C5 FOREST MANAGEMENT PLAN 2006–2026

APPENDIX 6A. TIMBER SUPPLY ANALYSIS - LANDBASE DESCRIPTION

FMU C5
FOREST MANAGEMENT PLAN

Landbase Description

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF MAPS

1 OVERVIEW

This document contains a detailed description of the methods used to classify the landbase for the 2005 Forest Management Unit (FMU) C5 Forest Management Plan (FMP). Map 1-1 illustrates the FMU's boundaries and its location within Alberta, Canada. C5 FMU encompasses 351,886 ha in three discrete areas.

The result of the landbase classification process was a digital file that identified the areas available for timber management activities.

A complete description of the C5 FMU can be found in the *Landscape Assessment document* (Forest Management Branch 2004). Note that the landscape assessment was completed on an interim version of the classified landbase (c5_net3) and not the final version described in this document and used in the timber supply analysis.

1.1 Objectives

Landbase classification is the process of categorizing the FMU into types necessary for the timber supply analysis (TSA). The main result of this landbase classification was the creation of a shapefile for use in the TSA; which was used to determine a preferred forest management strategy (PFMS) for the 2005 C5 FMU FMP.

This landbase classification was completed under the Alberta Forest Management Planning Standard (Version 3 dated June 2005). This standard was under development at the same time as the landbase classification; therefore it was not possible to meet every item in the standard. However it meets most criteria outlined in the current version.

1.2 Landbase Classification Process

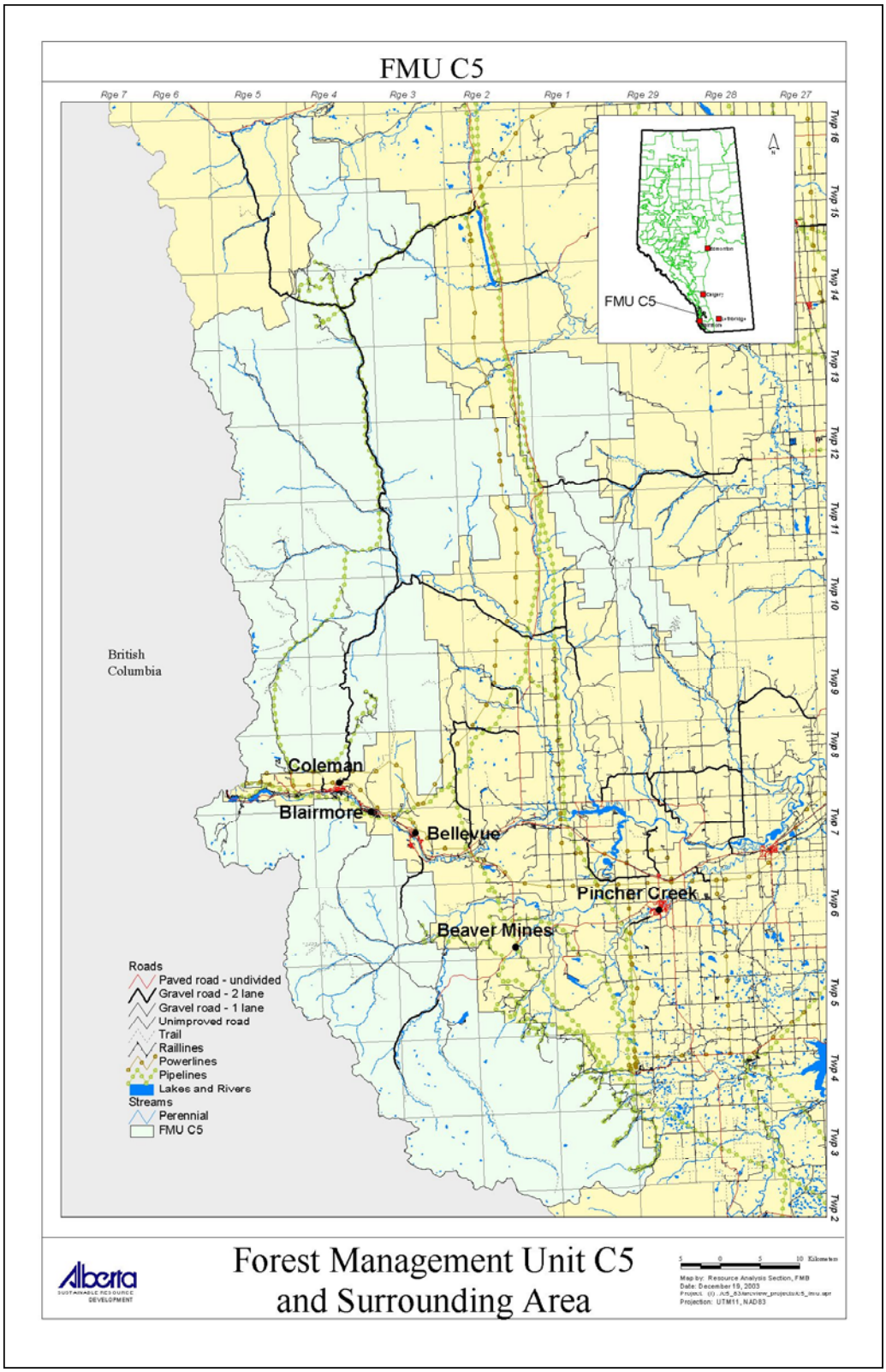
The purpose of classifying the landbase was to determine the timber harvesting landbase, which represents the areas available for timber harvesting activities (also known as the active or contributing landbase). The active landbase was further classified into either the conifer or deciduous landbase depending on the species composition. Historic blocks with no species information available were placed into the conifer landbase.

For the 2005 C5 FMU FMP only forested areas within the active conifer landbase were available for harvest in the TSA. The areas available for timber harvesting, being the active conifer landbase in this analysis, were referred to as the managed landbase.

The final product of the spatial classification was a shapefile with all attributes necessary to run the TSA models, as well as the attributes required by the Planning Standard.

Many types of information were incorporated into the landbase classification. The information came from many sources; both Alberta Sustainable Resources Development (SRD) and The Forestry Corp were involved in the landbase classification process.

The general approach to the landbase classification can be seen in Figure 1-1.



Map 1-1: Forest Management Unit C5 and the surrounding area.

