VANDERHOOF LAND AND RESOURCE MANAGEMENT PLAN
RESOURCE ANALYSIS - ENVIRONMENT

Prepared for:
Vanderhoof Interagency Planning Team

Prepared by:
ECL Envirowest Consultants Limited
1323 Connaught Drive
Prince George, B.C.

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Multiple Accounts Analysis Summary Table - Environment

KEY ACCOUNTS	BASE CASE TRENDS (INCL.TSR, FPC, RPAT)	CONSENSUS PLAN VS BASE CASE
BIODIVERSITY	• protected areas provide significant representation for 4 of 8 subzone variants and 2 of the 4 ecosections • 7.2% of the LRMP area occurs in proposed protected areas • 15% of the timber harvesting landbase meets high biodiversity age class objectives • 15% of the LRMP landbase maintained as old growth • decline in natural biodiversity in the long-term due to high proportion of forest in young age classes, high road density and habitat fragmentation • landscape connectivity improved over the TSR in western portion by new proposed protected areas	• protected areas provide significant representation for 5 of 8 subzone variants and 2 of the 4 ecosections • 6.8% of the LRMP area occurs in proposed protected areas (reduction to meet Provincial target) • 20% of the timber harvesting landbase meets high biodiversity age class objectives • 15% of the LRMP landbase maintained as old growth • less risk to biodiversity with less high intensity and favourable LRMP defined objectives and strategies • increase in low intensity RMZ's and LRMP identified FEN's improve landscape connectivity in the western portion over the Base Case
WILDLIFE HABITATS	• continued declines in deciduous trees and Douglas-fir expected to negatively affect important wildlife habitat • high proportion of high intensity development (83%) expected to degrade quality of many habitat types • outlook for protection of riparian habitats good with FPC vs TSR practices • low elevation spruce-pine habitats at greatest risk • risk of wetland habitats becoming isolated with adjacent timber harvesting in high intensity development areas	• LRMP defined management objectives and strategies to maintain Douglas-fir/deciduous types • less high intensity (69%) provides for improved quality of habitats in the western portion (most high in east) • LRMP increases low intensity areas and define wildlife movement corridors • reduced risk for low elevation spruce-pine in western portion • greater proportion of wetlands within low intensity development and FEN's in high intensity development areas
Grizzly Bear	• 79 % of medium quality grizzly habitat within high intensity development areas • reduced populations expected in long-term with increased fragmentation and access • FPC improves riparian protection, stand management and seral stage distribution requirements • new proposed protected areas provide core habitat areas but the benefits may be limited by isolating effects of adjacent high intensity development areas	• 60 % of medium quality grizzly habitat within high intensity development areas • reduced populations anticipated in high intensity areas • stable populations in Laidman, Crystal, Sutherland RMZ's with LRMP access management strategies • LRMP designated low intensity development areas adjacent to proposed protected areas increase viable habitat over the Base Case

Multiple Accounts Analysis Summary Table - Environment (contd)

KEY ACCOUNTS	BASE CASE TRENDS (INCL.TSR, FPC, RPAT)	CONSENSUS PLAN VS BASE CASE
Moose	• lack of comprehensive management for critical winter ranges • wetland habitats expected to become isolated in high intensity RMZ's • reduced populations expected in long-term in high intensity areas due to increased access and vegetation management	• critical habitats (incl. winter ranges) identified as sensitive areas requiring forested buffers • LRMP defined vegetation and access management strategies anticipated to maintain stable numbers and potentially increase in some areas
Marten	• 80 % of high quality marten habitat within high intensity development areas • declining populations expected in long-term with increased access, decreased habitat connectivity and decreased mature timber	• 63 % of high quality marten habitat within high intensity development areas • population decline to lower carrying capacity expected • LRMP recommendation for aggregated harvest units (with larger leave areas) may partially mitigate impacts
Species at Risk	• Tweedsmuir-Entiako caribou at risk due to the lack of a management plan, proposed protected areas would capture a significant proportion of key habitats • grizzly decline in long term associated with altered habitat and increased access • bald eagle, trumpeter swan, great blue heron and American bittern better protected with FPC riparian protection and lakeshore management • slow decline and stabilization at lower numbers for bull trout with FPC • white sturgeon study to develop Provincial management strategy underway	• decreased risk to caribou with LRMP defined access and timber management recommendations • LRMP access and vegetation management, and low intensity development RMZ's adjacent to proposed protected areas create more viable areas for grizzly • increased protection for bull trout with decreased proportion of land in high intensity development RMZ's
FISHERIES	• FPC riparian protection and watershed assessments improve outlook for protection over the TSR • Base Case improves the outlook in 16 of 18 fisheries units over the TSR • Base Case provides greater protection than the Consensus Plan for fisheries values in 1 fisheries unit (Stuart) • significantly enhanced protection for 2 fisheries units in the Base Case, none in the TSR • impacts expected in 13 fisheries units in the TSR and 7 in the Base Case • 15 lakes in proposed protected areas and low intensity development RMZ's in the Base Case	• Consensus Plan reduces proportion of lands in high intensity development RMZ's by 14% over the Base Case and results in significantly improved outlooks for 6 fisheries units over the Base case • significantly enhanced protection for 6 fisheries units in the Consensus Plan, 2 in the Base Case • continued impacts expected 6 of 18 fisheries units due to high levels of existing development (settlement, agriculture, road density) and designation as high intensity RMZ's • 120 lakes in proposed protected areas and low intensity development RMZ's

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this resource analysis is to provide table members with an assessment of the environmental consequences associated with the proposed land use plan. The analysis presented here summarizes the incremental changes in key environmental values that would result from the implementation of the proposed land use plan in contrast to the base case. The base case provides a benchmark by which the Consensus Plan can be compared and assumes a continuance of current management practices. Current management includes the Forest Practices Code (FPC) and areas of interest identified by the Regional Protected Area Team for the Provincial Protected Areas Strategy (PAS). Where possible, the base case presents area statistics for the January 1995, Timber Supply Review (TSR) separately from the FPC and PAS, which occurred later in time.

2.0 INDICATORS, MEASURES, METHODS AND ASSUMPTIONS

A range of indicators were selected in order to demonstrate the effects of the consensus land use plan on environmental values (i.e. fish, wildlife, biodiversity, etc.) and to determine if desired future conditions for environmental values are likely to be achieved. The indicators, measures and assessment methods were selected based on the quality and availability of information. The indicators chosen for this resource analysis are primarily habitat based and are consistent with those identified during a resource analysis indicator workshop held by the Ministry of Environment Lands and Parks in March, 1995.

The indicators used to compare the effects of the TSR, Base Case and Consensus Plan on environmental values include area statistics, LRMP defined management strategies, and professional judgement. The percentage of land occurring within each resource development intensity is frequently used as the primary measure for evaluating general biodiversity and species status. Management Objectives and Strategies outlined by the LRMP, including general and more specific landscape prescriptions were used where appropriate. Professional judgement was used to assess the significance of the impacts based on the results of the indicator area statistics and management strategies.

Landscape and stand level management recommendations outlined in the FPC Biodiversity Guidebook (1995) provide the framework for managing biodiversity according to natural disturbance types (NDT). Five NDT's and three biodiversity emphasis options are identified and described in the guidebook. The management recommendations for each NDT are modelled to approximate the natural disturbance patterns within biogeoclimatic subzones and subzone variants. For the purposes of analysis, the three biodiversity emphasis options (high, medium and low) were assumed to equate to three resource development intensity designations; Low, General and High, respectively. The Settlement/Agriculture designations are not managed to meet the requirements of the FPC, however, they were considered as Low Biodiversity Emphasis areas. The minimum percentage of mature and old forest and the maximum percentage of early seral forests that are required to meet each biodiversity emphasis option, were used to determine seral stage distribution.

To support the analyses and conclusions, it is necessary to make clear statements about the assumptions used. Throughout this analysis, the indicators, measures, methods and assumptions are presented within the appropriate sections. A number of key assumptions apply to the analysis in general, including the following:

- by managing habitats to meet a specific set of objectives, we are managing for particular subsets of flora and fauna
- mimicking patterns and processes of natural disturbance in managed forests promotes the maintenance of natural biodiversity
- lower intensity development RMZ's (= high biodiversity emphasis) provide more options and opportunities for maintaining native species and ecological processes
- the greater the amount of each biogeoclimatic subzone in protected and low intensity resource management zone (RMZ), the greater the probability that most native species and ecological processes will be maintained

It is important to recognize that our ability to predict the status of wildlife populations into the future is limited. Understanding the functional relationships between habitat (availability, suitability, juxtaposition and structure) and population dynamics is highly complex and typically limits predictive techniques to surrogate measures where empirical data is difficult to collect and interpret. In addition, there is no clear indication of how particular habitats within a landscape unit will be distributed. The application of Geographic Information Systems will be an important tool in modelling habitat availability and suitability as forest management strategies evolve and will improve the predictive abilities of resource managers.

3.0 LANDSCAPE LEVEL OVERVIEW

The incremental changes in resource use intensity and land use planning in the gross landbase demonstrate a significant improvement in the outlook for key environmental values (Table 1). This is largely attributable to the addition of new protected areas; increasing from 0.02% to 6.8% of the gross landbase.

