marten, 22 per cent weasel , 23 per cent muskrat and 22 per cent squirrel. Marten and weasel are typically associated with older forest. However, Lofroth and Steventon (1990) state that immature forest with appropriate habitat characteristics (coarse woody debris, stumps and snags) may meet denning and foraging requirements for marten. At the stand level, selective harvesting techniques which maintain at least 30 per cent canopy cover and a large amount of coarse woody debris are preferred for maintenance of marten habitat values (see Lofroth and Steventon, 1990, for more details).

## Fisheries

Fisheries values are high within this watershed. The Babine River and its tributaries are extremely productive streams for salmonids and resident fish. The Babine River is recognized as a world class river for steelhead fishing and is classified as a Class 1 angling stream. Only five rivers within the province have this status. Requirements for this status include a wilderness setting with the opportunity to catch trophy size fish. Access and fishing pressure will be regulated by the Environment ministry to maintain this Class 1 status. Numerous lakes in the watershed support sport fish populations. Like the Babine River, a wilderness fishing experience is possible due to the lack of access to these areas. Details on some lakes can be found in the Skeena Region Lake Management files.

The fisheries values in various stream reaches have been extensively reviewed by a number of individuals (Beere, M.C. 1991; Careless, R. 1990; Bustard et al., 1989; Sebastian, D.C. 1988; Hancock et al., 1983; Graham et al., 1976). Some of the highlights from these reports include the following:

1. The four most important streams for fish habitat include Babine River, Nilkitkwa River, Nichyeskwa and Boucher Creeks.
2. Soils in the Nichyeskwa and Nilkitkwa watersheds have high concentrations of fine textured material, resulting in natural

sedimentation during runoff or after heavy rain. As a result these waterbodies are sensitive to streamside or upland disturbance that may increase this problem.

3. Most steelhead fry production occurs in non-glacial streams such as Nichyeskwa and Boucher Creeks and their associated clear water tributaries.
4. Streamside vegetation should remain intact along Nichyeskwa and Boucher Creeks (mainstems and tributaries) to maintain water quality, bank stability and provide cover for juvenile fish.
5. Small, clear water tributaries of Nichyeskwa and Nilkitkwa and Babine River are very important for rearing of juvenile salmonids.
6. The Boucher Creek and Babine River confluence is a high use spawning site for salmonids.
7. Streams draining into Nilkitkwa Lake have not been assessed yet, but they may represent important rainbow trout spawning and rearing areas.
8. Evidence suggests that the most productive rainbow trout streams are those not heavily used by sockeye spawners.

The primary objectives identified in *Options for the Babine River Area* were as follows:

- maintenance of existing levels of water quality, clarity and hydrologic stability in the Babine River and its tributaries;
- maintenance of the Class 1 angling status of the Babine River; and,
- maintenance of fish habitat.

The wilderness zone located along the Babine River and the adjacent special management zone should provide protection for this Class 1 angling river. To protect fish habitat and maintain existing levels of water quality in the Babine watershed the following management guidelines apply on all tributaries to Babine River. Sediment control measures and fish habitat protection will require implementation of:

- the Interior Fish/Forestry/Wildlife Guidelines (Draft, February, 1993);
- the Watershed Workbook (1987);
- the Bulkley Sediment Control Plan;
- the Prince Rupert Region Interim Regional Harvesting Guidelines (1992) and Slope Stability and Surface Erosion Hazard Guidelines (Weiland and Schwab, 1991); and,
- the Kispiox Resource Management Consensus Report.

The riparian ecosystem adjacent to all water bodies plays an important role in protecting the integrity of that water body. The structural and compositional complexity of vegetation and size of these riparian areas is determined by several factors. These include the degree of influence of the associated water body, the presence of edges, variations in topography,

aspect, elevation, soil type (Hunter, 1990), and the ecosystem associations involved. The riparian vegetation is highly productive. It provides stream bank stability, cover and food for a wide variety of wildlife.

In this report the riparian ecosystem primarily refers to the forested vegetation community beside the stream and influenced by the water. Most riparian ecosystems are narrow in the Babine as they are associated with incised creeks. However, there are some wider forested alluvial ecosystems that are subject to periodic flooding as evidenced by old flood channels and surface sands or gravel. A riparian ecosystem is a source of large organic debris; it helps regulate water temperature (particularly important on small streams); it is a source of terrestrial insects and detritus; it also provides cover for fish, traps sediment and filters overland flows. To ensure the integrity of the riparian ecosystem is maintained, management prescriptions outlined in Treatment Unit 1 apply. The Draft Interior Fish/ Forestry/Wildlife Guidelines apply to all other riparian areas.

As indicated in the *Kispiox Resource Management Consensus Report*, the Kispiox Forest District will follow the Coastal Fish\Forestry Guidelines until the Interior Fish\Forestry\Wildlife Guidelines are approved.

## Wildlife habitat

Biophysical habitat maps were produced for the Babine planning unit in the Bulkley Forest District at a scale of 1:50,000. These maps stratify the area into habitat types on the basis of air photo, soil and terrain map interpretation and field work involving vegetation and soil plots.

Several objectives for wildlife habitat were identified in the *Options for the Babine River Area* report. These include:

- identifying and maintaining important wildlife habitat;
- increasing or maintaining wildlife habitat diversity; and,
- identifying and maintaining grizzly movement corridors to and along the river and areas outside the river corridor.

As stated in the options report, increasing or maintaining wildlife habitat diversity can be achieved by protection of important habitats, managing for a longer rotation in some areas, and the use of partial cutting systems. These objectives are dealt with by Treatment Units.

Managing the landscape for a diversity of seral stages may result in an increase in certain wildlife populations, such as moose. However, an increase in road access restrictions may lead to some reduction in the hunting opportunities in the Babine River watershed.

## Grizzly bears

The grizzly bear population requires special management attention in the Babine River drainage as they are on the Environment ministry Wildlife Branch's Blue List and are considered a sensitive/vulnerable species in B.C. (*Managing Wildlife to 2001: A Discussion Paper*, 1991). Specific management objectives outlined for grizzly bears in *Options for the Babine River Area* include maintaining the present population and managing for grizzly bear viewing opportunities identified along the Babine River corridor. Results of the "Limits of Acceptable Change" survey may have implications for the extent of development possible for these viewing sites.

The impact of increased access associated with resource development on grizzly bear populations has been reviewed by a number of authors (Hamilton, 1987; McLellan and Shackleton, 1989; McLellan and Shackleton, 1988; Peek et al, 1987; Simpson, 1990). Road construction often exploits landscape features that are associated with important bear habitats (eg. riparian areas). Grizzly bear use of habitats in close proximity to roads is limited (McLellan and Shackleton, 1988). Displacement of bears from these habitats may result in increased pressure on similar habitats elsewhere and permanent loss of these habitats to the population. Bear response to human activities is moderated by the presence of cover (McLellan, 1990; McLellan and Shackleton, 1989). Both McLellan (1989) and Simpson (1990) have recommended that road development avoid open habitat types, like meadows, and the maintenance of visual cover along haul roads. Closure of spur roads upon completion of silvicultural activities was also recommended.

Bears become used to human activity leading to a greater frequency of bear-human interactions (McLellan and Shackleton, 1989). This makes bears more vulnerable to legal and illegal harvesting, a major cause of mortality in adult bears (Hamilton, 1990; McLellan and Shackleton, 1988; Peek et al, 1987). Road closure or controlled access in areas where bears are known to congregate will reduce this problem and the likelihood of increased mortality.

A contract was issued by the environment ministry to K. Simpson (Keystone Bioresearch) in 1990 to rank the biophysical habitat units in the Babine watershed for use by grizzly bears. Overlays were produced which ranked these units into high, moderate and low value to bears (Simpson, 1991). Work undertaken by Simpson in 1992 linked these high value habitats within and between sub-drainages and identified movement corridors. A key point from his work was the need for protection of important habitats to facilitate maintenance of the Babine grizzly bear population over the long term.

Appendix 5 outlines which habitats were ranked for high, medium and low value to bears from Simpson's report (1992) and the anticipated season of use. A listing of plants known to be used for forage by grizzly bears is included in this appendix. The high value habitats were rated on the basis of the percentage of desirable bear foods available and the season(s) in which these habitats would be used. Moderate value habitats were predicted to regenerate with berry producing shrubs once logged. Prompt access removal to these areas is important since an increase in bear activity is anticipated. Low value habitat may be used for travel, security cover and bedding sites. Little food is available or likely to be so following logging in these habitat types. These habitat types are the preferred areas for permanent road development and logging activity.

It is anticipated that with proper planning of harvesting activities and access control, particularly beside high value habitat, management objectives for the Babine River grizzly bear population can be met. The Babine LRUP must be adaptable through time since bears may change their use of habitats due to changes in cover, forage and population as development proceeds within the watershed.

As a result of this information and the recommendations resulting from Simpson's report (1990, 1992), management prescriptions for the high and medium value habitats are outlined in Treatment Units 4 and 5. Prescriptions for the Integrated Resource Management Unit are outlined in Treatment Unit 6.

# Biodiversity

## Introduction

The main objectives in managing for biodiversity are the maintenance of viable populations of all native plant and animal species, genetic diversity within these species, and existing functional links between species

(vertebrates, invertebrates and microorganisms) and their environment. It is assumed that these objectives can be met by maintaining a proportion of all representative ecosystems in their natural state, while promoting habitat diversity by providing a range of seral stages for each habitat type across the landscape.

## Forest ecosystem networks (FEN)

Forest ecosystem networks have been identified to meet one of the objectives of maintaining biodiversity in the Babine River watershed. The biodiversity discussion paper (Steventon, 1993) suggests it is necessary at the landscape level to preserve representative examples of all ecosystems within each biogeoclimatic subzone. Potential FENs were identified within each sub-drainage that incorporate a number of overlapping concerns. These are described in Appendix 7. The wilderness zone is contained within the SBSmc (Sub-Boreal Spruce moist cold subzone) biogeoclimatic zone; therefore, the emphasis in delineation of additional areas was placed in the ESSF (Engelmann Spruce-Subalpine Fir) biogeoclimatic zone with links from riparian ecosystems through to the alpine. To reduce isolation and fragmentation of these ecosystems the FEN consists of reserve areas and linkages among the reserves (biodiversity committee minutes, October 26, 1992).

Particular emphasis is placed on incorporating unmanaged stands of older forest in these reserves. This reflects the anticipated difficulty and time required to re-establish these communities and the possible reliance of some species on older forest attributes. Attributes commonly associated with mature forests may include:

- presence of large trees;
- variation in tree sizes and spacing;
- canopy gaps and multiple canopy layers; and,
- accumulation of coarse woody debris.

These forested older seral stages should comprise areas of no less than 100 hectares and 400 metres across to provide interior forest conditions (Steventon, 1993).

Disturbance of these areas by fire, wind or disease will result in a greater percentage of early seral stages over the landscape. This may require some adjustment in scheduled harvesting activities for that biogeoclimatic subzone outside the FEN. This will ensure adequate representation of older seral stages over the landscape. Even in a disturbed state, these areas will presumably evolve naturally without human interference and continue

to provide functional links between all species (plants, vertebrates, invertebrates and microorganisms) and the physical environment.

These linkage areas may be moved, providing replacement areas become available with appropriate attributes such as those listed above. More details are provided in Appendix 2.

### Old growth

The biodiversity issue focuses primarily on old growth forests as it is this seral stage that is most affected by forest harvesting. It is difficult to recreate this seral stage with appropriate structural attributes; they are typically replaced by younger stands with less structural diversity (Steventon, 1993). Grizzly bears, small fur bearers and birds will benefit from the maintenance of older forests in each biogeoclimatic subzone across the landscape (Simpson, 1992).

Extensive forested areas greater than 140 years old (age class 8 and 9) are present within the Babine watershed. Black spruce stands, however, are relatively rare and it may be desirable to preserve them. Conservation of old growth aspen stands will require some disturbance over time. These stands are characterized by the presence of trees between 80 to 100 years old that have begun to rot, often with top and branch breakage. The presence of deciduous tree species within a stand increases the diversity of forested habitat present on the landscape. Nesting, foraging and perching habitat are provided by these trees.

Old growth is distributed throughout the sub-drainages and its representation will change in time through losses to wildfire and conventional harvesting. Planning for the retention and replacement of old growth stands will be incorporated into the total chance plans developed for the watershed. Keeping old growth will be accomplished using FENs; replacement of old growth stands will achieved with younger stands containing old growth attributes.

## Timber

Timber objectives outlined in *Options for the Babine River Area* and established by the Ministry of Forests include the following:

1. Manage the forest land base outside the wilderness zone.
2. Obtain a positive economic return from the forested land base outside

the wilderness zone.

3. Plan harvesting activity in consideration of other resource values and in a manner which minimizes the impact on these values.
4. Improve access to the watershed to protect and manage forest health (bark beetle infestations) and control fire outbreaks.
5. Provide access to the not sufficiently restocked (NSR) fire areas to get them back into timber production.
6. Provide an important source of spruce and pine logs not available elsewhere in the Bulkley Forest District.
7. Distribute the harvest proportionately over the Bulkley and Kispiox Timber Supply Areas.

The present age class distribution for the Bulkley Forest District is poorly represented in the earlier seral stages (0-60 years), Appendix 3. Through careful planning, some timber harvesting in forested habitats, within each biogeoclimatic subzone will result in an increase in the range of seral stages of each habitat type. This is consistent with the wildlife objectives of maintaining or increasing present habitat diversity.

