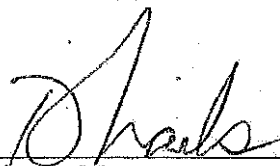


Okanagan Timber Supply Area Timber Supply Review

Data Package

April 2010


District Manager
Okanagan Shuswap Forest District

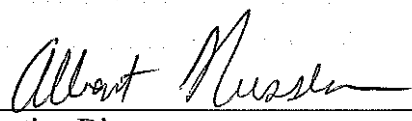

Acting Director
Forest Analysis and Inventory Branch

Table of Contents

1. INTRODUCTION	1
1.1 PURPOSE.....	1
1.1.1 Timber supply review	1
1.1.2 Data package.....	2
1.1.3 Allowable annual cut background	2
1.2 DESCRIPTION OF THE OKANAGAN TSA	3
1.2.1 Land base.....	3
1.2.2 People	4
1.2.3 Okanagan-Shuswap Land and Resource Management Plan	4
1.2.4 The environment.....	5
1.2.5 Wildlife and species at risk.....	6
1.3 FIRST NATIONS.....	6
1.4 PROCESS.....	7
1.4.1 Timber supply review process	7
1.4.2 Chief Forester’s instructions.....	8
1.5 MAJOR ISSUES	9
1.5.1 Mountain pine beetle infestation.....	9
2. INVENTORY AND DATA LAYERS	10
2.1 STANDARD DATA LAYERS.....	10
2.1.1 Landscape-level biodiversity emphasis options.....	10
2.1.2 Biogeoclimatic ecosystem classification	12
2.1.3 Community watersheds.....	15
2.1.4 Licensee operating areas.....	18
2.1.5 Forest inventory.....	19
2.1.6 Ungulate winter range.....	22
2.1.7 Wildlife habitat areas	27
2.1.8 Parks, protected areas, ecological reserves, and wildlife management areas.....	31
2.1.9 Old growth management areas	35
2.1.10 Operability classification	42
2.1.11 Ownership.....	43
2.1.12 Existing roads and trails.....	46
2.1.13 Railways and transmission lines	49
2.1.14 Slope	50
2.1.15 Riparian	52
2.1.16 Environmentally sensitive areas (forest regeneration).....	54
2.1.17 Terrain stability mapping.....	55
2.1.18 Visual management	57
2.1.19 Timber licence reversions.....	61

Table of Contents

2.2	OTHER DATA.....	62
2.2.1	Silviculture records.....	62
2.2.2	Non-forest, non-productive forest, and non-typed.....	63
2.2.3	Future roads, trails and landings.....	63
2.2.4	Mountain Pine Beetle.....	64
2.3	ECONOMIC FACTORS.....	64
2.3.1	Low productivity sites.....	64
2.3.2	Problem forest types.....	65
2.4	NON-TIMBER MANAGEMENT FACTORS.....	65
2.4.1	Integrated resources management zones.....	65
2.4.2	Stand-level biodiversity — wildlife tree retention.....	66
3.	ANALYSIS AND MODELLING PROCEDURES.....	67
3.1	TIMBER SUPPLY MODEL.....	67
4.	REGENERATION AND GROWTH AND YIELD.....	68
4.1	GENERAL CONSIDERATIONS.....	68
4.2	REGENERATION.....	68
4.3	GENETIC GAIN.....	68
4.4	GROWTH AND YIELD MODELLING.....	69
4.4.1	Natural stand analysis units and yields.....	69
4.4.2	Partially harvested natural analysis units.....	71
4.4.3	Managed stands analysis units and yields.....	72
5.	MODELLING CONSIDERATIONS.....	74
5.1	MINIMUM HARVESTABLE AGE.....	74
5.2	HARVEST SYSTEMS.....	74
5.3	HARVEST FLOW OBJECTIVES.....	75
5.4	UTILIZATION.....	75
5.5	VOLUME EXCLUSIONS FOR MIXED-SPECIES STANDS.....	75
5.6	NON-RECOVERED LOSSES.....	75
6.	SENSITIVITY ANALYSES.....	77

Table of Contents

Tables

TABLE 1.	AAC HISTORY SINCE 1980	3
TABLE 2.	OKANAGAN TSA TSR PROCESS.	8
TABLE 3.	BEC LABELS FOR BEC ZONES AND SUBZONES FOUND IN THE OKANAGAN TSA	14
TABLE 4.	COMMUNITY WATERSHED NAMES	17
TABLE 5.	MAPSHEETS FOR OKANAGAN TSA WITH VRI.....	20
TABLE 6.	MDWR SNOW INTERCEPTION COVER (SIC) DEFINITION BY SNOWPACK ZONE	24
TABLE 7.	WILDLIFE HABITAT AREAS BY SPECIES.....	30
TABLE 8.	RIPARIAN SITE SERIES WITH POST HARVEST STOCKING TARGET OF 0 IN GRIZZLY BEAR HABITAT	31
TABLE 9.	PROVINCIAL PARKS, PROTECTED AREAS, ECOLOGICAL RESERVES AND WILDLIFE MANAGEMENT AREAS.....	33
TABLE 10.	LRMP ACCEPTED TARGETS USED IN PROCESS TO LOCATE OGMAS	37
TABLE 11.	TWO NEW CFAS HAVE BEEN AWARDED SINCE TSR 3	45
TABLE 12.	ROADS AND TRAILS BUFFER WIDTH.....	47
TABLE 13.	STREAM BUFFER WIDTH	53
TABLE 14.	LAKE BASED RIPARIAN MANAGEMENT AREAS BUFFER WIDTH.....	53
TABLE 15.	WETLANDS-BASED RIPARIAN MANAGEMENT AREAS BUFFER WIDTH.....	54
TABLE 16.	FOREST COVER REQUIREMENTS FOR VISUALLY SENSITIVE AREAS	59
TABLE 17.	DESCRIPTION OF SITES WITH LOW TIMBER GROWING POTENTIAL	64
TABLE 18.	DECIDUOUS AND NON-MERCHANTABLE CRITERIA.....	65
TABLE 19.	GENETIC GAIN AND SELECT SEED USE	68
TABLE 20.	NATURAL STAND ANALYSIS UNIT DEFINITIONS	70
TABLE 21.	TIPSY REGENERATION COMPOSITION INPUTS FOR THOSE STANDS NOT HARVESTED TO DATE.....	72
TABLE 22.	UTILIZATION CRITERIA BY ANALYSIS UNIT.....	75
TABLE 23.	VOLUME EXCLUSIONS FOR MIXED-SPECIES STANDS	75
TABLE 24.	NON-RECOVERED LOSSES.....	76
TABLE 25.	SENSITIVITY ANALYSES.....	77

1. Introduction

1.1 Purpose

1.1.1 Timber supply review

Timber supply is the quantity of timber available for harvest over time. Timber supply is dynamic, not only because trees naturally grow and die, but also because conditions that affect tree growth, and the social and economic factors that affect the availability of trees for harvest, change through time.

Assessing the timber supply involves considering physical, biological, social and economic factors for all forest resource values, not just for timber. Physical factors include the land features of the area under study as well as the physical characteristics of living organisms, especially trees. Biological factors include the growth and development of living organisms. Economic factors include the financial profitability of conducting forest operations, and the broader community and social aspects of managing the forest resource.

All of these factors are linked: the financial profitability of harvest operations depends upon the terrain, as well as the physical characteristics of the trees to be harvested. Determining the physical characteristics of trees in the future requires knowledge of their growth. Decisions about whether a stand is available for harvest often depend on how its harvest could affect the growth and development of another part of the forest resource, such as wildlife or a recreation area.

These factors are also subject to both uncertainty and different points of view. Financial profitability may change as world timber markets change. Unforeseen losses due to fire or pest infestations will alter the amount and value of timber. The appropriate balance of timber and non-timber values in a forest is an ongoing subject of debate, and is complicated by changes in social objectives over time.

Thus, before an estimate of timber supply is interpreted, the set of physical, biological and socio-economic conditions on which it is based, and which define current forest management — as well as the uncertainties affecting these conditions — must first be understood.

Timber supply analysis is the process of assessing and projecting the current and future timber supply for a management unit (a geographic area). For a timber supply area (TSA), the timber supply analysis forms part of the information used by the chief forester of British Columbia in determining an allowable annual cut (AAC) — the permissible harvest level for the area.

Timber supply projections made for TSAs look far into the future — 250 years or more. However, because of the uncertainty surrounding the information and because forest management objectives change through time, these projections should not be viewed as static prescriptions that remain in place for that length of time. They remain relevant only as long as the information upon which they are based remains relevant. Thus, it is important that re-analysis occurs regularly, using new information and knowledge to update the timber supply picture — usually every five years. This allows close monitoring of the timber supply and of the implications for the AAC stemming from changes in management practices and objectives.

Timber supply analysis involves three main steps.

- The first is collecting and preparing information and data. The Ministry of Forests and Range (MFR) forest inventory plays a major role in this.
- The second step is using this data along with a timber supply computer model or models to make projections or estimates of possible harvest levels over time. These projections are made using different sets of assumed values or conditions for the factors discussed above.
- The third step is interpreting and reporting results.

1. Introduction

1.1.2 Data package

The purpose of the data package is to provide a clear description of information sources, assumptions, issues, and any relevant data processing or adjustments related to the land base, growth and yield, and management objectives and practices. The data package will act as a foundation document for the timber supply review (TSR), and all other TSR documents, such as the information report, analysis report and TSR binder, will be based on the information and summaries found within it.

The following principles and standards will apply to the data sources and data package:

- The data package must describe, and where appropriate summarize, all data and information to be used in the timber supply analysis;
- The data package must contain descriptions of how current forest management, or reasonable extrapolations of current management will be modelled;
- The most current and best available data must be used;
- Data will undergo rigorous screening and quality assurance procedures before inclusion in the analysis;
- More detailed discussion should be provided in the package for data for which there is a high degree of uncertainty;
- The data package must contain a summary of plans for examining the potential impacts of important uncertainties in information (e.g., planned sensitivity analysis);
- The evidentiary basis for information used in analyses must be available on request, and to the extent possible be included in the data package. Evidence could include the following:
 - A description of data sources;
 - The source data itself;
 - A description of sampling and data analysis methods or standards;
 - Digital or analog maps of the land base (e.g., forest cover, ownership, habitat areas);
 - Results of any reviews or audits of source information or inventories; and
 - Any acceptances by appropriate professionals.
- When collecting or analyzing data to include in the data package, existing standards should be followed, unless justification is provided for diverging from standards. Such justification should demonstrate that although standards were not followed, the information is the best available that could be obtained for the timber supply review;
- Where possible, the implications to the timber supply analysis (e.g., increased uncertainty) of diverging from the standards should be examined and reported; and
- The area summaries in this data package represent gross or total land area. Reductions have not been made to account for areas not suitable for harvest or areas otherwise removed from the timber harvesting land base.

1.1.3 Allowable annual cut background

- On January 1, 2006 the AAC was set at 3 375 000 cubic metres, including a 700 000 cubic metre uplift to deal with the Mountain Pine Beetle (MPB), an 80 000 cubic metre partition for small scale salvage and a 20 000 cubic metre partition for deciduous volumes. This represented a 27% increase to the existing AAC.

1. Introduction

- In 2001 the AAC was set at 2 655 000 cubic metres, including an 80 000 cubic metre partition for small scale salvage and the partition for decadent cedar/hemlock was discontinued.
- At the end of 1993 the Mountain Pine Beetle uplifts expired.
- In 1992 the AAC was set at 2 615 000 cubic metres, including a 50 000 cubic metres per year apportionment for harvesting decadent cedar/hemlock or hemlock/cedar stands (age class 8, 9 and grade 4 and the combined cedar and hemlock volume is greater than 50% of the stand).
- In 1981 the AAC was set at 2.7 million cubic metres. This continued as the AAC (excluding mountain pine beetle uplifts) until 1992.
- Table 1 below documents the AAC and uplifts since 1980.

Table 1. AAC history since 1980

Year	Total AAC (millions m ³)	Uplifts and partitions included in total AAC	
		MPB uplift (m ³)	Partition (m ³)
2006	3.375	700 000	80 000 SSSP 20 000 decid.
2001	2.655		80,000
1996	2.615		50,000
1994	2.615		50,000
1993	2.804	189 000	50,000
1992	2.815	200 000	50,000
1990	2.900	200 000	
1989	2.820	120 000	
1988	3.200	500 000	
1987	2.900	200 000	
1980	2.700	-	

1.2 Description of the Okanagan TSA

1.2.1 Land base

The Okanagan TSA, located in south-central British, covers approximately 2.25 million hectares of the Southern Interior Forest Region. The TSA is one of the larger and more ecologically complex in the province. It is administered by the Okanagan Shuswap Forest District located in Vernon with field offices in Penticton and Salmon Arm.

The Okanagan TSA is approximately 320 kilometres long and 140 kilometres wide and stretches from the Seymour River/Shuswap Lake in the north to the Canada-United States international border in the south, and from the Monashee Mountains in the east to the Okanagan Mountains in the west. The climate and terrain produces a wide range of vegetation, from wet interior hemlock and cedar forests in the north to semi-arid sagebrush grasslands in the south.

Approximately 64% of the area within the TSA boundary is considered productive forest land (1.4 million hectares) and 73% of the productive forest, or 46% of the total area within the TSA boundary is considered available for timber harvest.

1. Introduction

The forests are very diverse. Within the land base currently considered available for timber harvesting, lodgepole pine (Pl) leading stands represent approximately 50% of the forested land base and Douglas-fir (Fd) leading stands represent approximately 30% of the forested land base. Subalpine fir, western red cedar and western hemlock are also common, while white pine, aspen, birch and cottonwood appear in smaller amounts.

The areas of susceptible lodgepole pine in the Okanagan TSA are separated by areas of mixed forests, forests of other species, elevation changes and varied topography. This may somewhat slow the spread and expansion of the MPB.

The TSA contains seven biogeoclimatic zones that reflect unique combinations of climate, vegetation, and soils. The broad variety of habitat types supports many species, including approximately 30 red- and blue-listed vertebrates that are associated with forested ecosystems.

The high level of diversity in land forms, elevations, biogeoclimatic zones, and tree species provide for many different land management options.

The allowable annual cut effective January 1, 2006 is 3 375 000 cubic metres of which 80 000 is for a small scale salvage partition, 20 000 is for a deciduous partition and 700 000 cubic metres is a MPB uplift.

1.2.2 People

Over 55% of the population of the Okanagan TSA lives in the communities of Kelowna, Vernon, Penticton, and Salmon Arm. The 2006 population in the TSA was approximately 356,000.

Members of eleven First Nations reside in or have asserted traditional territories within the Okanagan TSA. Seven Okanagan bands (Lower Similkameen, Upper Similkameen, Osoyoos, Penticton, Westbank, Okanagan, and Upper Nicola) are associated with the Okanagan Nation Alliance and four Shuswap bands (Splatsin, Little Shuswap, Adams Lake and Neskonlith) belong to the Shuswap Nation Tribal Council. The Upper Nicola Band is considered part of the Okanagan Nation Alliance as well as the Nicola Tribal Association.

1.2.3 Okanagan-Shuswap Land and Resource Management Plan

The Okanagan-Shuswap Land and Resource Management Plan (OSLRMP) is a strategic Crown land use plan for the Okanagan-Shuswap. The plan covers all of the Crown land and resources, including lakes and rivers within the plan area. The plan itself consists of maps of resource management zones (RMZs) and proposed new protected areas (PAs) and text that contain land and resource management objectives and strategies that apply to the entire Crown land base, as well as additional objectives and strategies that are specific to each of the identified zones.

The provincial government initiated the OSLRMP process in July 1995. Over 4.5 years a group of 30 stakeholders representing a diverse range of interests and local governments met to develop a recommended LRMP. On September 9, 2000 the OSLRMP Table reached full agreement on a package of LRMP recommendations which was intended by the Table members to bring land use certainty to resource interests and direction to government managers in the plan area.

On January 18, 2001, the Okanagan-Shuswap LRMP was approved by Cabinet. While the base line for management at that time was the Forest Practices Code, the LRMP represents Cabinet directed policy, to be considered by statutory decision makers. Where the LRMP directs management 'above' the requirements of the FPC it was indicated that there will a "higher level plan" developed that elevates those items from policy (LRMP) to legislation (HLP) so that they override those legal elements of the FPC.

1. Introduction

No specific higher level plan objectives have been approved for the Okanagan-Shuswap LRMP however management by government and licensees have followed to date the intention of the LRMP and the processes.

1.2.4 The environment

The Okanagan timber supply area contains seven biogeoclimatic zones; bunchgrass, ponderosa pine; interior Douglas-fir, interior cedar hemlock, montane spruce, Englemann spruce subalpine fir and alpine tundra. Four of these, ESSF, ICH, IDF and MS, comprise 88% of the total TSA land base. The varied ecological features as well as the unique nature of the area contribute to high biodiversity values found within this timber supply area.