Low intensity Resource Management Zones (RMZ) will also contribute significantly to the maintenance of key environmental values. The areas of low intensity resource development in the TSR are limited to areas with restrictive Visual Quality Objectives (VQO's) and the Chedakuz Riparian Plan area, which comprise 11% of the gross landbase. A proportion of the VQO's identified in the TSR fall within proposed protected areas in the Base Case, decreasing the amount of low intensity to 10% in the Base Case. Low intensity areas comprise 13% of the gross landbase in the Consensus Plan and include VQO areas outside of proposed protected areas, the Chedakuz Riparian Plan area and newly designated areas within the timber harvesting landbase with special management emphasis. Correspondingly, the incremental change in high intensity resource development areas decreases from 89% to 83% and 69% from the TSR to the Base Case and Consensus Plan, respectively

Table 1. Land Use Designations Within the Vanderhoof LRMP Area in hectares (% of total land base)			
	TSR	Base Case	**Consensus Plan**
Protected Areas	873 (0.07%)	95,868 (6.9%)*	**93,956 (6.8%)**
Low Intensity	152, 960 (11%)	136,011 (10%)	**177,098 (13%)**
General Intensity	0	0	**161,382 (12%)**
High Intensity	1,229,674 (89%)	1,383,507 (83%)	**951,071 (69%)**
Total	1383507	1383507	**1,383,507**

* The RPAT area exceeds the Provincial target by approximately 2,000 ha

In general, improved outlooks for key environmental values within the timber harvesting landbase are associated with the introduction of the FPC. Apart from reductions within the timber harvesting landbase, the 'working forest' constitutes approximately 50% of the gross landbase in the Base Case and Consensus Plan (Table 2). The working forest is subject to the FPC requirements and is where resource development intensity designations have the greatest potential to affect biodiversity as they equate to a particular level of biodiversity emphasis in the Biodiversity Guidebook.

Increased reductions in the timber harvesting landbase in the Base Case and Consensus Plan are associated with riparian reserve zones and wildlife tree patches to meet FPC requirements (which have been estimated at approximately 8.9%), as well as proposed protected areas.

Table 2. Gross Landbase and Reductions to the Timber Harvesting Landbase in hectares (% of total landbase) - Vanderhoof Forest District			
	TSR	Base Case	**Consensus Plan**
Private Land	165,434 (12%)	165,434 (12%)	**165,434 (12%)**
Non-forest Land	142,396 (10%)	142,396 (10%)	**142,396 (10%)**
Reductions in the Timber Harvesting Landbase	261,852 (19%)	376,930 (28%)	**374,301 (28%)**
Remaining Timber Harvesting Landbase	804,464 (59%)	689,386 (50%)	**692,015 (50%)**
Total**	1,374,146	1,374,146	**1,374,146**

** the difference in total landbase in Table 2 is due to the lack of data for the area south of Tatuk Lake

Areas of private land comprise a significant proportion of the landbase, the vast majority of which comprises the Nechako Valley RMZ, which is a highly modified landscape where impacts to fish and wildlife values are significant. The non-forest lands include areas that are not capable of growing productive forest (i.e. wetlands, lakes, rock). The reductions within the timber harvesting landbase occur in a wide range of categories including forested and non-forested exclusions. Polygons of each exclusion category are recorded separately in the timber inventory database and there is significant overlap in many (i.e. inoperable and environmentally sensitive areas), which make it difficult to extract meaningful areal estimates.

4.0 BIOLOGICAL DIVERSITY

The assessment of potential impacts to natural biodiversity in the Base Case and as a result of the Consensus Plan is considered at the landscape and stand levels. At the landscape level, the relative proportion of ecosystems occurring in protected and high biodiversity emphasis areas demonstrates the incremental differences in scenarios. An evaluation of the potential impacts to biodiversity at the stand level is more subjective as and is based on the interpretation of future outcomes as a result of current operating standards and LRMP defined Management Objectives and Strategies.

The Biodiversity Guidebook (1995), developed for the FPC, provides the framework for the interpretation of potential impacts to biodiversity at the landscape and stand levels. The underlying assumption of the Biodiversity Guidebook is "all native species and ecological processes are more likely to be maintained if managed forests are made to resemble those forests created by the activities of natural disturbance agents such as fire, wind, insects and disease". Biodiversity objectives are described within the Biodiversity Guidebook for the five natural disturbance types (NDT's) occurring within the Province. Three NDT's occur within the Vanderhoof LRMP area (Table 3).

Table 3. Natural Disturbance Types within the Vanderhoof LRMP Area

Type	Definition	Hectares (% of LRMP)	Subzones/Variants
NDT 1	ecosystems with rare stand-initiating events	527 (<0.1%)	ESSFwv
NDT 2	ecosystems with infrequent stand-initiating events	161,207 (12%)	ESSFmv1
NDT 3	ecosystems with frequent stand-initiating events	1,201,077 (88%)	SBSdk, SBSdw2, SBSdw3, SBSmc2, SBSmc3, SBPSdc, SBPSmc

The NDT 3 occurs throughout the lower elevation areas and the NDT 1 and NDT 2 occur in the Engelmann Spruce-Subalpine Fir (ESSF) subzones at higher elevations. The implications of the large proportion of NDT 3 for forest management are largely associated with the cutting pattern, seral stage, patch size distribution and landscape connectivity. Some of the main recommendations in the Biodiversity Guidebook for NDT 3, that are sanctioned by the LRMP include:

- a clustered harvest pattern with aggregated harvest units
- retention of patches of mature timber within aggregated harvest units
- seral stages should occur in a variety of patch sizes within a landscape unit and follow a distribution appropriate for the NDT
- management for even-aged stands
- retain forest attributes including coarse woody debris, wildlife trees and deciduous species
- partial cutting systems for Douglas-fir and larch stands
- provide landscape connectivity along riparian corridors

The existing pattern of harvest is largely dispersed medium-sized cutblocks and leave areas, which, when projected into the future without the application of the FPC (i.e. TSR), would result in a highly fragmented landscape. One of the benefits of aggregated harvest units would be that other large areas of older forest would be left intact and unfragmented for extended periods.

This strategy could be implemented in the short term with some benefits but the greatest benefits would occur over the long term as larger, contiguous areas of even-aged forests evolve.

LRMP defined strategies for maintaining stand structural attributes and species composition are consistent with, and in many areas, more extensive than the recommendations of the Biodiversity Guidebook. The Consensus Plan provides for the greatest level of biodiversity.

Forested exclusions represent 18% of the land base in the TSR, and approximately 27% in the Base Case and Consensus Plan (Figure 1). Apart from new protected areas, the increase in forest exclusions in the Base Case and Consensus Plan are associated with riparian reserve zones and wildlife tree patches, which will contribute to biodiversity. Other forest exclusions that will contribute to biodiversity include non-commercial brush, inoperable areas, environmentally sensitive areas (ESA's), problem forest types and low productivity forest types. It should be recognized that the ability for many of the forest exclusions to function as "default" protection areas is dependant on their size and spatial distribution.

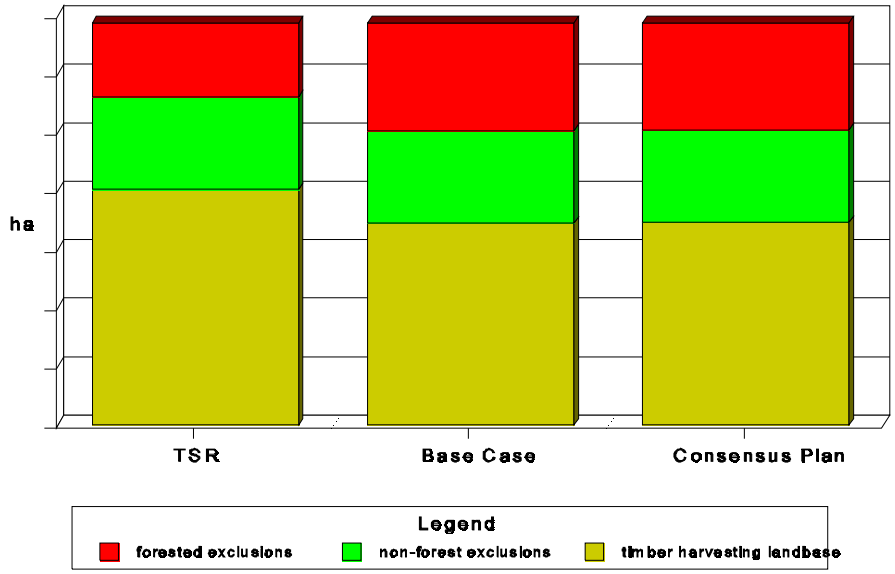


Figure 1. Timber Harvesting Landbase and Exclusions

The proportion of non-forested exclusions remains constant in all scenarios at 23% of the gross landbase. Although the types of non-forest exclusions include private land and roads, other types including wetlands and lake surfaces have a more direct contribution to natural biodiversity. The proportion and distribution of each type was not available for this analysis but should be considered secondarily to portions of the landbase that are subject to change (i.e. the working forest).

4.1 Protected Area Strategy

The Protected Area Strategy (PAS) is designed to protect large representative examples of natural diversity (Goal 1 areas) as well as smaller areas with significant special features (Goal 2 areas). The proposed protected areas in the base case include 5 areas,

which increase protected areas from 0.02% (TSR) to 6.9% of the planning area (Table 4). The Consensus Plan excludes the Dry William Lake Goal 2 area, adds the Francois South (Goal 1) and Nechako Canyon (Goal 2) areas and modifies the protected area proposals to decrease the total protected area to meet the 6.8% Provincial target.