A summary of the area identified as high value grizzly bear habitat is presented in Appendix 8. A summary of the operable timber (80+ years) for the Bulkley Forest District for each biogeoclimatic zone is presented in Appendix 9. LRMP criteria were used to determine operability. Estimates of operable timber in the Babine River watershed for all treatment units and the wilderness zone are outlined in Appendix 10.

There is an abundance of older age classes in all sub-drainages (Appendix 3). In Nichyeskwa South and Boucher much of the ESSF is inoperable (58.4 and 60.5 per cent respectively; Appendix 9); therefore meeting the 50 per cent greater than 80 years will have little impact on the rate of harvesting, providing meeting these objectives through inoperable areas is acceptable. This is not the case in the SBS for any of the sub-drainages, nor the ESSF for Nichyeskwa North and Horetsky. Although first pass will have no impact, in order to meet the seral stage guidelines suggested in Steventon's (1993) discussion paper the rate of cut in these sub-drainages may need to be adjusted to account for subsequent harvesting activities.

Treatment Unit 1 - Riparian ecosystems, upland buffers and potential movement corridors (Appendix 10):

Approximately 4.3 per cent of the operable timber within the LRUP is located in this treatment unit. Some volume will be available using selective logging techniques within this treatment unit.

Treatment Unit 2 - Forest ecosystem networks:

Treatment unit 2 contains 4,520 hectares of operable forest land representing about 3.6 per cent of the operable timber in the LRUP. With the exception of brood removal, commercial harvesting will not be permitted within this zone. Conservation of some older forest across the landscape is consistent with the interim forest harvesting guidelines for this region.

Treatment Unit 3 - Linkage areas:

In consideration of the total landbase these areas are not very extensive. Some timber is available through selective harvesting and all timber may be available through time providing replacement areas are designated and managed for now. Approximately 2.1 per cent of the operable timber in the LRUP is within these areas.

Treatment Unit 4 - High value grizzly bear habitat:

Some timber extraction is possible in these units. The operable timber within treatment units 4 and 4a represents 11.8 per cent of the operable timber available in the LRUP.

Treatment Units 5 and 6 - Moderate value grizzly bear habitat and integrated resource management:

Treatment units 5 and 6 contain the majority of the operable timber in the LRUP at 24.9 per cent and 49.0 per cent respectively.

Wilderness Zone:

The wilderness zone contains approximately 4.3 per cent of the operable timber in the LRUP.

NOTE: A breakdown of these data for the Bulkley and Kispiox Forest Districts is included in Appendix 10.

## Bark beetles

The mountain pine bark beetle continues to be a serious threat to the mature pine forests in the Bulkley Forest District portion of the watershed. The Bulkley Forest District pine beetle management strategy is outlined in Appendix 11. Although the Kispiox Forest District has fewer pine forests, it would follow a similar management strategy if a serious infestation occurs.

There is also a growing concern about the prevalence of balsam bark beetle within the Bulkley Forest District. In recognition of this, there is now a priority on logging beetle-infested balsam within the ESSF.

## Soil stability/surface erosion hazard

An overlay was produced outlining areas with a significant component of Class 4 or 5 for soil stability in the Bulkley Forest District portion of this watershed.

Class 4: Steep slopes (greater than 60 per cent) with high potential for slope failure; most gullies and avalanche slopes; terrace scarps; glaciolacustrine soils greater than 15 per cent slope.

Class 5: Presently unstable slopes; active slope failure at many sites; very high potential for accelerating slope processes, e.g. active gullies, terrace and river bank scarps; starting zones for avalanche slopes.

Class 5 areas are to be avoided for road building as major problems are expected with road cuts and slope stability. Special road construction and or harvesting techniques are to be used in Class 4 areas to mitigate impacts from development. More frequent monitoring for adherence to Ministry of Forests engineering specifications and harvesting guidelines should be considered.

Areas with a significant component of high or very high surface erosion hazard were also mapped. Forest development is to be avoided on very high hazard areas. Problems exist when water is channeled onto or over these sites. All disturbed areas must be immediately revegetated.

The Bulkley Forest District Sediment Control Plan has been developed to provide guidelines to control and monitor operational harvesting and road building activities. Forest development in the Babine watershed will adhere to these guidelines throughout all planning and operational phases.

A sediment monitoring program has been established in the Bulkley Forest District portion of the watershed. Water samples are being taken from various sites along the Babine and Nilkitkwa Rivers and Nichyeskwa Creek.

## Access

Access to the entire watershed will be addressed through development of a coordinated access management plan (CAMP). Suggestions arising from *Options for the Babine River Area* include ensuring that motorized access to the river is prevented by using bridges at the Nilkitkwa and Nichyeskwa crossings as control points. Bridge spans would be removed during periods of high recreation and grizzly bear use of the river.

# Part C: Treatment Units and Management Units

## Introduction

To coordinate development activities between the two forest districts, all treatment unit definitions were combined. One exception is Bulkley Treatment Unit 2a; Kispiox does not have a similar treatment unit. As well, the Kispiox Forest District contains several habitat types which are not found in the Bulkley Forest District. The Kispiox portion of the plan includes one management unit (the special management zone) and may require more management units as the area becomes developed.

Eight treatment units (see Appendix 12) and four management units have been established on the basis of resource values present, specific management objectives detailed in the options report and the presence of high value grizzly bear habitat.

| Treatment Unit | Location or type |
|---|---|
| 1 | Riparian ecosystems, upland buffers and potential movement corridors |
| 2 | Forest ecosystem networks |
| 2a | Conservation zones associated with lakes |
| 3 | Linkage areas |
| 4 | High value grizzly bear habitat |
| 4a | Mixed forest management |
| 5 | Moderate value grizzly bear habitat |
| 6 | Integrated resource management |

**Management Unit**

Bulkley Forest District:

| | |
|---|---|
| 1 | The Boucher Creek wetlands |
| 2 | South of Nichyeskwa Creek |
| 3 | North of Nichyeskwa Creek |

Bulkley and Kispiox Forest Districts:

| | |
|---|---|
| 4 | Special management zone |

Air photo interpretation and ground work will result in more detailed mapping at 1:20,000 of the spatial arrangement of habitat types within Treatment Units 4 through 6 thus refining what treatment prescription is required (see Lea and Kowell, 1990 for a description of habitat types). This is a necessary prerequisite for the development of Total Chance Plans in this drainage as the minimum mappable type at 1:50,000 is 50 hectares.

## Treatment Unit 1: Riparian ecosystems, upland buffers/movement corridors

A number of values or functions are associated with this treatment unit. These include but are not limited to the following: a movement corridor, a riparian ecosystem and upland buffer, dispersal routes for small mammals and birds, multi-season foraging sites, perching and nesting areas, denning habitat for small fur bearers, and moose winter range.

The main objectives in this treatment unit are:

- maintain the riparian ecosystem intact in terms of structure, composition and function;
- maintain 70 per cent of all habitat types structurally and functionally intact in the upland buffer/movement corridor to provide habitat for wildlife;
- manage for no net loss of aspen-maple habitat;
- provide linkage with other habitats.
- maintain the integrity of the movement corridor through providing thermal and security cover, snow interception and visual screening of the riparian ecosystem; and,
- maintain the productivity of streams for fish habitat.

The following treatment prescriptions apply:

No harvesting in a riparian ecosystem as described on page ten.

Where the riparian ecosystem boundary cannot be clearly defined, maintain a no-harvesting reserve approximately 150 metres from the water body.

In areas exhibiting deeply incised slopes, maintain an additional 50 metre no-harvesting reserve back from the ridge break. If the area presents a high blowdown risk, then a feathered cut within the 50 metre reserve may be acceptable.

Wherever possible, no permanent roads will be located within 150 metres of Treatment Unit 1. All access into this unit will be temporary and deactivated after use.

In the upland buffer/movement corridor maintain 70 per cent of the basal area of any logging area intact. This means that some form of alternative silvicultural system such as single tree or group selection must be employed. In harvested areas leave coarse woody debris on the ground (logs in various stages of decomposition), deciduous trees and brush patches. On a site specific basis, additional volume may be removed providing that the objectives of the treatment unit are achieved.

For aspen-maple habitat treat as per Treatment Unit 4a.

Utilize fall and burn or fall and remove control measures for epidemic populations of mountain pine beetle.

Silvicultural treatment objectives will include maintaining the range of naturally occurring tree species. Manual brushing and weeding is the only acceptable method of brush control within a riparian area. Maintain the productivity of these areas for wildlife by using heavy thinning of stands to promote forage production and/or lowering the stocking standards on plantations to maintain forage production. Flexibility in the silviculture standards is required to meet these objectives.

For grizzly bears, provide forested bedding habitat and security cover of 100 metres adjacent to open habitat types such as wetlands and meadows.

Unit 1 is used by grizzly bears throughout all three active seasons. To avoid contact and displacement of bears, restrict harvesting to the winter season only.

## Treatment Unit 2: Forest Ecosystem Networks (FEN)

The primary goal for these areas is to preserve representative ecosystems across a landscape unit. For a description of specific FENs see Appendix 7.

The objectives for this unit are as follows:

- maintain unmanaged stands of old growth representative of each forested habitat type;
- maintain as part of the forest ecosystem network; and
- maintain linkage with other units.

Treatment prescriptions include the following:

No future roads will be developed within this unit; however, crossings may be required to access operable timber. These will be identified and approved at the development plan stage.

No logging will take place in this unit.

Utilize fall and burn (or fall and remove, provided no new roads are constructed) control measures to prevent epidemic populations of mountain pine beetle from spreading to stands outside the FEN.

Efforts will be made to control forest fires in these units threatening the surrounding timber. No efforts will be made to regenerate these sites following these types of disturbances.

Disturbance of old-growth forest by fire or disease may require an adjustment in scheduled harvesting activities within that biogeoclimatic subzone outside the FEN. This is discussed further under the report sections titled **Sub-drainages** and **Forest ecosystem networks**.

## Treatment Unit 2a (Bulkley Forest District only): Conservation zones associated with lakes

The primary goal for these areas is keeping a forested buffer zone surrounding the larger lakes, and protection of identified viewscapes.

Treatment prescriptions include the following:

Single-tree selection logging may take place in this unit, provided no bladed trails or roads are constructed.

Access will be walk-in only and all road development will remain at least 200 metres away from the lakeshore.

Utilize fall and burn (or fall and remove, provided no new roads are constructed) control measures to prevent epidemic populations of mountain pine beetle from spreading to stands outside the buffer.

## Treatment Unit 3: Linkage areas

The objectives in this unit are as follows:

- prevent habitat fragmentation across the landscape;
- provide linkage with FEN, riparian areas and high value grizzly bear habitat;
- contribute to the biodiversity objectives; and,
- maintain grizzly bear movement corridors.

Treatment prescriptions include the following:

Road density will be kept to a minimum and only used as passage to access other areas. Where future roads are necessary, use reduced right of ways (20 metres maximum). The short length of road involved in crossing these areas will not be a safety problem for traffic on the road.

Single tree selection logging is allowed, provided no bladed trails or roads are constructed. Avoid harvesting during periods of anticipated use by bears (see Appendix 5).

Utilize fall and burn or fall and remove (provided no new roads are constructed) control measures to prevent epidemic populations of mountain pine beetle from spreading to adjacent stands.

These areas may be replaced through time as suitable sites providing a similar continuity between habitats become available, with attributes characteristic of that biogeoclimatic subzone. This may include the amount of coarse woody debris, the presence of snags and potential snags, the range of naturally occurring tree species, canopy gaps, canopy structure, and other considerations (Appendix 2).

## Treatment Unit 4: Important grizzly bear habitat

The long term intent is to have no net loss of important grizzly bear habitat and no displacement of grizzly bears from this drainage. Therefore, the primary objective in this unit is to minimize human-bear conflicts and preserve high value grizzly bear habitat.

Treatment prescriptions are as follows:

Roads should remain 150 metres from seepage areas, riparian floodplains, meadows, fens, wetlands, deciduous south facing slopes and avalanche

chutes (Habitat types: AC, AF, AH, AM, BD, BF, CD, ST, TC, WI, WS). See Appendix 6 for habitat type descriptions.

Forested areas of approximately 100 metres are required for bedding habitat and security cover adjacent to seepage areas, riparian floodplains, meadows, fens, wetlands, deciduous south facing slopes and avalanche chutes (AC, AF, AH, AM, BD, BF, CD, ST, TC, WI, WS). The degree of cover required adjacent to some of these habitat types will vary depending on the presence of coniferous trees within them.

The following habitat types are to remain undeveloped (treat as per Unit 2):
- AC, TC, WS, ST, AF, CD and WI;
- wetlands associated with SH, SD and BS; and,
- wetlands equal to or greater than 50 per cent of the habitat polygon.

Where logging has previously occurred within high-value bear habitat, manage the site to maintain productivity of foraging areas. This could include reforesting with a mix of tree species (deciduous and coniferous) and using a variety of thinning regimes to create openings within the block to encourage shrub growth.

Complex polygons: For complex polygons not previously mentioned, identify all high value habitat within the treatment unit using 1:20,000 air photos and some ground work. Road and bedding/security cover requirements outlined above apply to high value habitat within these polygons. Harvesting techniques emphasizing partial cutting will be encouraged within these polygons. These techniques will reduce fragmentation of high value habitat and provide some forested linkage between these habitats and other treatment units.