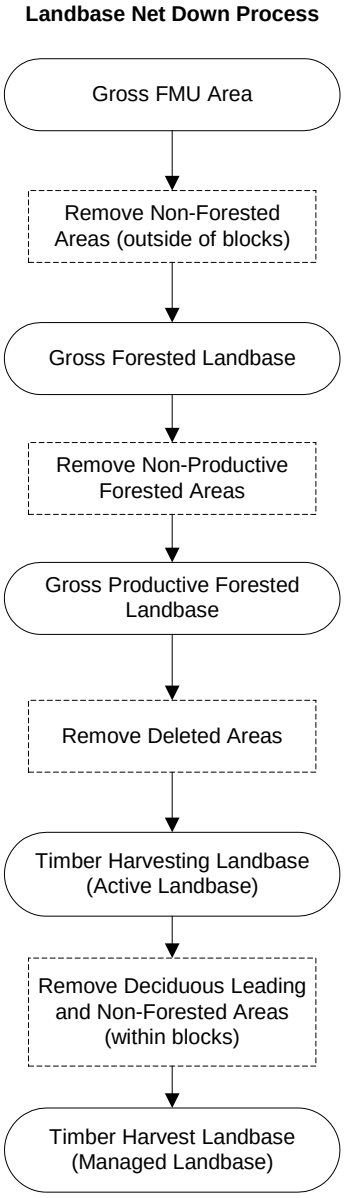


Figure 1-1: Landbase classification process used to create the managed landbase for the 2005 FMP.

1.3 Effective Date

The effective date of the classified landbase for TSA purposes was May 1, 2005. The majority of the input datasets were effective to May 1, 2001, however the stand ages, harvesting activities, and fires were updated to May 1, 2005.

1.4 Terminology

The terminology used in this document follows the Alberta Forest Management Planning Standard (Version 3 dated June 2005). Additional terminology specific to this document is defined below:

Gross landbase – The gross landbase includes all area within the C5 FMU boundary.

Timber harvesting landbase – The timber harvesting landbase is the area available for timber harvesting (ie. Areas with no reason to prohibit forest management activities). The timber harvest landbase is also referred to as the active or contributing landbase.

Passive landbase – The passive landbase is the area within the gross landbase not included in the timber harvest landbase; this area is also called the non-contributing landbase.

Managed landbase – The managed landbase includes the portions of the timber harvest landbase available for timber management activities specific to the 2005 FMP TSA (the forested conifer stands within the timber harvest landbase).

Unmanaged landbase - The active deciduous landbase, non-forested areas within the conifer landbase, and the passive landbase.

Non-forested – Areas with no forest cover according to AVI (after updates for recent fires, range improvement and historic harvesting activities).

Forested – Stands in the forested landbase have a valid tree species in the ***sp1*** field of AVI (first species of the overstorey layer). All post-91 cutblocks were considered forested regardless of the AVI species composition.

Productive – All forested stands are considered productive.

Non-productive – All non-forested stands are non-productive.

Conifer landbase - The conifer landbase is comprised of forested stands with CD and C cover types and non-forested areas within existing cutblocks that have no other reason for deletion from the net landbase.

Deciduous landbase – The deciduous landbase is comprised of forested stands with D and DC cover types.

Classified landbase – The classified landbase is comprised of spatial information with associated attributes that describe the area for the purposes of a timber supply analysis (TSA).

1.5 Structure of Report

This document describes the development of the classified landbase and is divided into five main sections. The next section of this document describes the datasets that were used in the creation of the classified landbase. Subsequently, the document describes the spatial data processing that occurred to create the final landbase coverage and shapefile. Then there is a description of the attribute processing that occurred on the FMU. Finally this document ends with a brief description of the final classified landbase.

2 DATA

This section lists all the input datasets used in the landbase classification. Input data sets were provided in many formats, the majority included spatial features, however some data sets were non-spatial and some were non-digital. A brief description of the input data sets is also provided.

2.1 Input Datasets

The sources for all spatial information used to generate the classified landbase are listed in Table 2-1. This table provides the source, effective date, scale / accuracy, and a brief description of each dataset. Spatial datasets were coverages unless otherwise specified.

Table 2-2 lists the non-digital datasets that were used in the landbase classification. Table 2-3 lists the non-spatial datasets used.

Table 2-1: Spatial input datasets used in the 2005 C5 landbase classification.