Table 4. Proposed Protected Area Summary

Area of Interest	Base Case	Consensus	Key Subzones
Stuart River	15,641	7,739	SBSdw3
Sutherland River	4,752	4,738	SBSdk, SBSmc2
Francois South	0	6,870	SBSdk, SBSmc2
Nechako Canyon	0	1,299	SBSdk
Finger-Tatuk	18,928	17,376	SBSmc3, ESSFmv1
Entiako	54,924	55,061	SBPSmc, SBSmc3, ESSFmv1
Dry William	750	0	SBSdk
Total	94,995	93,083	

In general, the proposed protected areas would make a significant contribution towards maintaining natural ecosystems and species assemblages. Areas of interest in adjacent planning areas could expand the Stuart River, Sutherland River, Francois Lake and Entiako areas and further enhance their viability. The Entiako proposed protected area, would link Tweedsmuir Park and indirectly, the Itchas Ilgachuz proposed protected area (Cariboo CORE), significantly increasing ecosystem viability. The linear nature of the proposed Stuart River protected area makes it less insular and more susceptible to influences of adjacent land use activities than other areas of interest.

Management Objectives and Strategies defined by the LRMP provide management direction for the proposed protected areas that includes proactive measures such as beetle control and prescribed burning. Prescribed burning has been recommended for the purposes of habitat enhancement and controlling pest epidemics. Controlling beetle outbreaks within protected areas would be suppressing a primary natural disturbance vector, although the effects would be difficult to quantify. Where B.C. Parks would likely manage new protected areas, an LRMP defined strategy would require joint approval from the Ministry of Forests and the Ministry of Environment, Lands and Parks prior to initiating proactive measures in protected areas. A working involvement of both of these agencies would provide a measure of security in terms of scientific and logistical support.

4.2 Ecosystem Representation

There are two useful land classification schemes that capture the variation in plant and animal communities at a sub-regional scale. Ecosections (Regional Ecosystem Classification) are contiguous areas that are large enough to sustain a variety of plant and wildlife communities; four transect the LRMP area. Biogeoclimatic subzones and

subzone variants (Biogeoclimatic Classification) are characterized by a particular combination of dominant plant species; nine occur within the LRMP area. Subzones and subzone variants are dispersed within sub-regional areas and often occur within a relatively narrow elevational range and/or in relation to aspect. Each subzone has different values for different subsets of wildlife species.

It is important to consider both ecosections and subzones/variants to assess the potential impacts to ecosystems at the landscape level.

4.2.1 Ecosections

Of the four ecosections that transect the LRMP area, the Nazko Upland (NAU) comprises the greatest proportion (47%) of the landbase (Figure 2). The NAU ecosection has the greatest proportion of protected areas (11%), including the Entiako and Finger-Tatuk areas of interest. Combined with low intensity resource development areas, a total of 28% of the ecosection area (13% of the gross landbase) would meet high biodiversity objectives. An additional area of interest (Lakes LRMP) could expand the Entiako area of interest and increase the proportion of NAU in protected areas.

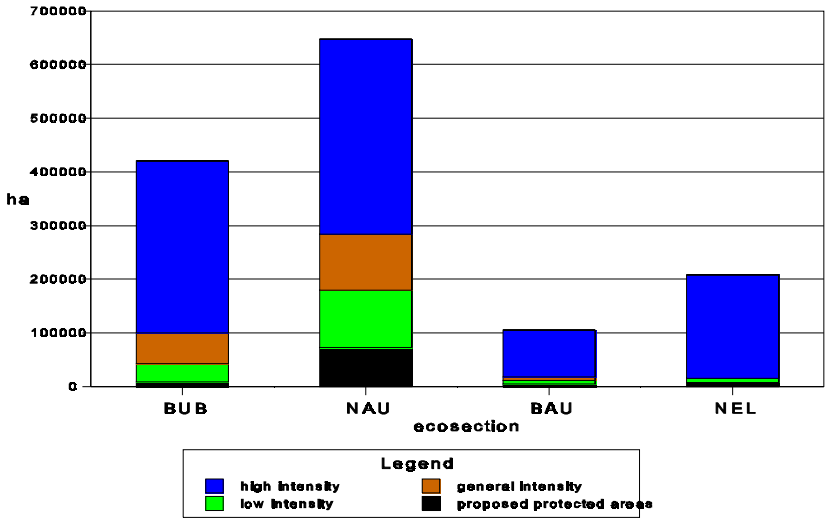


Figure 2. Ecosection Representation within the Vanderhoof LRMP Area.

Approximately 29% of the total provincial area of the Bulkley Basin (BUB) ecosection occurs within the LRMP area. Proposed protected areas within the BUB ecosection include the Francois South and Nechako Canyon areas of interest, which comprise 2% of the ecosection area within the LRMP boundaries. Low intensity resource development zones comprise an additional 8% within the BUB ecosection. Collectively, a total of 10% of the BUB ecosection would meet high biodiversity objectives. Even with new proposed protected areas the BUB will likely remain poorly represented (Table 5).

Table 5. Ecosection Protection at the Provincial Level

Planning Area		Ecosection/Area (ha)			
		BUB	NAU	BAU	NEL
Vanderhoof	existing protected	287	136	0	139
	proposed protected	9,195	72,437	4,738	7,849
Lakes	existing protected	4,200	n/a	0	n/a
	proposed protected	51,460	n/a	26,275	n/a
Fort. St. James	existing protected	n/a	n/a	297	43
	proposed protected	n/a	n/a	1,940	5,280
Prince George	existing protected	n/a	0	n/a	24,800
	proposed protected	n/a	3,150	n/a	113,950
Cariboo	existing protected	n/a	71,630	n/a	24,867
	proposed protected	n/a	37,920	n/a	n/a
Total Protected		4,487	71,766	297	49,849
Total Proposed Protected		60,655	110,357	6,688	127,079
% of total ecosection potentially protected		4.5%	9%	1.7%	9%

A relatively small proportion (11%) of the total provincial area of the Nechako Lowland (NEL) ecosection occurs within the LRMP area. The proposed Stuart River protected area comprises 4% of the NEL ecosection within the LRMP area. Including low intensity resource development zones, a total of 7% of the NEL ecosection would meet high biodiversity objectives. Additional proposed protected areas include a similar proportion along the north side of the Stuart River (Fort St. James LRMP), an extension to the Stuart River area of interest and several other Goal 1 areas (Prince George LRMP), which could potentially increase the protected area within the NEL ecosection to 9%.

A small proportion (5%) of the total provincial area of the Babine Upland (BAU) ecosection occurs within the Vanderhoof LRMP area. The proposed Sutherland River protected area comprises 5% of the ecosection area within the LRMP area. An additional 6% occurs within low intensity RMZ's. Collectively, 11% of the BAU would meet high biodiversity objectives. Although additional areas of interest in the Fort St. James and Lakes planning areas could potentially increase the total protected area within the BAU ecosection to 1.7%, it would remain poorly represented at the Provincial level.

4.2.2 Biogeoclimatic Subzones and Subzone Variants

Where ecosections provide provincial and broad sub-regional perspective for large ecosystems, the potential impacts of land use activities and intensity within biogeoclimatic subzones/variants are more discernable with respect to plant and animal communities. As such, they are an appropriate indicator of potential ecosystem impacts (Table 6).

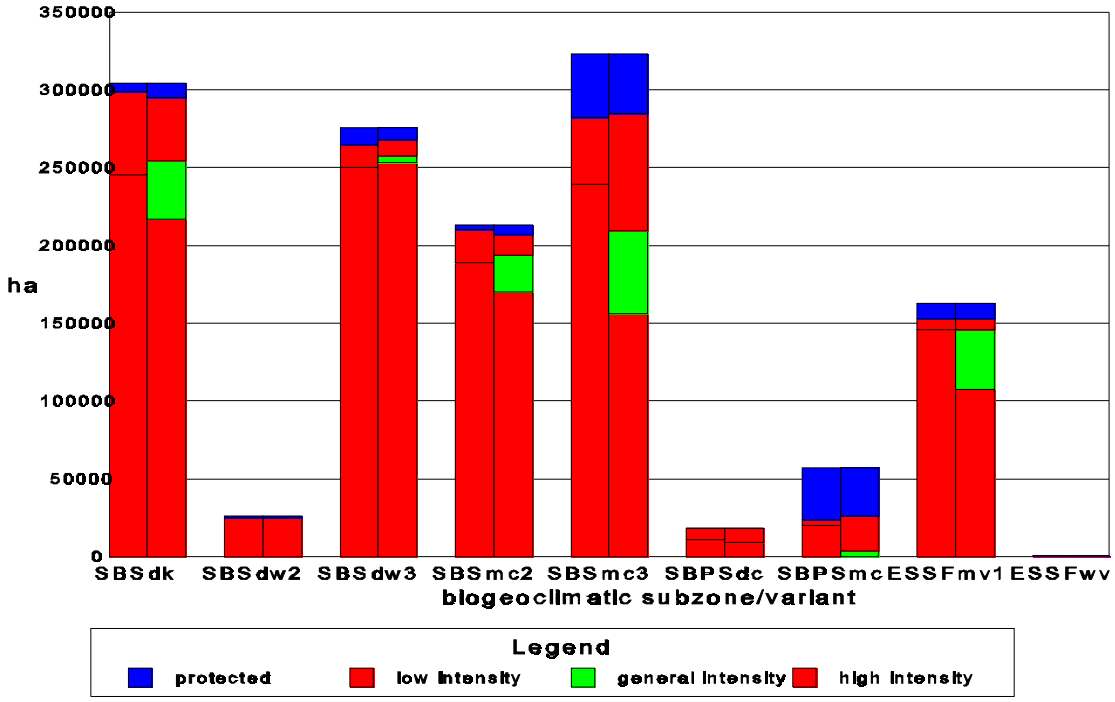
Table 6. Indicator, Method and Assumptions for Biogeoclimatic Subzone/Variant Representation	
Indicator	• ha of biogeoclimatic subzones/variants in (1) protected areas, (2) low intensity development, (3) general intensity development, and (4) high intensity development (incl. Settlement/Agriculture) areas.
Method	• A breakdown of each development intensity option by biogeoclimatic subzone/variant of the total ha in (1) the timber harvesting landbase, (2) forested exclusions, (3) non-forested exclusions, and (4) the gross landbase.
Assumptions	• Lower intensity development RMZ's (= high biodiversity emphasis) provide more options for maintaining native species and natural ecological processes. • Forested (inoperable, riparian reserves) and non-forested (rock outcrops, swamps) exclusions contribute to biodiversity.