The Bunchgrass zone (BG) comprises the grasslands that dominate the lower elevations of the Okanagan Valley and the Similkameen Valley, generally occurring at elevations between 700 and 1000 metres. This zone is characterized by warm to hot, dry summers and moderately cold winters with relatively little snowfall. Tree establishment is restricted and grasslands predominate. Although not significant as a source of harvestable timber, the BG zone is very important for agriculture, tourism and biodiversity purposes.

The Ponderosa Pine zone (PP) occupies low elevations along the very dry valleys along the Similkameen River and the Okanagan Lake occurring at elevations between 335 to 900 metres. This zone is characterized by low annual precipitation, very warm summers and cool winters. This zone is of limited commercial value for forestry but is used for cattle grazing, particularly in early spring and late fall.

The Interior Douglas-fir zone (IDF) dominates the low- to mid-elevation landscape of the TSA. It can be found at elevations ranging from 350 to 1450 metres. The IDF has warm dry summers and cool winters thereby allowing a long growing season. Douglas-fir is the primary species with ponderosa pine found at lower elevations, lodgepole pine found throughout and white spruce at higher elevations. Forestry is a very important resource use as is cattle grazing.

The Interior Cedar Hemlock zone (ICH) is located at lower to middle elevations ranging from 400-1500 metres. It experiences wet cool winters and warm dry summers. The ICH is the most productive forest zone in the interior of British Columbia and second only to the Coastal Western Hemlock in all of Canada. It has a high diversity of tree species, which include western red cedar, western hemlock, grand fir, white spruce, Engelmann spruce, subalpine fir, western larch, Douglas-fir, western white pine and lodgepole pine. Forestry is the major economic activity and many recreational opportunities exist.

The Montane Spruce zone (MS) occurs at middle elevations between 1100 and 1700 metres. The climate is continental with cold winters and short warm summers. Hybrid white spruce, subalpine fir and lodgepole pine are the dominant species found here. Forestry, cattle grazing and fur trapping are all important resource uses of this zone.

The Engelmann spruce subalpine fire (ESSF) zone is the uppermost forested zone in the Okanagan TSA. Lying below the alpine tundra zone, it is found between elevations of 1500 to 2300 metres. It has a relatively cold, moist snowy continental climate with a cool short growing season and a long, cold and snowy winter. Engelmann spruce and subalpine fir are the dominant climax tree species while lodgepole pine is the common seral species after fire. Western white pine, Douglas-fir, western hemlock and western redcedar can be found at the lower elevations. Timber and fur harvesting are important economic activities occurring here but cattle grazing is limited.

The alpine tundra (AT) zone occurs on high mountains at elevations above 2250 metres above the ESSF zone. The climate here is cold, windy and snowy with a short growing season. By definition this zone is treeless therefore timber harvesting does not occur.

1. Introduction

The diverse forests found throughout the aforementioned zones host a wide variety of flora and fauna, some of which are considered to be endangered or threatened. Wildlife examples include grizzly bear, gopher snake, northern goshawk and night snake.

The timber supply area supports numerous fish species that include kokanee, rainbow trout, lake char, largemouth bass and whitefish. The Shuswap Lake system supports sockeye lake spawners and provides vital rearing area for hundreds of millions of coho, chinook and sockeye fry that makes it one of the most important salmon producing areas in British Columbia. The Adams River sockeye run is the second largest in British Columbia.

Water is a primary and fundamental resource of the timber supply area. It is available as surface or groundwater and is a crucial component of the ecosystems found here.

1.2.5 Wildlife and species at risk

Due to the varied topography and climate found throughout the timber supply area the flora and fauna that reside here are quite diversified. Large mammals include black bear, grizzly bear, moose, mule deer, white-tailed deer, cougars, elk, mountain goat, bighorn sheep and mountain caribou.

The Okanagan TSA contains a number of ecosystems which are either unique to the area or of a very limited distribution on a provincial basis thereby making it home for a number of species which are considered endangered or threatened reside here.

Current forest management practices follow the legislation and guidelines set out by the *Forests and Range Practices Act* (FRPA). Under the FRPA, a process exists for identifying species at risk and designating wildlife habitat areas with specific management practices. A list of the wildlife species that have been designated as ‘identified wildlife’ maintained by the B.C. Ministry of Environment and is available at <http://www.env.gov.bc.ca/wld/frpa/iwms/accounts.html>

The BC Conservation Data Centre (CDC) lists the conservation status of animals, plants and plant communities and assigns a provincial ranking, which is based solely on the species status within British Columbia. There are 33 animal and 236 plant species identified as *species of concern* for the Okanagan Shuswap Forest District.

Indigenous species, sub-species or ecological communities that are not *extirpated*, *endangered* or *threatened* but are considered to be of special concern in British Columbia are referred to as *blue-listed*.

Indigenous species, sub-species, or ecological communities that have, or are candidates for, *extirpated*, *endangered* or *threatened* status in British Columbia are *red-listed* and may be formally designated.

A list of these species is maintained by the B.C. Conservation Data Centre and is available at: <http://a100.gov.bc.ca/pub/eswp/> (accessed Aug 26, 2009).

Forest district tracking lists are restricted to those species that breed in the district; i.e. species will not be placed on forest district lists for districts where they occur only as migrants.

1.3 First Nations

Human history of the southern interior of British Columbia commenced between 11,000 and 10,000 years ago. There are approximately 1, 000 recorded archaeological sites throughout the Okanagan TSA.

There are eleven First Nation bands in the Okanagan TSA with a total population of approximately 4,500. Six bands (Lower Similkameen, Upper Similkameen, Osoyoos, Penticton, Westbank, Okanagan) found within the TSA boundaries are members of the Okanagan Nation Alliance (ONA).

Four bands (Adams Lake, Little Shuswap, Neskonlith and Splotsin) found within the TSA boundaries are members of the Shuswap Nation Tribal Council (SNTC).

1. Introduction

The Upper Nicola Band, a member of the ONA, is based outside the district but has traditional territory within the Okanagan TSA.

Some First Nations people work in forestry activities such as; harvesting, silviculture, watershed restoration and inventory. Adams Lake, Neskonlith, Little Shuswap, Spallumacheen, Westbank and Osoyoos Indian Bands have woodlots within the TSA. All of the above bands as well as the Okanagan Indian Band have been involved with the Small Business Forest Enterprise Program (SBFEP).

Fishery resources have a high subsistence and cultural significance to First Nations. Consequently, proposed developments, which may impact the fishery resource are of concern. First Nation communities are also concerned about timber harvesting in areas of importance to First Nations. It is expected that additional clarity pertaining to First Nation rights and title issues will be determined through the legal system.

1.4 Process

1.4.1 Timber supply review process

The timber supply review process has three main stages: (1) data package preparation, (2) timber supply analysis and revised data package, and (3) AAC determination. First Nations and the public are formally offered an opportunity to review and comment on the draft documentation prepared for the first two steps. Comments and information obtained from First Nations and the public during the formal review processes will be summarized and presented to the chief forester for his consideration in the AAC determination.

Specifically for the data package, there will be two opportunities for First Nations and the public to formally comment. The first is the current 30-day opportunity for the review of this draft data package and information report. The second opportunity will be for the review of the timber supply analysis report, which includes the revised data package as an appendix.

To facilitate the data package review process, a web site dedicated to the current TSR analyses was established at <http://www.for.gov.bc.ca/hts/tsa/tsa22/>. This provides individuals with the opportunity to download these materials for review. A description of the TSR documents can be found at <http://www.for.gov.bc.ca/hts/tsa/tsa22/docs.htm>.

The expected milestones for the current TSR process are presented in Table 2.

1. Introduction

Table 2. Okanagan TSA TSR process.

Data Package Completed											
	Data Package Released										
	Public Review										
	Analysis Report										
					Public Review						
								AAC Decision and Rationale			
Feb	March	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Jan

1.4.2 Chief Forester’s instructions

In the 2006 AAC rationale, the chief forester made several recommendations to district staff to reduce risk and uncertainty in subsequent TSRs:

- *Roads, trails and landings*: the assumptions used to estimate existing and future losses due to roads, trails and landings need to be refined given the uncertainty raised in the timber supply analysis about how this factor was assessed;
- *Inoperable areas and unstable terrain*: current operability lines have been reconciled with older (Es) mapping for unstable soils should be assessed relative to the more recent terrain stability mapping so that the lines can be confirmed or adjusted where warranted;
- *Controlled recreation areas*: controlled recreation areas are being negotiated in support of BC’s all season resort strategy and when established their impact on timber supply on the TSA should be assessed and tracked;
- *Existing forest inventory*: the Okanagan TSA has one of the oldest forest inventories in the province; VRI phase 1 re-inventory work needs to be completed given the age of the existing forest inventory;
- *Genetic worth*: because of uncertainty regarding the level of deployment of select seed in planting operations in the TSA, the Reporting Silviculture Updates and Landstatus Tracking System (RESULTS) data base should be reviewed to assess actual use of select seed; and
- *Regeneration delay*: the assumed two-year regeneration delay in the timber supply analysis may be optimistic given apparent increased reliance on natural regeneration in the TSA which normally results in longer delays however a review of RESULTS data indicates an average regeneration delay of two years since 1995.

1. Introduction

1.5 Major issues

1.5.1 Mountain pine beetle infestation

The total timber volume on the forested land base of the Okanagan TSA is estimated to be about 250 million cubic metres. Of this volume, lodgepole pine comprises about 57 million cubic metres (23 percent). The current mountain pine beetle (MPB) epidemic is projected to kill about 75 percent of the mature pine in the Okanagan TSA by 2026. It is estimated that the cumulative pine mortality in 2010 is about 15 million cubic metres (26 percent of the pine volume). Figure 1 shows the Ministry of Forests and Range projection of pine mortality in the TSA.

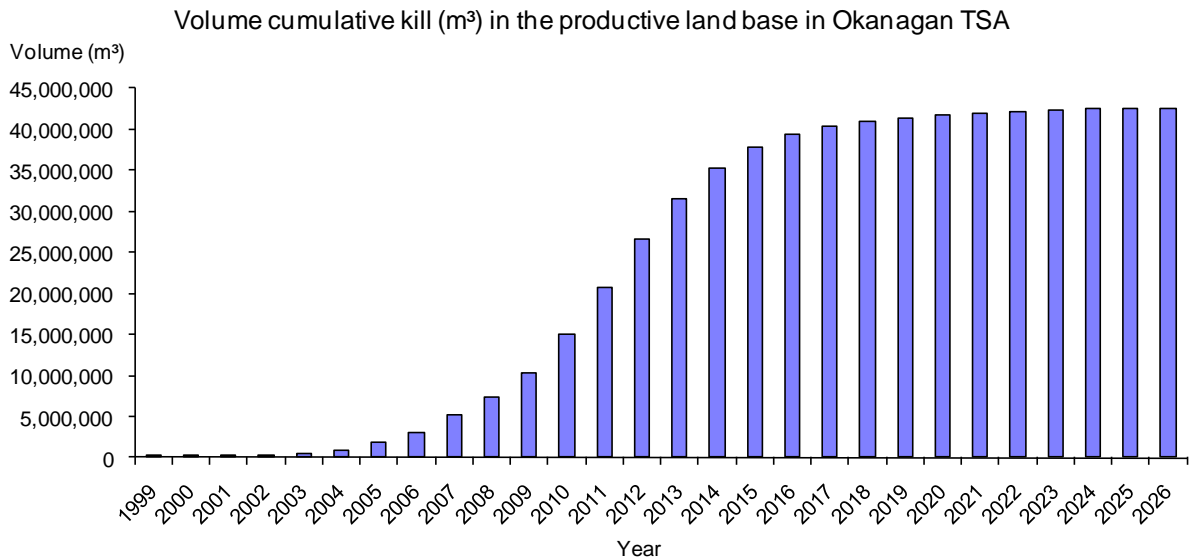


Figure 1. Volume cumulative kill (m³) in the productive land base in the Okanagan TSA.

In an effort to control the spread of the MPB, the allowable annual cut (AAC) for the TSA was increased by 700 000 cubic metres in 2006. Given the significance of the projected pine mortality, this analysis will focus attention on different ways to salvage as much value from pine-leading stands as possible before the trees become unusable. One option available to the chief forester to control the harvesting in the TSA is to divide the AAC into a pine portion and a non-pine portion. Partitioning the AAC will be among the options explored in this analysis to manage the projected mortality from MPB in the Okanagan TSA.

2. Inventory and Data Layers

2.1 Standard data layers

This section describes the data inputs for the TSR analysis. For each layer, the data package provides a standard description that includes an introduction to the data, some background information regarding its relevance to current management, source information and the status of the data.

A detailed data description table is followed by attribute information and land base impact summaries. Before inclusion in the timber supply analysis, subject matter experts from MFR, MOE or other agencies reviewed the data inputs and provided their approval, as indicated in the data description table.

2.1.1 Landscape-level biodiversity emphasis options

Introduction

This dataset identifies landscape units (LUs) and their assigned biodiversity emphasis objectives (BEOs) for the Okanagan TSA.

BEOs are based on LUs and BEC classification and in the case of the Okanagan TSA, the BEO values were established during the Okanagan-Shuswap LRMP process.

Background

Landscape units are large areas of land, generally on the order of 50 000 hectares in size, where trade-offs between overlapping resource values takes place. This is of particular importance with regard to management of old-growth forests over time.

According to the *Biodiversity Guidebook*, BEOs provide a range of three options for emphasizing biodiversity at the landscape level. Each option is designed to provide a different level of natural biodiversity and a different risk of losing elements of natural biodiversity.

A low BEO may be appropriate for areas where other social and economic demands, such as timber supply, are the primary management objectives. This option provides habitat for a wide range of native species, but the pattern of natural biodiversity may be significantly altered, and the risk of some native species being unable to survive in the area may be relatively high.

An intermediate BEO is a trade-off between biodiversity conservation and timber production. Compared to the low BEO the intermediate BEO provides a higher level of biodiversity and a reduced risk of eliminating native species from an area.

A high BEO gives a higher priority to biodiversity conservation but would have the greatest impact on timber harvest. This option is recommended for those areas where biodiversity conservation is a high management priority.

Source

The Okanagan-Shuswap LRMP recommended BEOs for each LU-BEC subzone combination in the Okanagan TSA and set target levels for old growth management areas (OGMAs) in each LU BEC combination.

Status

This dataset reflects BEOs as recommended in the Cabinet approved Okanagan-Shuswap Land and Resource Management Plan.

2. Inventory and Data Layers

Source dataset

Source data file name	Landscape units of British Columbia
Title	- Current
Data file description	<p>**See the accuracy and usage WARNING in the Identification: Supplemental Information and Data Quality: Source Information sections.**Landscape Units are spatially identified areas of land and/or water used for long-term planning of resource management activities. Landscape units are important for designing strategies and objectives to maintain landscape-level biodiversity and for managing other forest resources. Landscape units are also used to initiate landscape unit plans, which provide direction on biodiversity, old-growth forest retention, wildlife habitat maintenance and timber harvesting. LUs may also be used as planning zones for other stakeholders in addition to forest licensees and MFR.</p> <p>This spatial view was created based on the selection from the layer LANDSCAPE UNIT SP, where the DATE OF RETIREMENT is null. Therefore, only current LU shapes are included in this layer.</p>
Feature type name	WHSE_LAND_USE_PLANNING.RMP_LANDSCAPE_UNIT_SVW
Data custodian	BCGOV AL CLAD Strategic Land Policy and Legislation Branch
Date of data	2008-01-22 (creation)
System	LRDW
Unique identifier	10008
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=51078&recordSet=ISO19115
Data issues	none

2. Inventory and Data Layers

Attribute information

Attribute	Value	Description
BIODIVERSITY EMPHASIS OPTION	High	High BEO
	Int	Intermediate BEO
	Low	Low BEO
	Multiple	If more than one BEO. This occurs when part of the LU is in a TFL and the TFL portion has a Low value and the non-TFL portion has a different value.
LANDSCAPE UNIT NAME	Various	Unique landscape unit name.

2.1.2 Biogeoclimatic ecosystem classification

Introduction

The biogeoclimatic (BGC) ecosystem classification (BEC) is an integrated hierarchical classification scheme that combines climate, vegetation and site classifications to describe and map an ecosystem on the land base. Biogeoclimatic subzone/variant/phase mapping is the further stratification of the BEC zone landscape according to a combination of ecological features, primarily climate and physiography.

Background

One of the earliest applications for BEC was to provide a tool for determining which tree species to plant on which sites. Now, BEC influences many different aspects of the management of forests and other resources in British Columbia.

Broad biogeoclimatic zonal units are used for landscape timber supply modeling by providing natural disturbance types (fire frequency), and ecosystem-based wildlife habitat management. More detailed ecosystem mapping of site units provide a structure upon which forest productivity, reforestation considerations and tree species regeneration are used to assess the impact of future timber supply.