Spatial input data				
Dataset	Source	Scale/ Accuracy	Effective Date	Description*
Administrative and Land Use				
C5_1MGEOESIP	RIMB[1]	1:1 000 000	2001	ESIP (Eastern Slopes Integrated Policy) zones
C5_1MGEOFLUZ	RIMB	1:50 000	2001	FLUZ (Forest Land Use Zones)
C5_1MGEOIRP	RIMB	1:50 000	2001	IRP (Integrated Resource Plan) areas
C5_1PGEOOWNQ	PLFD[2]	1:20 000	2001	LSAS land ownership by quarter section (GLIMPS)
C5_1PGEOFRAP	CD[3]	1:20 000	2001	Forest Recreation Areas
C5_1PGEOPAS	CD	1:20 000	2001	Protected areas
C5_1PGEOPRAP	CD	1:20 000	2001	Provincial Recreation Areas
C5_ALLOT	FMB[4]	1:1 000 000	2001	Grazing allotments
C5_COMPART	FMB	1:20 000	2001	Landscape Management Units and Compartments
LICENCE16BOUNDARY.SHP	SRA	1:20 000	2005	Shapefile of the license 16 boundary
Base Features				
C5_1PACCALL	RIMB	1:20 000	2001	BF (Base Features) roads
C5_1PACCCUT	RIMB	1:20 000	2001	BF cutlines
C5_1PACCRWY	RIMB	1:20 000	2001	BF railways
C5_1PATSQSEC	RIMB	1:20 000	2001	BF ATS quarter sections
C5_1PATSSEC	RIMB	1:20 000	2001	BF ATS sections
C5_1PATSTWP	RIMB	1:20 000	2001	BF ATS townships
C5_1PFACALLP	RIMB	1:20 000	2001	BF access polygons
C5_1PFACPPL	RIMB	1:20 000	2001	BF pipelines
C5_1PFACPWSX	RIMB	1:20 000	2001	BF Wellsites (points)
C5_1PFACTRL	RIMB	1:20 000	2001	BF Transmission lines
C5_1PGEOFMU	RIMB	1:20 000	2001	BF Geoadmin FMU C5 boundary
C5_1PHYDLAK	RIMB	1:20 000	2001	BF lakes and river polygons
C5_1PHYDSLN	RIMB	1:20 000	2001	BF hydro single line network
C5_1PHYDSTRA	RIMB	1:20 000	2001	BF stream arcs
Natural Subregions				
C5_1FGEONATR	RIMB	1:1 000 000	2001	Natural Subregions of Alberta
C5_LPPNSR	FMB	1:1 000 000	2001	Modified Natural Subregion boundaries based on elevation and professional judgement; plot data supported the changes.
Vegetation Inventory				
C5_1PAVI2001	RIMB	1:20 000	2001	Alberta Vegetation Inventory (AVI)
INVENTORY	FMB	1:20 000	2001	AVI photo and inventory dates by township
Inventory Updates				
C5_UPDATE_03	FMB	1:20 000	2002	Composite coverage of updates to AVI, includes cutblock and range improvement updates to 2001-2002
Elevation				
DEM	RDB	1:20 000	2001	Digital elevation model (25m) for C5 regional area
DEMSHADE	FMB	1:20 000	2001	Hill-shaded DEM (25m)
C5_1PTOP25EG	FMB	1:20 000	2001	Clipped DEM
C5SLOPE45G	FMB	1:20 000	2001	Slopes 45 percent and above
C5SLOPEGRID	FMB	1:20 000	2001	Slope percent rise (corrected to maximum 100%)
Visual Quality and Recreation				
RANDOM	FMB	1:50 000	2001	Random camping sites (point coverage provided by Area staff)
C5_VQO	FMB	1:20 000	2001	Areas with visual quality objectives
Fires				
C5_FIRES	RIMB	1:20 000	2001	Composite coverage of fires P010212000, CWF-084-2003 and CWF-136-2003, clipped to FMU boundary

Dataset	Source	Scale/ Accuracy	Effective Date	Description*
Blocks				
PREBLOCKS_PF	FMB	1:20 000	2001	Post-fire preblocks (removed some preblocks from previous PREBLOCKS coverage and added fire salvage blocks – September, 2003)
CWF081_CUTBLOCKS.SHP	SRA[5]	1:20 000	2004	Shapefile of regen blocks within the Lost Creek fire
PROPBLKNOV26.SHP	SRA	1:20 000	2004	Shapefile of salvage blocks within the Lost Creek fire
FIRST PASS BLOCKS OCT 04.SHP	SLS[6]	1:20 000	2004	Shapefile of Spray Lakes blocks
BLOCKS_RDS.SHP	GTS[7]	1:20 000	2004	Atlas blocks in Savana Creek (Microstation)
THEMES2004.DGN	GTS	1:20 000	2004	Atlas blocks (Microstation)
DUTCH_CREEK_2004.DGN	GTS	1:20 000	2004	Atlas blocks in Dutch Creek (Microstation)
LOWERLIVINGSTONE.DGN	GTS	1:20 000	2004	Atlas blocks in Upper Livingstone (Microstation)
UPPERLIVINGSTONE.DGN	GTS	1:20 000	2004	Atlas blocks in Lower Livingstone (Microstation)
CASTLE_HARDWIRE2.SHP	SRA	1:20 000	2004	Shapefile of blocks in Castle
CROWSNEST_MPB_HARDWIRE.SHP	SRA	1:20 000	2004	Shapefile of blocks in the Crowsnest
ELKHORN_HARDWIRE.SHP	SRA	1:20 000	2004	Shapefile of blocks near Elkhorn ranch
FIRE_SMART_2004.SHP	SRA	1:20 000	2004	Shapefile of FireSmart blocks and treatments
LINDERMAN_HARDWIRE_REV.SHP	SRA	1:20 000	2005	Shapefile of Linderman blocks
LYNDONCB.SHP	SRA	1:20 000	2004	Shapefile of Lyndon blocks
MCGILLIVRAYCB.SHP	SRA	1:20 000	2004	Shapefile of McGillivray blocks
NSR_BLKS.SHP	SRA	1:20 000	2005	Shapefile of not sufficiently restocked blocks in C5
CUTBLKS2004BNAD83.SHP	SRA	1:20 000	2005	Shapefile of cutblock update file from the district
050926YORKCREEKLINDERMAN.SHP	SRA	1:20 000	2005	Shapefile of cutblocks in York Creek
050921STARWATERSHEDESIGN.SHP	SRA	1:20 000	2005	Shapefile of the Star watershed design
050921DEFERALSTODECADE2.SHP	SRA	1:20 000	2005	Shapefile of cutblocks to defer to decade 2
C5L5 BLOCK.SHP	SRA	1:20 000	2005	Shapefile of cutblocks in Porcupine Hills Subregion
050926TP15RG3HARDWIRE1STPASS.SHP	SRA	1:20 000	2005	Shapefile of cutblocks in Township 15 Range 3
050926TP15RG3HARDWIRE2NDPASS.SHP	SRA	1:20 000	2005	Shapefile of cutblocks in Township 15 Range 3
050922ELKHORNLIVINSTONEHARDWIRE.SHP	SRA	1:20 000	2005	Shapefile of cutblocks in Elkhorn / Livingstone areas
FIRE_SMART_YORK_OVRID.SHP	SRA	1:20 000	2005	Shapefile of FireSmart cutblocks

ALLISONTSA_HARDWIREVS02.SHP	SRA	1:20 000	2005	Shapefile of cutblocks in the Allison area (updated)
Wildlife				
ROUGH_OLSEN_ELKTHEME.SHP	SRA	1:1 000 000	2004	Shapefile of elk habitat
2020RATING HIGH AND EXTREME.SHP	SRA	1:20 000	2004	Shapefile of revised mountain pine beetle hazard rating
HARD_HSI.SHP	SRA	1:20 000	2004	Shapefile of harlequin duck habitat suitability index
WOLV_HSI.SHP	SRA	1:20 000	2004	Shapefile of wolverine habitat suitability index
C5WATERBODIES.SHP	SRA	1:20 000	2004	Shapefile of ponds for long-toed salamander and western frog habitat
C5_1HINVEOX	CD	1:1 000 000	2001	Rare element occurrence database (clipped point coverage)

* Spatial data format is coverages unless otherwise specified.