Of the nine subzones/variants occurring within the Vanderhoof LRMP area, five are present in amounts greater than 150,000 ha, including the SBSmc3, SBSdk, SBSdw3, SBSmc2 and ESSFmv1, in declining order (Figure 3).

The proportion of SBSmc3 within the LRMP area comprises 94% of the total provincial area. The Consensus Plan proposed protected areas capture 12% of the SBSmc3; 13% in the Base Case. Together with low intensity resource development areas, both scenarios provide adequate representation of this subzone variant.

Although the ESSFmv1 comprises only 12% of the LRMP area, this amount represents 87% of the total provincial area. The Base Case and Consensus Plan protected areas capture 6% of the ESSFmv1, however, the total protected and low intensity is 1% greater (12%) in the Consensus Plan. In addition to resource intensity designations, the total forested and non-forested (brush types and some rock) exclusions account for 43% of the ESSFmv1 within the LRMP area (Figure 4). This suggests a larger proportion would meet high biodiversity objectives when considering exclusion areas.

Relative to the total amount of SBSdk within the LRMP area, 2% occurs in proposed protected areas in the Base Case and 3% in the Consensus Plan (a result of a the addition of the Francois South area of interest). Together with low intensity areas, 16% of the total area of SBSdk would meet the objectives for high biodiversity in the Consensus Plan and 20% in the Base Case. It is also important to note that 43% of the SBSdk occurs in the non-forested exclusion category (Figure 4), which reflects the high proportion of private and agricultural lands in the Nechako Valley RMZ. No additional protected areas have been proposed in other planning areas that include SBSdk.



Base Case = left bar Consensus Plan = right bar

Figure 3. Biogeoclimatic Subzone Representation in the Vanderhoof LRMP area.

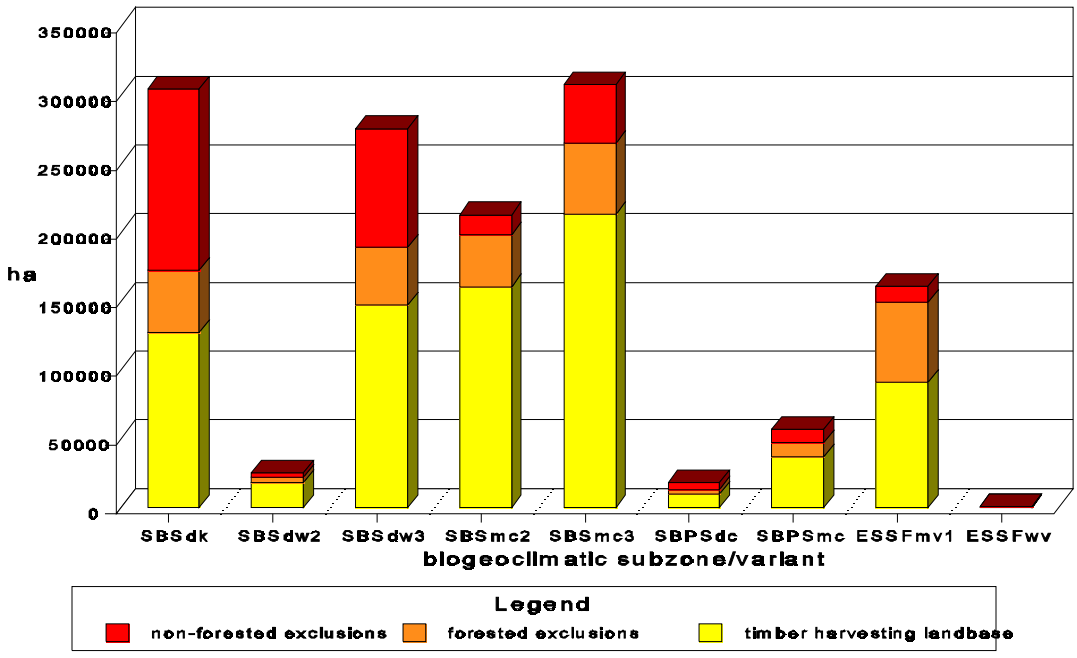


Figure 4. Exclusions from the Timber Harvesting Landbase within the LRMP area.

The SBSmc2 is poorly represented in proposed protected areas in both the Base Case and Consensus Plan (<1%). Collectively, a larger proportion (12%) of SBSmc2

would meet the objectives for high biodiversity (protected and low intensity) in the Base Case. The SBSmc2 within the LRMP area accounts for 10% of the total provincial area.

4.3 Old Growth

Old growth forests provide essential habitats for plant and animal species which are generally not available in younger forests. Old growth forests are characterized by a wide range of tree ages and sizes (including those of large diameter), multi-layered canopies, standing snags and large logs on the forest floor and in streams.

One of the major threats to old growth forests is fragmentation. Fragmenting old growth stands can have deleterious consequences where increasing isolation of habitats can affect species dispersal and reproductive success. Fragmentation reduces the quality of habitat for various reasons, including: (i) the edges of old growth stands are poorer quality due to increased disturbance (i.e. wind) and climatic extremes; (ii) small stands are not suitable for species that require larger home ranges or forest interior conditions; and (iii) animals and plants moving between widely spaced old growth habitats are susceptible to higher rates of mortality. For these reasons, the long term viability of populations of some species may be lower in landscapes where old growth habitat is highly fragmented.

Riparian reserves, wildlife tree patches and forested exclusions will contribute to the total amount of old growth, however, many will not contain significant areas of forest interior conditions. Riparian reserves will provide travel corridors for old growth dependant species.

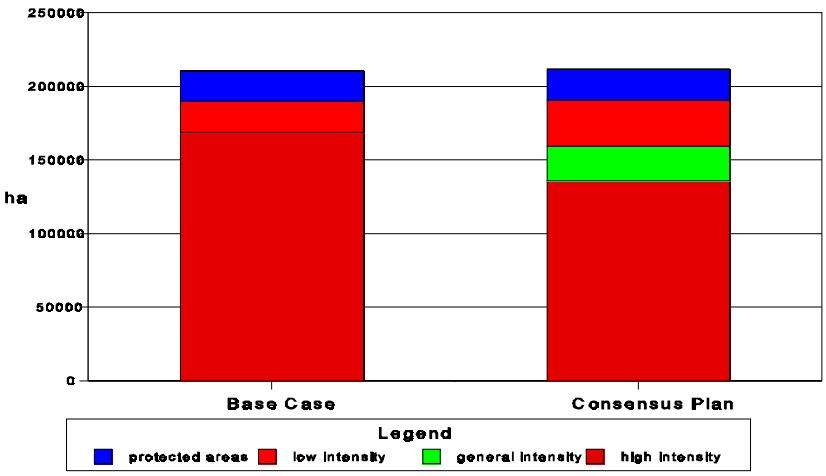
The Biodiversity Guidebook was used as a means to evaluate the prospective amount and distribution of old growth in the Base Case and Consensus Plan (Table 7).

Table 7. Indicator, Method and Assumptions for Old Growth Representation

Indicator	• % of LRMP area maintained as old growth
Method	• Total ha maintained at an old seral stage using the Natural Disturbance Type (NDT) definition of old and target percentages for each biodiversity emphasis.
Assumptions	• Old growth provides unique biodiversity values. • The closer the total to the target for high biodiversity emphasis (by NDT), the greater the likelihood that key ecosystem elements are maintained. • Forested exclusions maintain old growth.

Old growth accounts for 15% of the gross landbase in both the Base Case and Consensus Plan, the majority of which occurs within high intensity resource development zones (Figure 5). The implication is that a greater proportion of young seral forests in high intensity areas would result in sharper habitat transitions and isolate more patches of old growth within a matrix of young forest types. The consensus plan is more favourable than the Base Case as it distributes more old growth into protected and low intensity areas.

Figure 5. Distribution of Old Growth by Resource Development Intensity Option.



4.4 Landscape Linkages

Landscape linkages are also important in maintaining biodiversity. Wildlife corridors or landscape linkages serve two major functions: (1) they provide habitat for plants and animals; and (2) they act as travel corridors which provides for the seasonal movements and exchange of genetic material in wide ranging species.

The size of protected and low intensity areas and linkages between them is used to evaluate landscape connectivity (Table 8).

Table 8. Indicator, Method and Assumptions for Landscape Linkages

Indicator	• the size and connectivity of protected and low intensity development areas
Method	• a subjective assessment of the degree of connectivity. FEN's are attributable to the base case except where LRMP direction exceeds the NDT level.
Assumptions	• large areas (>5,000 ha) are better than small areas. • connected areas (>600 m wide corridors) are better than isolated areas.

In general, the application of FPC riparian management zones and Forest Ecosystem Networks (FEN's) improves the connectivity over the TSR scenario. The Entiako proposed protected area links Tweedsmuir Park and indirectly, the Itchas Ilgachuz proposed protected area in the Cariboo and significantly improves landscape connectivity to the southwest of the LRMP area. The low intensity resource development designation for the Upper Blackwater RMZ and portions of the Laidman Lake and Chedakuz RMZ's in the Consensus Plan further enhances the landscape connectivity in the southwest portion of the LRMP area.

The Consensus Plan identifies a low intensity resource development area adjacent to the Sutherland proposed protected area, which may be expanded by the Fort St. James LRMP and further improve the connectivity to the northwest.