2. Inventory and Data Layers

Source dataset

Source data file name	Biogeoclimatic map
Title	BEC_BIOGEOCLIMATIC_POLY
Data file description	The current and most detailed version of the approved corporate provincial digital biogeoclimatic zone/subzone/variant/phase map (version 7, March 31, 2008). This is the LRDW version. Use this version (or the e00 version) when performing GIS analysis regardless of scale. This mapping is deliberately extended beyond the provincial border to facilitate intersection with a BC terrestrial boundary of your choice.
Feature type name	WHSE_FOREST_VEGETATION.BEC_BIOGEOCLIMATIC_POLY
Data custodian	BCGOV FOR Research Branch
Date of data	2008-05-15 (revision)
System	LRDW
Unique Identifier	10004
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=51819&recordSet=ISO19115

Attribute information

Biogeoclimatic zones are usually named after one or more of the dominant climax species in zonal ecosystems (e.g., cedar hemlock), and a geographic (e.g., coastal, interior) or climatic modifier (e.g., boreal, montane). Biogeoclimatic zone names are represented by a two- to four-letter acronym. For example, the Interior Cedar-Hemlock zone is the ICH zone and the Engelmann Spruce Sub-Alpine Fir zone is the ESSF zone.

Subzone names are derived from classes of relative precipitation and temperature or continentality. The first part of the subzone name describes the relative precipitation and the second part describes either the relative temperature (Interior zones) or relative continentality (Coastal zones). For example, the ICHmw stands for the Moist Warm subzone of the Interior Cedar-Hemlock Zone. Subzone names are abbreviated as letter codes (Table 3).

Biogeoclimatic variants are given geographic names reflecting their relative location or distribution within the subzone. For example, the Engelmann Spruce-Subalpine Fir wet cold Subzone (ESSFwc) has six variants. Variant names are given number codes (e.g., ESSFwc1), which in most cases reflect their geographic distribution within the subzone from south to north.

2. Inventory and Data Layers

The polygon attribute BECLABEL contains the principal information for the biogeoclimatic subzone/variant/phase designation. The BECLABEL attribute is nine characters wide. The first four character positions designate the biogeoclimatic zone. Character positions 5-7 designate the subzone. Position 8 designates the variant, and position 9 designates the phase. A complete list and description of the valid BECLABEL values can be obtained from the BEC website:

<http://www.for.gov.bc.ca/HRE/becweb/downloads>

Table 3. BEC labels for BEC zones and subzones found in the Okanagan TSA

BEC label	BEC zone	BEC subzone / variant
ESSF dc1	Engelmann Spruce – Subalpine Fir	Dry Cold
ESSF dc2	Engelmann Spruce – Subalpine Fir	Dry Cold
ESSF dc3	Engelmann Spruce – Subalpine Fir	Dry Cold
ESSF dcp	Engelmann Spruce – Subalpine Fir	Dry Cold Parkland
ESSF dcw	Engelmann Spruce – Subalpine Fir	Dry Cold Woodland
IDF dk1	Interior Douglas-fir	Dry Cold
IDF dk2	Interior Douglas-fir	Dry Cold
MS dm1	Montane Spruce	Dry Mild
MS dm2	Montane Spruce	Dry Mild
MS dm3	Montane Spruce	Dry Mild
IDF dm1	Interior Douglas-fir	Dry Mild
ICH mk1	Interior Cedar – Hemlock	Moist Cool
ICH mk2	Interior Cedar – Hemlock	Moist Cool
ICH mw2	Interior Cedar – Hemlock	Moist Warm
ICH mw3	Interior Cedar – Hemlock	Moist Warm
IDF mw1	Interior Douglas-fir	Moist Warm
IDF mw2	Interior Douglas-fir	Moist Warm
IMA un	Interior Mountain-heather Alpine	Undifferentiated
ESSF vc	Engelmann Spruce – Subalpine Fir	Very Wet Cold
ESSF vcp	Engelmann Spruce – Subalpine Fir	Very Wet Cold Parkland
ESSF vcw	Engelmann Spruce – Subalpine Fir	Very Wet Cold Woodland
ICH vk1	Interior Cedar – Hemlock	Very Wet Cool
ESSF wc1	Engelmann Spruce – Subalpine Fir	Wet Cold
ESSF wc2	Engelmann Spruce – Subalpine Fir	Wet Cold

2. Inventory and Data Layers

BEC label	BEC zone	BEC subzone / variant
ESSF wc4	Engelmann Spruce – Subalpine Fir	Wet Cold
ESSF wcp	Engelmann Spruce – Subalpine Fir	Wet Cold Park land
ESSF wcw	Engelmann Spruce – Subalpine Fir	Wet Cold Woodland
ICH wk1	Interior Cedar – Hemlock	Wet Cool
ESSF xc1	Engelmann Spruce – Subalpine Fir	Very Dry Cold
ESSF xc2	Engelmann Spruce – Subalpine Fir	Very Dry Cold
ESSF xcp	Engelmann Spruce – Subalpine Fir	Very Dry Cold Parkland
ESSF xcw	Engelmann Spruce – Subalpine Fir	Very Dry Cold Woodland
BG xh1	Bunchgrass	Very Dry Hot
IDF xh1	Interior Douglas-fir	Very Dry Hot
IDF xh2	Interior Douglas-fir	Very Dry Hot
PP xh1	Ponderosa Pine	Very Dry Hot
PP xh2	Ponderosa Pine	Very Dry Hot
MS xk1	Montane Spruce	Very Dry Cool

2.1.3 Community watersheds

Introduction

This dataset identifies community and domestic watersheds for the Okanagan TSA. Approximately 19% of the timber harvesting land base in the Okanagan Shuswap Forest District occurs within the drainage areas of streams within community watersheds.

The community watersheds 1:20,000-scale inventory shows the location of watersheds that supply communities with domestic water and is used in conjunction with stream network coverages from TRIM mapping.

Background

Designated community watersheds have been in existence since the *Guidelines for Watershed Management of Crown Lands used as Community Water Supplies* was prepared by a government interagency task force and published by the Ministry of Environment, Lands and Parks (now Ministry of Environment) in October 1980.

The broad definition of a community watershed is any natural watershed area on which a community holds a valid water licence, issued under the *Water Act*, by the Comptroller of Water Rights. Forest companies commonly conduct hydrological assessments to determine existing and potential water problems and recommend appropriate management strategies to protect water. Community watershed designations fall under the authority of the Ministry of Environment and are managed as per the FPC *Watershed Guidebook*.

The watershed assessment procedure (WAP) is a tool to help forest managers understand the type and extent of current water-related problems that exist in a watershed and to recognize the possible hydrologic implications of proposed forestry-related development in that watershed.

2. Inventory and Data Layers

The assessment of hydrological impacts focuses on:

- the potential for changes to peak flows;
- the potential for landslides;
- the potential for accelerated surface erosion, and;
- the anticipated changes to the channel riparian buffer.

From the results of a WAP, recommendations can be made, aimed at preventing or mitigating the impacts of forestry-related activities in the watershed. The recommendations may call for such actions as modifying future harvest layout or scheduling, recognizing sensitive zones, or adopting specific practices in the watershed.

Source

The CWS dataset was created in 2003 by the Science and Information Branch of the Ministry of Environment in 2003 and is available on the LRDW (WHSE_WATER_MANAGEMENT.BC_COMMUNITY_WATERSHEDS).

Status

The community watershed dataset was created in November 2003 and is updated as needed. No updates of the Okanagan TSA portion of this dataset have occurred since the dataset was created.

Dataset

Source data file name	BC community watersheds
Title	BC community watersheds
Data file description	This 1:20,000 scale inventory contains digital maps of community watershed boundaries. The watershed boundaries show the location of watersheds that supply communities with domestic water. These are meant to be used in conjunction with stream network map coverages from TRIM mapping. Attribute data for community watersheds can be downloaded into a spreadsheet or database.
Feature type name	WHSE_WATER_MANAGEMENT.BC_COMMUNITY_WATERSHEDS
Data custodian	Science & Information Branch (MOE)
Date of data	2003-06-11 (creation)
System	LRDW
Unique identifier	7562
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=3575&recordSet=ISO19115

2. Inventory and Data Layers

Attribute information

Attribute	Value	Description
FCODE	e.g. WA25100200	Watershed identifier

Table 4. Community watershed names

CWS name	CWS name
Affleck Community Watershed	Lambly Community Watershed
Alocin Community Watershed	Maid Community Watershed
Anglemont Community Watershed	Meighan Community Watershed
B.X. Community Watershed	Mission Community Watershed
Bass Community Watershed	Naramata Community Watershed
Bastion Community Watershed	Newsome Community Watershed
Brash Community Watershed	Norris Community Watershed
Chute Community Watershed	Olalla Community Watershed
Coldstream Community Watershed	Oyama Community Watershed
Corning Community Watershed	Peachland Community Watershed
Duteau Community Watershed	Penticton Community Watershed
East Canoe Community Watershed	Pooley Community Watershed
Ellis Community Watershed	Powers Community Watershed
Farleigh Community Watershed	Rancher Community Watershed
Fortune Community Watershed	Robinson Community Watershed
Glanzier Community Watershed	Rose Valley Community Watershed
Gordon Community Watershed	Shingle Community Watershed
Hobson Community Watershed	Sicamous Community Watershed
Hope Community Watershed	Silver Community Watershed
Hudson Community Watershed	Skiing Brook Community Watershed
Hydraulic Community Watershed	Swayne Community Watershed
Irish Community Watershed	Trapping Creek Community Watershed
Kelowna Community Watershed	Trepanier Community Watershed
Kendry Community Watershed	Trout Community Watershed
Keremeos Community Watershed	Vernon Community Watershed

2. Inventory and Data Layers

CWS name	CWS name
King Edward (Deer) Community Watershed	Wade Community Watershed
Klim Community Watershed	White Cliff Community Watershed
Klo Community Watershed	Wiseman Community Watershed
Kruly Community Watershed	

2.1.4 Licensee operating areas

Introduction

This dataset identifies licensee operating areas in the Okanagan TSA.

Background

Operating areas indicate the defined forest areas for harvest tenures for the Okanagan TSA. There are six major forest companies and BCTS who hold tenures for the harvesting of Crown timber. There are also a number of smaller licenses.

Status

This dataset reflects existing operating areas, community forests and woodlots as well as candidate woodlots as of July 2007.

Dataset

Layer name	Licensee operating areas
Data file description	Licensee operating areas
Date	December 2006
Data format	Shapefile
Shapefile location	W:\FOR\RSI\DOS\Library\Local_Data\Warehouse\District\operating_areas\aooparea_tok.shp
Data source	Okanagan Shuswap Forest District
Link to metadata	Not available

Attribute information

Attribute	Value	Description
Op_Area	Various	Indicates the tenure-holder or company name.

2. Inventory and Data Layers

2.1.5 Forest inventory

Introduction

This dataset identifies the forest inventory for the Okanagan TSA.

Background

The Vegetation Resources Inventory (VRI) is a photo-based, two-phased vegetation inventory program. The photo interpretation phase (Phase I) involves estimating vegetation polygon characteristics, from existing information, aerial photography, or other sources. No sampling is done in Phase I.

The ground sampling phase (Phase II) provides the information necessary to determine how much of a given characteristic is within the inventory area. Ground samples alone cannot be collected in sufficient numbers to provide the specific locations of the land cover characteristics being inventoried. The ground measurements are used to estimate the total for the population. The relationship between the polygon estimates and ground samples is used to adjust the photo-interpreted polygon estimate. The total for the population is then distributed into the adjusted description for each polygon.

Net Volume Adjustment Factor (NVAF) sampling collects data on a number of selected trees to account for inaccuracies in the estimates of net tree volume. The NVAF is calculated from the ratio of actual to estimates of sample tree volumes and is applied as a correction to VRI ground sample volumes. This data, used in conjunction with the original ground sampling data, provides an unbiased estimate of the net volume in the project area.

The ground measurements are used to estimate the proper total for the population. The relationship between the polygon estimates and ground samples is used to adjust the photo-interpreted polygon estimate. The total for the population is then distributed into the adjusted description for each polygon.

VRI identifies stand characteristics such as the presence or absence of trees, species, number of trees, age and timber volume. It is also used to identify non-forest and non-productive forest areas (e.g., rock, swamp, alpine areas and water bodies), non-commercial cover areas (e.g., non-commercial brush), and problem forest types (PFT) — stands that are operable but contain non-merchantable or low quality timber, and low timber productivity areas — areas occupied by forest with low timber growing potential.

Source

The Forest Analysis and Inventory Branch of the MFR provided the VRI dataset for this analysis. This dataset was retrieved from the LRDW and includes VDYP 6 volumes.

Status

The Okanagan Innovative Forestry Society, through support from the Forest Investment Account, has been working towards completing the VRI work for the Okanagan Shuswap Forest District. At this time VRI phase 1 work has been completed for the following mapsheets and will be used in this analysis.

- Highlighted cells have new Phase 1 VRI information for at least part of the mapsheet (164 maps);
- All other cells are FC1/FIP rollover data with updates (34 mapsheets).

2. Inventory and Data Layers

Table 5. Mapsheets for Okanagan TSA with VRI

92H

south									west	maps
008										1
009	019	029				069	079	089	099	7
010	020	030	040	050	060	070	080	090	100	10
east									north	18

92I

south									west	maps
010			040	050						3
east									north	3

82E

south									west	Maps
001	011	021	031	041	051	061	071	081	091	10
002	012	022	032	042	052	062	072	082	092	10
003	013	023	033	043	053	063	073	083	093	10
004	014	024	034	044	054	064	074	084	094	10
	015	025	035		055	065	075	085	095	8
							076	086	096	3
								087	097	2
								088	098	2
								089	099	2
east									north	57

2. Inventory and Data Layers

82L

south									west	maps
001	011	021	031	041	051					6
002	012	022	032	042	052	062	072	082	092	10
003	013	023	033	043	053	063	073	083	093	10
004	014	024	034	044	054	064	074	084	094	10
005	015	025	035	045	055	065	075	085	095	10
006	016	026	036	046	056	066	076	086	096	10
007	017	027	037	047	057	067	077	087	097	10
008	018	028	038	048	058	068	078	088	098	10
009	019	029	039	049	059	069	079	089	099	10
				050	060	070				3
east									north	89

82M

south									west	maps
003	013	023								3
004	014	024	034							4
005	015	025	035	045		065				6
006	016	026	036	046	056	066				7
007	017	027	037	047	057					6
008	018	028	038							4
009										1
east									north	31

2. Inventory and Data Layers

Dataset

Source data file name	VRI - Forest Vegetation Composite Polygons and Rank 1 Layer
Title	veg_comp_lyr_R1_poly table
Data file description	FOREST VEGETATION COMPOSITE POLYGONS: A composite table comprising the polygon table attributes joined to the attributes from the non-veg, non-tree, land cover component, tree layer, tree species and tree volume tables. This SDE layer coverage contains vegetation cover from the Ministry of Forests and Range. Attribute information is also maintained in this table. It will supersede F_FC. Vegetation Cover is comprised of spatial layers for the collection, manipulation and production of forest inventory data, which has accompanying textual attributes. This joined table was created to support the Data Distribution Services on the LRDW.
Feature type name	WHSE_FOREST_VEGETATION.VEG_COMP_LYR_R1_POLY
Data custodian	BCGOV FOR Forest Analysis and Inventory Branch
Date of data	2006-10-15 (creation)
System	LRDW
Unique identifier	9320
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=47574&recordSet=ISO19115

Attribute information

A detailed data dictionary for VRI is available at:

http://www.for.gov.bc.ca/hts/vridata/standards/datadictionary/rpt_vri_datadict0907_draft1.0e.pdf

2.1.6 Ungulate winter range

Introduction

This dataset includes ungulate winter range as identified in the approved ungulate winter ranges, #U-3-005 (Mountain Caribou), #U-8-001 (Mule Deer), #U-8-004 (Mountain Caribou), #U-8-005 (Mountain Goat) and #U-8-006 (Moose) within the Okanagan TSA.

Background

Ungulates are hooved mammals, including mountain caribou, mule deer, moose, and mountain goat. One of the most important requirements for the maintenance of healthy ungulate populations is their ability to overwinter when they have to forage for food and live off fat reserves.

2. Inventory and Data Layers

An ungulate winter range (UWR) is an area that is required to meet the winter habitat requirements of an ungulate. UWR are based on our current understanding of ungulate habitat requirements in winter, as interpreted by the Ministry of Environment (MOE) regional staff based on current scientific and management literature, local knowledge, and other expertise from the region. Areas considered of particular importance as UWR include low elevations areas with minimal snow accumulation (i.e., south aspects), abundant forage plants, and sufficient forest cover to allow hiding or movement. The data indicates the general location where these areas can be found, but this does not mean that all the areas identified are high value winter range.

Timber harvesting can improve UWR in many instances, but requires careful forethought and planning. In general, a mix of different habitat types is considered desirable — open areas for foraging, and forested areas for cover. Since we do not have conclusive knowledge of optimal winter range requirements, or the likelihood of this emerging under "natural" disturbance patterns, a great deal of professional judgment is necessary.

Formal legal establishment of UWR and associated objectives began under the FPC and continues, under the FRPA. Sections 9 and 12 of the Government Actions Regulation (GAR) of the FRPA outline the regulatory authority for establishing UWR.