1 Resource Information Management Branch
2 Public Lands and Forests Division
3 Community Development – Parks and Protected Areas / ANHIC
4 Forest Mangement Branch
5 Southern Rockies Area
6 Spray Lakes Sawmills
7 Glaimhin Technical Services

Table 2-2: Non-digital input data used in the 2005 C5 landbase classification.

Non-digital Spatial Input Data				
Dataset	Source	Scale/ Accuracy	Effective Date	Description
Administrative and Land Use				
New Access Control Units	SRA	1:150 000	2005	map with additional units for harvest sequencing noted
Detailed IRC1 Access Control information	SRA	1:105 000	2005	map with detailed access control information for IRC1
Watersheds				
study watersheds	SRA	1:15 000	2004	map with watershed study areas and planned blocks within study watersheds

Table 2-3: Non-spatial input data used in the 2005 C5 landbase classification.

Non-spatial Input Data				
Dataset	Source	Scale/ Accuracy	Effective Date	Description
Administrative and Land Use				
quota spheres	SRA	n/a	2005	list of companies and the units for harvest sequencing each will be given timber rights
Vegetation Inventory				
c5_meadows.dbf	FMB	n/a	2004	list of meadows
avi_polys.dbf	FMB	n/a	2005	list of AVI polygons requiring reduced yield estimates in the TSA
Blocks				
c5l70405harvest.xls	SRA	n/a	2004	list of Spray Lakes historic blocks
Opening Summary Apr 4 '05 A2,C1,C2,C3,C05,C5.xls	FMB	n/a	2005	ARIS opening summary report

2.2 Input Data Description

There was a large quantity of information available for the C5 landbase classification. Some of this information was standard for Alberta such as AVI, while some information was specific to C5 FMU. A brief description of the datasets used are provided in this section.

2.2.1 Administrative and Land Use

Administrative and land use data included Eastern Slopes Integrated Policy zones, Forest Land Use Zones, Integrated Resource Plan areas, GLIMPS, Forest Recreation Areas, Protected areas, Provincial Recreation Areas, grazing allotments, and license areas.

2.2.2 Base Features

Base features used in the landbase classification included linear features, township grids, oil and gas and watercourses.

2.2.3 Natural Subregions

A spatial representation of the natural subregions of Alberta was used in the landbase classification.

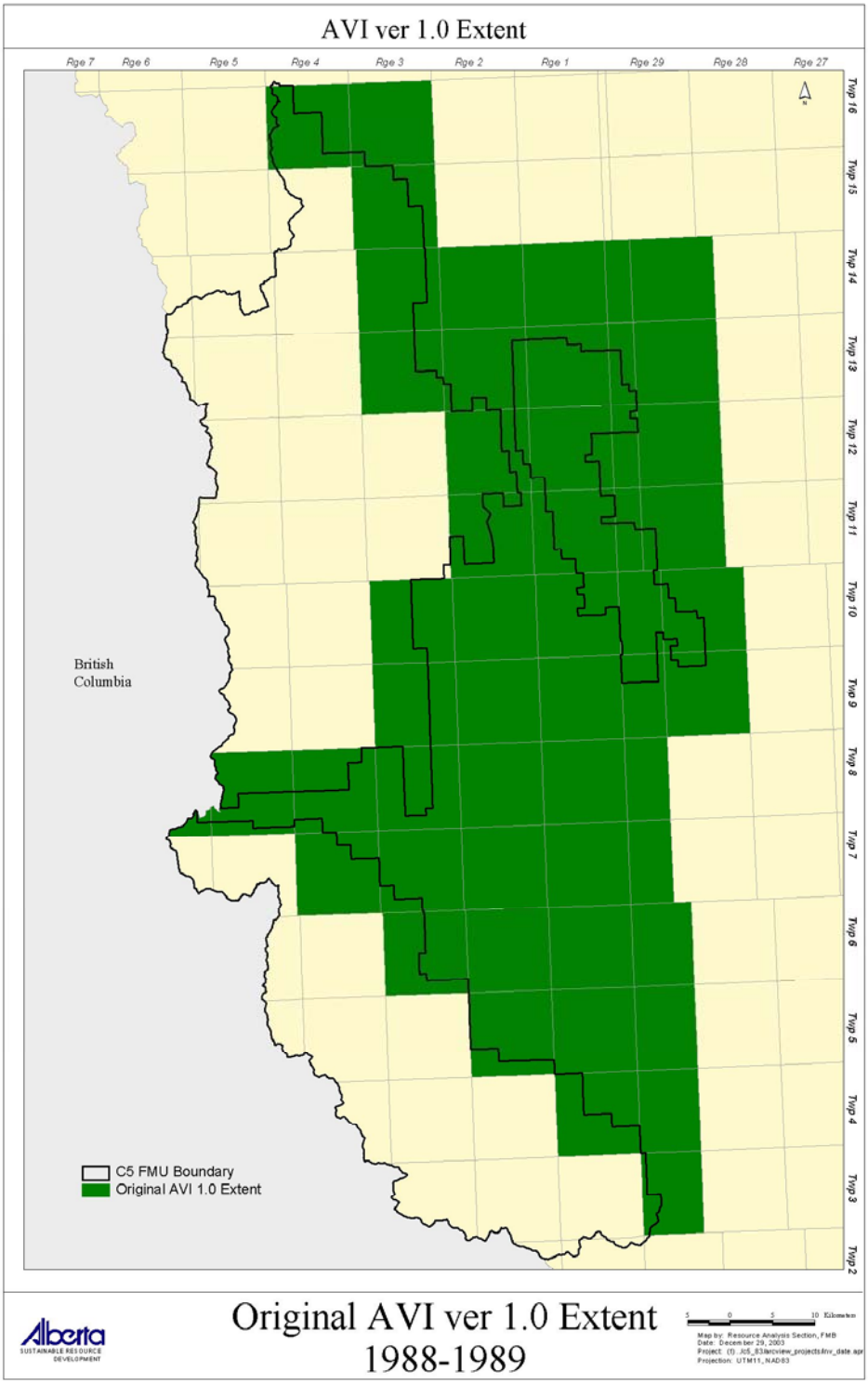
2.2.4 Vegetation Inventory

The Alberta Vegetation Inventory (AVI) was used to classify the vegetated and non-vegetated areas within C5 FMU. A portion of the AVI for C5 FMU was completed under AVI version 1.0 specifications in 1988-89 (Map 2-1). Portions of this inventory were subsequently "normalised" by Alberta Environmental Protection in 1994-95. This process involved the reclassification of horizontal stands and adjustment of the spatial coverage to maintain consistency with the provincial base data. The remainder of the FMU was inventoried under AVI version 2.1 specifications.