Areas with timber harvesting restrictions to preserve scenic values provide a linkage along the Nechako River corridor in the Base Case and Consensus Plan (a portion of which is designated as low intensity resource development in the latter), although the link is broken at the town of Vanderhoof. The Consensus Plan identifies two Forest Ecosystem Networks and recognizes two wildlife movement corridors that are supported within low intensity resource subzones. Additional proposed protected areas, low intensity resource development areas, scenic areas and leave block concepts identified in the Consensus Plan improve connectivity over the Base Case, although in more disjointed areas. Landscape connectivity, apart from FPC riparian management areas, is poor in the eastern portion of the planning area in both the Base Case and Consensus Plan, primarily due to the high proportion of high intensity resource development areas.

5.0 WILDLIFE

5.1 Wildlife Habitats

Biophysical Habitat Classes are relatively broad ecosystem classifications that are used by the Wildlife and Habitat Protection branches of the Ministry of Environment, Lands and Parks to provide a framework for managing natural resources (i.e. wildlife). Each biophysical habitat class was mapped at the landscape level (1:250,000) and has different values for different wildlife species. The distribution of habitat classes within each resource development intensity options allows for an evaluation of potential impacts to various wildlife species (Table 9).

Table 9. Indicator, Method and Assumptions for Wildlife Habitat Assessment

Indicator	• proportion (ha) of biophysical habitat classes in each development intensity option
Method	• GIS analysis
Assumptions	• Protected areas and low intensity resource development RMZ's provide more options for maintaining natural habitat attributes. • The greater the proportion of a particular habitat class in proposed protected areas and low intensity resource development RMZ's, the greater the likelihood that the requirements of wildlife species dependant upon them will be met.

It is important to note that the data used for this analysis is incomplete and should be considered preliminary. Data for approximately 9% of the LRMP planning area were unavailable, largely a result of areas that are unclassified, and to a lesser extent due to data loss. The unclassified areas occur along the southeast boundary (including the Finger-Tatuk area) and a smaller portion in the southwest corner. Data loss is largely associated with very small habitat polygons distributed throughout the planning area. The data gaps affect the results, however, it is likely that habitat classes are affected to a similar extent, minimizing the bias in results. Successional stage and aspect influences are not considered in this portion of the analysis but were used to develop feature indicator species mapping.

Two habitat classes dominate the landscape within the LRMP area (70% collectively); Subboreal White Spruce - Lodgepole Pine (SL), and White Spruce - Subalpine Fir (SF). These habitat classes are important for timber production and are widely distributed in large, relatively contiguous polygons that sustain primary habitats for species such as moose, marten, grizzly

bear and caribou. A total of 11% of the SL and 20% of the SF habitat classes occur in low intensity resource development and proposed protected areas (Figure 6). This provides core areas of high quality habitat for many species in the western portion of the LRMP area.

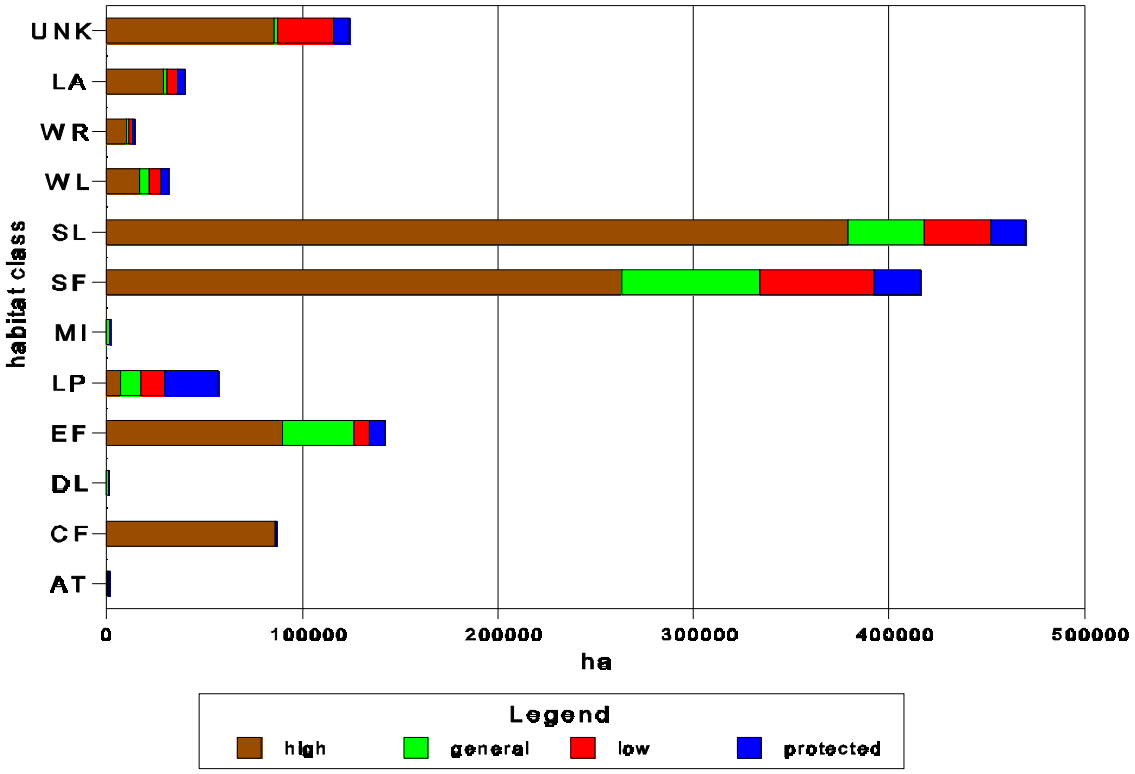


Figure 6. Biophysical Habitat Classes within the Vanderhoof LRMP Area

UNK	unclassified	MI	Mine
LA	lakes/reservoirs	LP	Lodegepole Pine
WR	White Spruce - Black Cottonwood Riparian	EF	Engelmann Spruce - Subalpine Fir
WL	Wetland	DL	Douglas-fir - Lodgepole Pin
SL	Subboreal White Spruce - Lodgepole Pine	CF	Cultivated Field
SF	White Spruce - Subalpine Fir	AT	Alpine Tundra

The Engelmann Spruce - Subalpine Fir (EF) habitat class comprises a significant proportion of the LRMP area (11%), most of which occurs in large, contiguous polygons. This habitat class sustains primary habitats for caribou and grizzly bear. In addition to the 11% that occurs in low intensity resource development zones and proposed protected areas, a significant proportion (43%) of the total area occurs in forested exclusions. A significant proportion of the EF habitat class would, therefore, be maintained in a natural state in the Consensus Plan.

A total of 70% of the Lodgepole Pine habitat class, which comprises approximately 5% of the LRMP area, occurs in low intensity resource development zones and proposed protected areas. This reflects a high level of protection for habitats of species such as caribou and marten.

Although the total area of the Wetland habitat class suggests it comprises approximately 2.5% of the LRMP area, this is likely an underestimate where many wetlands are small and difficult to map at the LRMP scale. Wetlands provide important habitat for a large number of wildlife

species including moose, aquatic furbearers, waterfowl, great blue heron and American bittern. Approximately 30% of the identified wetlands occur in low intensity resource development zones and proposed protected areas. Although wetlands receive some protection through the FPC in the Base Case, the LRMP defined management strategies in the Consensus Plan identify several wetland complexes and riparian habitats as wildlife movement corridors. Wetland habitats within high intensity development zones are more likely to become isolated as timber is harvested around them to the nominal (FPC) riparian management zone widths.

The White Spruce - Black Cottonwood Riparian (WR) habitat class, which comprises approximately 1% of the LRMP area, receives a disproportionately greater amount of use by a wider range of species than any other habitat class. The WR occurs along the major rivers and functions as a wildlife movement corridor, provides critical spring and winter range for ungulates, spring and fall habitat for grizzly bear and nesting habitat for bald eagles. Approximately 23% of the WR identified occurs in low intensity resource development zones and proposed protected areas. Riparian reserve and management zones, inoperable slopes and environmentally sensitive areas would likely significantly increase the protection of WR.

Douglas-fir occurs in small stands or as scattered individuals; rarely as a leading species. These trees are fire resistant and often remain as veterans in regenerating stands following wildfire, providing habitat complexity and critical mule deer winter range (when in stands). The identified areas of the Douglas-fir - Lodgepole Pine habitat class occur in general (95%) and high (5%) intensity resource development zones and comprise less than 1,000 ha of the LRMP area. The lack of a formal management strategy to maintain Douglas-fir in the TSR and Base Case results in a continued negative trend. However, the LRMP has recommended that Douglas-fir be maintained across the planning area in proportion to the existing amounts.

5.2 Species at Risk

A relatively small number of species (11) occurring within the Vanderhoof LRMP area occur on the Conservation Data Centre Red and Blue lists; candidates for legal designation as rare or endangered and threatened or vulnerable, respectively. Most of these species are habitat specialists and are found in low numbers and/or are widely distributed on the landscape. In addition, observations and known occurrences likely only represent a small proportion of the actual occurrences. In light of these facts, an assessment of the potential impacts to these species is largely limited to professional judgement, based on the best available information and biological rationale. In most cases, general trend statements are used to demonstrate the incremental differences between the TSR, Base Case and Consensus Plan (Table 9). Exceptions include grizzly bear and woodland caribou, which are discussed in more detail in the following sections of this analysis.