Source

The Ministry of Environment is responsible for UWR and posts all approved UWR orders and spatial files on their website.

2.1.6.1 Mule Deer

Introduction

This dataset identifies mule deer winter range (MDWR) for the Okanagan TSA.

Background

MDWR requirements in this analysis come from the “Approved Ungulate Winter Ranges” (UWR) on the Ministry of Environment’s (MoE’s) website http://www.env.gov.bc.ca/wld/frpa/ugwr/approved_ugwr.html

The applicable order with regard to mule deer is: Ungulate Winter Range #U-8-001-Okanagan TSA.

The forest cover requirements are implemented by planning cell and depend upon snowpack zone (defined by BEC). The forested retention area in each planning cell is shown below (source: MOE–UWR #U-8-001).

2. Inventory and Data Layers

Table 6. MDWR snow interception cover (SIC) definition by snowpack zone

Snowpack zone	BGCZ	Dominant tree species	Minimum stand age (years)	Canopy closure
Shallow	BG PP IDFxh	Douglas-fir	Not less than 140	None specified Small patches, clumps or “vets” acceptable
Moderate	IDFdk IDFdm IDFmw MS ICHdw	Douglas-fir	IDFmw – not less than 140. All other units – not less than 175 or not less than 40 cm dbh	At least 36%
Deep	ICH (except ICHdw)	Douglas-fir	Not less than 100, or not less than 40 cm dbh	At least 46%

Note: Forest cover constraints for this factor will be modelled based on stand age class. Canopy closure is not available for modelling purposes.

The following section summarizes the requirements applied to each MDWR zone and is broken up by snowpack zone.

Shallow Snowpack:

- SIC retention as set out in the table “u-8-001_SnowInterceptionCover.xls” located at the FTP site indicated at http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html. This information is included in the table below.

Moderate Snowpack:

- SIC retention as set out in the table “u-8-001_SnowInterceptionCover.xls” located at the FTP site indicated at http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html. This information is included in the table below.
- On all BECs excluding IDFmw, up to 50% of the retention requirement can be met on the non-THLB.
- On IDFmw, there is no restriction on the amount of SIC located in the non-THLB.
- A disturbance requirement that a maximum of 30% can be less than 20 years is implemented on each planning cell.

Deep Snowpack:

- SIC retention as set out in the table “u-8-001_SnowInterceptionCover.xls” located at the FTP site indicated at http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html. This information is included in the table below.

2. Inventory and Data Layers

Source dataset

Source data file name	Ungulate winter range
Title	UWR
Data file description	The dataset contains approved legal boundaries for ungulate winter range and specified areas for ungulate species.
Feature type name	WHSE_WILDLIFE_MANAGEMENT.WCP_UNGULATE_WINTER_RANGE_SP
Data custodian	BCGOV ENV Ecosystems Branch (MOE)
Date of data	2005-03-23 (creation)
System	LRDW
Unique identifier	3302
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=36173&recordSet=ISO19115

Attribute information

Attribute	Value	Description
UWR_NUMBER		Plan number identifying the group of units (polygons) in the UWR, e.g. u-8-001, where '8' is the MOE Region number and '001' is the 3 digit plan number.
SPECIES_1	M-ODHE	Primary ungulate species included in the plan. Code interpretation: M-RATA = Caribou; M-ALAL = Moose; M-CEEL = Elk; M-ODHE = Mule Deer; M-ODHC = Black-tailed Deer; M-ODVI = White-tailed Deer; M-ORAM = Mountain Goat; M-OVCA = Bighorn Sheep; M-OVDA = Stone Sheep; M-BIBI = Bison
FEATURE_NOTES (FEAT_NOTES when downloaded)	Pcell #1176: SIC = 369	A specific description of the UWR area (optional). For MDWR this means maintain 369 hectares of forest for snow interception cover in UWR planning cell #1176

2. Inventory and Data Layers

2.1.6.2 Mountain Caribou

Introduction

This dataset identifies the legally established areas identified as necessary for the maintenance and recovery of the mountain caribou within the Okanagan TSA.

Background

Mountain caribou requirements in this analysis come from the approved UWR on the MoE's website http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html.

The applicable orders with regard to mountain caribou are:

1. Ungulate Winter Range #U-3-005 for the Revelstoke Shuswap Planning Unit, effective Feb 12, 2009, and
2. Ungulate Winter Range #U-8-004 for the Revelstoke Shuswap and South Monashee Planning Units, effective July 28, 2006.

In the Okanagan TSA, those areas identified in the two orders are treated as no harvest zones.

Status

These areas have been established under legal GAR order.

Source Dataset

Refer to the dataset information found under section 2.1.7.1 Mule Deer.

2.1.6.3 Mountain Goat

Introduction

This dataset identifies the legally established areas identified as necessary for the maintenance of the mountain goat population within the Okanagan TSA.

Background

Mountain goat requirements in this analysis come from the approved UWR on the MoE's website http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html.

The applicable order with regard to mountain goat is:

- Ungulate Winter Range #U-8-005 for the Okanagan TSA, effective July 28, 2006.

In the Okanagan TSA, those areas identified in the GAR order divided into mountain goat planning cells the general wildlife measures outlined in this order are implemented in this analysis as follows:

- To reflect a three-pass system no more than 33% of the pine-leading forested area of each winter range is to be less than 33 years of age; and
- No more than 33% of the non-pine leading forested area of each winter range is to be less than 50 years of age.

Status

These areas have been established under legal GAR order.

Source Dataset

Refer to the dataset information found under section 2.1.7.1 Mule Deer.

2. Inventory and Data Layers

2.1.6.4 Moose

Introduction

This dataset identifies the legally established areas identified as necessary for the maintenance of the moose population within the Okanagan TSA.

Background

Moose requirements in this analysis come from the approved UWR on the MoE's website http://www.env.gov.bc.ca/wld/frpa/uwr/approved_uwr.html.

The applicable order with regard to moose is:

- Ungulate Winter Range #U-8-006 for the Okanagan TSA, effective July 28, 2006.

In the Okanagan TSA, the moose zone is divided into moose winter range units and the general wildlife measures outlined in this order are implemented in this analysis as follows:

- Within each moose winter range unit, 33% of the gross forested area must be > 16 metres in height.
- Minimum of 15% of forested area in each winter range unit is to be less than 25 years (ICH/IDF) and 35 years (MS/ESSF).

Status

These areas have been established under legal GAR order.

Dataset

Refer to the dataset information found under section 2.1.7.1 Mule Deer.

Status

This file represents approved UWR 4-001, amended on February 7, 2007 under legal GAR order.

2.1.7 Wildlife habitat areas

Introduction

The dataset contains approved legal boundaries for wildlife habitat areas (WHAs) and specified areas for species at risk and regionally important wildlife. WHAs consist of core areas, where harvesting activities are usually excluded. They may also include buffer or management zones, where general wildlife measures limit harvesting activities to protect the core area. The wildlife species may not be identified in the dataset if identification of the species or feature might place undue risk on the wildlife area or feature.

Background

WHAs are areas managed for selected species and plant communities that have been designated under the FRPA as "Identified Wildlife". The Identified Wildlife Management Strategy (IWMS) is a responsibility of the Ministry of Environment carried out in consultation with other resource ministries, stakeholders and the public. Statutory authority is provided for the Ministry of Environment to carry out this strategy under provisions of the FRPA and previously under the FPC. The IWMS provides direction, policy, procedures and guidelines for managing identified wildlife. The goals of the IWMS are to minimize the effects of forest and range practices on identified wildlife situated on Crown land and to maintain their current ranges and, where appropriate, their historic ranges. One method of managing identified wildlife is through the establishment of WHAs and the implementation of general wildlife measures and objectives.

2. Inventory and Data Layers

Source

Under the FRPA, the Minister of the Environment, who is responsible for the *Wildlife Act*, is authorized to establish two categories of wildlife which require special management attention to address the impacts of forest and range activities on Crown land. Approved WHA spatial data is available directly from the Ministry of Environment website and is posted on the Land Resource Data Warehouse site.

Wildlife habitat area (WHAs) data was sourced from MoE's approved WHA webpage <http://www.env.gov.bc.ca/wld/frpa/iwms/wha.html>.

Status

According to the GeoBC website metadata, this information is updated daily.

Source dataset

Source data file name	Wildlife habitat areas
Title	WHA
Data file description	The dataset contains approved legal boundaries for wildlife habitat areas and specified areas for species at risk and regionally important wildlife.
Feature type name	WHSE_WILDLIFE_MANAGEMENT.WCP_WILDLIFE_HABITAT_AREA_POLY
Data custodian	BCGOV ENV Ecosystems Branch (MOE)
Date of data	2005-03-23 (publication)
System	LRDW
Unique identifier	3301
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to Meta Data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=36172&recordSet=ISO19115
Changes since TSR 3	Some updates

2. Inventory and Data Layers

Attribute information

Details of important attribute values

Attribute	Value	Description
Feature_notes	Various	A specific description of the WHA area.
	FF33515120	Core area.
Common_Species_Name	Various	Identified wildlife common species name or 'Data Sensitive'.

Attribute information

Details of important attribute values

Attribute	Value	Description
Feature_notes	Various	A specific description of the WHA area.
	FF33515120	Core area.
Common_Species_Name	Various	Identified wildlife common species name or 'Data Sensitive'.

Land base summaries

There are 109 WHAs in the Okanagan Shuswap Forest District that cover a total area of approximately 14 225 hectares of which approximately 3100 are considered mature THLB. WHAs have been established for 12 species listed below.

Wildlife habitat area (WHAs) data was sourced from MoE's approved WHA webpage <http://www.env.gov.bc.ca/wld/frpa/iwms/wha.html>

2. Inventory and Data Layers

Table 7. *Wildlife habitat areas by species*

Species	Total hectares	WHA number	Modelling constraints
Antelope-Brush/Needle-And-Thread Grass	198	8-338, 8-339, 8-343, 8-344, 8-345, 8-347, 8-348, and 8-349	no measures to model
Bighorn Sheep	385	8-006, 8-007, 8-008, 8-009, and 8-010	no measures to model
Brewer's Sparrow	48	8-002	no measures to model
Grizzly Bear	4722	8-131, 8-132, 8-133, 8-134, 8-135, 8-136, 8-137, 8-138, 8-144, 8-145 and 8-146	no harvesting
Grizzly Bear	unknown	8-232	see ORDER constraints below
Lewis's Woodpecker	469	8-221, 8-122, 8-123, 8-245, 8-246, 8-247, 8-248, 8-249, 8-250, 8-251, 8-253, 8-266, 8-274, 8-275, 8-276, 8-277, 8-278, 8-280, 8-293 and 8-294	no harvesting
Mountain Caribou	5600		no harvesting
Tiger Salamander	151	8-090, 8-091, 8-092, 8-093 and 8-094	no harvest constraints
Tiger Salamander	70	8-236, 8-237 and 8-238	no harvest
Western Screech Owl	148	8-124, 8-261 and 8-262	no harvest
White-headed Woodpecker	199	8-014, 8-015, 8-016 and 8-017	no harvest
Williamson's Sapsucker	471	8-101, 8-102, 8-103, 8-106, 8-107, 8-108, 8-110, 8-113, 8-190, 8-191, 8-192, 8-194, 8-197, 8-199, 8-201 and 8-211	do not harvest or salvage
Yellow-breasted Chat	38	8-018, 8-067, 8-068, 8-069, 8-070, 8-071, 8-072, 8-073, 8-074, 8-075, 8-076, 8-127, 8-128, 8-129, 8-130, 8-234 and 8-235	no forest constraints

Order – Grizzly Bear Specified Area #8-232

Harvesting and Silviculture

- Forest practices will result in at least 10% of each management unit containing forest stands that exhibit a height of at least 19.5 metres, in patches that are at least five hectares in size, which will be managed at an operational level. Management units are defined as the area of each BEC subzone within each landscape unit.
- Forest harvesting along avalanche tracks, that are at least 40 metres in width, will result in forest stands that are at least 15 metres in height for 100 metres on one side of the avalanche track, or 50 metres on both sides of the avalanche track which will be managed at an operational level.
- In those sites where grizzly bear forage production is a priority the stocking standard, post harvest, will be 0. (See table below for list of sites).

2. Inventory and Data Layers

Table 8. Riparian site series with post harvest stocking target of 0 in Grizzly Bear Habitat

BEC subzone variant	Site series
ESSFdc1	07
ESSFdc2	09
ESSFvc	06
ESSFvv	05
ESSFwc2	10
ESSFwc4	08
ESSFxc	09, 10
ICHmk1	08
ICHmw2	08
ICHmw3	09
ICHwk1	08
MSdm1	08

2.1.8 Parks, protected areas, ecological reserves, and wildlife management areas

Introduction

This dataset contains boundaries for all provincial parks, protected areas, ecological reserves, and wildlife management areas within the Okanagan TSA.

Background

British Columbia is home to many nationally and internationally significant natural and cultural values. Through the establishment of parks, ecological reserves, protected areas, and wildlife management areas, an important first step has been undertaken to ensure that these values are afforded legal protection. The provincial legal framework for protecting these important areas includes the:

- *Protected Areas of British Columbia Act;*
- *Park Act;*
- *Ecological Reserve Act;* and
- *Environment and Land Use Act.*

Parks and protected areas are managed for important conservation values and are dedicated for the preservation of their natural environments for the use and enjoyment of the public.

Places of special ecological importance are designated as ecological reserves for scientific research and educational purposes. Scientific research and study of values contained in protected areas are part of BC Parks' mandate.

2. Inventory and Data Layers

Source

There is a single source dataset available through the LRDW for these four land classifications.

Status

All provincial and national protected areas designated by order-in-council or legislation are included in this dataset. Park proposals or draft boundaries are not considered

Dataset

Source data file name	Parks and protected areas
Title	Parks and Protected Areas
Data file description	The Parks and Protected Areas dataset contains outline for Provincial Protected areas boundaries for all protected areas designated by OIC or legislation.
Feature type name	WHSE_PARKS.PA_PROTECTED_AREA_POLY
Data custodian	BCGOV ENV Parks and Protected Areas Branch
Date of data	2004-07-22 (publication)
System	LRDW
Unique identifier	6722
Product type	Feature Type
Resource type	Abstraction
Resource storage location	LRDW Data Store
Storage format	E00
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=3997&recordSet=ISO19115

The following are wholly or partially contained in the TSA:

Provincial protected area	Area within TSA (hectares)
Provincial park	131 884.4
Protected area	51 581.1
Ecological reserve	4925.6
Wildlife management area	392.3
Total	188 783.4

2. Inventory and Data Layers

Table 9. Provincial parks, protected areas, ecological reserves and wildlife management areas

Type	PA_name	Area (hectares)
ER	Big White Mountain Ecological Reserve	763
ER	Browne Lake Ecological Reserve	113
ER	Buck Hills Road Ecological Reserve	16
ER	Campbell-Brown Ecological Reserve	104
ER	Cougar Canyon Ecological Reserve	553
ER	Field's Lease Ecological Reserve	4
ER	Hayne's Lease Ecological Reserve	100
ER	Kingfisher Creek Ecological Reserve	1496
ER	Lily Pad Lake Ecological Reserve	101
ER	Mahoney Lake Ecological Reserve	39
ER	Mara Meadows Ecological Reserve	178
ER	Mount Griffin Ecological Reserve	1253
ER	Trout Creek Ecological Reserve	68
ER	Upper Shuswap River Ecological Reserve	91
ER	Vance Creek Ecological Reserve	47
PA	Anarchist Protected Area	466
PA	Brent Mountain Protected Area	4274
PA	Cathedral Protected Area	68
PA	Fintry Protected Area	3065
PA	Greenbush Lake Protected Area	2788
PA	Myra-Bellevue Protected Area	51
PA	Snowy Protected Area	25 650
PA	South Okanagan Grasslands Protected Area	9494
PA	Vaseux Protected Area	1995
PA	White Lake Grasslands Protected Area	3737
Park	Anstey Hunakwa Park	6854
Park	Bear Creek Park	158
Park	Browne Lake Park	43
Park	Cathedral Park	32 911
Park	Christie Memorial Park	3
Park	Cinnemousun Narrows Park	578

2. Inventory and Data Layers

Type	PA_name	Area (hectares)
Park	Darke Lake Park	1504
Park	Denison-Bonneau Park	376
Park	Eagle River Park	454
Park	Echo Lake Park	145
Park	Ellison Park	223
Park	Enderby Cliffs Park	2278
Park	Eneas Lakes Park	1036
Park	English Lake Park	332
Park	Fintry Park	361
Park	Granby Park	34
Park	Graystokes Park	11 963
Park	Haynes Point Park	43
Park	Herald Park	80
Park	Inkaneep Park	15
Park	Kalamalka Lake Park	3218
Park	Kekuli Bay Park	59
Park	Keremeos Columns Park	20
Park	Kickininee Park	52
Park	Kingfisher Creek Park	440
Park	Mabel Lake Park	200
Park	Mara Meadows Park	212
Park	Mara Park	12
Park	Monashee Park	22 616
Park	Monte Lake Park	5
Park	Mount Griffin Park	1759
Park	Myra-Bellevue Park	7809
Park	Nickel Plate Park	117
Park	Okanagan Falls Park	2
Park	Okanagan Lake Park	85
Park	Okanagan Mountain Park	11 027
Park	Pennask Creek Park	1238
Park	Pennask Lake Park	240

2. Inventory and Data Layers

Type	PA_name	Area (hectares)
Park	Pillar Park	2
Park	Pukeashun Park	1779
Park	Roderick Haig-Brown Park	86
Park	Shuswap Lake Marine Park	941
Park	Shuswap Lake Park	154
Park	Shuswap River Islands Park	185
Park	Silver Beach Park	156
Park	Silver Star Park	5574
Park	Skookumchuck Rapids Park	71
Park	Sun-Oka Beach Park	37
Park	Trepanier Park	2870
Park	Truman Dagnus Locheed Park	7
Park	Upper Seymour River Park	10 546
Park	Upper Violet Creek Park	124
Park	Vaseux Lake Park	17
Park	Victor Lake Park	12
Park	Wap Creek Park	328
Park	White Lake Park	266
Park	Wrinkly Face Park	43
Park	Yard Creek Park	175
WMA	South Okanagan Wildlife Management Area	392

2.1.9 Old growth management areas

Introduction

This dataset identifies candidate old growth management areas (OGMAs) for the Okanagan TSA.