The draft Interior Fish/Forestry/Wildlife Guidelines are applicable for classification and management of all stream reaches, lakes and forested or non-forested riparian ecosystems.

Any harvesting taking place within or adjacent to these habitats will be restricted to periods of low or no use by bears (see Appendix 5).

## Treatment Unit 4a: Mixed forest management

This unit consists of forested types with a major deciduous and/or a major conifer component, depending on the present seral stage. Important attributes in these types are the presence of a diverse understory desirable for both large mammals and the bird community. These habitats require

periodic disturbance to maintain the aspen, Douglas maple and other shrubs. As a result mixed forest management will incorporate group-selection silvicultural systems. Openings of approximately two tree lengths are suggested; however, a larger opening may be necessary if pine is to be used for site regeneration.

Disturbance should be maintained on a continuous basis to favour forage and browse production; so a four or five pass removal system with even distribution is recommended.

Unless access is restricted during spring, a visual screening buffer will be necessary around AM habitat in the early seral stages. Bears using this area will be highly visible until green-up has occurred.

The draft Interior Fish/Forestry/Wildlife Guidelines are applicable for classification and management of all stream reaches, lakes and forested or non-forested riparian ecosystems.

Road density will be minimized to reduce human interaction with bears.

## Treatment Unit 5: Moderate value grizzly bear habitat

It is anticipated that harvesting within these habitat types will result in an increase in berry shrub production in the short term, thus rendering them attractive to bears during the summer and fall. These habitat types include LB, HB and BB. The main objective in these habitat types is to minimize road development and the number and duration of entries.

Partial cutting: A single entry followed by a period of sustained inactivity is preferred, in order to achieve the main objective for this unit. In contrast to the cutblock sizes recommended in the Interim Prince Rupert Regional Harvesting Guidelines, blocks up to 200 hectares would facilitate meeting this objective, providing techniques such as patch retention and group selection are used to promote structural diversity, ensure a supply of coarse woody debris and future wildlife trees. Leave patches should consist of at least 20 live stems per hectare, representing the range of larger diameter stems characteristic of that block. These patches can be retained as clumps or strips and be placed alongside creeks, small wetlands and rocky outcrops or other suitable areas.

Clearcutting: Clearcutting within this treatment unit will be carried out in accordance with the Interim Prince Rupert Regional Harvesting Guidelines.

Harvesting activity should be concentrated and silvicultural treatments and secondary road deactivation would preferably be completed within five years after harvest.

The draft Interior Fish/Forestry/Wildlife Guidelines are applicable for classification and management of all stream reaches, lakes and forested or non-forested riparian ecosystems.

Where high value habitat types are identified, implement management strategies as per Treatment Unit 4. These strategies do not apply to high value habitat units smaller than two hectares unless there is evidence of significant use by wildlife such as browsing, scats, nests or beds.

Where these habitats border on high value bear habitat, maintain a visual screening buffer of approximately 100 metres adjacent to these sites. Depending on the type of vegetation present this may consist of partial cuts and/or leave strips within the buffer.

Utilize management strategies for control of populations of mountain pine beetle. In general harvesting should be planned to address current attack trees.

Avoid mechanical site preparation methods that uproot berry producing shrubs.

## Treatment Unit 6: Integrated Resource Management

Habitats within the Bulkley Forest District portion of this treatment unit include BM and SO in the SBSmc and FD and FH in ESSFmc and FA in ESSFwv. In the Kispiox Forest District, this treatment unit includes BM, SO, HM and HA in the SBS and ICH biogeoclimatic zones. Habitats within the ESSF biogeoclimatic zone include FD, FH and FA. These areas play a role in providing bedding habitat and security cover for bears, in addition to food and cover for a number of other wildlife species.

Treatment Unit 6 is the most appropriate unit for building permanent roads, camps, recreation sites, etc.

The draft Interior Fish/Forestry/Wildlife guidelines are applicable for classification and management of all stream reaches, lakes and forested or non-forested riparian ecosystems.

The Interim Prince Rupert Regional Harvesting Guidelines apply to harvesting prescriptions in this treatment unit.

Where high value habitat types are identified, implement management strategies as per Treatment Unit 4. These strategies do not apply to high value habitat units smaller than two hectares unless there is evidence of significant use by wildlife such as browsing, scats, nests or beds.

On harvested sites maintain the range of naturally occurring tree species.

Where these habitats border on high value bear habitat maintain a visual screening buffer of approximately 100 metres adjacent to these sites. Depending on the type of vegetation present, this may consist of partial cuts and or leave strips within the buffer.

NOTE: Management Units 1 to 3 have been identified in only the Bulkley District portion of the Babine River Watershed.

## Management Unit 1: Boucher Creek wetlands

The Boucher Creek wetlands is an important complex of smaller treatment units requiring specific management prescriptions. It contains numerous wetlands and bogs as well as small lakes containing resident fish. Boucher Creek is an important stream for spawning and rearing. As it is tributary to the Babine River, the maintenance of water quality is essential. This unit also provides multi-season feeding opportunities for bears and potential ungulate winter range. As a result of its location with respect to the Van Fire (9,000 hectares, approximately 34 years old with berry feeding opportunities), Bait Mountain Range (possible denning habitat) and Babine River (salmon run), the Boucher Creek wetlands play an important role, linking high use areas and providing a major movement area for large mammals.

The objectives for Management Unit 1 are:

- maintain linkage between the Van Fire, Bait Range and Babine River;
- maintain the forest ecosystem network along Boucher Creek intact in terms of structure, composition and function; and,
- provide linkage with other high value habitats within this unit and between other sub-drainages.

The following prescriptions apply in this unit:

To protect the wildlife values in this treatment unit harvesting should be planned to operate as a two pass system. Providing the seral stage guidelines are met over the Boucher sub-drainage a two pass system means that 50 per cent of this area may be harvested over a period of five years.

If practical for first-pass access control, the bridge deck located at 1.6 kilometres will be removed between May and mid-November each year. Reforestation activities must be done promptly. Following completion of first-pass logging and reforestation, the bridge deck will be removed until crown closure is reached for stands in this area. This could take at least 50 years, depending on the growing conditions of the site.

Roads should avoid high value grizzly bear habitat if possible. Where this is not possible construct roads with a maximum right of way of 20 metres to minimize disturbance in the area. Consider deactivation plans for this road system.

For FENs, implement prescriptions outlined in Treatment Unit 2.

For high value habitat (Appendix 5), implement prescriptions outlined in Treatment Unit 4.

For moderate value habitat (Appendix 5), implement prescriptions outlined in Treatment Unit 5.

For habitat types BM, SO, FD, FH, and FA, implement prescriptions outlined in Treatment Unit 6.

Winter logging is preferred due to the high use of the area by grizzly bears in all three active seasons.

After access has been removed to this unit, utilize fall and burn or heli-logging to control epidemic populations of mountain pine beetle. If winter construction is not possible, road building should be completed in as short a period as possible to minimize public access and encounters with bears. The coordinated access management plan (CAMP) should refine the details of access control to this area.

## Management Unit 2: South of Nichyeskwa Creek

This unit contains a large percentage of alder-fern (AF) habitat, complexed with mature forest in the ESSFmc and spruce-horsetail (SH)\willow-sedge wetland (WS) complexes in the SBSmc2. These would receive high use by grizzly bears during late spring through mid-summer. Other factors that make this area important are its adjacency to Nichyeskwa Creek, a key riparian area, and its proximity to Babine River.

The objectives for this unit include:

- maintain a linkage between high value grizzly bear habitat structurally and functionally intact extending from Nichyeskwa Creek to the alpine;
- facilitate movement of grizzly bears between important feeding areas and reduce the potential of human-bear contact, by providing a linkage between high value habitats and limiting access; and,
- preserve representative areas of old growth within the FEN and manage harvested areas within and adjacent to high value habitats for the benefit of bears.

To meet these objectives, treatment prescriptions are as follows:

For future development in the AF-FD and SH-WS complexes, implement the management prescriptions of Treatment Unit 4.

The main haul road requires a visual screening buffer of approximately 100 metres either side of the road to protect bears from view. Some overstory removal may be possible within this buffer, providing the visual screening criteria is maintained.

Part of this unit is unique because existing and proposed development prohibits implementation of Treatment Unit 4 prescriptions. Therefore the following prescriptions apply to this unit:

In previously harvested blocks within high value bear habitat, use silvicultural treatments which maintain production of foraging areas and provide cover. Such treatments include encouraging a mix of tree species and using a variety of thinning regimes to create openings within the block to promote shrub growth.

Where development is already approved and proceeding in areas identified as high value, measures should be taken to provide some benefit to bears and other wildlife. This means retaining all brushy areas. Silvicultural standards may need to be modified to accommodate this objective. Site

disturbance should be minimized in AF habitat types. Where the opportunity still exists, use lower impact harvesting methods to protect advanced regeneration. When practical, provide buffer/feathered edges to maintain security and bedding habitat adjacent to AF habitat.

Access will be restricted in high value bear habitat from May through July. This will be accomplished by removing bridges or culverts after completion of logging and reforestation activities.

Within high value grizzly bear habitat restrict harvesting to winter and construct roads using a maximum right of way of 20 metres. Close these roads following completion of harvesting and reforestation. Minimize the total length of time required to complete these operations.

Avoid conflicts between humans and bears by not placing camps in high value grizzly bear habitat.

Future development in this unit will need to address the treatment prescriptions outlined in Treatment Unit 4 for complex polygons.

## Management Unit 3: North of Nichyeskwa Creek

This unit has an abundance of high value bear habitat and ungulate winter range between Nichyeskwa Creek and Babine River. The high value bear habitats include AM habitat (used primarily in the spring), AF habitat associated with mature forest (used mainly in late spring through mid-summer) as well as WS and BS habitat. These high value habitats contain forested stands which are expected to regenerate with berry producing shrubs following harvesting. In addition to providing all season habitat for small mammals and birds, these areas would receive high use in the spring and fall by grizzly bears, and during the winter by moose.

The objectives for this treatment unit are:

- provide links between the Special Management Zone, high value bear habitats and Nichyeskwa Creek;
- manage for no net loss of trembling aspen-Douglas maple habitat;
- reduce the number and duration of entries into potential berry producing shrub habitat;
- reduce fragmentation of high value grizzly bear habitat; and,
- recognize the goals for the special management zone and plan harvesting adjacent to this zone accordingly.

Treatment prescriptions to meet these objectives are:

For high value habitat implement as per Treatment Unit 4.

For linkage areas implement prescriptions as outlined in Treatment Unit 3.

In high value habitat, utilize fall and burn control measures (or fall and remove where it meets the criteria for these units) for epidemic populations of mountain pine beetle.

It is recognized that AM habitat types must be crossed to access timber in the area. Construct roads through these habitats using a maximum right of way of 20 metres. No road should parallel these units and visual screening cover should be provided beside roads throughout these units. Some overstory removal may be possible within this buffer, providing the visual screening criteria is met.

The goal in moderate value habitat (Unit 5) is to reduce the number and duration of entries into each habitat type and minimize the amount of road development. Implement prescriptions as outlined in Treatment Unit 5.

Access control point(s) to this management unit will be necessary. It is recommended that all logging take place during the winter with the temporary closure of main roads between March and November each year. If the access control point is a bridge, it can be installed for short periods for silvicultural purposes. Public access should be restricted. Individuals working in the area should be educated about grizzly bears and their habits.

## Management Unit 4: Special management zone, (Bulkley and Kispiox Forest Districts)

The main objective for this zone is protection of the river based resource values within the wilderness zone. Harvesting will be deferred in this zone, subject to preparation of a plan regulating small-scale forest management activities in the special management zone. Harvesting activity will be planned over a rotation of 150 and 200 years in the Bulkley and Kispiox Forest Districts respectively . No less than 30 per cent of the forested landscape will be 140 years and greater at any one time.

Partial cutting systems are to be used. If clearcuts are proposed, they must be less than 15 hectares and retain patches containing some large diameter future wildlife trees. Leave strips between blocks should be larger than the blocks themselves.

Second pass logging will not take place until the adjacent reforested cutblocks have greened-up (three metres tall).

Future unrestricted, permanent road access north of the Babine River bridge will not be established. All temporary access will remain at least 300 metres from the wilderness zone boundary, with the exception of the Big Slide Chart (*Options for the Babine River Area*).

Harvesting will only take place in winter.

High value grizzly bear habitat and movement corridors will be managed in accordance with Treatment Unit 4 in this zone.

Sight distances along roads will not exceed 300 metres.

Harvesting will prioritize stands attacked by or at high risk of being attacked by mountain pine beetle. Otherwise, harvesting will be scheduled to proceed inwards from the outer boundary of the special management zone.

See Appendix 1, *Options for the Babine River Area* for mountain pine beetle pest and fire management direction in the special management zone.

# Part D: Monitoring

## Introduction

A monitoring plan must be in place to ensure the LRUP management prescriptions are adhered to. Examples of the types of monitoring that will be required are:

- sedimentation levels in the Babine River and its tributaries;
- the number of grizzlies (and other wildlife) hunted and poached annually;
- river recreation use which could be divided into commercial rafting, fish guiding and private usage;

- timber harvesting activities like cutblock size, road standards, method of harvest, visual quality, access removal where required, roadside screening and other considerations; and,
- the impact of timber harvesting activities on grizzly bears.