Table 9. Red and Blue Listed Species Trends within The Vanderhoof LRMP Area

Red List	Sensitivity	TSR	Base Case	Consensus Plan
white sturgeon	water quality and quantity	unknown	research underway to identify status	same as Base Case
American white pelican	water recreation activities	unknown	unknown	unknown
Blue List				
woodland caribou	increased access, logging	high risk (see text)	moderate risk (see text)	reduced risk (see text)

grizzly bear	increased access, poaching	high risk (see text)	moderate risk (see text)	moderate risk (see text)
fisher	overtrapping, reduction in old forest/riparian, loss of denning sites (large diameter snags)	high risk due to increased access, loss of denning sites, reduction in old forest, riparian impacts	moderate risk with FPC riparian protection, wildlife tree retention and seral stage requirements	reduced risk with 14% less area in high intensity RMZ's where loss of denning sites may be a limiting factor
northern bog lemming	riparian disturbances in high elevation wet meadows	unknown (no occurrence records)	unknown	unknown
trumpeter swan	disturbances on wintering grounds	unknown	unknown	unknown
sandhill crane	harassment, poaching	unknown	unknown	unknown
great blue heron	riparian disturbance	moderate risk due to lack of wetland/ riparian protection, known occurrences in high intensity RMZ	reduced risk with FPC wetland/riparian protection, known occurrences in high intensity RMZ	low risk with FPC wetland/riparian protection, known occurrences in low intensity RMZ
American bittern	riparian disturbance	moderate risk due to lack of wetland/ riparian protection	low risk with FPC wetland/riparian protection	same as Base Case
bull trout	road development, disturbance of small stream habitats, overfishing	high risk with lack of riparian protection and high proportion of high intensity development (89%)	moderate risk with FPC riparian protection and reduced high intensity RMZ's (83%)	moderate risk with FPC riparian protection and reduced high intensity development RMZ's (69%)

A general lack of information with respect to population size, distribution and status for the white sturgeon and northern bog lemming largely precludes a reasonable assessment. However, in the case of white sturgeon, which are known to occur in the Fraser Lake and the Fraser, Nechako, Stuart, Stellako and Nautley rivers, the sensitivity to water quality and quantity, as well as overfishing are concerns that suggest future impacts may be realized.

The outlook for species that are dependent on riparian habitats, such as the great blue heron and American bittern improves with the application of FPC stream and lakeshore reserves. However, many riparian habitats occur on private land and therefore remain at risk from human disturbance. Overall, there will be benefits from managing more landscape units and key habitat types for high biodiversity compared to the base case.

5.3 Feature Indicator Species

Three wildlife species were chosen as indicators for the resource analysis; moose, marten and grizzly. The primary criteria in the selection of appropriate species include: (i) the data must be available, (ii) they must be sensitive to habitat change, (iii) their habitat requirements should overlap a number of other species, (iv) different species should be selected to cover a range of habitat types, and (v) selected species should occur throughout the sub-regional planning area. The proportion of high quality habitat occurring in high intensity resource development RMZ's is an appropriate indicator of potential impacts to each species (Table 10).

Table 10. Indicator, Method and Assumptions for Feature Species Assessment	
Indicator	• ha of high quality habitat for feature species - moose, marten and grizzly in high intensity development (incl. Settlement/Agriculture) zones.
Method	• Use MoELP mapping for feature species. GIS analysis.
Assumptions	• The greatest potential for increased road access, habitat fragmentation and impacts to seral stage distribution and habitat structural attributes occurs in high intensity RMZ's • High quality moose, marten and grizzly habitat is representative of requirements for a broad range of wildlife species. • The default biodiversity emphasis for all RMZ's is low for the base case.

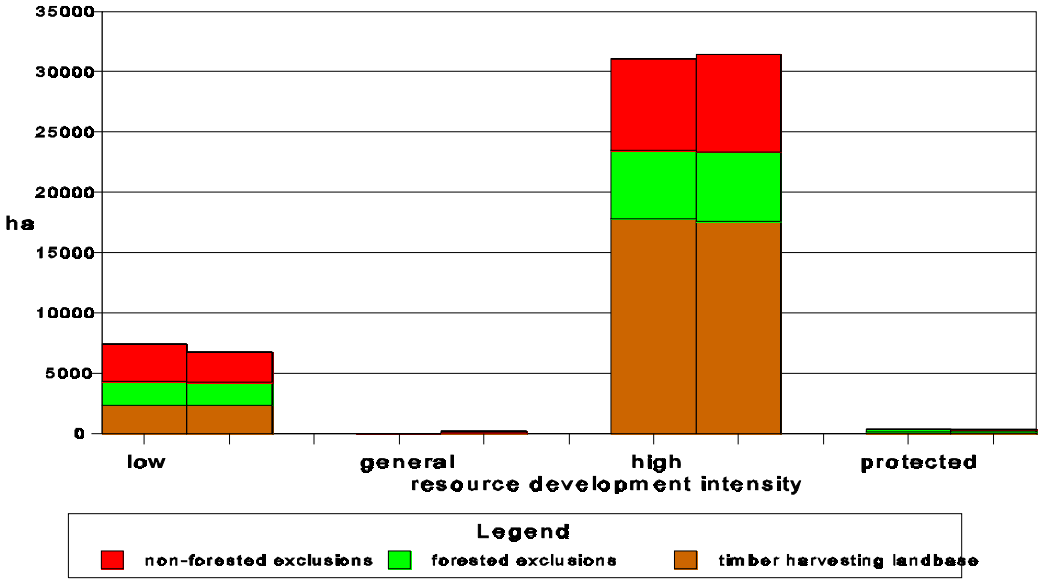
5.3.1 Moose

Moose were selected as an indicator species because they occur throughout the study area and they represent a wide range species with requirements for mixed seral stages, understory shrub layers and riparian habitats. Moose are sensitive to intensive brush control, increased levels of access and degradation of critical winter ranges.

Increased access and brush management would likely act to lower moose numbers in high intensity areas in the long term in the TSR and Base Case scenarios due to increased hunter harvest, decreased forage and cover adjacent to forage areas. Urban and agricultural development in the Nechako Valley RMZ has alienated mixed and deciduous (birch and aspen) habitats, which has likely permanently reduced the carrying capacity of the area. The distribution of high value moose habitats is strongly bimodal in the Base Case, with the largest proportion (80%) occurring in high intensity resource development areas (Figure 7).

Protected areas, riparian management zones and wildlife tree patches provide thermal and security cover in the Base Case and Consensus Plan. Low intensity areas and LRMP defined FEN's, vegetation management recommendations, movement corridors and access restrictions create a more favourable outlook for moose, which may result in stable or potentially higher populations in the long term.

Figure 7. Distribution of High Value Moose Habitat



Base case = left bar Consensus Plan = right bar

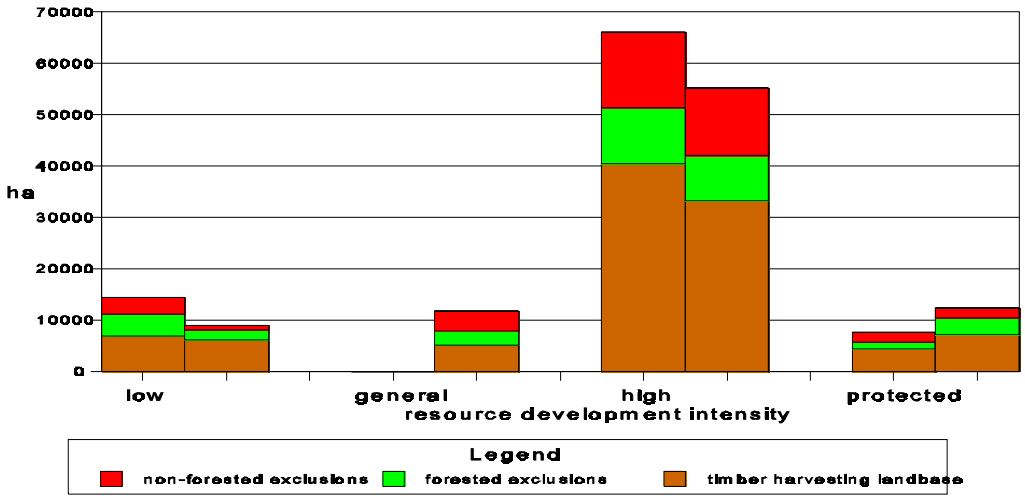
5.3.2 Marten

Marten were selected as an indicator species due to their dependance on mature and old growth forest types and their sensitivity to habitat fragmentation. Marten are also widely distributed within the LRMP area, although suitable habitats are lacking through the settlement corridor in the Nechako Valley RMZ.

Marten populations are disproportionately impacted with increasing levels of habitat fragmentation, beginning with first pass harvesting in an area. The existing pattern of harvest is that of relatively evenly dispersed, medium-sized cutblocks and nominal leave areas. A continuance of this pattern of harvest (i.e. TSR) would likely significantly decrease the carrying capacity across the LRMP area. An exception may be within the Laidman RMZ, where the high proportion of forested exclusions (mostly inoperable areas) would buffer potential timber impacts.

A large proportion (80%) of high value marten habitat occurs in high intensity areas in the Base Case (Figure 8). Shorter rotations, lower old growth and patch size requirements, reduced amounts of coarse woody debris and slash increase the risk to marten in high intensity resource development areas. The recommendations for aggregated harvest units and large leave areas in the Consensus Plan would partially mitigate the potential impacts in the long term. The addition of new protected areas improves the outlook, but over a limited area.

The gradual loss of suitable denning sites (large diameter snags) in high intensity areas may be a limiting factor in long term management under default FPC regulations.