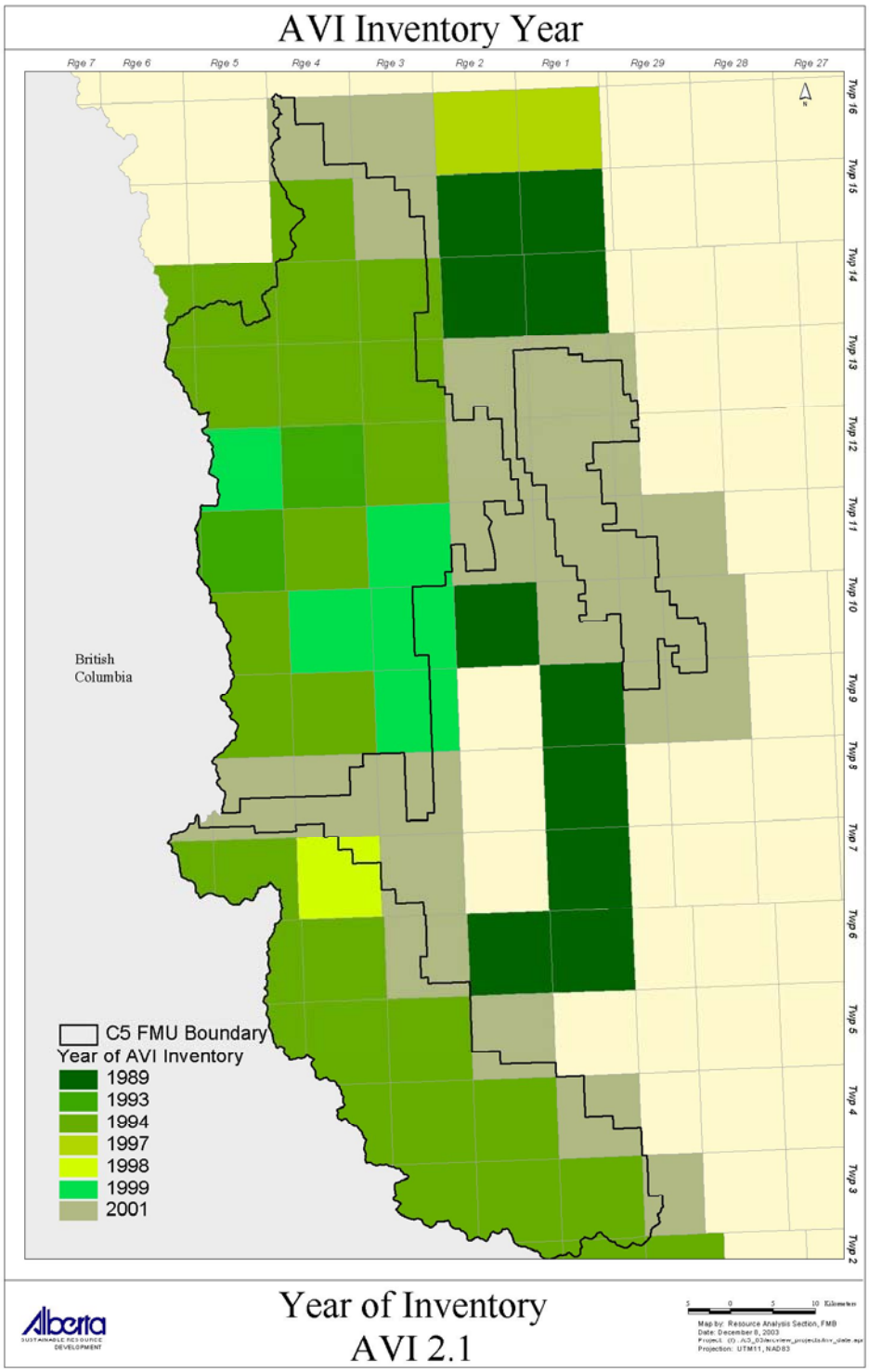
In 1997-1998, Alberta Environmental Protection was piloting an ecologically based landscape planning project in the Livingstone-Porcupine Hills portion of C5 FMU. Through the course of this Southern Rockies Landscape Planning Pilot (SRLPP), concern was expressed over the quality of the AVI data in the project area. In June of 1998, under contract to Resource Data Branch (RDB), The Forestry Corp undertook an examination of the AVI data to evaluate the accuracy of the spatial and attribute information (Addendum III).

The Forestry Corp concluded that there were issues regarding the delineation of stands by certain interpreters as well as quality control issues in the attribute loading and polygon digitizing. They recommended replacing all areas covered by AVI 1.0 as well as those AVI 2.1 townships completed by certain interpreters.

As a result, 1 township was reinterpreted in 1998, 5 in 1999 and 25 township equivalents were completed in 2001; all reinterpretation was completed using 1998 photography (Map 2-2).



Map 2-1: Extent of original AVI ver 1.0 inventory.



Map 2-2: Year of the most current AVI (ver 2.1) for the FMU.

Some of the relevant AVI fields used in this analysis include crown closure class, height, species composition, origin, stand structure and treatment modifiers.

2.2.5 Inventory Updates

Inventory updates were completed on a yearly basis from the AVI effective date, using 1:20 000 aerial photography. This analysis includes cutblock updates up to and including 2001-2002, and updates for clearing for range improvement.

2.2.6 Elevation

Elevation information was provided by a digital elevation model (DEM).