## Monitoring committee

A monitoring committee will be formed to ensure compliance with the Babine River LRUP management objectives for fisheries, timber, tourism and wildlife resources.

These monitoring recommendations were made by the Technical Advisory Committee:

- a brief terms of reference should be written by the agencies for the committee, although the Babine River LRUP will be the group's main reference source;
- a maximum of 10-12 monitoring committee members, including a chairperson and a recorder elected by the committee;
- the committee needs broad representation to ensure it monitors what the public considers to be important, and to give the group credibility in the eyes of the public;
- suggested participants include the Ministry of Environment, Lands and Parks, Ministry of Forests, Ministry of Tourism, major licensees, the B.C. Wildlife Federation, the Bulkley Valley Naturalists, Babine Norlakes Lodge, First Nations representation and a local logging contractor;
- a minimum of two field trips per year, summer and winter, with invited non-committee members;
- commendations for work well done, penalties for not following the LRUP treatment and management prescriptions, as per the appropriate legislation; and,
- a yearly report card, consisting of one or two pages tabling the committee's findings. The report card will be published in the local paper.

The monitoring committee should agree on a dispute resolution mechanism.

# Part E: Revisions to the Plan

The plan may be reviewed and revised on an annual basis. A complete review and revision of the plan will be completed by the resource agencies at least every five years. Public input will be requested for the revised plan.

Revisions to the plan may be required:

- to address emerging issues related to the access of timber north of the Babine River within the Kispiox Forest District, if the present impediment to access of the area is not resolved within a period of one year; or,
- as result of practical experience gained in the field; or,
- due to the recommendations of the monitoring committee.

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# Appendix 1: Fire and Pest Management Direction

## Wilderness Zone Management Strategies

Management intent will be consistent with the Ministry of Forests policy Managing Wilderness in Provincial Forests.

Management directions currently applied and recommended for inclusion in a future wilderness management plan for the area are:

1. The cutting of trees would not be permitted except for purposes such as safety, fire fighting and pest management.

2. The following pest (i.e. mountain pine beetle) management direction would be employed in order to minimize the impact of an epidemic population developing within the wilderness area and spreading into adjacent stands:

    i) Use fall and burn or heli-logging control measures.

    ii) If fall and burning or heli-logging is employed, it would preferably take place from November to March so that impacts to river recreationists would be minimized. Activities planned outside this time frame would be discussed with primary river users.

    iii)Tree marking like flagging and paint would be minimized along the river so that the wilderness experience will not be degraded. After operations all flagging will be removed and major blazes painted with a dark colour so they become indistinguishable.

3. The suppression of wildfires in the wilderness zone is also an important consideration in the protection of adjacent forest values. The following are some highlights of the fire management strategy which would be detailed further in the wilderness management plan:

    i) All fires regardless of cause will receive immediate and vigorous initial attack. The ministry will attempt to control all fires by 10:00 a.m. of the day following detection.

    ii) Initial attack response will include, but not be limited to heli-tack crews, air tankers, helicopters, foam etc.

iii)The Babine River is identified as a critical drop zone. Precautions will be taken to avoid stream contamination whenever retardants are used in fire suppression.

iv) In the event that expanded attack is required to address a large fire, the Ministry of Forests would use the principle of a "light hand on the environment" in carrying out suppression activities. This principle will be translated into guidelines and communicated in the wilderness management plan as well as the District Fire Management Plans.

## Special Management Zone

The special management zone will lie immediately adjacent to the wilderness zone and is designed to act as a buffer which will ensure that wilderness management objectives are met. Fire and pest management guidelines proposed for this zone are:

- The same fire management strategy as described for the Wilderness Zone would be used in this Zone;

- The pest management strategy would be essentially the same as the wilderness zone except that the infected trees would be removed through harvesting activities where possible; and,

- Smoke management is a concern in this area and will be addressed in a strategy for the entire planning area. The potential impacts of smoke from prescribed burning on the river users is well recognized, but requires more detailed review in relation to future silviculture prescriptions within the planning area.

# Appendix 2: Structural objectives for mature stands

(values in brackets are averages for "zonal" sites)

| | SBSmc | SBSdk/SBPS | ESSF |
|---|---|---|---|
| Snags/ha | | | |
| >17.5 cm dbh | 9 (99) | 6 (67) | 10 (121) |
| >27.5 | 3 (24) | 3 (12) | 8 (84) |
| >37.5 | 2 (11) | 1 (2) | 4 (40) |
| Total: | 14 (134) | 10(81) | 22 (245) |
| CWD m3/ha >10 cm diam | >50 (100) | >25 | >50 |
| Stems/ha >17.5 cm dbh | >400 (798) | >400 (805) | >400 (887) |
| Large trees/ha >37.5 cm dbh | 15 (83) | 10 (37) | 15(145) |

| | ICH | CWH | MH |
|---|---|---|---|
| Snags/ha | | | |
| >17.5 cm dbh | 5 (53) | 5 (23) | 5 |
| >27.5 | 2 (13) | 2 (11) | 3 |
| >37.5 | 3 (25) | 3 (13) | 2 |
| Total: | 10 (91) | 10 (47) | 10 |
| CWD m3/ha >10 cm diam | >50 (100) | >50 | >25 |
| Stems/ha >17.5 cm dbh | >400 (689) | >300 (337) | >400 |
| Large trees/ha >37.5 cm dbh | >20 (175) | 30 (144) | >15 |

From Steventon, 1993

# Appendix 3: Forest inventory data and habitat classes by Sub-drainage and biogeoclimatic subzone

Units with forested successional stages are designated:

1 Shrub-herb
2 Pole-sapling (less than 20 years)
3 Young Forests (20-60 years)
4 Mature Forests (60-140 years)
5 Old Growth Forests (over 140 years)

**NICHYESKWA SOUTH**

| | | Total Area (ha) | Percent (%) forested area | Percent (%) total area |
|---|---|---|---|---|
| Biogeoclimatic subzone AT | | | | |
| Age Class | | | | |
| Non-forested | 0 | 2184. | | 78.8 |
| 0-20 years | 1 | 0 | 0 | 0 |
| 21-40 years | 2 | 0 | 0 | 0 |
| 41- 0 years | 3 | 0 | 0 | 0 |
| 1-80 years | 4 | 0 | 0 | 0 |
| 81-100 years | 5 | 0 | 0 | 0 |
| 101-120 years | | 34 | 5.8 | 1.2 |
| 121-140 years | 7 | 0. | 10.3 | 2.2 |
| 141-250 years | 8 | 493 | 83.9 | 17.8 |
| 251+ years | 9 | 0 | 0 | 0 |
| Other | | 0 | | 0 |
| Total Forested | | 587. | 100 | 21.2 |
| Total area | | 2772.2 | | |
| Biogeoclimatic subzone ESSFmc | | | | |
| Non-forested | 0 | 70 .9 | | 7.7 |
| 0-20 years | 1 | 0 | 0 | 0 |
| 21-40 years | 2 | 0 | 0 | 0 |
| 41- 0 years | 3 | 0 | 0 | 0 |
| 1-80 years | 4 | 192.3 | 2.3 | 2.1 |
| 81-100 years | 5 | 97.3 | 1.2 | 1.1 |
| 101-120 years | | 1037.2 | 12. | 11.3 |
| 121-140 years | 7 | 4 9.4 | 5.7 | 5.1 |
| 141-250 years | 8 | 081. | 73.9 | .5 |
| 251+ years | 9 | 355.4 | 4.3 | 3.9 |
| Other | | 210.3 | | 2.3 |
| Total Forested | | 8233.1 | 100 | 90 |
| Total area | | 9150.3 | | |
| Biogeoclimatic subzone SBSmc | | | | |
| Non-forested | 0 | 709.4 | | 5 |
| 0-20 years | 1 | 1429.4 | 11.8 | 10.1 |
| 21-40 years | 2 | 1198.7 | 9.9 | 8.5 |
| 41- 0 years | 3 | 520.8 | 4.3 | 3.7 |
| 1-80 years | 4 | 1378 | 11.4 | 9.8 |
| 81-100 years | 5 | 115.3 | 0.9 | 0.8 |
| 101-120 years | | 707.8 | 5.8 | 5 |
| 121-140 years | 7 | 5 3.7 | 4. | 4 |
| 141-250 years | 8 | 071.9 | 50 | 43 |
| 251+ years | 9 | 155.1 | 1.3 | 1.1 |
| Other | | 12 9.4 | | 9 |
| Total Forested | | 12140 | 100 | 8 |
| Total area | | 14119.5 | | |

**NICHYESKWA NORTH**

| | | Total Area (ha) | Percent (%) forested area | Percent (%) total area |
|---|---|---|---|---|
| Biogeoclimatic subzone ESSFmc | | | | |
| Non-forested | 0 | 654.8 | | 8.3 |
| 0-20 years | 1 | 0 | 0 | 0 |
| 21-40 years | 2 | 0 | 0 | 0 |
| 41-60 years | 3 | 114.4 | 1.6 | 1.4 |
| 61-80 years | 4 | 332.2 | 4.8 | 4.2 |
| 81-100 years | 5 | 0 | 0 | 0 |
| 101-120 years | 6 | 369.8 | 5.3 | 4.7 |
| 121-140 years | 7 | 1564 | 22.5 | 19.7 |
| 141-250 years | 8 | 3770 | 54.2 | 47.5 |
| 251+ years | 9 | 809 | 11.6 | 10.2 |
| Other | | 315.6 | | 4 |
| Total Forested | | 6959.4 | 100 | 87.8 |
| Total area | | 7929.8 | | |
| Biogeoclimatic subzone SBSmc | | | | |
| Non-forested | 0 | 465.8 | | 3.6 |
| 0-20 years | 1 | 0 | 0 | 0 |
| 21-40 years | 2 | 0 | 0 | 0 |
| 41-60 years | 3 | 92.3 | 0.8 | 0.7 |
| 61-80 years | 4 | 2068.9 | 17.4 | 15.8 |
| 81-100 years | 5 | 0 | 0 | 0 |
| 101-120 years | 6 | 600.6 | 5 | 4.6 |
| 121-140 years | 7 | 1445 | 12.1 | 11 |
| 141-250 years | 8 | 6240.6 | 52.3 | 47.6 |
| 251+ years | 9 | 1473.6 | 12.4 | 11.2 |
| Other | | 716.9 | | 5.5 |
| Total Forested | | 11920 | 100 | 91 |
| Total area | | 13103.6 | | |

**HORETSKY**

| | | Total Area (ha) | Percent (%) forested area | Percent (%) total area |
|---|---|---|---|---|
| Biogeoclimatic subzone ESSFmc | | | | |
| Non-forested | 0 | 466.8 | | 22.2 |
| 0-20 years | 1 | 0 | 0 | 0 |
| 21-40 years | 2 | 0 | 0 | 0 |
| 41-60 years | 3 | 0 | 0 | 0 |
| 61-80 years | 4 | 0 | 0 | 0 |
| 81-100 years | 5 | 0 | 0 | 0 |
| 101-120 years | 6 | 0 | 0 | 0 |
| 121-140 years | 7 | 0 | 0 | 0 |
| 141-250 years | 8 | 358 | 21.9 | 17 |
| 251+ years | 9 | 1279.7 | 78.1 | 60.8 |
| Other | | 0 | | 0 |
| Total Forested | | 1637.6 | 100 | 77.8 |
| Total area | | 2104.4 | | |
| Biogeoclimatic subzone SBSmc | | | | |
| Non-forested | 0 | 1173.4 | | 6.3 |
| 0-20 years | 1 | 2359 | 13.5 | 12.6 |
| 21-40 years | 2 | 222.6 | 1.3 | 1.2 |
| 41-60 years | 3 | 10.1 | 0.1 | 0.1 |
| 61-80 years | 4 | 0 | 0 | 0 |
| 81-100 years | 5 | 0 | 0 | 0 |
| 101-120 years | 6 | 582.7 | 3.4 | 3.1 |
| 121-140 years | 7 | 573.8 | 3.3 | 3.1 |
| 141-250 years | 8 | 10234 | 59 | 54.8 |
| 251+ years | 9 | 3371.8 | 19.4 | 18.1 |
| Other | | 138.7 | | 0.7 |
| Total Forested | | 17354 | 100 | 93 |
| Total area | | 18666 | | |