Base case = left bar Consensus Plan = right bar

Figure 8. Distribution of High Value Marten Habitat

The Consensus Plan decreases the proportion of the land base in high intensity areas, and correspondingly, the proportion of high value marten habitat in high intensity areas. The increased proportion of low intensity areas in the Consensus Plan has resulted in less high value habitat occurring in low intensity areas. This is due to the redistribution of visually sensitive areas and modifications to proposed protected areas in the Base Case. Conversely, the modifications in proposed protected areas has increased the proportion of high value marten habitat in protected areas. LRMP defined management objectives and strategies with respect to maintaining stand structural attributes (including coarse woody debris) is a mitigating factor. The Consensus Plan is the most favourable scenario for marten, however, reduced carrying capacities are likely over the long term in high intensity areas.

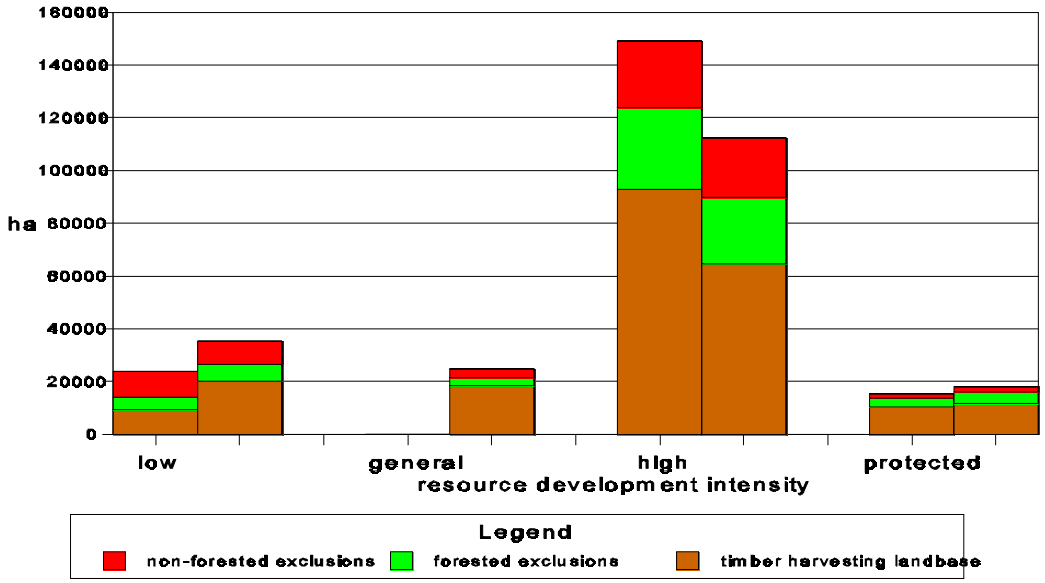
5.3.3 Grizzly Bears

Grizzly bears are currently blue-listed (on a provincial basis) because they are vulnerable to human disturbance, have large home range requirements and a low reproductive rate. It is generally accepted that grizzly bears require large relatively undisturbed areas to reduce bear-human conflicts as most of the potential threats are related to human settlement and road access. However, large, relatively undisturbed areas are becoming increasingly rare, which implies that the majority of grizzly bear habitat will require a co-ordinated approach to habitat management such as that recommended in the *Grizzly Bear Conservation Strategy, (1995).*

Grizzly bears require a variety of seral stages to meet seasonal habitat requirements. Important habitats include mature forest, herb-dominated avalanche chutes, subalpine meadows, riparian areas, floodplains, salmon-bearing streams, and habitats with berry-

producing shrubs. Intensive silvicultural practices can reduce the amount of herbaceous forage and berry-producing shrubs by favouring early conifer establishment.

A significant proportion of grizzly habitat occurs in high intensity resource development areas in the Base Case (Figure 9). These are viewed as high risk areas due to increased road densities and access into remote areas. The Consensus Plan increases the proportion of grizzly habitat in low intensity and protected areas, and correspondingly decreases the proportion in high intensity. Low intensity areas adjacent to proposed protected areas (Sutherland, Crystal and Laidman RMZ's) increase the viability as grizzly habitat. In addition, LRMP defined access management restrictions in these areas is favourable.



Base case = left bar Consensus Plan = right bar

Figure 9. Distribution of Medium Value Grizzly Habitat

5.3.4 Woodland Caribou

Woodland caribou were not selected as an indicator species due to their limited range within the LRMP area and specific habitat requirements. The Tweedsmuir-Entiako caribou herd (approximately 500 animals) occur in the southwest portion of the LRMP area. The potential impacts to this herd are primarily associated with the direct loss of habitat from logging, and increased access and disturbance.

At the time of the TSR, the key caribou areas were deferred from harvest but no formal management plan had been developed. Correspondingly the risk to the herd was high. The proposed Entiako protected area in the Base Case captures the critical habitat areas but the lack of a management plan to address access and timber harvesting in adjacent,

lower value caribou habitats does not eliminate the risks. The existing mineral claim areas in the Entiako area of interest are excluded in the RPAT proposal.

The Consensus Plan decreases the total amount of protected area in the Entiako area of interest, excluding a portion of low value caribou habitat. LRMP defined objectives and strategies address access and timber harvesting adjacent to the Entiako area of interest and do not exclude the existing mineral claim areas. The strategy would allow the potential mine to continue its operations with the intent that claim areas would be incorporated into the protected area after the claims lapse. Without knowing the potential lifespan of mining activity or extent of potential additional exploration and development, there continues to be a higher risk of impacts to caribou than the Base Case. The comprehensiveness of the LRMP recommendations, particularly the access management strategies in the Laidman zone, are a mitigating factor.

6.0 Fisheries

6.1 Stream Fisheries

Watershed assessment procedures developed for the FPC have become an essential analytical tool for evaluating the cumulative effects of development activities on the natural hydrologic and sediment transport regimes of rivers throughout the Province. Watershed assessments provide documentation of the development status of a drainage based on clearcut equivalency and hydrologic recovery. Timber harvesting and non-forested areas are used to calculate *clearcut equivalency*, defined within a hydrological context as the proportion of a watershed area in a disturbed or early seral state and lacking the hydrological characteristics of mature forest stands. Elevation and forest type are important considerations due to the influence on channel hydrology and sediment transport.

The relationship of increasing equivalent clearcut area with an increasing proportion of high intensity resource development and settlement/agriculture areas within a watershed management unit approximates the potential impacts on stream fisheries values (Table 11). The assessment of the relative magnitude and significance of the potential impacts on fisheries values requires professional judgement where future conditions such as harvest rates within sub-basins and road densities are difficult, if not impossible to predict relative to known fisheries values within management units.

The fisheries units used for the analysis were co-operatively defined by the Ministry of Environment, Lands and Parks and the Department of Fisheries and Oceans. The boundaries of fisheries units are common to the landscape units identified in the Plan document, which will facilitate management decisions in the future (Figure 10). Two landscape units were subdivided to accomodate different watershed and fisheries management concerns and values. The primary criteria for defining fisheries units include (i) areas with similar topography, (ii) areas with similar management concerns, and (iii) areas with similar fisheries habitat values.

Table 11. Indicator, Method and Assumptions for Fisheries Impact Assessment

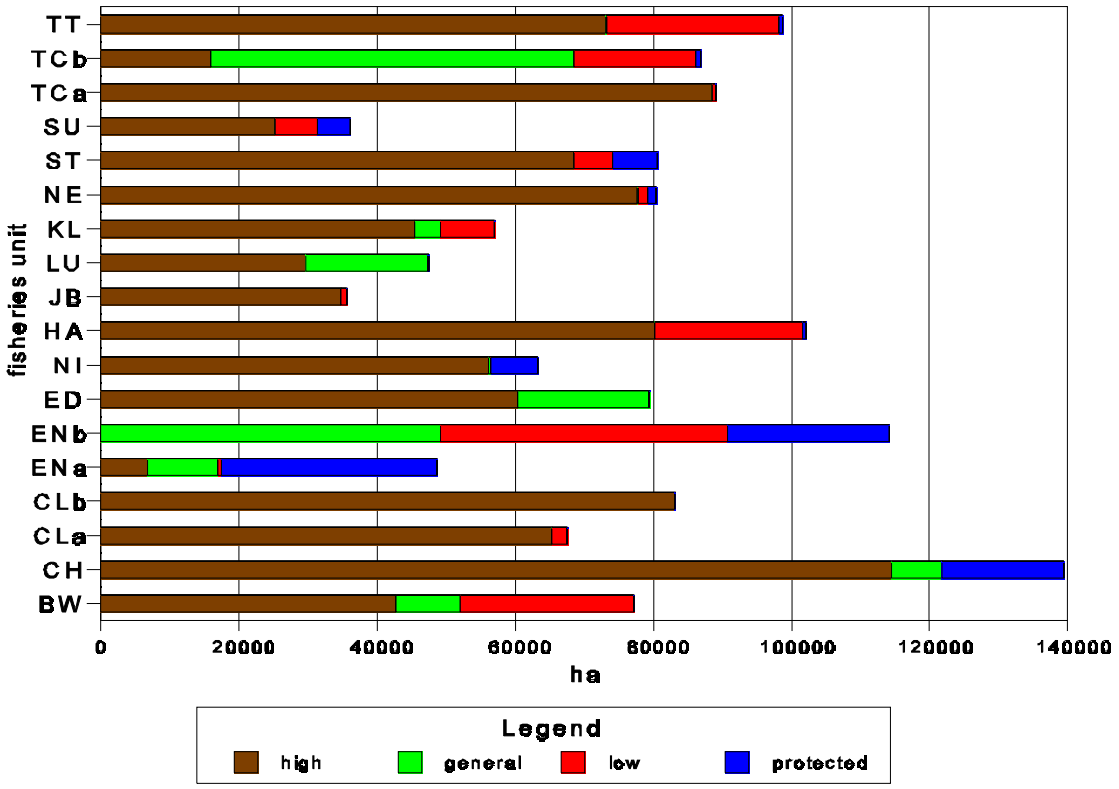
Indicator	• proportion of river watersheds/sub-basins in a high intensity development zone (incl. Settlement/Agriculture).
Method	• Total the high intensity resource development areas (incl. Settlement/Agriculture) for each watershed unit. Use professional judgement to assign a value of -2, -1, 0, $^{+}$1, $^{+}$2 to each unit (-2 = strong negative impact, 0 = no impact, etc.).
Assumptions	High intensity development = 1) greater road density and road life, 2) a greater proportion of lands in an early or arrested state of hydrologic recovery, 3) a greater potential for cumulative impacts associated with nutrient loading & chemical use, 4) a greater potential for low flow impacts associated with greater demands for water use, and 5) fewer opportunities for enhanced riparian protection.