2.2.7 Visual Quality and Recreation

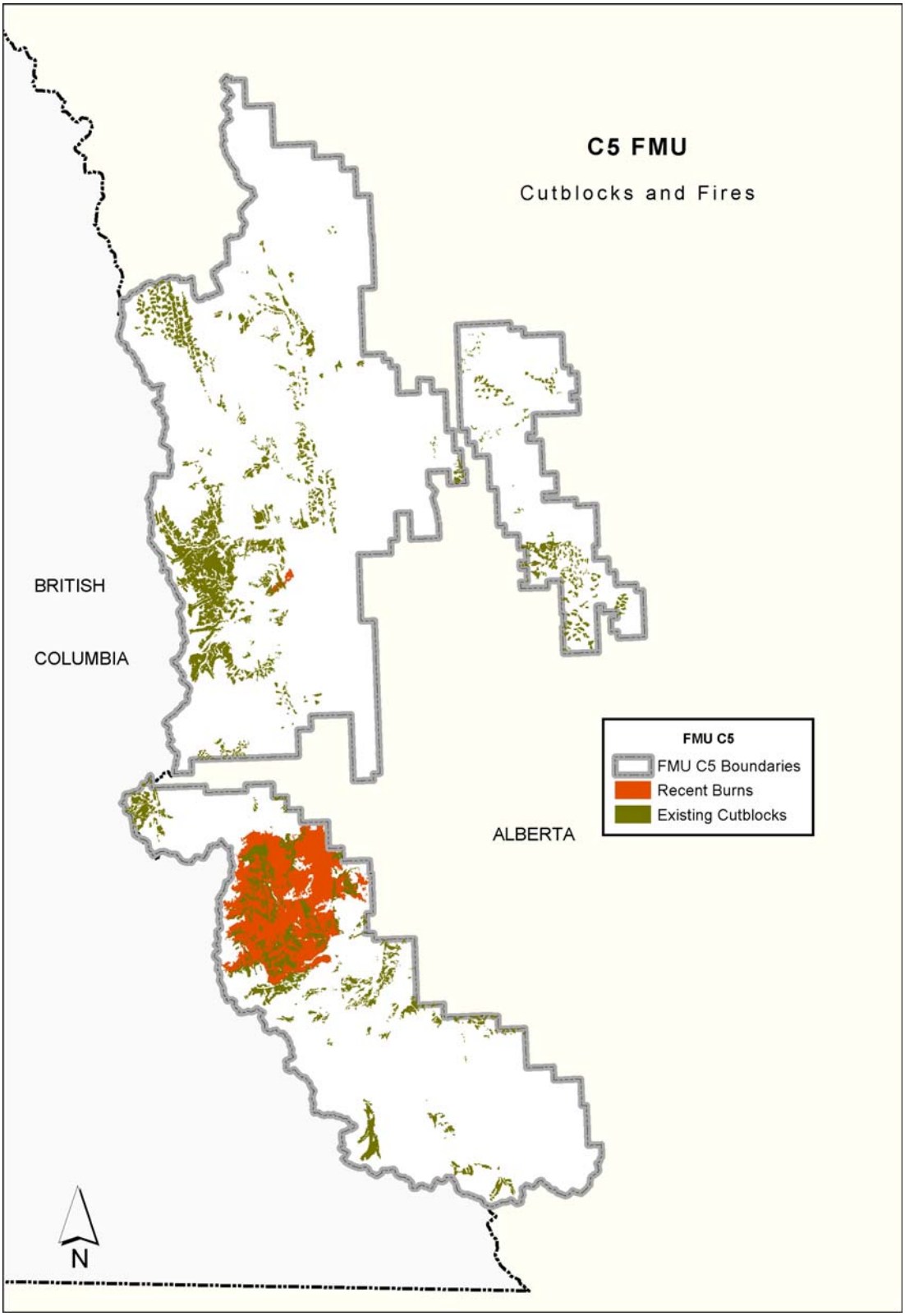
Areas with special visual quality objectives were identified. A point coverage of known random camping sites was also created by local SRD staff.

2.2.8 Watersheds

Watershed sub-basins were provided for the FMU. Five smaller watersheds sub-basins were also identified to be part of research study areas.

2.2.9 Fires

Fire boundaries for fires P01-021-2000 (Cherry Hill Fire), CWF-084-2003 (Lost Creek Fire) and CWF-136-2003 (Wintering Creek Fire) were incorporated into the net landbase (Map 2-3).



Map 2-3: Historic cutblocks and recent fires.

2.2.10 Blocks

Blocks were a difficult aspect of the landbase classification process. Block information was continually provided in many different formats and often datasets contradicted each other.

In general, blocks can be classified into two categories: historic and planned. Historic blocks are areas cut prior to the effective date of the analysis. Planned blocks occur any time after the effective date and were included in the TSA.

The inventory updates included all historic and planned blocks identified by FMB as of 2001. However, there were additional blocks that needed to be incorporated into the net landbase from other data sources, as well as including historic blocks between 2001 and 2005. Three main reasons that additional block information was required in the landbase classification process are:

1. To update the landbase to 2005 (the effective date),
2. To incorporate planned treatments that were not available during the development of the interim net landbases, and
3. To incorporate additional historic information that was not captured in the interim net landbases.

This additional block information included:

- Historic blocks maintained by the Southern Rockies Area (SRA),
- Historic blocks in the Lost Creek Fire,
- Historic and planned blocks maintained by disposition holders, and
- Planned FireSmart blocks.

A summary map of all historic blocks identified in the classified landbase can be seen in Map 2-3 (previous page).

2.2.10.1 SRA Historic Blocks

Historic cutblock information was part of AVI in the modifier fields, however in C5 FMU this did not provide a complete picture of past harvesting activities. SRA maintains digital information of historical cutblock data collected from various sources (Phase 3 maps, Annual Operating Plan (AOP) maps, etc.). There were many blocks included in this dataset that were not identified or were misinterpreted in the AVI.

In some cases, an area was delineated as one AVI stand and 'CC' modifiers were noted to identify that stand as a historic block. The additional information from SRA actually spatially identified small clearcut areas within the AVI stand, which lead to the assumption that the 'CC' modifier should not apply to the entire stand, only those small clearcut areas that were spatially identified by SRA data. An example is POLY_NUM 103040217, which was classified as an A15Fd8Aw2-1900-CC2, with an area of 42.9 ha. In actual fact, three small areas, with a total area of 7.7 ha, were removed from what is now this single AVI type.