**BOUCHER**

| | | Total Area (ha) | Percent (%) forested area | Percent (%) total area |
|---|---|---|---|---|
| Biogeoclimatic subzone AT | | | | |
| Non-forested | 0 | 4925 | | 89 |
| 0-20 years | 1 | 3. | 0. | 0.1 |
| 21-40 years | 2 | 0 | 0 | 0 |
| 41- 0 years | 3 | 0 | 0 | 0 |
| 1-80 years | 4 | 0.1 | 0 | 0 |
| 81-100 years | 5 | 23.1 | 3.8 | 0.4 |
| 101-120 years | | 0 | 0 | 0 |
| 121-140 years | 7 | 0 | 0 | 0 |
| 141-250 years | 8 | 398.7 | 5.2 | 7.2 |
| 251+ years | 9 | 185.9 | 30.4 | 3.4 |
| Other | | 0 | | 0 |
| Total Forested | | 11.4 | 100 | 11 |
| Total area | | 553 .4 | | |
| Biogeoclimatic subzone ESSFmc | | | | |
| Non-forested | 0 | 43 2.7 | | 28.8 |
| 0-20 years | 1 | 1355.8 | 12.7 | 8.9 |
| 21-40 years | 2 | 209.9 | 2 | 1.4 |
| 41- 0 years | 3 | 0 | 0 | 0 |
| 1-80 years | 4 | 05.2 | 5. | 4 |
| 81-100 years | 5 | 575.7 | 5.4 | 3.8 |
| 101-120 years | | 18.8 | 0.2 | 0.1 |
| 121-140 years | 7 | 8. | 0.1 | 0.1 |
| 141-250 years | 8 | 5008.8 | 4 .8 | 33 |
| 251+ years | 9 | 2930.1 | 27.4 | 19.3 |
| Other | | 98.7 | | 0.7 |
| Total Forested | | 10712.8 | 100 | 70. |
| Total area | | 15174.2 | | |
| Biogeoclimatic subzone SBSmc | | | | |
| Non-forested | 0 | 3080.4 | | 10.5 |
| 0-20 years | 1 | 3133.5 | 12.1 | 10.7 |
| 21-40 years | 2 | 1295.5 | 5 | 4.4 |
| 41- 0 years | 3 | 30.2 | 0.1 | 0.1 |
| 1-80 years | 4 | 3 3.2 | 1.4 | 1.2 |
| 81-100 years | 5 | 5 3.4 | 2.2 | 1.9 |
| 101-120 years | | 2309. | 8.9 | 7.9 |
| 121-140 years | 7 | 2 40.2 | 10.2 | 9 |
| 141-250 years | 8 | 15350 | 59.2 | 52.5 |
| 251+ years | 9 | 259.4 | 1 | 0.9 |
| Other | | 210.7 | | 0.7 |
| Total Forested | | 25945 | 100 | 88.7 |
| Total area | | 2923 | | |

**WILDERNESS ZONE**

| | | Total Area (ha) | Percent (%) forested area | Percent (%) total area |
|---|---|---|---|---|
| Biogeoclimatic subzone SBSmc | | | | |
| Non-forested | 0 | 776.4 | | 12.4 |
| 0-20 years | 1 | 63.8 | 1.2 | 1 |
| 21-40 years | 2 | 0 | 0 | 0 |
| 41-60 years | 3 | 79.4 | 1.5 | 1.3 |
| 61-80 years | 4 | 0.1 | 0 | 0 |
| 81-100 years | 5 | 26 | 0.5 | 0.4 |
| 101-120 years | 6 | 329.7 | 6.1 | 5.3 |
| 121-140 years | 7 | 629.3 | 11.7 | 10.1 |
| 141-250 years | 8 | 4121 | 76.4 | 65.9 |
| 251+ years | 9 | 143.6 | 2.7 | 2.3 |
| Other | | 86.9 | | 1.4 |
| Total Forested | | 5392.9 | 100 | 86.2 |
| Total area | | 6256.2 | | |

**Nichyeskwa South**

| BGC | Habitat | Phase | Seral Stage | Area | Percent BGC | Percent Total |
|---|---|---|---|---|---|---|
| Alpine | AC | c | | 0.30 | 0.00 | 0.00 |
| | AC | c | | 0.30 | 0.00 | 0.00 |
| | AC | w | | 0.20 | 0.00 | 0.00 |
| | FL | | | 314.07 | 15.41 | 1.19 |
| | MP | | | 440.71 | 21.62 | 1.67 |
| | RO | c | | 324.39 | 15.91 | 1.23 |
| | RO | m | | 263.19 | 12.91 | 1.00 |
| | RO | w | | 249.64 | 12.25 | 0.95 |
| | SV | | | 336.58 | 16.51 | 1.28 |
| | TA | | | 109.83 | 5.39 | 0.42 |
| Total | | | | 2038.48 | | 7.73 |
| ESSFmc | AC | c | | 68.71 | 0.55 | 0.26 |
| | AC | w | | 51.01 | 0.41 | 0.19 |
| | AC | | | 38.98 | 0.31 | 0.15 |
| | AF | | | 735.86 | 5.90 | 2.79 |
| | BB | d | 5 | 136.01 | 1.09 | 0.52 |
| | BB | s | 4 | 409.64 | 3.28 | 1.55 |
| | BB | s | 5 | 330.70 | 2.65 | 1.25 |
| | BB | s | | 62.53 | 0.50 | 0.24 |
| | FD | | 4 | 284.49 | 2.28 | 1.08 |
| | FD | | 5 | 2901.50 | 23.25 | 11.00 |
| | FV | | 4 | 138.15 | 1.11 | 0.52 |
| | FV | | 5 | 247.21 | 1.98 | 0.94 |
| | HB | c | 5 | 1880.73 | 15.07 | 7.13 |
| | HB | | 3 | 12.46 | 0.10 | 0.50 |
| | HB | | 4 | 739.68 | 5.93 | 2.80 |
| | HB | | 5 | 3595.04 | 28.80 | 13.63 |
| | OW | | | 37.96 | 0.30 | 0.14 |
| | RO | c | | 74.34 | 0.60 | 0.28 |
| | RO | w | | 159.54 | 1.28 | 0.60 |
| | SH | | 5 | 22.63 | 0.18 | 0.90 |
| | SV | | | 380.50 | 3.05 | 1.44 |
| | TA | | | 16.70 | 0.13 | 0.60 |
| | WS | | | 157.40 | 1.26 | 0.60 |
| Total | | | | 12481.77 | | 47.33 |

**Nichyeskwa South (cont'd)**

| BGC | Habitat | Phase | Seral Stage | Area | Percent BGC | Percent Total |
|---|---|---|---|---|---|---|
| SBSmc2 | AF | | | 67.02 | 0.57 | 0.25 |
| | AM | d | 4 | 237.60 | 2.00 | 0.90 |
| | AM | d | 5 | 41.12 | 0.35 | 0.16 |
| | AM | d | | 4.28 | 0.40 | 0.20 |
| | AM | s | 2 | 35.36 | 0.30 | 0.13 |
| | BM | c | 4 | 0.19 | 0.00 | 0.00 |
| | BM | c | 5 | 2.67 | 0.20 | 0.10 |
| | BM | l | 1 | 63.31 | 0.53 | 0.24 |
| | BM | l | 2 | 232.36 | 1.96 | 0.88 |
| | BM | l | 4 | 236.91 | 2.00 | 0.90 |
| | BM | l | 5 | 115.29 | 0.97 | 0.44 |
| | BM | l | | 51.84 | 0.44 | 0.20 |
| | BM | m | 2 | 2720.60 | 22.95 | 10.32 |
| | BM | m | 4 | 2586.12 | 21.82 | 9.81 |
| | BM | m | 5 | 1440.40 | 12.15 | 5.46 |
| | LB | | 2 | 233.10 | 1.97 | 0.88 |
| | LB | | 4 | 65.39 | 0.55 | 0.25 |
| | LB | | 5 | 20.93 | 0.18 | 0.80 |
| | LB | | | 205.14 | 1.73 | 0.78 |
| | OW | | | 103.52 | 0.87 | 0.39 |
| | SD | | 4 | 0.65 | 0.10 | 0.00 |
| | SD | | 5 | 26.99 | 0.23 | 0.10 |
| | SH | | 2 | 61.78 | 0.52 | 0.23 |
| | SH | | 4 | 49.04 | 0.41 | 0.19 |
| | SH | | 5 | 424.92 | 3.58 | 1.61 |
| | SO | | 1 | 84.42 | 0.71 | 0.32 |
| | SO | | 2 | 285.91 | 2.41 | 1.08 |
| | SO | | 4 | 189.98 | 1.60 | 0.72 |
| | SO | | 5 | 1226.62 | 10.35 | 4.65 |
| | SO | | | 63.31 | 0.53 | 0.24 |
| | ST | | 1 | 22.18 | 0.19 | 0.80 |
| | ST | | 4 | 10.00 | 0.80 | 0.40 |
| | ST | | 5 | 17.19 | 0.15 | 0.70 |
| | TA | | | 20.31 | 0.17 | 0.80 |
| | TC | | | 2.16 | 0.20 | 0.10 |
| | WS | | | 904.58 | 7.63 | 3.43 |
| Total | | | | 11853.19 | | 44.94 |
| Total area | | | | 26373.44 | | |

**Nichyeskwa North**

| BGC | Habitat | Phase | Seral Stage | Area | Percent BGC | Percent Total |
|---|---|---|---|---|---|---|
| ESSFmc | AF | | | 288.55 | 3.53 | 1.40 |
| | BB | d | 4 | 77.38 | 0.95 | 0.38 |
| | BB | d | 5 | 115.07 | 1.41 | 0.56 |
| | BB | s | 4 | 331.49 | 4.05 | 1.61 |
| | BB | s | 5 | 67.52 | 0.83 | 0.33 |
| | BS | | | 97.50 | 1.19 | 0.47 |
| | FD | | 4 | 448.93 | 5.49 | 2.18 |
| | FD | | 5 | 588.71 | 7.20 | 2.86 |
| | FH | | 4 | 27.72 | 0.34 | 0.13 |
| | HB | c | 4 | 919.39 | 11.24 | 4.47 |
| | HB | | 2 | 99.02 | 1.21 | 0.48 |
| | HB | | 4 | 1035.28 | 12.66 | 5.04 |
| | HB | | 5 | 3271.00 | 39.99 | 15.91 |
| | OW | | | 18.00 | 0.22 | 0.90 |
| | RO | c | | 142.00 | 1.74 | 0.69 |
| | RO | w | | 26.00 | 0.32 | 0.13 |
| | WS | | | 625.00 | 7.64 | 3.04 |
| Total | | | | 8178.56 | | 39.79 |
| SBSmc2 | AD | | | 106.96 | 0.86 | 0.52 |
| | AF | | | 127.72 | 1.03 | 0.62 |
| | AM | d | 4 | 476.26 | 3.85 | 2.32 |
| | AM | d | 5 | 93.40 | 0.75 | 0.45 |
| | AM | d | | 21.32 | 0.17 | 0.10 |
| | AM | s | 4 | 149.76 | 1.21 | 0.73 |
| | AM | s | 5 | 67.57 | 0.55 | 0.33 |
| | BM | c | 4 | 8.95 | 0.70 | 0.40 |
| | BM | c | 5 | 421.84 | 3.41 | 2.05 |
| | BM | m | 1 | 168.10 | 1.36 | 0.82 |
| | BM | m | 4 | 2220.15 | 17.94 | 10.80 |
| | BM | m | 5 | 3438.76 | 27.79 | 16.73 |
| | BS | | | 248.03 | 2.00 | 1.21 |
| | LB | | 4 | 0.19 | 0.00 | 0.00 |
| | LB | | 5 | 120.53 | 0.97 | 0.59 |
| | OW | | | 35.44 | 0.29 | 0.17 |
| | PB | | 1 | 27.43 | 0.22 | 0.13 |
| | PB | | 5 | 45.72 | 0.37 | 0.22 |
| | RO | w | | 22.06 | 0.18 | 0.11 |
| | SD | | 4 | 756.86 | 6.12 | 3.68 |
| | SD | | 5 | 700.35 | 5.66 | 3.41 |
| | SH | | 5 | 35.23 | 0.28 | 0.17 |
| | SM | d | 4 | 39.23 | 0.32 | 0.19 |
| | SO | | 4 | 292.95 | 2.37 | 1.43 |
| | SO | | 5 | 1893.90 | 15.30 | 9.21 |
| | ST | | 1 | 71.85 | 0.58 | 0.35 |
| | ST | | 4 | 49.76 | 0.40 | 0.24 |
| | ST | | 5 | 101.11 | 0.82 | 0.49 |
| | TC | | | 13.84 | 0.11 | 0.70 |
| | WS | | | 619.37 | 5.01 | 3.01 |
| Total | | | | 12374.64 | | 60.21 |
| Total Area | | | | 20553.20 | | |

**Horetsky**

| | Habitat | Phase | Seral Stage | Area | Percent BGC | Percent Total |
|---|---|---|---|---|---|---|
| Alpine | MP | | | 112.52 | 100.00 | 0.53 |
| Total | | | | 112.52 | | 0.53 |
| ESSFmc | AC | c | | 41.15 | 2.08 | 0.19 |
| | AF | | | 181.47 | 9.19 | 0.85 |
| | BB | m | 5 | 29.68 | 1.50 | 0.14 |
| | BB | s | 5 | 334.12 | 16.91 | 1.57 |
| | BB | s | | 224.28 | 11.35 | 1.05 |
| | FH | | 5 | 150.56 | 7.62 | 0.71 |
| | HB | | 5 | 618.24 | 31.29 | 2.91 |
| | HB | c | 5 | 299.72 | 15.17 | 1.41 |
| | WS | | | 96.45 | 4.88 | 0.45 |
| Total | | | | 1975.67 | | 9.29 |
| SBSmc2 | AF | | | 121.09 | 0.63 | 0.57 |
| | AM | d | 5 | 39.17 | 0.20 | 0.18 |
| | AM | d | 4 | 97.56 | 0.51 | 0.46 |
| | AM | d | 5 | 30.28 | 0.16 | 0.14 |
| | AM | s | 4 | 52.01 | 0.27 | 0.24 |
| | AM | s | 5 | 185.05 | 0.96 | 0.87 |
| | AM | s | 2 | 88.48 | 0.46 | 0.42 |
| | AM | s | 4 | 166.60 | 0.87 | 0.78 |
| | BM | c | 2 | 144.86 | 0.76 | 0.68 |
| | BM | c | 5 | 651.87 | 3.40 | 3.06 |
| | BM | d | 5 | 29.42 | 0.15 | 0.14 |
| | BM | m | 5 | 8815.34 | 45.96 | 41.45 |
| | BM | m | 2 | 1423.76 | 7.42 | 6.69 |
| | BM | m | 4 | 12.26 | 0.60 | 0.60 |
| | BM | m | 4 | 86.54 | 0.45 | 0.41 |
| | BS | | | 165.61 | 0.86 | 0.78 |
| | LB | | 2 | 347.07 | 1.81 | 1.63 |
| | LB | | 4 | 48.16 | 0.25 | 0.23 |
| | LB | | 5 | 1360.38 | 7.09 | 6.40 |
| | OW | | | 140.88 | 0.73 | 0.66 |
| | PB | | 5 | 18.40 | 0.10 | 0.90 |
| | SD | | 5 | 844.83 | 4.40 | 3.97 |
| | SH | | 5 | 175.79 | 0.92 | 0.83 |
| | SH | | 5 | 442.49 | 2.31 | 2.08 |
| | SO | | 2 | 168.71 | 0.88 | 0.79 |
| | SO | | 4 | 10.61 | 0.60 | 0.50 |
| | SO | | 5 | 994.84 | 5.19 | 4.68 |
| | ST | | 2 | 17.73 | 0.90 | 0.80 |
| | ST | | 4 | 9.32 | 0.50 | 0.40 |
| | ST | | 5 | 289.16 | 1.51 | 1.36 |
| | WS | | | 2203.00 | 11.49 | 10.36 |
| Total | | | | 19181.27 | | 90.18 |
| Total Area | | | | 21269.46 | | |