Background

Old-growth forests contain unique habitat structure that takes a long time to return if altered. The establishment of OGMAs is one method to conserve old-growth biodiversity elements in the forest ecosystem.

Draft OGMAs cover an area negotiated by the OSLRMP planning table at the Landscape Unit, BEC, THLB/non-THLB level during the creation of the OSLRMP.

OGMAs area generally excluded from harvesting operations and if an OGMA is harvested, a suitable replacement is to be identified.

2. Inventory and Data Layers

Source

Candidate OGMAs were identified through negotiations between the MFR, ILMB, forest industry representatives and Environmental Non-governmental Organizations (ENGOs) following the completion of the Okanagan-Shuswap LRMP.

Status

The OGMAs in this dataset are in draft format and there are no plans to have them legally established beyond their inclusion in Forest Stewardship Plans. This allows the strategy to be adjusted over time to deal with insect outbreaks, forest fires, or other changes which may affect their permanency.

Dataset

Title	Old growth management areas – non-legal – current
Data file description	This non-legal "current" layer is freely downloadable. These are spatially defined areas of old-growth forest that are identified during landscape unit planning or an operational planning process. Forest licensees are not required to follow direction provided by non-legal OGMAs when preparing FSPs, and may choose to manage required old-growth biodiversity targets in other ways. OGMAs, in combination with other areas where forestry development is prevented or constrained, are used to achieve biodiversity targets. This spatial view will show the most current polygons and exclude the sensitive information. ** See the accuracy and usage WARNINGS in Identification: Supplemental Information and Data Quality: Source Information.**
Feature type name	WHSE_LAND_USE_PLANNING.RMP_OGMA_NON_LEGAL_CURRENT_SVW
Data custodian	BCGOV AL CLAD Strategic Land Policy and Legislation Branch
Date of data	2009-07-16 (revision)
System	LRDW
Unique identifier	10059
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=51678&recordSet=ISO19115
Changes since TSR 3	none

2. Inventory and Data Layers

Table 10. LRMP accepted targets used in process to locate OGMAs

BEO	LU name	BEC subzone	THLB	Non-THLB	THLB increment
High	Anarchist	BGxh1	-		
High	Anarchist	ESSFdc1	-		
High	Anarchist	ESSFxc	47	10	
High	Anarchist	IDFdk1	240	132	
High	Anarchist	IDFdm1	126	277	
High	Anarchist	IDFxm1	668	641	
High	Anarchist	MSdm1	-	22	
High	Anarchist	MSxk	135	20	
High	Anarchist	PPxm1	-	829	100
High	Ashnola	BGxh1	-		
High	Ashnola	ESSFdc2	-	60	
High	Ashnola	ESSFxc	-	6162	
High	Ashnola	IDFdk1	-	2208	
High	Ashnola	IDFdk2	18	98	
High	Ashnola	IDFxm1	-	622	
High	Ashnola	MSdm2	-	766	
High	Ashnola	MSxk		3405	
High	Ashnola	PPxm1	-	3	
Int	Keremeos	BGxh1	-	-	
Int	Keremeos	ESSFxc	2	1247	167
Int	Keremeos	IDFdk1	-	1024	
Int	Keremeos	IDFdk2	-	283	
Int	Keremeos	IDFxm1	651	394	
Int	Keremeos	MSdm2	-	278	167
Int	Keremeos	MSxk	9	1186	167
Int	Keremeos	PPxm1	-	83	90
Low	Kettle	ESSFdc1	-	989	
Low	Kettle	ESSFxc	-	508	
Low	Kettle	ICHmk1	35	155	
Low	Kettle	IDFdm1	-	494	
Low	Kettle	MSdm1	319	1250	200

2. Inventory and Data Layers

BEO	LU name	BEC subzone	THLB	Non-THLB	THLB increment
Int	Mission	BGxh1	-	-	
Int	Mission	EssFdc1	966	1931	
Int	Mission	ESSFxc	-	1342	
Int	Mission	ICHmk1	439	2002	250
Int	Mission	IDFdm1	-	347	
Int	Mission	IDFmw1	-	1488	
Int	Mission	IDFxh1	-	426	150
Int	Mission	MSdm1	2322	665	
Int	Mission	PPxh1	-	67	
Int	Pennask	ESSFdc2	336	24	
Int	Pennask	ESSFxc	1013	665	
Int	Pennask	IDFdk1	12	-	
Int	Pennask	MSdm2	810	318	
Int	Pennask	MSxk	6	3152	500
Int	Penticton	BGxh1	-	-	
Int	Penticton	ESSFdc1	720	1190	
Int	Penticton	IDFdm1	-	1724	
Int	Penticton	IDFxh1	-	792	800
Int	Penticton	MSdm1	1109	1846	
Int	Penticton	PPxh1	-	443	200
Int	Trepanier	ESSFdc2	49	5	
Int	Trepanier	ESSFxc	33	69	
Int	Trepanier	IDFdk1	66	-	
Int	Trepanier	IDFdk2	702	1870	
Int	Trepanier	IDFmw1	21	7	
Int	Trepanier	IDFxh1	553	324	
Int	Trepanier	MSdm2	1606	1126	
Int	Trepanier	MSxk	38	4	
Int	Trepanier	PPxh1	138	141	575
Int	Trout	BGxh1	-	-	
Int	Trout	ESSFxc	113	1548	
Int	Trout	IDFdk1	16	491	

2. Inventory and Data Layers

BEO	LU name	BEC subzone	THLB	Non-THLB	THLB increment
Int	Trout	IDFdk2	1097	1872	
Int	Trout	IDFxb1	968	630	
Int	Trout	MSdm2	401	3769	400
Int	Trout	MSxb	248	11	
Int	Trout	PPxb1	-	485	588
Int	Anstey	ESSFwc2	-	1951	
Int	Anstey	ICHmw2	7	77	
Int	Anstey	ICHmw3	107	1951	
Int	Anstey	ICHvk1	187	82	
Int	Anstey	ICHwk1	584	303	
Low	Crowfoot	ESSFwc2	71	473	
Low	Crowfoot	ICHmw2	-	-	
Low	Crowfoot	ICHmw3	-	543	
Low	Crowfoot	ICHwk1	99	161	150
Low	Crowfoot	IDFmw2	-	25	
Int	Eagle River	ESSFvc	-	3266	
Int	Eagle River	ESSFwc2	1436	1036	
Int	Eagle River	ESSFwc4	85	199	
Int	Eagle River	ICHmw2	30	69	
Int	Eagle River	ICHmw3	83	2004	
Int	Eagle River	ICHvk1	47	1008	
Int	Eagle River	ICHwk1	1129	2053	
Int	Kingfisher	ESSFvc	-	150	100
Int	Kingfisher	ESSFwc2	1671	2703	
Int	Kingfisher	ESSFwc4	30	189	100
Int	Kingfisher	ICHmk1	161	113	
Int	Kingfisher	ICHmw2	204	2416	
Int	Kingfisher	ICHmw3	-	47	
Int	Kingfisher	ICHvk1	22	139	50
Int	Kingfisher	ICHwk1	830	642	
Int	Kingfisher	IDFmw1	-	453	

2. Inventory and Data Layers

BEO	LU name	BEC subzone	THLB	Non-THLB	THLB increment
Int	Kingfisher	IDFxh1	-	3	
Int	Pukeashun	ESSFwc2	1490	3454	
Int	Pukeashun	ICHmk2	27	100	
Int	Pukeashun	ICHmw3	10	900	
Int	Pukeashun	ICHwk1	1105	586	
Int	Pukeashun	IDFmw2	119	266	
Int	Pukeashun	IDFxh2	-	12	
Int	Salmon Arm	ESSFdc2	774	555	
Int	Salmon Arm	ICHmk2	669	294	
Int	Salmon Arm	ICHmw2	1352	242	
Int	Salmon Arm	ICHmw3	75	77	200
Int	Salmon Arm	IDFdk2	363	267	
Int	Salmon Arm	IDFmw1	340	112	
Int	Salmon Arm	IDFmw2	257	2372	
Int	Salmon Arm	IDFxh1	9	24	
Int	Salmon Arm	IDFxh2	26	145	
Int	Salmon Arm	MSdm2	906	807	
Int	Salmon Arm	PPxh2	-	-	
High	Seymour	ESSFvc	-	4135	
High	Seymour	ESSFwc2	1403	1544	
High	Seymour	ICHmw3	1544	2201	
High	Seymour	ICHvk	-	1382	
High	Seymour	ICHwk1	2294	987	
Low	White	ESSFwc2	103	-	
Low	White	ICHmw2	151	-	
Low	White	ICHmw3	338	136	
Low	White	ICHwk1	29	-	
Low	White	IDFmw2	-	284	
Low	Cherryville	ESSFdc1	-	138	
Low	Cherryville	ESSFwc4	-	703	

2. Inventory and Data Layers

BEO	LU name	BEC subzone	THLB	Non-THLB	THLB increment
Low	Cherryville	ESSFxc	-	91	
Low	Cherryville	ICHmk1	148	494	
Low	Cherryville	ICHmw2	-	474	100
Low	Cherryville	IDFmw1	-	350	
Int	Harris	ESSFdc1	45	126	
Int	Harris	ESSFxc	-	1696	
Int	Harris	ICHmk1	884	463	
Int	Harris	IDFmw1	860	795	
Int	Harris	IDFhx1	247	-	
Int	Harris	MSdm1	1818	81	
Low	Mabel	ESSFdc2	45	126	100
Low	Mabel	ESSFwc2	-	1311	400
Low	Mabel	ICHmw2	439	536	
Low	Mabel	ICHwk1	-	319	100
Low	Mabel	IDFmw1	-	80	
Int	OK West Side	ESSFdc2	269	-	
Int	OK West Side	ESSFxc	48	-	
Int	OK West Side	ICHmk1	273	-	
Int	OK West Side	ICHmk2	242	57	
Int	OK West Side	IDFdk1	81	100	
Int	OK West Side	IDFmw1	719	464	
Int	OK West Side	IDFhx1	202	27	300
Int	OK West Side	MSdm2	253	175	
Int	OK West Side	MSxk	-	6	
Low	Trinity	ESSFdc2	-	217	
Low	Trinity	ICHmk1	-	71	
Low	Trinity	ICHmw2	708	632	
Low	Trinity	IDFmw1	-	215	
Low	Trinity	IDFhx1	22	-	
Low	Upper Kettle	ESSFdc1	-	823	
Low	Upper Kettle	ESSFwc4	1151	411	

2. Inventory and Data Layers

BEO	LU name	BEC subzone	THLB	Non-THLB	THLB increment
Low	Upper Kettle	ICHmk1	850	283	
Low	Upper Kettle	ICHmw2	-	108	
Low	Upper Salmon	ESSFdc2	100	58	
Low	Upper Salmon	ESSFxc	115	95	
Low	Upper Salmon	ICHmk1	14	-	
Low	Upper Salmon	ICHmk2	13	-	
Low	Upper Salmon	IDFdk1	-	241	
Low	Upper Salmon	IDFdk2	-	292	
Low	Upper Salmon	IDFmw1	103	39	
Low	Upper Salmon	IDFmw2	-	61	
Low	Upper Salmon	IDFxh1	-	13	
Low	Upper Salmon	IDFxh2	-	234	450
Low	Upper Salmon	MSdm2	-	235	100
Low	Upper Salmon	MSxk	-	280	200
High	Upper Shuswap	ESSFwc2	1834	889	
High	Upper Shuswap	ESSFwc4	-	4403	300
High	Upper Shuswap	ICHmw2	1281	844	
High	Upper Shuswap	ICHvk1	-	951	
High	Upper Shuswap	ICHwk1	1944	118	
Low	Vernon	ESSFdc2	8	16	
Low	Vernon	ESSFxc	38	17	
Low	Vernon	ICHmk1	103	464	100
Low	Vernon	ICHmw2	13	1	
Low	Vernon	IDFmw1	-	529	
Low	Vernon	IDFxh1	-	148	50
Low	Vernon	MSdm1	338	187	
Low	Vernon	PPxh1		1	
TOTAL			51 407	119 346	7153

2.1.10 Operability classification

Introduction

This dataset identifies operability linework for the Okanagan TSA.

2. Inventory and Data Layers

Background

- Operability lines were developed for the Okanagan TSA in 1993. In 1997 inoperable areas for the former Salmon Arm Forest District were digitally updated for use in the 2001 AAC determination. At that time Forest Service and forest industry reviewed the operability lines and some adjustments that where necessary were made. No additional changes have been made since that time.
- Approximately 118 500 hectares of productive forest are considered inoperable for this analysis.

Source

Forest Service staff from the former Penticton, Vernon and Salmon Arm Forest Districts along with representatives from the major forest licensees collaboratively developed this dataset based GIS analysis, local knowledge and discussions.

Status

This dataset reflects current management within the TSA.

Dataset

Title	Operable / inoperable areas
Data file description	To delineate operability polygons
Layer name	Inoperable
Abstract	Inoperable areas in the Southern Interior
Date of data	Current to 1997
Coverage	s:\for\rsi\dos\library\gis\data\srm_rdw\forest\opr\fopr_tok
Data type	Coverage feature class
Feature class	Polygon
Data issues	None
Changes since TSR 3	None

Attribute information

Attribute	Value	Description
oper	A	Operable (accessible)
	I	Inoperable
	N	Not mapped

2.1.11 Ownership

Introduction

This dataset identifies land ownership classifications used to derive the Crown Forested Land Base (CFLB) available for inclusion in this analysis.

2. Inventory and Data Layers

Background

The ownership information identifies land designations that are excluded from the Crown land base or are not administered by the MFR and, therefore, do not contribute to the CFLB.

Source

The Okanagan Shuswap Forest District utilized the following datasets to identify that land classified as private land, Indian Reserves, woodlots, community forests, and Controlled Recreation Area (CRA) datasets. Areas with any of these classifications are not available for this analysis.

Status

The ownership dataset used in the previous TSR was originally derived from old forest cover data and is no longer maintained. Although not a complete ownership inventory of the TSA, this dataset represents the best available data at this time, and sufficiently captures land areas that are excluded from the THLB based on ownership. Other datasets capture proposed tenures or changes in land ownership, such as community forests and proposed woodlots.

2.1.11.21 Indian Reserve land

Introduction

This dataset identifies Indian Reserves located within the Okanagan Timber Supply Area (TSA).

Background

- Land classified as Indian Reserve is not included within the land base of the TSA. Currently, there are 37 Indian Reserves within the Okanagan Shuswap Forest District, which collectively comprise approximately 65 826 hectares.

Dataset

Title	Indian Reserves - National Framework Canada Lands Administrative Boundaries Level 1
Data file description	Provide the administrative boundaries (exterior limits) of Canada Lands which includes Indian Reserves, Cree-Naskapi Category 1A and 1A-N Lands, Yukon First Nations Settlement Lands, Kanesatake Mohawk Interim Land Base, National Parks, National Park Reserves, National Marine Conservation Areas and Aboriginal Land Claims Settlement Areas. More specific information related to each administrative boundary can be found in the Entity and Attribute section. Administrative boundaries were compiled from Legal Surveys Division's cadastral datasets and survey records archived in the Canada Lands Survey Records.
Feature type name	WHSE_ADMIN_BOUNDARIES.CLAB_INDIAN_RESERVES
Data custodian	CDNGOV Natural Resources Canada
Date of data	2005-02-03 (publication)
System	LRDW
Unique identifier	5050

2. Inventory and Data Layers

Title	Indian Reserves - National Framework Canada Lands Administrative Boundaries Level 1
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=33890&recordSet=ISO19115

2.1.11.2 Community forest agreements and woodlots

Introduction

This dataset identifies community forest agreements and woodlots for the Okanagan Timber Supply Area (TSA).