2.2.10.2 Lost Creek Fire Blocks

In the net landbase, areas burnt in recent (post-AVI) fires were identified as non-forested and completely removed from the managed landbase for the entire planning horizon; unless management activities resulting in regeneration liability occurred after the fire. These activities affected salvage logging operations and replanting of historic blocks. Salvage and regenerating blocks that were identified were included in the managed landbase.

Two shapefiles defining the stands affected, one for salvage blocks and one for regenerating bocks, both were provided by SRD (Map 2-4).

2.2.10.3 Blocks from Disposition Holders

Disposition holders also maintained their own block records. The disposition holders in C5 FMU include, Spray Lakes Sawmills (SLS), Atlas Lumber, 848507 Alberta Ltd., and 770583 Alberta Ltd. The numbered companies will be referred to as Linderman from here on in the document. The planned block information extended well into the future where disposition holders have developed long-term harvest plans.

2.2.10.4 FireSmart Blocks

FireSmart seeks to mitigate large, high intensity, high severity wildfires and incorporate natural disturbance emulation. Therefore, FireSmart treatments were not limited to the managed landbase. FireSmart treatments planned for the FireSmart community zone around the Crowsnest Pass in C5 FMU were identified.

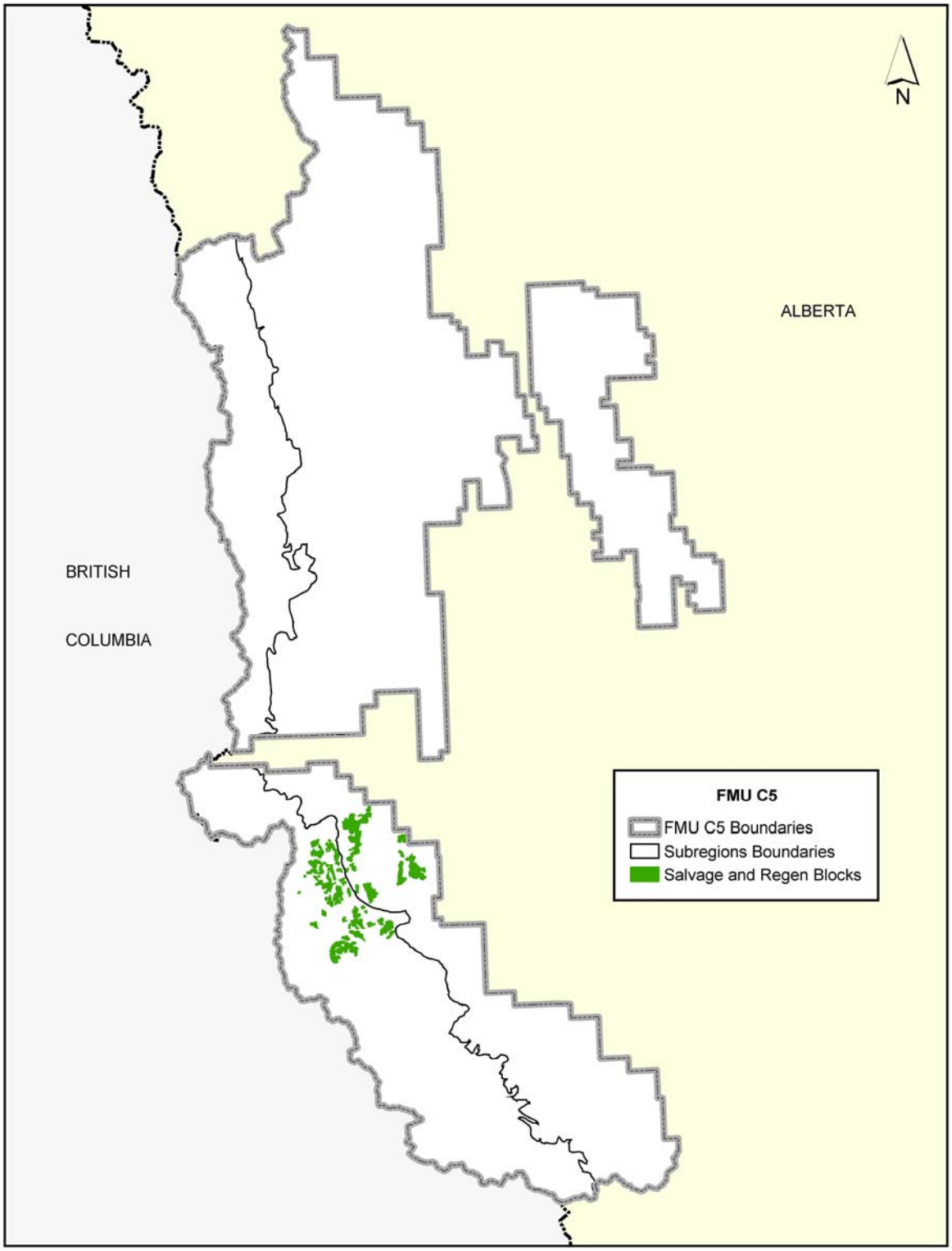
2.2.11 Fauna

Many wildlife species were important and considered in the TSA. Spatial information was available to incorporate into the classified landbase for these species, harlequin ducks, wolverines, elk, long-toed salamanders, and western toads. Mountain pine beetle hazard was also included under wildlife.

Habitat suitability index classifications were provided for harlequin duck and wolverine. Four habitat elements for elk were provided by SRA. Water bodies within C5 FMU with high likelihood of suitable habitat for long-toed salamander and western toad were provided.

2.2.12 Non-Digital Data

Non-digital data consisted of large (3’4” X 4’) paper maps with areas identified for harvest sequencing and study watersheds. The information on these maps was converted to digital information by digitizing the information. All non-digital information related to harvest sequencing in Patchworks and did not affect the forest attributes. These maps are contained in the copy of this document submitted to SRD for review (Addendum IV).



Map 2-4: Cutblocks within the Lost Creek Fire boundary.

2.2.13 Non-Spatial Data

Non-spatial data was provided in many different formats. Most of these datasets were linked to the landbase and attributes were assigned to spatial locations. Other datasets (e.g. ARIS opening summary report) were summarized and attributes were assigned to all blocks in the landbase file.