**Boucher**

| Stage | Habitat | Phase | Seral Stage | Area | Percent BGC | Percent Total |
|---|---|---|---|---|---|---|
| Alpine | | | | | | |
| | BB | d | 5 | 0.40 | 0.00 | 0.00 |
| | IC | | | 36.76 | 0.94 | 0.80 |
| | MP | | | 1174.76 | 30.00 | 2.68 |
| | RO | c | | 188.81 | 4.82 | 0.43 |
| | RO | w | | 1853.99 | 47.35 | 4.23 |
| | SV | | | 395.62 | 10.10 | 0.90 |
| | TA | | | 265.33 | 6.78 | 0.61 |
| Total | | | | 3915.31 | | 8.94 |
| ESSFmc | AC | c | | 44.44 | 0.36 | 0.10 |
| | AC | w | | 196.40 | 1.58 | 0.45 |
| | BB | d | 2 | 480.00 | 3.86 | 1.10 |
| | BB | d | 5 | 3598.85 | 28.91 | 8.22 |
| | BB | s | 2 | 419.24 | 3.37 | 0.96 |
| | BB | s | 5 | 718.79 | 5.77 | 1.64 |
| | FD | | 5 | 318.62 | 2.56 | 0.73 |
| | FH | | 5 | 141.61 | 1.14 | 0.32 |
| | FV | | 5 | 7.64 | 0.60 | 0.20 |
| | HB | c | 2 | 329.94 | 2.65 | 0.75 |
| | HB | c | 5 | 874.07 | 7.02 | 2.00 |
| | HB | | 1 | 85.66 | 0.69 | 0.20 |
| | HB | | 2 | 1169.87 | 9.40 | 2.67 |
| | HB | | 5 | 3073.87 | 24.69 | 7.02 |
| | MP | | | 19.08 | 0.15 | 0.40 |
| | OW | | | 29.44 | 0.24 | 0.70 |
| | RO | w | | 13.07 | 0.10 | 0.30 |
| | SV | | | 80.13 | 0.64 | 0.18 |
| | TA | | | 91.12 | 0.73 | 0.21 |
| | WS | | | 755.79 | 6.07 | 1.73 |
| Total | | | | 12447.00 | | 28.43 |

**Boucher (cont'd)**

| | Habitat | Phase | Seral Stage | Area | Percent BGC | Percent Total |
|---|---|---|---|---|---|---|
| SBSmc2 | | | | | | |
| | AM | d | 2 | 186.97 | 0.68 | 0.43 |
| | AM | d | 4 | 256.36 | 0.93 | 0.59 |
| | AM | d | 5 | 1782.27 | 6.50 | 4.07 |
| | AM | s | 2 | 194.33 | 0.71 | 0.44 |
| | AM | s | 4 | 228.04 | 0.83 | 0.52 |
| | AM | s | 5 | 143.24 | 0.52 | 0.33 |
| | BM | c | 2 | 70.38 | 0.26 | 0.16 |
| | BM | c | 5 | 242.99 | 0.89 | 0.55 |
| | BM | l | 1 | 0.28 | 0.00 | 0.00 |
| | BM | l | 4 | 26.90 | 0.10 | 0.60 |
| | BM | l | 5 | 72.85 | 0.27 | 0.17 |
| | BM | m | 2 | 1395.67 | 5.09 | 3.19 |
| | BM | m | 4 | 2997.76 | 10.93 | 6.85 |
| | BM | m | 5 | 5267.90 | 19.21 | 12.03 |
| | BM | | 2 | 1142.66 | 4.17 | 2.61 |
| | BS | | | 902.02 | 3.29 | 2.06 |
| | HB | | 5 | 0.40 | 0.00 | 0.00 |
| | LB | | 2 | 141.44 | 0.52 | 0.32 |
| | LB | | 4 | 1523.69 | 5.56 | 3.48 |
| | LB | | 5 | 1178.10 | 4.30 | 2.69 |
| | OW | | | 1325.36 | 4.83 | 3.03 |
| | PB | | 5 | 563.45 | 2.05 | 1.29 |
| | SD | | 5 | 517.08 | 1.89 | 1.18 |
| | SH | | 2 | 233.64 | 0.85 | 0.53 |
| | SH | | 4 | 98.62 | 0.36 | 0.23 |
| | SH | | 5 | 794.40 | 2.90 | 1.81 |
| | SO | | 1 | 16.03 | 0.60 | 0.40 |
| | SO | | 2 | 390.00 | 1.42 | 0.89 |
| | SO | | 4 | 1254.10 | 4.57 | 2.86 |
| | SO | | 5 | 1371.87 | 5.00 | 3.13 |
| | ST | | 2 | 60.45 | 0.22 | 0.14 |
| | ST | | 4 | 6.50 | 0.20 | 0.10 |
| | ST | | 5 | 352.06 | 1.28 | 0.80 |
| | WS | | | 2688.38 | 9.80 | 6.14 |
| Total | | | | 27425.83 | | 62.63 |
| Total area | | | | 43788.77 | | |

# Appendix 4: Trapping records for the Bulkley District portion of the Babine River Watershed

| TRAPPER | YEAR | WOLF | BEAR | BEAVER | COYOTE | FISHER | FOX | MARTEN | MINK | MUSKRAT | OTTER | RACCOON | SQUIRREL | WEASEL | WOLVERINE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | NUMBER OF ANIMALS TRAPPED | | | | | | | | | | | | | |
| 607T001 | 1979 | | | | | | | 70 | 8 | | | | 85 | 3 | |
| | 1980 | 1 | | 3 | 1 | | | 11 | 3 | 22 | 1 | | 31 | 1 | |
| | 1981 | | | | | | | 5 | 3 | 5 | | | 12 | | |
| | 1986 | | | 24 | 1 | | 1 | 16 | 9 | 139 | 3 | 3 | 10 | 1 | |
| | 1987 | | | 8 | 2 | 1 | 1 | 31 | 7 | 63 | | 1 | 43 | 15 | |
| | 1988 | | | 1 | 2 | | 1 | 212 | 4 | 19 | | | 7 | 10 | |
| | 1989 | | | | 1 | | 2 | 46 | 3 | 14 | | | | 5 | |
| | 1990 | | | | | | | | | | | | | | |
| 608T025 | 1986 | | | | | | | | | | | | | | |
| | 1987 | | | | | | | | | | | | | | |
| | 1988 | | | | | | | 10 | | | | | | | |
| | 1989 | | | | | 1 | | 1 | | | | | | | |
| | 1990 | | | | | | | | | | | | | | |
| 608T026 | 1986 | | | | | | | | | | | | | | |
| | 1987 | | | | | | | 14 | 1 | | | | | | |
| | 1988 | | | | | | | 36 | 5 | | | | 30 | 8 | |
| | 1989 | | | 2 | | | | 13 | 1 | | | | 2 | 2 | |
| | 1990 | | | | | | | 10 | | | 1 | | | | 1 |
| 608T030 | 1937 | | 1 | | | | | 2 | | | | | | 30 | |
| | 1938 | | | | | | | 3 | | | | | | 20 | |
| | 1940 | | | 9 | | | | 6 | | 30 | | | 125 | 30 | |
| | 1942 | | | | | | | 6 | 1 | 1 | | | 50 | 20 | |
| | 1944 | | | | | 1 | | 4 | | | | | | 22 | |
| | 1952 | | | 2 | | | | | 1 | 10 | | | | | |
| | 1986 | | | | | | | | | | | | | | |
| | 1987 | | | | | | | 1 | | | 2 | | | | |
| | 1988 | | | | | | | | | | | | | | |
| | 1989 | | | | | | | | | | | | | | |
| | 1990 | | | | | | | 5 | | | | | 1 | 1 | |
| TOTAL | | 1 | 1 | 46 | 6 | 3 | 5 | 416 | 32 | 276 | 6 | 4 | 268 | 164 | 1 |
| PERCENT | | 0.1 | 0.1 | 3.7 | 0.5 | 0.2 | 0.4 | 33.8 | 2.6 | 22.5 | 0.5 | 0.3 | 21.8 | 13.3 | 0.1 |

# Appendix 5: Habitat ratings for grizzly bear value and season of use

| High value habitats | Seasonal Use |
|---|---|
| SBSmc-Sub-Boreal Spruce moist cold subzone and ICH biogeoclimatic zone | |
| Polygons with greater than 50 % Willow-sedge wetland (WS) | April-May |
| WS complexed with Spruce-devil's club lower slope (SD) | April-July |
| WS complexed with Spruce-horsetail flat (SH) | April-May |
| WS complexed with Black spruce bog (BS) | April-May |
| WS complexed with Devil's club-oak fern (DO) | April-May |
| WS complexed with Horsetail swamp (HO) | April-May |
| Willow swamp (WI) | April-May |
| Black cottonwood-red osier dogwood (CD) | April-Nov |
| Trembling aspen-beaked hazelnut (AH) | April-May |
| Paper birch-red osier dogwood (BD) | April-May |
| Paper birch-falsebox (BF) | April-May |
| Spruce-black twinberry floodplain (ST) | April-Nov |
| Trembling aspen-Douglas maple (AM) | April-May |
| Sitka alder-spiny wood fern seepage area (AF) | May-July |
| Thimbleberry-cow parsnip medows (TC) | May-July |
| ESSFmc-Englemann Spruce-Subalpine Fir moist cold subzone | |
| Polygons with greater than 50% WS | June-July |
| complexed with Black huckleberry-five-leaved bramble (BB) | Aug-Sept |
| and Black huckleberry-bunchberry mesic (HB) | Aug-Sept |
| Sitka alder-cow parsnip avalanche chute (AC) | May-July |
| Sitka alder-spiny wood fern seepage area (AF) | May-July |
| Thimbleberry-cow parsnip medows (TC) | May-July |
| **Moderate value habitats** | |
| SBSmc-Sub-Boreal Spruce moist cold subzone and ICH biogeoclimatic zone | |
| Lodgepole pine-dwarf blueberry (LB) | July-Aug |
| Lodgepole pine-soopolallie (LS) | July-Aug |
| ESSFmc-Englemann Spruce-Subalpine Fir moist cold subzone | |
| Black huckleberry-bunchberry mesic (HB) | Aug-Sept |
| Black huckleberry-five leaved bramble (BB) | Aug-Sept |
| Western hemlock-black huckleberry (HH) | Aug-Sept |
| **Integrated Resource Management Units** | |
| SBSmc-Sub-Boreal Spruce moist cold subzone and ICH biogeoclimatic zone | |
| Bunchberry-moss (BM) | |
| Spruce-oak fern (SO) | |
| Western hemlock-moss (HM) | |
| Western hemlock-false azalea (HA) | |
| ESSFmc-Englemann Spruce-Subalpine Fir moist cold subzone | |
| Subalpine fir-devil's club (FD) | |
| Subalpine fir-common horsetail swamp (FH) | |
| ESSFwv-Englemann Spruce-Subalpine Fir wet very cold subzone | |
| Subalpine fir-false azalea (FA) | |