Greater than 80% of the area in 9 of the 18 fisheries units occurs in high intensity resource development intensity areas in the Consensus Plan (Figure 11). Settlement and agricultural lands comprise a significant proportion of lands in the Nechako, Cluculz_A, Cluculz_B, Tachick_A and Endako and Nithi fisheries units. The fact that these lands are largely in an early or arrested state of hydrological recovery and are not subject to the requirements of the FPC were important considerations in the assessment of potential impacts. Additionally, the larger Nechako, Chilako and Endako Watershed Planning areas identified in the *Salmon Watershed Planning Profiles for the Fraser Basin within the Vanderhoof Land and Resource Management Plan* (DFO 1995), are described as the first, second and third priority watersheds (respectively), having the highest level of development concerns and sensitive features. The report comprehensively describes the existing conditions, concerns and considerations for watershed areas throughout the LRMP planning area and was used in the resource analysis.

The potential aggregate impacts at the LRMP level are minimized in the Consensus Plan, with an overall net benefit to fisheries values, in terms of the level of protection (Table 11). In total, the potential impacts to fisheries values sum to -19 in the TSR, +2 in the Base Case and +8 in the Consensus Plan. In general, cumulative watershed impacts in the TSR scenario are primarily a result of the large proportion of the LRMP area occurring in high resource development intensity designations (89%). Mitigating factors in the TSR are limited to areas with restrictions on timber harvesting associated with restrictive visual quality objectives (i.e. Nechako and Stuart river corridors), the Chedakuz Riparian Management Area, local resource planning along the Blackwater River, and access management and netdowns for ESA'a and inoperable areas in the Entiako area.

The introduction of new (proposed) protected areas and the FPC improve the outlook for fisheries values in the Base Case. The primary aspects of the FPC that benefit fisheries values include watershed, gully, terrain and site hazard assessments, riparian reserve and management zones, wildlife tree patch retention, seral stage and distribution requirements, soil conservation requirements and road construction, maintenance and deactivation requirements. The watershed restoration program, funded through Forest Renewal BC, has significant potential to restore impacted fish habitats, however, the potential benefits are unknown at this time.

Figure 11. Distribution of Resource Development within Fisheries Units



TT	-	Tatelkuz	KL	-	Kluskus	ENb	-	Entiako_B
TCb	-	Tachick_B	LU	-	Lucas	ENa	-	Entiako_A
TCa	-	Tachick_A	JB	-	Jerryboy	CLb	-	Cluculz_B
SU	-	Sutherland	HA	-	Hallet	CLa	-	Cluculz_A
ST	-	Stuart	NI	-	Nithi	CH	-	Chilako
NE	-	Nechako	ED	-	Endako	BW	-	Blackwater

Table 11. Potential Impacts to Fisheries Habitat

	BW	CH	CLa	CLb	ENa	ENb	ED	NI	HA	JB	LU	KL	NE	ST	SU	TCa	TCb	TT
TSR	+1	-2	-2	-2	-1	0	-2	-1	-1	0	-1	-2	-2	0	-1	-2	-1	0
Base	+2	-1	-1	-2	+1	+1	-1	0	0	+1	+1	-1	-2	+2	+1	-1	+1	+1
Plan	+2	-1	-1	-2	+2	+2	-1	0	+1	+1	+2	0	-2	+1	+2	-1	+2	+1

impact ranking value definitions:

+2	- significantly enhanced protection for fisheries values
+1	- moderately enhanced protection for fisheries values
0	- no anticipated impacts or benefits to fisheries values
-1	- moderate impacts to fisheries values
-2	- significant impacts to fisheries values

The Consensus Plan reduces the proportion of the landbase in high resource development intensity from 83% (Base Case) to 69% and provides management strategies and objectives that are specific to maintaining or enhancing fisheries values. This results in an improved outlook over the Base Case for 7 fisheries units; 10 remain the same, and 1 (Stuart) is better protected in the Base Case. A larger proposed protected area provides a higher level of protection within the Stuart fisheries unit in the Base Case.

The Consensus Plan does not change the outlook from the Base Case where moderate impacts to fisheries values are anticipated within 4 fisheries units, and significant impacts within 2 fisheries units. Significant and moderate impacts are largely associated with existing levels of settlement and agriculture, combined with high intensity resource development and the lack of mitigating factors such as the FPC and LRMP objectives and strategies, which have little influence on private lands.

Significant impacts are anticipated in the Nechako and Cluculz_B fisheries units in all scenarios. This is largely due to cumulative impacts associated with existing high road densities, agriculture, settlement and range development, combined with the high proportion (>95%) of the units designated as high intensity resource development and the anticipated continued increases in water demands. Although the Finger-Tatuk proposed protected area provides protection for some fisheries values (i.e. kokanee, rainbow trout) within the Chilako fisheries unit, there are several important salmon bearing tributaries occurring within areas designated as high intensity resource development as well as linear developments along the mainstem Chilako River, which supports the assessment of moderate impacts.

Significantly enhanced protection (see assumptions) for fisheries values are provided within 6 fisheries units in the Consensus Plan; 2 in the Base Case.

6.2 Lake Fisheries

The assessment of potential impacts to fisheries values is difficult to achieve where fishing pressure generally has a greater overall impact on fish populations in lakes than adjacent land use activities. Over time, as access is provided to more lakes through block roads from timber harvesting adjacent to lakes, increased fishing pressure on isolated lakes is viewed as an impact to lake resident fish populations, particularly lake trout and bull trout, which are sensitive to angling pressure. The application of the FPC lake classification and associated shoreline reserve zones would prevent access to within 250 m of lakes where access restrictions are not in place. The potential for increased shoreline reserve zones and access restrictions is greater in low intensity development areas. Therefore, the incremental difference in the number of lakes in low intensity resource development and protected areas should provide a reasonable (general) measure of the difference between the Base Case and the Consensus Plan (Table 12).

Table 12. Indicator, Method and Assumptions for Lake Fisheries

Indicator	• # of lakes >5 ha in size in (1) protected areas, (2) low intensity development, (3) general intensity development, and (4) high intensity development (incl. Settlement/Agriculture).
Method	• Total number of lakes >5 ha in size in low intensity development areas plus access management areas from other development intensity zones.
Assumptions	• Non-roaded access provides a greater level of protection for sensitive/native stocks. • Road access to within 250 m of lakes is assumed where no access restrictions are in place. • Block road rollback, access closures and enhanced shoreline reserves are more likely in low intensity development areas.

Lake classification and lakeshore management recommendations in the Consensus Plan may result in an increased level of protection (over Regional Lake Classification for the FPC) for some lakes. For example lakes with sensitive fisheries or high wilderness values may receive

enhanced shoreline protection or access management. In addition, any areas that restrict access, particularly motor vehicle access following road construction, will also serve to protect lake fisheries values.

A total of 120 lakes greater than 5 ha in size occur in access management and low intensity resource development areas in the Consensus Plan in contrast to a total of 80 in the Base Case (Figure 12). As the LRMP has stated that lakes within low intensity resource development and access management areas are more suitable for management as refugia lakes, limited/restricted access lakes and quality lakes, there is a greater likelihood that fisheries values will be better protected in the Consensus Plan.

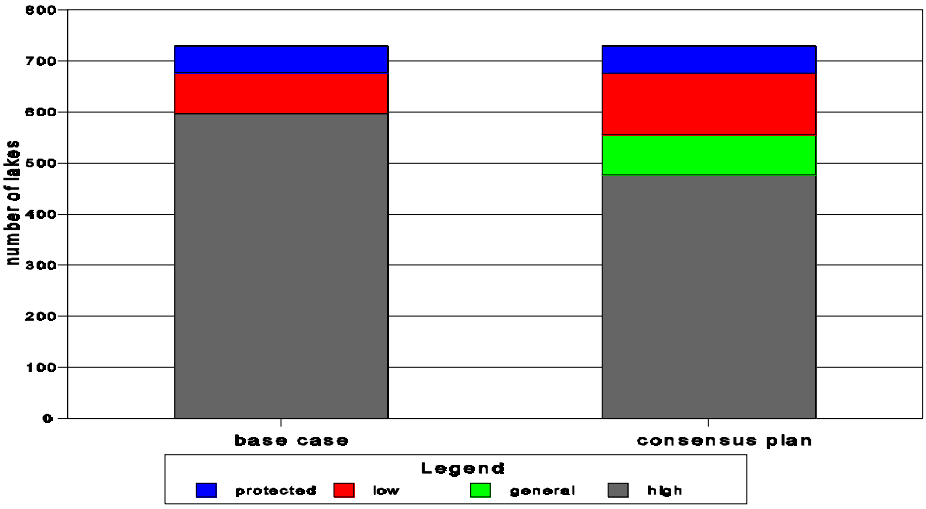


Figure 12. Distribution of Lakes by Resource Development Intensity