Background

- Community Forest Agreements (CFAs) are not included within the land base of the TSA. Currently, there are three CFAs within the Okanagan Shuswap Forest District, which collectively comprise approx 73 567 hectares, with a collective annual allowable cut (AAC) of approximately 106 500 cubic metres per year.

Table 11. Two new CFAs have been awarded since TSR 3

CFA name	Area (hectares)	Volume (cubic metres per year)
Keremeos/LSIB	26 800	20 000
Cherryridge (Cherryville)	1071	1500

The Westbank First Nation CFA was the only one of the three that was issued prior to the last TSR. Both the Village of Keremeos/Lower Similkameen Indian Band (LSIB) CFA and the Cherry Ridge Management Committee (CRMC) CFA were issued after the last TSR.

In 2005, the Regional Executive Director made an apportionment decision that allocated an additional 60 000 cubic metres to smaller area based tenures as part of the Bill 28 take back. Of this, approximately 40 000 cubic metres was to be allocated to additional CFAs within the Okanagan TSA. There is one CFA that is yet to be awarded using the outstanding volume. The Village of Lumby and the Okanagan Indian Band has been invited to apply for this CFA. It is expected that this CFA totalling an AAC of approximately 20 000 cubic metres per year will be issued within the coming years. This “future” CFA has not been accounted for in the land base inventory in this analysis.

2. Inventory and Data Layers

Dataset

Title	Forest tenure managed licence
Data file description	This is a spatial layer showing Ministry of Forests and Range managed licences. These are Community Forest Schedule A and B, Woodlot License Schedule A and B. The Forest Tenures Section (FTS) is responsible for the creation and maintenance of digital Forest Atlas files for the province of British Columbia encompassing Forests and Range.
Feature type name	WHSE_FOREST_TENURE.FTEN_MANAGED_LICENCE_POLY_S VW
Data custodian	BCGOV FOR Resource Tenures and Engineering (RTEB)
Date of data	2008-01-15 (creation)
System	LRDW
Unique identifier	10394
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=51020&recordSet=ISO19115

Attribute information

Attribute	Value	Description
Map_Label	K1P A Schedule B	Community forest
	W1821 A Schedule_B	Woodlot

2.1.12 Existing roads and trails

Introduction

This dataset containing road location and road class information for the Okanagan TSA is really two separate datasets.

The first contains the non forest service roads and highways throughout the TSA and the second is the forest service roads and road permits.

Background

These two datasets include highways, streets, rural roads, and resource roads compiled at a scale of 1:20,000.

The roads are classified into four classes: main, operational, spur, and trail. It is recognized that further work is desirable to check and refine these categories, but this data is currently the best available.

An up-to-date road coverage was obtained and all roads were buffered by a width dependent on road type.

2. Inventory and Data Layers

Table 12. Roads and trails buffer width

Feature	Buffer width (metres)
Highways	15
Local road	10
Forest roads	10
Trails	5

Additional to the spatial road reductions described above, an aspatial reduction of 0.58% was applied to account for the loss of productive forest due to in-block roads.

Status

The roads compilation was completed in April 2009 based upon the best available information and includes the sources listed and manual digitization of 2004 and 2005 orthophotography.

Dataset 1

Source data file name	WHSE_BASEMAPPING.DRA_DIGITAL_ROAD_ATLAS_LINE_SP (Digital Road Atlas)
Title	DRA M-PAR
Data file description	The layer contains partially attributed road data (PAR) for the named roads from the Digital Road Atlas (DRA), with data up to April 2007. For information on the fully attributed and up-to-date DRA data, please visit http://ilmbwww.gov.bc.ca/bmgs/products/mapdata/digital_road_atlas_products.htm
	Data Custodian Organization: Base Mapping and Geomatic Services Branch(ILMB)
Data custodian	BCGOV AL ILMB Crown Registry and Geographic Base Branch
Date of data	2007-04-01 (revision)
System	LRDW
Unique identifier	8754
Product type	Feature type
Resource type	Data
Resource storage location	LRDW Data Store - Source from Shapefile (DRA data delivery)
Storage format	SDE/Oracle
Link to metadata (if available)	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=45674&recordSet=ISO19115
Changes since TSR 3	Updates

2. Inventory and Data Layers

Attribute information

Attribute	Value	Description
Road class	Highway	Provincial highways
	Local	Local road

Dataset 2

Source data file name	WHSE_FOREST_TENURE.FTEN_ROAD_LINES
Title	Forest Tenure Toad Section Lines
Data file description	This is a spatial layer that reflects operational activities for road sections contained within a road permit. The Forest Tenures Section (FTS) is responsible for the creation and maintenance of digital Forest Atlas files for the province of British Columbia encompassing Forest and Range Act Tenures. It also supports the forest resources programs delivered by MFR. Each feature contains a Ministry of Forests and Range (MFR) FEATURE_CLASS_SKEY (number) column that further defines the type of that feature. The layer contains the center line of the permit boundary for the following feature classes: Forest Service Road (FSR) (558), Road Permit (767), and Special Use Permit – Roads (783). Each road section has a life cycle status that is either PENDING – the road section has been submitted as a new road section or an amendment, but is not yet approved or rejected, ACTIVE – the road section is approved and activities may be taking place on the road section, or RETIRED - all activities
Data custodian	BCGOV FOR Resource Tenures and Engineering (RTEB)
Date of data	2007-06-27 (creation)
System	LRDW
Unique identifier	9790
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to metadata (if available)	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=50818&recordSet=ISO19115
Changes since TSR 3	Updates

2. Inventory and Data Layers

Attribute information

Attribute	Value
File type description	Forest Service Road Road permit Special Use Permit, Forest Special Use Permit, Non-Forest

2.1.13 Railways and transmission lines

Introduction

This dataset identifies railway, transmission line and pipeline rights-of-way within the Okanagan TSA.

Background

Utility and transportation lines including railway, transmission line and pipeline rights-of-way have corridor widths that are excluded from harvesting.

An up-to-date coverage was obtained and all railways and transmission lines were modelled with a 10 metre wide buffer.

Dataset

Source data file name	WHSE_BASEMAPPING.TRIM_CULTURAL_LINES
Title	TRIM Cultural Lines
Data file description	Cultural man made features. The TRIM program produces digital maps, which is a collection of coverages to conform with the BC Geographic System layout. TRIM mapping consists of 7,027 mapsheets covering the province of British Columbia at a scale of 1:20,000.
Data custodian	BCGOV ILMB Crown Registry and Geographic Base Branch
Date of cata	2003-02-06 (creation)
System	LRDW
Unique identifier	9790
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to metadata (if available)	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=4095&recordSet=ISO19115
Changes since TSR 3	Updates

2. Inventory and Data Layers

Attribute information

Attribute	Value	Description
FCODE	EA16400120	Transmission lines
	EA21400000	Pipelines
	DE22850000	Rail line (double track)
	DE22950000	Rail line (single track)

2.1.14 Slope

Introduction

This dataset identifies percent slope for the Okanagan TSA.

Background

Slope is used in managing and modelling resources such as visual polygons and terrain stability, for identifying land base features and for categorizing other data when it is related to slope.

Source

There are three separate datasets, each one covering an area equivalent to the former district boundaries for the Penticton, Vernon and Salmon Arm Forest Districts.

These datasets were created using TRIM II elevation data points and breaklines.

Dataset – area formerly known as Penticton Forest District

Source layer name	dpe slope% polygon
Data file description	Slope categories based on TRIM II elevation data points
Data custodian	BCGOV ILMB Crown Registry and Geographic Base Branch
Date of data	September 2001
Data type	Coverage feature class
Location	BC MFR server MARBLE \\for\rsi\dos\library\gis\data\srm_rdw\base\sea\tslp_dpe
Feature class	Polygon

2. Inventory and Data Layers

Dataset – area formerly known as Vernon Forest District

Source layer name	dve slope% polygon
Data file description	Slope categories based on TRIM II elevation data points
Data custodian	BCGOV ILMB Crown Registry and Geographic Base Branch
Date of data	September 2001
Data type	Coverage feature class
Location	BC MFR server MARBLE \\for\rsi\dos\library\gis\data\srm_rdw\base\sea\tslp_dve
Feature class	Polygon

Dataset – area formerly known as Salmon Arm Forest District

Source layer name	dsa slope% polygon
Data file description	Slope categories based on TRIM II elevation data points.
Data custodian	BCGOV ILMB Crown Registry and Geographic Base Branch
Date of data	September 2001
Data type	Coverage Feature Class
Location	BC MFR server MARBLE \\for\rsi\dos\library\gis\data\srm_rdw\base\sea\tslp_dsa
Feature class	Polygon

Combined, these three data sets cover the entire Okanagan Shuswap Forest District.

Attribute information

Attribute	Value	Description
Slope-Code	5	0-5% slope
	30	6-30% slope
	90	46-90% slope
	120	91-120% slope
	999	>120% slope

2. Inventory and Data Layers

2.1.15 Riparian

Riparian areas occur next to the banks of streams, lakes, and wetlands and include both the area dominated by continuous high moisture content and the adjacent upland vegetation that exerts an influence on it. Riparian ecosystems contain many of the highest value non-timber resources in the natural forest. Streamside vegetation protects water quality and provides a "green zone" of vegetation that stabilizes stream banks, regulates stream temperatures, and provides a continual source of woody debris to the stream. The majority of fish food organisms come from overhanging vegetation and bordering trees, while leaves and twigs that fall into streams are the primary nutrient source that drives aquatic ecosystems. Riparian areas frequently contain the highest number of plant and animal species found in forests and provide critical habitats, home ranges, and travel corridors for wildlife. Biologically diverse, these areas maintain ecological linkages throughout the forest landscape, connecting hillsides to streams and upper headwaters to lower valley bottoms. There are no other landscape features within the natural forest that provide the natural linkages of riparian areas.

Under FRPA riparian zones must be preserved to maintain habitat, biodiversity, bank stability as well as integrity of watersheds. In most cases, trees within a riparian reserve zone (RRZ) must not be cut or removed and within riparian management areas (RMA) a portion of the basal area of trees is maintained.

2.1.15.1 Streams

Introduction

Although there is some data available which assigns a classification to specific portions of specific streams there is no single dataset which provides a stream class for each stream within the TSA.

The OSLRMP also identified a budget of 9300 hectares within the TSA's THLB as enhanced riparian reserve.

Background

A stream reach is a relatively homogeneous section of a stream having a sequence of repeating structural characteristics (or processes) and fish habitat types. The key physical factors used to determine reaches in the field are channel pattern, channel confinement, gradient, and streambed and bank materials. Stream reaches generally show uniformity in these characteristics and in discharge.

At this time there is not a data base that identifies a stream class for each stream reach within the Okanagan TSA. Instead of a specific riparian buffer for each stream class a weighted average riparian buffer width across all streams was calculated for the Okanagan TSA based on an assessment of stream class distribution by Wild Stone Resources. This average reserve width of 12.4 metres was applied to each side of all streams identified in the Okanagan TSA timber supply review file (TRIM based streams).

Enhanced riparian reserves are to be modelled by determining the ratio of enhanced riparian reserve to the entire THLB and reducing each THLB polygon proportionately to account for the 9300 hectares.

2. Inventory and Data Layers

Table 13. Stream buffer width

Within a community watershed or fish bearing		Not within a community watershed or fish bearing	
Stream width (metres)	Stream class	Average channel width (metres)	Stream class
>20	S1	>3	S5
>5-20	S2	<= 3	S6
1.5-5	S3		
<1.5	S4		

2.1.15.2 Lakes

Introduction

This dataset represents lake classification information for Okanagan TSA, which guides the requirement for Riparian Management Zone designations.

Background

Lake classifications are primarily determined by:

- lake size
- biogeoclimatic unit in which they occur.

Table 14. Lake based riparian management areas buffer width

Feature size and BEC	Class	Riparian Guidebook reserve width (metres)	Riparian Guidebook management zone width (metres)	Per cent (%) retention	Modelled reserve width (metres)
> 5 hectares	L1	10	0	0	10
1-5 hectares BG, PP, IDFxh, xw, xm	L2	10	20	25	15
1-5 hectares not in above BEC	L3	0	30	25	7.5
0.25-1 hectares BG, PP, IDFxh, xw, xm	L4	0	30	25	7.5

Source

This information is to be based on TRIM lake features and biogeoclimatic information to determine and apply riparian buffer.

2. Inventory and Data Layers

2.1.15.3 Wetlands

A wetland is a swamp, marsh, or similar area that supports natural vegetation that is distinct from the adjacent upland areas. More specifically, a wetland is an area where a water table is at, near, or above the surface or where soils are water-saturated for a sufficient length of time that excess water and resulting low oxygen levels are principal determinants of vegetation and soil development.

Riparian classification is based on:

- whether the wetland is a simple wetland or wetland complex;
- wetland size;
- biogeoclimatic unit in which the wetland occurs.

The *Riparian Management Area Guidebook* defines the riparian reserves and the riparian management zones widths for different classes of streams, lakes and wetlands. These specifications are also listed in the Operational Planning Regulation. As individual lakes and wetlands were classified using a GIS process to determine their size and the biogeoclimatic zone in which they occur, the base case data file included spatial information for each of these reserve zones.

Table 15. Wetlands-based riparian management areas buffer width

Feature size and BEC	Class	Riparian Guidebook reserve width (m)	Riparian Guidebook management zone width (m)	Percent (%) retention	Modelled reserve width (m)
Wetland complex	W5	10	40	25	20
> 5 hectares	W1	10	40	25	20
1-5 hectares BG, PP, IDFxh, xw, xm	W2	10	20	25	15
1-5 hectares	W3	0	30	25	7.5
0.25-1 hectares BG, PP, IDFxh, xw, xm	W4	0	30	25	7.5

Source

This information is to be based on TRIM lake features and biogeoclimatic information to determine and apply riparian buffer.

2.1.16 Environmentally sensitive areas (forest regeneration)

Introduction

This dataset identifies environmentally sensitive areas (ESA) for the Okanagan TSA.

Background

Within the forest inventory there are forest lands identified and delineated as environmentally sensitive for such reasons as soils, avalanche, wildlife, recreation and forest regeneration problems.

For this analysis only those areas classified as having forest regeneration problems and labelled as Ep are considered. All other environmentally sensitive classifications are ignored for this TSR as other information is available and is considered to be of superior quality.

2. Inventory and Data Layers

Polygons designated as having forest regeneration problems are 100% netted out of the timber harvesting land base.

Source

This dataset is a product of the forest cover inventory.

Attribute information

Attribute	Value	Description
ESA_1 (high)	P	Forest regeneration
ESA_2 (moderate)	P	Forest regeneration

2.1.17 Terrain stability mapping

Introduction

This dataset identifies detailed and overview terrain stability mapping for the Okanagan TSA.

Background

Terrain stability mapping is conducted to assess the likelihood of mass movement of soil (landslides). This is of particular importance to road construction. Harvesting of trees does not usually affect stability, but roads often do.

Steep slopes and non-cohesive soils are most susceptible to mass movement, which is often triggered by water. Concentration of water drainage onto an unstable slope is a common cause of landslides.

Terrain stability mapping is used to minimize road construction on or above unstable terrain, and to trigger more detailed Terrain Stability Field Assessments and road designs for those areas that cannot be avoided.

Those areas with a Slope Stability Class (attribute SLPSTB_CLS) of 5 are netted out of the timber harvesting land base due to their high level of instability. All other classes are eligible for inclusion in the THLB.

Source

This dataset was created by Timberline Forest Inventory Consultants from individual project files in varying data formats. Individual project information merged into forest district extent datasets.

This dataset reflects the detailed and overview terrain stability mapping that has been completed for the TSA.

2. Inventory and Data Layers

Source dataset

Source data file name	Terrain stability mapping project Okanagan TSA
Title	/whse/kam/arclib/geology/terrstab/ttsm_tok
Data file description	Terrain stability mapping coverage for the Okanagan TSA
Feature type name	REG_LAND_AND_NATURAL_RESOURCE.TERRAIN_STABILITY_TOK_POLY
Data custodian	BCGOV EMPR Geosciences, Research and Development Branch
Date of data	2001-10-01 (publication)
System	Arc catalogue
Unique identifier	ArcCatalog_{3C3FAF8E-8E68-4B74-8157-11AD163D2E48}
Product type	Feature type
Resource type	Data
Resource storage location	Operational data store
Storage format	ArInfo coverage
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=37650&recordSet=ISO19115
Changes since TSR 3	Not used in TSR 3

(when in Arc, map a network drive to \\giswhse.env.gov.bc.ca\whse_np)

2. Inventory and Data Layers

Attribute information

Attribute	Value	Description	Mapping type
slpstb_cls	1	Nil	Detailed or level "B"
	2	Low instability	
	3	Moderate instability	
	4	High instability	
	5	Very high instability	
S	S	Stable. There is a negligible to low likelihood of landslide initiation following timber harvesting or road construction.	Overview or level "D"
	P	Potentially unstable. Expected to contain areas with a moderate likelihood of landslide initiation following timber harvesting or road construction.	
	U	Unstable. Natural landslide scars present. Expected to contain areas where there is a high likelihood of landslide initiation following timber harvesting or road construction.	