## Table B.1. Plants used for forage by grizzly bears in British Columbia with an indication of the most commonly consumed parts

| SCIENTIFIC NAME[a] | COMMON NAME[b] | PARTS USED[c] |
|---|---|---|
| Achillea millefolium | western yarrow | g |
| Allium spp. | wild onion | e |
| Amelanchier alnifolia | saskatoon | f |
| Angelica spp. | angelica | e |
| Aralia nudicaulis | wild sarsaparilla | f |
| Arctostaphylos uva-ursi | kinnikinnick | f |
| Aster spp. | aster | g |
| Astragalus spp. | milk-vetch | g |
| Athyrium filix-femina | lady fern | g |
| Betula glandulosa | scrub birch | g |
| Calamagrostis spp. | reedgrass | g |
| Carex spp. | sedge | g |
| Cicuta douglasii | Douglas water-hemlock | e |
| Cirsium spp. | thistle | e |
| Claytonia lanceolata | western springbeauty | r |
| Cornus sericea | red-osier dogwood | f |
| Corylus cornuta | beaked hazelnut | f |
| Crataegus spp. | hawthorn | f |
| Empetrum nigrum | crowberry | f |
| Equisetum spp. | horsetail | g |
| Erythonium grandiflorum | glacier lily | r |
| Festuca spp. | fescue | g |
| Fragaria spp. | strawberry | f |
| Hedysarium spp. | hedysarum | r |
| Heracleum sphondylium | cow-parsnip | e |
| Lathyrus ochroleucus | creamy peavine | g |
| Ligusticum canbyi | Canby's lovage | g |
| Lomatium spp. | wild parsley | g |
| Lonicera involucrata | black twinberry | f |
| Lonicera utahensis | Utah honeysuckle | f |
| Lupinus spp. | lupine | e |
| Luzula spp. | woodrush | e |
| Lysichiton americanum | skunk cabbage | g |
| Mahonia spp. | Oregon-grape | f |
| Oplopanax horridus | devil's club | f,g |
| Osmorhiza chilensis | sweet-cicely | e |
| Oxyria digyna | mountain sorrel | g |
| Platanthera spp. | bog-orchid | e |
| Picea spp. | spruce | b |
| Pinus spp. | pine | b |
| Populus balsamifera | poplar or cottonwood | b |
| Psuedotsuga menziesii | Douglas-fir | b |

## Table B.1. (cont'd)

| SCIENTIFIC NAME[a] | COMMON NAME[b] | PARTS USED[c] |
|---|---|---|
| Prunus virginiana | choke cherry | f |
| Rhamnus purshiana | cascara | f |
| Ribes spp. | currant | f |
| Rosa spp. | rose | f |
| Rubus spp. | salmonberry/raspberry/blackberry | f |
| Salix spp. | willow | g |
| Sambucus spp. | elderberry | f |
| Scirpus microcarpus | small-leaved groundsel | g |
| Senecio triangularis | arrow-leaved groundsel | g |
| Shepherdia canadensis | soopalallie | f |
| Sorbus spp. | mountain ash | f |
| Streptopus amplexifolius | clasping twistedstalk | f |
| Taraxacum spp. | dandelion | e |
| Tiarella trifoliata | three leaved foamflower | g |
| Trifolium spp. | clover | g |
| Trillium ovatum | western trillium | r |
| Vaccinium spp. | blueberry/huckleberry | f |
| Valeriana dioica | marsh valerian | g |
| Veratrum viride | Indian hellebore | g |
| Viburnum edule | highbush cranberry | f |

[a] Taylor, R.L., and B. MacBride. 1977 Vascular plants of British Columbia; a description resource inventory. Univ. of B.C. Press, Vancouver B.C.

[b] Meidinger, D. 1987. Recommended vernacular names for common plants of British Columbia. Ministry of Forests and Lands, Victoria B.C.

[c] Commonly used parts: G-growing (above ground) portion; E-entire plant; R-root; F-fruit; B-bark

# Appendix 6: Correlation Table of Habitat Types and Biogeoclimatic Site Series

| present study | | Ministry of Forests (reference) | |
|---|---|---|---|
| Map symbol | Name | | |
| **SBSmc2** | **Babine Moist Cold Sub-Boreal SpuceVariant** | | |
| AF | Sitka alder-spiny wood fern seepage area | - | none |
| AMd | Trembling aspen-Douglas maple southerly aspect, deep soil | SBSmc2/01 submesic phase | Hybrid white spruce-Huckleberry, submesic phase |
| AMs | Trembling aspen-Douglas maple southerly aspect, shallow soil | SBSmc2/01 submesic phase | Hybrid white spruce-Huckleberry, submesic phase |
| BA* | Barren | - | none |
| BMc | Bunchberry-moss cool aspect | SBSmc2/01 | Hybrid white spruce-Huckleberry |
| BMl | Bunchberry-moss mesic, lacustrine | SBSmc2/01 | Hybrid white spruce-Huckleberry |
| BMm | Bunchberry-moss, mesic, morainal | SBSmc2/01 | Hybrid white spruce-Huckleberry |
| BS | Black spruce bog | - | none |
| LB | Lodgepole pine-dwarf blueberry , coarse textured soil | SBSmc2/03 | Black spruce-Lodgepole pine-Feathermoss |
| OW* | Shallow open water wetland | - | none |
| ROw* | Rock outcrop, warm aspect | - | none |
| SD | Spruce-devil's club lower slope | SBSmc2/09 | Hybrid white spruce-Devil's club |
| SH | Spruce-horsetail flat | SBSmc2/10 | Hybrid white spruce-Horsetail |
| SO | Spruce-oak fern moist | SBSmc2/07 | Hybrid white spruce-Oak fern |
| ST | Spruce-black twinberry floodplain | - | none? |
| TC | Thimbleberry-cow parsnip meadow | - | none |
| WB | Willow-dwarf blueberry shrub-car | - | none |
| WS | Willow-sedge wetland | SBSmc2/12 | Black spruce-Scrub birch-Sedge |
| **ICH mc1** | **Nass Moist Cold Interior Cedar-Hemlock Variant** | | |
| ACc | Sitka alder-cow parsnip avalanche chute, cool aspect | - | none |
| ACw | Sitka alder-cow parsnip avalanche chute, warm aspect | - | none |
| AF | Sitka alder-spiny wood fern seepage areas | - | none |
| DO | Devil's club-oak fern lower slope | ICHmc1/04 | Western hemlock-Devil's club-Gooseberry |
| HA | Western hemlock-false azalea, shallow soil | | |
| HHd | Western hemlock-black huckleberry southerly aspect, deep soil | | |
| HHs | Western hemlock-black huckleberry southerly aspect, shallow soil | | |
| HM | Western hemlock-moss mesic | ICHmc2/01 | Western hemlock-step moss |

| | | | |
|---|---|---|---|
| HMc | Western hemlock-moss cool aspect | ICHmc2/01 | Western hemlock-step moss |
| HMf | Western hemlock-moss mesic, fluvial | ICHmc2/01 | Western hemlock-step moss |
| HO | Horsetail swamp | ICHmc2/06 | Western hemlock-Azalea-skunk cabbage? |
| ST | Spruce-black twinberry floodplain | ICHmc2/05 | Black cottonwood floodplain |
| WS | Willow-sedge wetland | | |

| **ICHmc2** | **Hazelton Moist Cold Interior Cedar-Hemlock Variant** | | |
|---|---|---|---|
| AHf | Trembling aspen-beaked hazelnut mesic, fluvial | ICHmc2/51 | Spruce-Twinberry-Hazelnut |
| AHm | Trembling aspen-beaked hazelnut mesic, morainal | | |
| AF | Sitka alder-spiny wood fern seepage area | - | none |
| BD | Paper birch-red osier dogwood fan | ICHmc2/03 | spuce-paper birch-Devil's club |
| BFd | Paper birch-falsebox southerly aspect, deep soil | ICHg/3 | Dry hemlock - moss |
| BFs | Paper birch-falsebox southerly aspect, shallow soil | ICHg/3 | Dry hemlock-moss-lithic phase |
| BS | Black spruce bog | ICHmc2/08 | Black spruce-sphagnum |
| CD | Black cottonwood-red osier dogwood floodplain | ICHmc2/07 | Black cottonwood-floodplain |
| CF* | Cultivated field | - | none |
| DO | Devil's club-oak fern lower slopes | ICHmc2/05 | Western red cedar-Western hemlock-Devil's club-Lady fern |
| HMc | Western hemlock-moss cool aspect | ICHmc2/01 | Western hemlock-step moss |
| LS | Lodgepole pine-soopalallie fluvial terrace | ICHmc2/02<br>ICHmc2/50 | Western hemlock-kinnikinnick-Cladonia Lodgepole pine-Western hemlock-feathermoss |
| OW* | Shallow open water wetland | - | none |
| TC | Thimbleberry-cow parsnip moist meadow | - | none |
| WI | Willow swamp | - | none |
| WS | Willow-sedge wetland | - | none |

| **ESSFmc** | **Moist Cold Englemann Spruce-Subalpine Fir Subzone** | | |
|---|---|---|---|
| ACc | Sitka alder-cow parsnip avalanche chute, cool aspect | - | none |
| ACw | Sitka alder-cow parsnip avalanche chute, warm aspect | - | none |
| AF | Sitka alder-spiny wood fern seepage area | - | none |
| BBd | Black huckleberry-five leaved bramble, southerly aspect, deep soil | ESSFmc/04 | Subalpine fir-Huckleberry-Heron's-bill |
| BBs | Black huckleberry-five leaved bramble, southerly aspect, shallow soil | ESSFmc/04 | Subalpine fir-Huckleberry-Heron's-bill |

| | | | |
|---|---|---|---|
| BS | Black spruce bog | | |
| FD | Subalpine fir-devil's club lower slopes | ESSFmc/07 | Subalpine fir-Devil's club-Lady fern |
| FH | Subalpine fir-common horsetail swamp | ESSFmc/10 | Subalpine fir-Horsetail-Leafy moss |
| HB | Black huckleberry-bunchberry mesic | ESSFmc/01 | Subalpine fir-Huckleberry-Leafy leavewort |
| HBc | Black huckleberry-bunchberry mesic, cool aspect | ESSFmc/01 | Subalpine fir-Huckleberry-leafy leavewort |
| MP | White mountain heather-partridgefoot meadow | ESSFmcp/06 | Heath |
| PH | Lodgepole pine-black huckleberry, coarse textured soil | ESSFmc2 | Subalpine fir-lodgepole pine Juniper-Cladonia |
| ROc* | Rock outcrop, steep cool aspects | - | none |
| ROm* | Rock outcrop, moderate slopes | - | none |
| ROw* | Rock outcrop, steep warm aspect | - | none |
| SV | Sedge-Sitka valerian moist meadow | ESSFmcp/04 | Arrow-leaved groundsel-Sitka valerian |
| TA* | Talus | - | none |
| WS | Willow-sedge wetland | | |

| **ESSFwv** | **Wet Very Cold Englemann Spruce-Subalpine Fir Subzone** | | |
|---|---|---|---|
| ABd | False azalea-bunchberry southerly aspect, deep soil | ESSFwv/03 | Subalpine fir-Mountain Hemlock-feathermoss |
| ABs | False azalea-bunchberry southerly aspect, shallow soil | ESSFwv/03 | |
| ACc | Sitka alder-cow parsnip avalanche chute, cool aspect | - | none |
| ACw | Sitka alder-cow parsnip avalanche chute, warm aspect | - | none |
| AF | Sitka alder-spiny wood fern seepage area | - | none |
| FA | Subalpine fir-false azalea mesic | ESSFwv/01 | Subalpine fir-Mountain Hemlock-Azalea |
| FAc | Subalpine fir-false azalea cool aspect | ESSFwv/01 | Subalpine fir-Mountain Hemlock-Azalea |
| FD | Subalpine fir-devil's club lower slope | ESSFwv/06 | Subalpine fir-Devil's club-Lady Fern |
| MP | White mountain heather-partridge foor meadow | ESSFwvp/01 | White mountain heather-partridge foot-moss |
| ROc* | Rock outcrop-steep cool aspect | - | none |
| ROm* | Rock outcrop-moderate slope | - | none |
| ROw* | Rock outcrop-warm aspect | - | none |
| SV | Sedge-sitka valerian moist meadow | ESSFwvp/03 | Sitka valerian-mullein |
| TA* | Talus | - | none |
| WS | Willow-sedge wetland | - | none |

| | | | |
|---|---|---|---|
| **ESSFmcp** | **Moist Cold Parkland Englemann Spruce-Subalpine Fir subzone** | | |
| **ESSFwvp** | **Wet Very Cold Parkland Englemann Spruce-Subalpine Fir Subzone** | | |
| FV | Subalpine fir-Sitka valerian parkland | ESSFwvp/07<br>ESSFmcp/08 | Meadow forest |
| MP | White mountain heather-partridgefoot meadow | ESSFmcp/06<br>ESSFwvp/01 | Heath<br>Mesic White mountain-heather-partridgefoot moss |
| ROc* | Rock outcrop-steep cool aspect | - | none |
| ROm* | Rock outcrop-moderate slope | - | none |
| ROw* | Rock outcrop-steep warm aspect | - | none |
| SV | Sedge-sitka valerian moist meadow | ESSFmcp/04<br>ESSFwvp/03 | Arrow -leaved grounsel-Sitka valerian;Sitka valerian mullein |
| TA* | Talus | - | none |

| | | | |
|---|---|---|---|
| **AT** | **Alpine Tundra zone** | | |
| FL | Altai fescue-lichen-lichen alpine grassland | - | none |
| IC* | Ice/glacier | - | none |
| MP | White mountain heather-partridge foot meadow | ESSFmcp/06<br>ESSFwvp/01 | Heath<br>Mesic White mountain-heather-partridgefoot moss |
| ROc* | Rock outcrop-steep cool aspect | - | none |
| ROm* | Rock outcrop-moderate slope | - | none |
| ROw* | Rock outcrop-warm aspect | - | none |
| SV | Sedge-Sitka valerian moist meadow | ESSFmcp/04<br>ESSFwvp/03 | Arrow -leaved grounsel-Sitka valerian; Sitka valerian mullein |
| TA* | Talus | - | none |

# Appendix 7: Forest Ecosystem Network (FEN) descriptions and area summaries

## Bulkley District

### Tsezakwa Creek

Concerns/Values:
- ESAs for soils
- high value grizzly bear habitat
- fish spawning habitat (particularly at the mouth of the creek)
- trail through Suskwa Pass
- old growth
- moose winter range

Placement of this FEN provides protection of the riparian ecosystem and movement corridor along the creek; protection of the visual quality objectives from Babine Lake, protection of a forested connection to the Suskwa Pass and a forested connection from a riparian ecosystem in the SBSmc through to the alpine.