2.1.18 Visual management

Introduction

The visual landscape inventory identifies and delineates areas of visual sensitivity near communities and along travel corridors throughout the province. It includes information about the visual condition, characteristics and sensitivity to alteration. This data set identifies individual scenic areas by assigned visual quality objectives (VQO).

Also identified in the database table for these zones are the existing visual condition (EVC), visual absorption capability (VAC), biophysical rating (BR), viewing condition (VC), viewer rating (VR), and visual sensitivity class (VSC).

Background

Visual quality objectives (VQOs) are established to specify limits of acceptable visual change based on visual sensitivity, number of viewers, level of concern or user expectations and other amenity values.

Four levels of VQOs, as described below, are managed in the Okanagan TSA:

Sec 1.1 (FPPR) "For the purposes of paragraph (c) of the definition of "altered forest landscape" in section 1, the following categories are prescribed, each according to the extent of alteration resulting from the size, shape and location of cutblocks and roads:

- (a) **preservation:** *consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint, is*
 - (i) *very small in scale, and*
 - (ii) *not easily distinguishable from the pre-harvest landscape;*
- (b) **retention:** *consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint, is*

2. Inventory and Data Layers

- (i) difficult to see, (ii) small in scale, and (iii) natural in appearance;*
- (c) **partial retention:** *consisting of an altered forest landscape in which the alteration, when assessed from a significant viewpoint, is*
 - (i) easy to see, (ii) small to medium in scale, and (iii) natural and not rectilinear or geometric in shape;*
- (d) **modification:** *consisting of an altered forest landscape in which the alteration, when assessed from a significant public viewpoint,*
 - (i) is very easy to see, and (ii) is (A) large in scale and natural in its appearance, or (B) small to medium in scale but with some angular characteristics.*

Prior to the LRMP there were four visual zones that made up the landscape zone as defined in the *Okanagan Timber Harvesting Guidelines*. The visual zones were managed as scenic areas with visual quality objectives.

The LRMP classified the plan area into three visual landscape management zones based on the relative visual importance of the zone and type of use within the zones. The LRMP approval in January 2001 provided direction for scenic areas and visual quality objectives to be established.

Status

On October 1st, 2001 the Vernon, Salmon Arm and Penticton Forest District managers made it known to the licensees that the zone 1 visual zone was a “scenic area” with established visual quality objectives.

Zone 2 was to be a non-scenic area with no visual quality objectives. Zone 3 required visual management in the foreground for recreational use. (e.g. trails).

A few additional areas have been mapped along the highway 97 corridor and some additional upland lakes have been mapped in the old Vernon Forest District. Most of the area mapped along the corridor is either on private land or in the lower valley with minimal timber impacts. Many of the lakes that were completed for visual impact assessment (VIA) are outside the THLB.

These areas will require a GAR order, to complete the process, which will not be completed prior to the final analysis.

There are some additional areas that still require mapping however these likely will only have a slight if any impact on the long-term timber supply.

Due to the pine dominated stands in the scenic areas a higher level of disturbance is to be allowed to deal with the MPB.

2. Inventory and Data Layers

Table 16. Forest cover requirements for visually sensitive areas

Visual quality objective	Visual absorption capability	LRMP % visible alteration	LRMP VEG height (m)
P	L	5.0	5.0
P	M	7.5	4.0
P	H	10.0	3.0
R	L	10.0	5.0
R	M	15.0	4.0
R	H	20.0	3.0
PR	L	15.0	5.0
PR	M	25.0	4.0
PR	H	25.0	3.0
M	L	25.0	5.0
M	M	30.0	4.0
M	H	35.0	3.0

Visual policies may be adjusted to provide flexibility for addressing the MPB scenarios. In discussions prior to this analysis it was agreed that the VQO zones could increase one class (i.e. retention becomes partial retention) if the area of PI leading stands warranted this change.

2. Inventory and Data Layers

Source dataset

Source data file name	Recreational visual landscape inventory
Title	REC
Data file description	The VLI identifies and delineates areas of visual sensitivity near communities and along travel corridors throughout the province. It includes information about the visual condition, characteristics and sensitivity to alteration.
Feature type name	WHSE_FOREST_VEGETATION.REC_VISUAL_LANDSCAPE_INVENTORY
Data custodian	BCGOV FOR Forest Practices Branch
Date of data	2004-01-15 (creation)
System	LRDW
Unique identifier	1940
Product type	Feature type
Resource type	Data
Resource storage location	LRDW data store
Storage format	SDE/Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=37650&recordSet=ISO19115

2. Inventory and Data Layers

Attribute information

Attribute	Value	Description
REC_RVQC_C	p	Preservation
	r	Retention
	pr	Partial retention
	m	Modification
RATIONALE	Free-hand update - Peter R., FRPA 181: DM 01 October 2001, Zone = 1	Zone 1
	FRPA 181: DM 01 October 2001, ZONE = 1	Zone 1
	FRPA 181: DM 30 December 2003, Cor_vqo = M	Zone 1
	FRPA 181: DM 30 December 2003, Cor_vqo = PR	Zone 1
	FRPA 181: DM 30 December 2003, Lks_vqo = PR	Zone 1
	FRPA 181: DM 30 December 2003, Lks_vqo = PR ,Cor_vqo = ,PR	Zone 1
	FRPA 181: DM 30 December 2003, Lks_vqo = R	Zone 1
	Gail S. via Peter R., FRPA 181: DM 01 October 2001, ZONE = 1	Zone 1
	HWY97C Gorman reinv 2000 -GMS & Roger V., FRPA 181: DM 01 October 2001, Zone = 1	Zone 1
	PENTICTON DISTRICT POLYGON, FRPA 181: DM 01 October 2001, Zone = 1	Zone 1
PENTICTON DISTRICT POLYGON, FRPA 181: DM 01 OCTOBER 2001. ZONE = 1	Zone 1	
All other values	Not Zone 1	

2.1.19 Timber licence reversions

Introduction

This dataset identifies all timber licences (TLs) within the Okanagan TSA.

Background

Timber licence areas are an old form of tenure that gives licensees the exclusive rights to harvest timber within that area. These areas do not contribute to the timber supply for the TSA until after the licensee has harvested the stand.

Once harvested, the area is included in timber supply modelling for the TSA and contributes to future timber supply.

The method of dealing with this in the timber supply analysis is to assume an even annual harvest rate for the remaining unharvested TLs with all TLs to be harvested by the end of 2027. The ages of these stands are reset at the start of the analysis to fulfill this harvest rate.

2. Inventory and Data Layers

Source dataset

Source data file name	Forest tenure timber licence
Title	TL
Data file description	A spatial representation of the map blocks for timber licences
Feature type name	WHSE_FOREST_TENURE.FTEN_TIMBER_LICENCE_POLY_SV W
Data custodian	BCGOV FOR Resource Tenures and Engineering (RTEB)
Date of data	2008-01-15 (creation)
System	LRDW
Unique identifier	10422
Product type	Feature Type
Resource type	Data
Resource storage location	LRDW Data Store
Storage format	SDE/Oracle
Link to meta data	https://apps.gov.bc.ca/pub/geometadata/metadataDetail.do?recordUID=51940&recordSet=ISO19115
Changes since TSR 3	Depletions

Modelling consideration

The method of dealing with this in the timber supply analysis is to assume an even annual harvest rate with all THLB within the timber licenses harvested by the end of year 2027, based on MFR direction.

2.2 Other Data

2.2.1 Silviculture records

Introduction

The **RE**porting **S**ilviculture **U**pdates and **L**and Status **T**racking **S**ystem (RESULTS) information system tracks and reports on silviculture activities from harvest to free-growing.

Data on the harvest method and regeneration characteristics of openings were extracted from the data base to provide a base for the volume projection of managed stands.

Background

The RESULTS information system is a business tool of the MFR used to capture and report on silviculture activities. It replaced the Integrated Silviculture Information System (ISIS).

Information on RESULTS can be found at

https://psc2.for.gov.bc.ca/RESULTS/HELP/index.htm#Results_Online_Help/Welcome_to_RESULTS/WR>Welcome_to_Results.htm or <http://www.for.gov.bc.ca/his/results/>.

2. Inventory and Data Layers

Status

The dataset is regularly updated.

2.2.2 Non-forest, non-productive forest, and non-typed

Overview

This category includes areas covered by such things as sparse alpine forest, ice, swamps, water, and rock

Legislation

The chief forester must make an AAC determination according to Section 8 of the *Forest Act* on Crown lands administered by the MFR and available for harvest.

Current practice

It is unlikely harvest would occur within areas identified except where areas are mistyped.

Future considerations

N/A.

Modelling considerations

Non-forest and non-productive forest classifications such as water, rock, non-productive brush and non-commercial, do not contribute to the THLB or other management objectives. Stands that are not sufficiently restocked (NSR) are included in the THLB. Indicators of the presence of a productive forest including the British Columbia Land Cover Classification Scheme, site index, a history of harvesting and other VRI attributes are used to classify the land base as productive forest, non-forest or non-productive forest.

2.2.3 Future roads, trails and landings

Overview

All future harvesting will be accompanied by the construction of new roads, trails and landings in order to facilitate the harvesting process. Some of these will occupy land which is currently considered part of the timber harvesting land base. This land will not be available for future forest growth and yield.

Modelling considerations

When a polygon is harvested in the future the area will be reduced spatially by 4.9% after harvest to reflect the impact due to future roads trails and landings. This applies only to those stands currently greater than or equal to 50 years of age.

2. Inventory and Data Layers

2.2.4 Mountain Pine Beetle

Overview

The current Mountain Pine Beetle (MPB) attack is an epidemic and its impact on timber supply will be modeled in the analysis. The results of the most recent provincial MPB infestation model, BCMPB.v6, will be incorporated into the analysis dataset. BCMPB.v6 keeps track of past attack since 1999 and projects future attack for stands that are 60 years of age or older. MPB attack on stands younger than 60 years has been observed in some areas in the province but will not be modelled in this analysis.

Modelling considerations

Due to the uncertainty of sawlog shelf-life for MPB attacked pine trees, a specific shelf-life will not be assumed in the analysis, but pine volume will be reported in the model according to its year of kill.

2.3 Economic factors

2.3.1 Low productivity sites

Introduction

- This dataset covers those areas that meet the criteria for low productivity sites.

Background

- Forested sites may be considered as low productivity due to a number of inherent site factors such as poor nutrient availability, exposure to hot microclimates, or excessive amounts of moisture or stand factors such as non-commercial species). Site productivity is measured as site index.
- Sites with a low site index are not considered available for harvesting and are excluded from the timber harvesting land base.
- Although licensees may not discreetly utilize a site index value to identify sites to avoid, they do stay away from these sites due to the poorer nature of stands found here.
- Table 17 lists the low sites considered as representing current practice by licensees and district staff. The model will utilize site index to identify these sites.

Table 17. Description of sites with low timber growing potential

Analysis unit	Lead species	SI limit (m @ 50 years)	Percent (%) excluded
101-107	Fir	< 8.5	100
108-113	Cedar	< 9	100
114-119	Hemlock	< 8	100
120-125	Balsam	< 8	100
126-131	Spruce	< 7.5	100
132-137	Lodgepole pine	< 7.5	100
138-140	Larch	<6.5	100
141	White pine	<8	100
142	Yellow pine	<7	100

2. Inventory and Data Layers

2.3.2 Problem forest types

Introduction

This dataset covers those areas that meet the criteria problem forest types.

Background

Problem forest types are physically operable stands that exceed low site criteria but are not currently utilized or have marginal merchantability.

Deciduous stands are those that are deciduous-leading (species 1 in the VRI is equal to one of: AC, AT, DG, DR, E, EP or MB). Non-merchantable stands are those not expected to reach merchantable height or volume.

The definitions for non-merchantable forest types are shown below in Table 18.

As in other land base reductions, previously harvested stands were not considered in this land base removal and stands that fulfilled the criteria were removed 100% from the THLB.

Table 18. Deciduous and non-merchantable criteria

PFT #	Leading species	SI	Volume (m ³ /ha)	Height (metres)	Age (years)
Decid	Deciduous	-	-	-	-
1	Non-Douglas-fir	10-13	< 100		
2	All species except	-	-	<= 19.4	>= 101
3	Hemlock leading	-	-	-	>=141
4	Pine	-	< 100	-	>=100-
5	Pine	-	-	<= 18.5	>= 81
6	Pine	-	-	<= 12.7	61-80
7	Pine	-	-	<= 9.5	41-60
8	Pine	-	-	<= 5.0	21-40

Modelling considerations

In the analysis the resultant area reductions will be fully (100%) excluded from the THLB, however, potential upward pressure on the THLB due to some of these areas contributing may be considered.

2.4 Non-Timber Management Factors

2.4.1 Integrated resources management zones

Overview

Cutblock adjacency (i.e., green-up) requirements are used to address a variety of issues (e.g., hydrology, visuals) and mimic the observed current harvest pass. Rules for cutblock adjacency are described in the FPPR.

In the Okanagan TSA green-up in the IRM zone had traditionally been set at three metres and modelled with a maximum of 30% disturbance however the Okanagan-Shuswap LRMP identified a reduced green-up height (two metres) for silviculture (i.e., IRM) purposes.

Cutblock adjacency will be modelled with a maximum disturbance of 30% with green-up height of two metres by landscape unit, NDT and BEC.

2. Inventory and Data Layers

2.4.2 Stand-level biodiversity — wildlife tree retention

Overview

Under the FPC, guidance on stand structure retention was provided in the *Biodiversity Guidebook* and through direction from the district manager. Under FRPA, the objective for stand-level biodiversity is simply “to retain wildlife trees” as stated in FPPR (Sec 9.1). Licensees must state how they will meet the objective for stand-level biodiversity in the FSP.

For the purposes of this discussion OGMAs are excluded from the THLB. Also the enhanced riparian reserves were deducted from the WTP summaries used from BCTS and Tolko.

- Wildlife tree retention is the primary tool for stand-level biodiversity management under the *Landscape Unit Planning Guide*. Wildlife tree patches are the primary tool used by the major licensees to maintain structural elements over time.
- The policy under the *Okanagan Timber Harvesting Guidelines* was to leave nine percent of stands for wildlife tree retention.
- The recommendation under the LRMP was to leave wildlife tree patches consistent with the policy found in Table A3.2 of the *Landscape Unit Planning Guide*.
- The updated WTP retention report for the Okanagan TSA shows an overall target average wildlife tree retention percent by landscape unit and BEC subzone of 6.45%. (March 27, 2007). WTP Reports will be revised once changes are made to the higher elevation BEC's due to the Caribou deferrals.

Modelling considerations

- Information regarding WTP retention levels was provided by major licensees in the Okanagan TSA with a combined harvest level exceeding 75% of the replaceable forest licence volume.
- Based on the information provided by the licensees, the value for stand-level biodiversity should be 10% of the volume residing on the timber harvesting land base.

3. Analysis and Modelling Procedures

3.1 Timber supply model

- All analyses for this timber supply review will be undertaken using Woodstock, a forest estate model developed by Remsoft Inc. in New Brunswick. Like other forest estate models, such as MFR's FSSIM, Woodstock is capable of incorporating land base inventory, growth and yield and cover constraints and projects timber supply. Woodstock can perform sequential simulation and optimization as well if linked to a linear programming solver.

4. Regeneration and Growth and Yield

4.1 General considerations

- Stand level estimates of timber volume over time are required for modelling timber supply. These estimates require an understanding of the current and future stand condition and the subsequent growth and yield. In this section, the regeneration of stands upon harvest is discussed and the modelling of growth and yield. Forest inventory is discussed in a separate section.

4.2 Regeneration

Current practice

Major licensees and timber sales managers are required to establish a free-growing stand (or retain a stocked stand) on harvested areas under the FRPA. The applicable stocking standards must be noted within approved FSPs.

Further information regarding current stocking standards, and the species mix of planted stands can be found in Section 4.4.3, “Managed stands analysis units and yields”.

4.3 Genetic gain

Current practice

FRPA requires use of Class “A” seed from tree improvement programs where it exists. The analysis utilized the most current genetic gain information available from the MFR Research Branch and the Forest Genetics Council. All genetic gains are geo-referenced based on MFR provincial seed planning zones (SPZ) and SPUs.

Licensees and MFR do utilize Class A seed when available however there are not adequate supplies of select seed for various species currently being planted within the TSA.

Modelling

Genetic gain estimates are used directly within the model TIPSy to project improved yield estimates. Within the model TIPSy the genetic gain estimate is applied to all trees within a stand.

Not all of the trees planted within the TSA are from genetically improved stock. As such consideration must be given for the differences in gains. For the current analysis, a TSA wide average genetic gain was developed for each species.