### Boucher Creek

- extensive wetlands
- large proportion of high value grizzly bear habitat
- presence of an important creek with valuable fish spawning and rearing habitat
- movement corridor along the creek for grizzly bears
- areas of old growth
- proximity to goat habitat with documented trails and mineral licks
- wolf rendevous/denning area
- recreational value surrounding a number of the lakes
- small areas of ESAs and slope stability/surface erosion hazard

The position of this area with respect to the Van fire (berry crop), salmon run in the Babine River and possible denning habitat in the Bait range for grizzly bears, further emphasizes its importance. This FEN also provides a connection with a riparian area in the SBSmc through to the alpine. The focus in delineating this FEN was to take advantage of the diversity of habitats in close proximity to Babine river and the Van Fire, the presence of old growth forests, valuable fish habitat, moose winter range, a key riparian area and travel corridor, valuable grizzly bear habitat, recreational opportunities and to provide a link from the SBSmc through to the alpine.

**Mount Horetsky**

- medium landscape sensitivity and partial retention visual quality objective
- areas of old growth
- high and moderate value grizzly bear habitat
- links with Babine River and Nilkitkwa River
- a significant component of high and very high surface erosion hazard

This FEN takes advantage of these concerns and values and provides linkage extending from a key riparian area to the alpine.

**Charleston Creek area**

- large forested/wetland complex
- high percentage of valuable grizzly bear habitat
- moose summer range

It maintains a linkage with the riparian area along Charleston Creek to the alpine. Much of this FEN contains non-merchantable timber, though opportunities for maintenance of old growth are present in the ESSFmc.

**Nichyeskwa Creek area**

- primarily high value grizzly bear habitat
- lower portion of the FEN is in moose winter range
- maintenance of old growth
- a wilderness lake
- approximately half of the polygons within the ESSFmc contain environmentally sensitive soils (Es)

This FEN is in close proximity to Nichyeskwa Creek and Babine River and provides linkage with Nichyeskwa Creek.

**Nichyeskwa Creek tributary**

- potential for very high mass wasting
- linkage with a riparian zone where water quality is a concern
- high value grizzly bear habitat

The FEN is predominately Es (riparian zone, FEN and links between grizzly bear habitat polygons) and provides some opportunity for maintenance of old growth forests.

## Kispiox District

### Upper Nichyeskwa

This area consists of high value steelhead producing streams and extensive wetland systems. It also contains summer moose range and medium/high grizzly bear habitat. This FEN also provides linkage to Gail Creek, Thompson Creek and Natlan Creek riparian ecosystems.

### Shenismike

This FEN provides a forested linkage from the Babine River to alpine areas located within the proposed Atna Range wilderness area.

### Hanawald

This FEN is primarily high value grizzly bear habitat with a major game trail on the east side of the creek along the ridge. In addition, it provides linkage to the alpine in the upper Hanawald as well as to the Shelagyote watershed.

## Area estimates within the FENs, wilderness zone and linkage areas by biogeoclimatic subzone for the Bulkley Forest District

| | AREA(ha) | PERCENT (%) TOTAL AREA | PERCENT (%) BULKLEY BABINE RIVER PLANNING AREA |
|---|---|---|---|
| FEN | | | |
| SBSmc | 5796 | 48.1 | 4.6 |
| ESSFmc | 5128 | 42.6 | 4.1 |
| AT | 1120 | 9.3 | 0.9 |
| TOTAL AREA | 12044 | - | 9.6 |
| LINKAGES | | | |
| SBSmc | 1740 | 74.9 | 1.4 |
| ESSFmc | 584 | 25.1 | 0.5 |
| AT | 0 | 0 | 0 |
| TOTAL AREA | 2324 | - | 1.9 |
| WILDERNESS ZONE | | | |
| SBSmc | 5757 | 71.7 | 4.6 |
| TOTAL AREA | 5757 | - | 4.6 |
| ESTIMATED PLANNING AREA TOTAL | 125000 | | |

# Appendix 8: Area estimates of high value grizzly bear habitat

| Habitat | Area (ha) | Per cent (%) of total area |
|---|---|---|
| Bulkley District | | |
| Non Forested | 4100 | 36.3 |
| Total Deciduous | 1600 | 14.2 |
| Total Forested | 5600 | 49.6 |
| Total Area | 11300 | |
| Kispiox District | | |
| Non Forested | 16173 | 68.2 |
| Total Deciduous | 647 | 2.7 |
| Total Forested | 6887 | 29.1 |
| Total Area | 23707 | |

# Appendix 9: Timber (80 + years) summary by Sub-drainage and Biogeoclimatic Subzone

**ESSF mc - Area (ha.)**

| Sub-drainage | Operable Immature | Operable Sawlog | Marginal Sawlog | Operable Pulp | Inoperable ESA | Inoperable Deciduous | Inoperable Coniferous | Non Productive | Total | Mature Constant |
|---|---|---|---|---|---|---|---|---|---|---|
| Nichyeskwa South | 386 | 1,664 | 1,181 | 0 | 3,021 | 75 | 1,004 | 710 | 8,041 | 4,810 |
| Nichyeskwa North | 258 | 2,107 | 2,319 | 0 | 761 | 0 | 938 | 130 | 6,513 | 1,829 |
| Horetsky | 0 | 120 | 1,230 | 0 | 257 | 0 | 31 | 0 | 1,638 | 287 |
| Boucher | 0 | 628 | 1,428 | 0 | 2,299 | 0 | 1,292 | 2,895 | 8,542 | 6,487 |
| **Sub-Total ESSF mc** | 643 | 4,519 | 6,158 | 0 | 6,338 | 75 | 3,265 | 3,734 | 24,733 | 13,413 |

**SBS mc2 - Area (ha.)**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nichyeskwa South | 156 | 6,281 | 223 | 0 | 485 | 106 | 151 | 212 | 7,614 | 955 |
| Nichyeskwa North | 355 | 6,429 | 1,792 | 0 | 305 | 179 | 437 | 263 | 9,760 | 1,184 |
| Horetsky | 0 | 9,282 | 4,218 | 0 | 321 | 60 | 610 | 271 | 14,762 | 1,262 |
| Boucher | 349 | 14,926 | 1,864 | 0 | 1,282 | 94 | 1,926 | 683 | 21,123 | 3,985 |
| Wilderness zone | 63 | 3,970 | 287 | 0 | 481 | 198 | 54 | 196 | 5,250 | 929 |
| **Sub-Total SBS mc2** | 923 | 40,888 | 8,383 | 0 | 2,874 | 638 | 3,177 | 1,626 | 58,509 | 8,315 |
| **Total Drainage** | **1, 67** | **4 ,406** | **14, 41** | **0** | **9,212** | **713** | **6,442** | **,360** | **83,242** | **21,727** |

N.B. Mature Constant represents a sum of all inoperable timber for that sub-drainage

**ESSF mc - % Area**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nichyeskwa South | 4.7 | 20.2 | 14.3 | 0.0 | 36.7 | 0.9 | 12.2 | 8.6 | 97.7 | 58.4 |
| Nichyeskwa North | 3.7 | 30.3 | 33.3 | 0.0 | 10.9 | 0.0 | 13.5 | 1.9 | 93.6 | 26.3 |
| Horetsky | 0.0 | 7.3 | 75.1 | 0.0 | 15.7 | 0.0 | 1.9 | 0.0 | 100.0 | 17.6 |
| Boucher | 0.0 | 5.9 | 13.3 | 0.0 | 21.5 | 0.0 | 12.1 | 27.0 | 79.7 | 60.5 |

**SBS mc2 - % Area**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Nichyeskwa South | 1.3 | 51.7 | 1.8 | 0.0 | 4.0 | 0.9 | 1.2 | 1.7 | 62.7 | 7.9 |
| Nichyeskwa North | 3.0 | 53.9 | 15.0 | 0.0 | 2.6 | 1.5 | 3.7 | 2.2 | 81.9 | 9.9 |
| Horetsky | 0.0 | 53.5 | 24.3 | 0.0 | 1.8 | 0.3 | 3.5 | 1.6 | 85.1 | 7.3 |
| Boucher | 1.3 | 57.5 | 7.2 | 0.0 | 4.9 | 0.4 | 7.4 | 2.6 | 81.4 | 15.4 |
| Wilderness zone | 1.2 | 73.6 | 5.3 | 0.0 | 8.9 | 3.7 | 1.0 | 3.6 | 97.3 | 17.2 |

# Appendix 10: Summary of the proportion of operable timber in the treatment units and wilderness zone in the Babine River LRUP

| | Treatment Unit | Area (ha) | Per cent (%) LRUP Operable |
|---|---|---|---|
| Babine River LRUP | | | |
| Riparian | 1 | 5400 | 4.3 |
| FEN | 2 +2a | 4520 | 3.6 |
| Link | 3 | 2650 | 2.1 |
| High Grizzly Bear | 4 +4a | 14700 | 11.8 |
| Moderate Grizzly Bear | 5 | 30800 | 24.9 |
| Integrated ResourceManagement | 6 | 60700 | 49.0 |
| Wilderness Zone | | 5380 | 4.3 |
| | | | |
| Estimated total operable Babine River LRUP | | 124150 | |

| | Treatment Unit | Area (ha) | Per cent (%) Planning Unit Operable | Per cent (%) T.S.A. Operable |
|---|---|---|---|---|
| Bulkley District | | | | |
| Riparian | 1 | 4200 | 5.5 | 1.6 |
| FEN | 2 +2a | 4300 | 5.6 | 1.6 |
| Link | 3 | 1600 | 2.1 | 0.6 |
| High Grizzly Bear | 4 +4a | 7200 | 9.4 | 2.7 |
| Moderate Grizzly Bear | 5 | 16000 | 21.0 | 6.1 |
| Integrated Resource Management | 6 | 39000 | 51.0 | 14.9 |
| Wilderness Zone | | 4100 | 5.4 | 1.6 |
| | | | | |
| Estimated total operable Bulkley | | 76400 | | 29.2 |
| Estimated operable for the T.S.A. | | 262000 | | |

| | Treatment Unit | Area (ha) | Per cent (%) Planning Unit Operable | Per cent (%) T.S.A. Operable |
|---|---|---|---|---|
| Kispiox District | | | | |
| Riparian | 1 | 1200 | 2.5 | 0.4 |
| FEN | 2 | 220 | 0.5 | 0.1 |
| Link | 3 | 1050 | 2.2 | 0.3 |
| High Grizzly Bear | 4 +4a | 7500 | 15.7 | 2.4 |
| Moderate Grizzly Bear | 5 | 14800 | 31.0 | 4.1 |
| Integrated ResourceManagement | 6 | 21700 | 45.4 | 7.0 |
| Wilderness Zone | | 1280 | 2.7 | 0.4 |
| | | | | |
| Estimated total operable Kispiox | | 47750 | | 15.5 |
| Estimated operable for the T.S.A. | | 309000 | | |

## Appendix 11: Mountain Pine Bark Beetle management strategy for the Babine River watershed

Summer air reconnaissance is conducted yearly to obtain an estimate of the number of red attack trees within the district. Photographs are taken of these areas and all information is transcribed onto 1:50,000 forest cover maps. Ground crews are then sent in to probe the more critical sites. Critical sites are those areas surveyed from the air containing a large number of red trees. Detailed site information is mapped at 1:20,000 and the number of attacked trees recorded. Trees are categorized as follows:

C - Current, green attack. Live insects are present.
Y1 - Red trees, live beetles are still present.
Y2 - Red trees, beetles have dispersed.

Areas containing C and Y1 trees are typically treated by the fall and burn method. The method is low impact with no trails or roads being established. Fall and burn takes place in the winter months due to fire hazard and risk of escape. Sites with less than 10 current (C) attack trees are considered low priority unless they are easily accessible such as along developed road networks. This year most areas within the triangle (between the Babine and Nilkitkwa Rivers), outside the special management zone were treated by fall and burn. Areas within the special management zone will subsequently be treated. Particular emphasis is placed on areas where logging is not anticipated to take place within the next two years, and/or areas where previous monetary investment in large pine stands has occurred.

To minimize the problem in areas scheduled for logging, the trees are baited with pheromone traps. This causes the insects to congregate in areas which will then be harvested. Those treated with pheromone traps last year are scheduled for harvesting this year, for example in the small business blocks adjacent to Nilkitkwa River. Small areas of concern exist near Nichyeskwa Creek. These are near an existing road and may lend themselves to a fall and remove method in an effort to salvage as much wood as possible.

Employment of these strategies is anticipated to minimize the impact of epidemic populations of mountain pine beetle and prevent spread of these populations into surrounding pine stands. Pine in age classes 6-8 are typically attacked by this insect. The management strategies outlined previously are addressed within the context of each treatment unit. In general, harvesting should be planned to address current attack trees. Even with active management the average increase in the number of green attack trees exceeds 12 per cent on a yearly basis.