Short-term genetic gain will be incorporated in the base case for this analysis. If projected increases in genetic gain are realized future timber supply may increase.

Table 19. Genetic gain and select seed use

Species	5 year average – genetic gain	5 year average – % select seed used	5 year average – net GW by spp
Fdi	16.4	4.7	0.8
Pli	6.6	31.1	2.1
Sx	9.4	84.7	8.0

4. Regeneration and Growth and Yield

4.4 Growth and yield modelling

Models

VDYP provides projections for existing stands based on vegetation inventory descriptions. VDYP is a MFR empirical yield model. It is intended for use in unmanaged, natural stands of pure or mixed-species composition. VDYP use is transitioning to a recent upgrade, VDYP7, from its current version VDYP6. See <http://www.for.gov.bc.ca/hts/vdyp/index.html> for further information on VDYP. As input for VDYP, specific forest cover inventory information is required.

TIPSY is a growth and yield program that provides managed stand yield tables for a specific site, species, and management regime. TIPSY interpolates tables generated by another growth and yield model TASS and an associated model SYLVER that looks at wood quality, products, and financial considerations. TIPSY is intended for use in managed even-aged stands for various coniferous and deciduous species growing in British Columbia. TIPSY and the underlying models were developed by the MFR Research Branch.

For further information on TIPSY see <http://www.for.gov.bc.ca/hre/gymodels/TIPSY/index.htm>. As input for TIPSY, a description of the initial stand conditions, including species composition, initial density, regeneration delay is required. Additionally, operational adjustment factors are required to modified the potential volumes projected by TIPSY to a volume level reflective of operational standards.

4.4.1 Natural stand analysis units and yields

Analysis units are aggregates of stands of similar characteristics and growth and yield responses. In order to precisely capture the value from each stand it is important to keep as much stand level information as possible, which in turn means that there is less opportunity for aggregation. For this analysis a balance was found by rounding certain stand-level attributes and then aggregating in cases where the rounded attributes were similar. The rounding and classification process involved:

- Finding the leading species;
- Rounding inventory site index to three separate classes which approximate the former classes of good, moderate and low;
- Harvest type: clearcut or partial harvest;
- Dry-belt or wet-belt;
- BEC zone; and
- After this classification process, stands with the same rounded site index, leading species, harvest type, BEC zone and dry/wet belt classification were grouped together in analysis units. Table 20 lists the natural stand analysis units.

4. Regeneration and Growth and Yield

Table 20. Natural stand analysis unit definitions

Analysis unit id	Analysis unit description	Lead Sp	Wet belt / dry belt	BEC	SI
101	Fir – Dry- Selection	F		PPxh1/PPxh2 IDFxh1/IDFxh2 IDFdk1/BGxh1	>8.4
102	Fir – Dry – Good	F	Dry	All	>18.5
103	Fir – Dry – Moderate	F	Dry	All	14.5-18.5
104	Fir – Dry - Low	F	Dry	All	8.5-14.4
105	Fir – Wet – Good	F	Wet	All	>18.5
106	Fir – Wet - Moderate	F	Wet	All	14.5-18.5
107	Fir – Wet - Low	F	Wet	All	8.5-14.4
108	Cedar – Dry – Good	C	Dry	All	>20.5
109	Cedar – Dry - Moderate	C	Dry	All	16-20.5
110	Cedar – Dry - Low	C	Dry	All	9-15.9
111	Cedar – Wet – Good	C	Wet	All	>20.5
112	Cedar – Wet - Moderate	C	Wet	All	16-20.5
113	Cedar – Wet - Low	C	Wet	All	9-15.9
114	Hemlock – Dry – Good	H	Dry	All	>19.5
115	Hemlock – Dry - Moderate	H	Dry	All	15-19.5
116	Hemlock – Dry - Low	H	Dry	All	8-14.9
117	Hemlock – Wet – Good	H	Wet	All	>19.5
118	Hemlock – Wet - Moderate	H	Wet	All	15-19.5
119	Hemlock – Wet - Low	H	Wet	All	8-14.9
120	Balsam – Dry – Good	B	Dry	All	>16.5
121	Balsam – Dry – Moderate	B	Dry	All	13-16.5
122	Balsam – Dry - Low	B	Dry	All	8-12.9
123	Balsam – Wet – Good	B	Wet	All	>16.5
124	Balsam – Wet - Moderate	B	Wet	All	13-16.5
125	Balsam – Wet - Low	B	Wet	All	8-12.9
126	Spruce – Dry – Good	S	Dry	All	>17
127	Spruce – Dry - Moderate	S	Dry	All	12.5-17
128	Spruce – Dry - Low	S	Dry	All	7.5-12.4
129	Spruce – Wet – Good	S	Wet	All	>17

4. Regeneration and Growth and Yield

Analysis unit id	Analysis unit description	Lead Sp	Wet belt / dry belt	BEC	SI
130	Spruce – Wet - Moderate	S	Wet	All	12.5-17
131	Spruce – Wet - Low	S	Wet	All	7.5-12.4
132	Lodgepole pine – Dry – Good	PI	Dry	All	>18
133	Lodgepole pine – Dry - Moderate	PI	Dry	All	13.5-18
134	Lodgepole pine – Dry - Low	PI	Dry	All	7.5-13.4
135	Lodgepole pine – Wet – Good	PI	Wet	All	>18
136	Lodgepole pine – Wet - Moderate	PI	Wet	All	13.5-18
137	Lodgepole pine – Wet - Low	PI	Wet	All	7.5-13.4
138	Larch - Good	L	All	All	>18
139	Larch – Moderate	L	All	All	13-18
140	Larch - Low	L	All	All	6.5-12.9
141	White Pine – All	Pw	All	All	>8
142	Yellow Pine – All	Py	All	All	>7

The site index estimates used depend on the data available for each strata.

- **Dry-belt:** Results from the Predictive Ecosystem Mapping (PEM) and SIBEC project conducted by the Okanagan Innovative Forest in 2002.
- **Wet-belt:** MFR’s site index biogeoclimatic ecological classification (SIBEC) system will be used to model the growth of managed stands in the wet-belt. For this analysis, the BEC site series was sourced from the MFR SIBEC website at: (<http://www.for.gov.bc.ca/hre/sibec/>).

4.4.2 Partially harvested natural analysis units

Partially harvested stands are those stands meeting the following criteria:

- Dry-belt;
- BEC: PPxh1/PPxh2/IDFxh1/IDFxh2/IDFdk1/BGxh1; and
- Douglas-fir leading.

These stands are classified as analysis unit 101. After a stand is harvested it is still classified as AU 101.

Partial harvesting is preferred for these stands due to their value as ungulate winter range.

It is assumed that these stands have 33% of their volume removed when harvesting occurs with a minimum return interval of 30 years.

It is assumed that they are regenerated back onto the same natural stand yield curve.

4. Regeneration and Growth and Yield

4.4.3 Managed stands analysis units and yields

Managed stands are found throughout the land base where an existing forest has been removed, usually by harvesting, and then re-established with the aid of human activity, usually planting. It is assumed that all stands less than 30 years of age are considered to be managed as there is sufficient forest activity history within the TSA to support this. Also note that all stands that are to be harvested in the future will be treated as managed stands.

Managed stand analysis units are groupings of forested polygons based on leading species, dry/wet-belt classification, age ranges and site index ranges. The groupings are listed in the table below.

Table 21. TIPSYS regeneration composition inputs for those stands not harvested to date

Natural analysis unit	Lead Sp	SI	Managed analysis unit	Sp1	%	Sp2	%	Sp3	%	SP4	%	OAF1	OAF2
101	F	>8.4	201	F	75	PI	25					15	10
102	F	>18.5	202	F	50	PI	30	S/B	10	C/H	10	15	10
103	F	14.5-	203	F	50	PI	30	S/B	10	C/H	10	15	10
104	F	8.5-	204	F	50	PI	30	F	50	PI	30	15	10
105	F	>18.5	205	F	50	PI	30	S/B	10	C/H	10	15	10
106	F	14.5-	206	F	50	PI	30	S/B	10	C/H	10	15	10
107	F	8.5-	207	F	50	PI	30	S/B	10	C/H	10	15	10
108	C	>20.5	208	F	50	S/B	20	PI	20	C/H	10	15	10
109	C	16-20.5	209	F	50	S/B	20	PI	20	C/H	10	15	10
110	C	9-15.9	210	F	50	S/B	20	PI	20	C/H	10	15	10
111	C	>20.5	211	F	50	S/B	20	PI	20	C/H	10	15	10
112	C	16-20.5	212	F	50	S/B	20	PI	20	C/H	10	15	10
113	C	9-15.9	213	F	50	S/B	20	PI	20	C/H	10	15	10
114	H	>19.5	214	F	50	S/B	20	PI	20	C/H	10	15	5
115	H	15-19.5	215	F	50	S/B	20	PI	20	C/H	10	15	5
116	H	8-14.9	216	F	50	S/B	20	PI	20	C/H	10	15	5
117	H	>19.5	217	F	50	S/B	20	PI	20	C/H	10	15	5
118	H	15-19.5	218	F	50	S/B	20	PI	20	C/H	10	15	5
119	H	8-14.9	219	F	50	S/B	20	PI	20	C/H	10	15	5
120	B	>16.5	220	S/B	90	PI	10					15	5
121	B	13-16.5	221	S/B	90	PI	10					15	5
122	B	8-12.9	222	S/B	90	PI	10					15	5
123	B	>16.5	223	S/B	90	PI	10					15	5
124	B	13-16.5	224	S/B	90	PI	10					15	5
125	B	8-12.9	225	S/B	90	PI	10					15	5
126	S	>17	226	S/B	90	PI	10					15	5
127	S	12.5-17	227	S/B	90	PI	10					15	5
128	S	7.5-	228	S/B	90	PI	10					15	5
129	S	>17	229	S/B	90	PI	10					15	5
130	S	12.5-17	230	S/B	90	PI	10					15	5

4. Regeneration and Growth and Yield

Natural analysis unit	Lead Sp	SI	Managed analysis unit	Sp1	%	Sp2	%	Sp3	%	SP4	%	OAF1	OAF2
131	S	7.5-	231	S/B	90	PI	10					15	5
132	PI	>18	232	PI	90	F	10					15	5
133	PI	13.5-18	233	PI	90	F	10					15	5
134	PI	7.5-	234	PI	90	F	10					15	5
135	PI	>18	235	PI	90	F	10					15	5
136	PI	13.5-18	236	PI	90	F	10					15	5
137	PI	7.5-	237	PI	90	F	10					15	5
138	L	>18	238	F	50	PI	30	S/B	10	C/H	10	15	5
139	L	13-18	239	F	50	PI	30	S/B	10	C/H	10	15	5
140	L	6.5-	240	F	50	PI	30	S/B	10	C/H	10	15	5
141	Pw	>8	241	F	50	PI	30	S/B	10	C/H	10	15	5
142	Py	>7	242	F	75	PI	25					15	5

Existing and future managed stand yields were developed using MFR BatchTIPSY (Version 4.1). The planted species composition and the operational adjustment factors used as input for TIPSY are provided in Table 21. All stands were modelled as planted regeneration method at 1,312 stems/hectare, which is the average over the last 11 years.

There continues to be much discussion regarding the potential impacts of root rot in fir-leading stands. In order to account for this, the standard OAF1 of 15 was used for all stands and an OAF2 of 5 was used for all non-fir-leading stands. For fir-leading stands, an OAF2 of 10 was used to represent additional volume losses.

5. Modelling Considerations

5.1 Minimum harvestable age

Overview

The minimum harvestable age (MHA) defines the earliest age at which stands will be available for harvest. It is based on an estimate of when a forest stand has reached a harvestable condition and has met minimum merchantability criteria. This is an age at which some stands may be harvested in order to meet timber supply needs.

Current practice

In TSR 3 (and TSR 2), the minimum harvestable age was set at 80 years for lodgepole pine-leading and 100 years for all other species. The chief forester noted concerns that fixed minimum harvestable ages do not consider differences in productivity between sites. He requested the consideration of refining criteria used to establish MHA for the next determination.

Currently, most stands are not being harvested until well past the threshold of MHA due to other constraints. In lodgepole pine stands affected by mountain pine beetle, the volume per hectare is a more important consideration for merchantability than stand age.

Future considerations

Any minimum harvest threshold will vary depending on economic considerations, and these are very difficult to predict.

Modelling considerations

Most current TSRs are modelling MHA based on a combination of when an analysis unit (on average) reaches its cumulative mean annual increment (CMAI) and a minimum volume per hectare of the analysis unit. The Okanagan Silviculture Type 2 analysis set the MHA as the age at which a stand reaches 90% of the CMAI, provided a minimum volume of 150m³/ha is achieved. The Merritt TSR 4 is using this same assumption, while Kootenay Lake used 95% of CMAI with a minimum volume of 100 cubic metres per hectare. Neither Kootenay Lake or Quesnel are using CMAI: they are using minimum volume per hectare, or a combination of volume, height, and diameter to determine MHA.

Based on current practice and licensee input to date, it is recommended that the modelling assumptions used in the Okanagan Silviculture Type 2 analysis continue to be used.

5.2 Harvest systems

Although this analysis uses a combination of clearcut and partial harvesting the vast majority of stands are harvested using a clearcut system.

Those stands that meet the following three conditions are considered to be candidates for partial harvesting and rather than being modelled as clear cut they have 33% of the stand volume harvested with a minimum return interval of 30 years. These stands continue to use the natural stand yield curves rather than managed stand yield curves.

1. Dry-belt;
2. BEC: PPxh1/PPxh2/IDFxb1/IDFxb2/IDFdk1/BGxb1; and
3. Douglas-fir leading.

5. Modelling Considerations

5.3 Harvest flow objectives

Harvest flow objectives for the Okanagan TSA are considered through the use of forest cover constraints and resource management zones as described in legislation, the Okanagan-Shuswap Land Resource Management Plan and approved Forest Stewardship Plans.

Other objectives provided by the province include the desire to minimize the impact to the short-, mid- and long-term timber supply and also to maximize the use of Mountain Pine Beetle killed lodgepole pine while at the same time saving non-insect infested species for harvest at a later date.

5.4 Utilization

The utilization levels define the maximum stump height, minimum top diameter inside bark (dib) and minimum diameter at breast height (dbh) by species, and are used in the analysis to calculate merchantable volume.

Table 22. Utilization criteria by analysis unit

Analysis unit	Utilization		
	Minimum dbh (cm)	Maximum stump height (cm)	Minimum top dib (cm)
All pine leading	12.5	30	10
Western redcedar > 140 years	17.5	30	15
All others	17.5	30	10

5.5 Volume exclusions for mixed-species stands

One or more species in mixed species stands may be unmerchantable. For example, the deciduous species in a predominantly coniferous stand may not be harvested, or may only be partially harvested. The non-harvested portion should not contribute to the estimated stand volume. Most deciduous-leading stands are excluded from the timber harvesting land base. For stands within the harvesting land base, the following table indicates which portions did not contribute to harvest volume forecasts.

Table 23. Volume exclusions for mixed-species stands

Inventory type group	Species	Volume exclusion (%)
All coniferous leading	Deciduous (broadleaf)	100

5.6 Non-recovered losses

Non-recovered losses (NRL) account for average annual volume lost to insect infestation and disease, fires, wind or other causes on the timber harvesting land base.

NRLs reflect only those areas where the volume will not be recovered or salvaged.

5. Modelling Considerations

Table 24. *Non-recovered losses*

Cause of loss	Annual NRLs (m ³ /year)
Fire	178 800
Douglas-fir beetle	29 800
Spruce bark beetle	3 200
Windthrow	16 500
Mountain pine beetle	Currently an epidemic and modelled separately from these non-recovered losses
Total	228 300

6. Sensitivity Analyses

Sensitivity analysis provides a measure of the timber supply impact of uncertainty in management assumptions and/or data. The magnitude of the increase or decrease in a particular variable should reflect the degree of uncertainty surrounding the assumption. By developing and performing a number of sensitivity analyses, it is possible to determine which variables most affect analysis results. The following table lists the sensitivity analyses to be performed for the Okanagan TSA.

Table 25. Sensitivity analyses

Uncertainty in land base available for harvest	THLB +/- 10%
Uncertainty in the estimated existing stand yields	Yield +/- 5%
Uncertainty in the estimated managed stand yields	Yield +/- 5%
Uncertainty in minimum harvestable ages	MHA +/- 10 years
Uncertainty in stand productivity	SI - 3 m reduction
Uncertainty in adjacency restrictions	Green-up ages +/- 5 years and/or green-up height +/- 1 m. Examine change in maximum disturbance.
Alternative harvest queue	Compare relative oldest (base case) to random harvest queue.
Visuals	Retention requirements +/- 5%
Alternative harvest flows	Harvest objectives that demonstrate the maximum even flow harvest and higher initial decade harvest levels will be modeled.
Uncertainty in volume reductions caused by root rot	Higher incidences of root rot will be assumed. Increase the OAF2 from 10% to 15% in Douglas-fir leading-stands.