3 LANDBASE PROCESSING

This section describes the creation of the spatial portion of the classified landbase for C5 FMU. All of the processes described in this section directly affected the spatial features of the landbase. The attribute assignments that were closely linked with the spatial processing are also discussed.

All GIS-processing was completed using ArcInfo 7.2.1. The AML's used to create landbase coverages are available on DVD in Addendum II. Although a portion of C5 FMU is west of the 4th meridian, all data were projected into UTM 11 NAD83. The coverage was converted to shapefile format and Visual FoxPro 6.0 was used for the post-GIS processing of derived attributes. The spatial data processing parameters for the final classified landbase are summarised in Table 3-1.

Table 3-1: Spatial data processing parameters.

GIS software	ArcInfo 7.2.1 on UNIX workstation
Projection/Datum	UTM 11 NAD83
Tolerance parameters	Fuzzy - 0.001 Dangle - 0.00 Snap - 10.0 Edit - 100.0 Node Snap - 2.5
Sliver polygons	See Section 3.4
Number of records (polygons)	161,644
Post-GIS processing software	Visual FoxPro 6.0; Oracle 8
Mapping software	ArcView 3.2a and ArcGIS 8.3

The first part of this section lists the processed datasets. Some of these datasets had simple processing, e.g. conversion to polygon layers from their original line or point layers by buffering. Some of the processing was complex and is described in more detail in the next section. The input and processed datasets were combined to create a spatial boundaries of the classified landbase. The remaining portion of the section describes the spatial processing that occurred on the landbase after all information had been joined into a single coverage. These descriptions are not presented in the same order in which they occurred during the processing as they occurred on various interim landbases.

3.1 Processed Data

Although some input datasets were used directly in the landbase classification process, many required additional processing to convert them into a more useful format. The processed datasets are described in Table 3-2. Datasets listed in this table are coverages unless otherwise specified. The interim and final classified landbases are also considered processed data.

Table 3-2: Processed datasets.

Processed data				
Dataset	Source	Scale/ Accuracy	Effective Date	Description*
Administrative and Land Use				
C5_SUBREGION	FMB	1:20 000	2001	Created by sub-dividing the three discrete areas of the FMU using some LMU and some compartment boundaries. Used for setting objectives and reporting.
PASITES_OC	FMB	1:20 000	2001	Created by extracting all OC (Order-in-Council) type polygons from C5_1PGEOPAS
OWNERSHIP	FMB	1:20 000	2001	Created by extracting all F (freehold) and M (mixed) polygons from C5_1PGEOOWNQ
TSA_RD8_ADJCOMP.ATT	TFC[1]	1:20 000	2004	Attribute table of ukeys within adjusted compartments
TSA_RD8_SPECIAL_MGT.ATT	TFC	1:20 000	2004	Attribute table of ukeys within special management zones
TSA_RD8_HWY_CORRIDORS.ATT	TFC	1:20 000	2004	Attribute table of ukeys within highway wildlife corridors
LICENCE16POLYGONS.SHP	TFC	1:20 000	2005	Shapefile identifying polygons of the classified landbase within licence 16
TSA_RD8_WILD_CORRIDORS.ATT	TFC	1:20 000	2004	Attribute table of ukeys within high elevation wildlife corridors
Base Features				
CUTLINEBUF	FMB	1:20 000	2001	Created by applying 3 m buffer to C5_1PACCCUT
ROADSBUF	FMB	1:20 000	2001	Created by applying 3 m/8 m buffers to C5_1PACCALL
LAKESBUF	FMB	1:20 000	2001	Created by applying 100 m buffers to all lakes > 4 ha in C5_PHYDLAK
STREAMBUF	FMB	1:20 000	2001	Created by applying 30 or 60 m buffers to C5_1PHYDSLN
PIPEBUF	FMB	1:20 000	2001	Created by applying 10 m buffer to C5_1PFACPPL
Natural Subregions				
C5_NSR	FMB	1:1 000 000	2001	A hybrid natural subregions coverage created by using the LPP modified subregions, where they existed (C5_LPPNSR), and the 1:1 million subregions (C5_1FGEONATR) where they didn't.
Vegetation Inventory				
WETLANDS	FMB	1:20 000	2001	All non-forested meadows with a moisture regime of 'w' or 'a' were pulled out of C5_1PAVI2001.
WETLANDSBUF	FMB	1:20 000	2001	Created by applying 30 m buffer to WETLANDS
Elevation				
C5_SLOPE45	FMB	1:20 000	2001	Slopes > 45% derived from C5SLOPE45G
C5_SLOPE451HA	FMB	1:20 000	2001	Slopes > 45% and > 1ha in size derived from C5_SLOPE45
Visual Quality and Recreation				
RANREC_BUF100	FMB	1:50 000	2001	Created by applying 100 m buffer to RANDOM
Watersheds				
C5_SBASINS	FMB	1:20 000	2001	Watershed sub-basins derived from DEM
C5_SBASINS_PF	FMB	1:20 000	2001	C5_SBASINS with 3 small watersheds incorporated. Small watersheds are part of a post-fire watershed study.

Dataset	Source	Scale/ Accuracy	Effective Date	Description*
Blocks				
C5_HIST_CC.SHP	SRA	1:20 000	2005	Shapefile of historical block information incorporated into the TSA landbase derived from NSR_BLKS.SHP and CUTBLKS2004BNAD83.SHP
SPRAY_PLAN	TFC	1:20 000	2004	Spray Lakes blocks derived from FIRST PASS BLOCKS OCT 04.SHP and c5l70405harvest.xls
SAVANA_PLAN	TFC	1:20 000	2004	Atlas blocks in Savana Creek derived from BLOCKS_RDS and THEMES2004.DGN
DUTCH_XPLAN	TFC	1:20 000	2004	Atlas blocks in Dutch Creek derived from DUTCH_CREEK_2004.DGN
LOW_LIV_PLAN	TFC	1:20 000	2004	Atlas blocks in Lower Livingstone derived from LOWERLIVINGSTONE.DGN
UP_LIV_PLAN	TFC	1:20 000	2004	Atlas blocks in Upper Livingstone derived from UPPERLIVINGSTONE.DGN
UC515_LBRD9F.SHP	TFC	1:20 000	2005	Cutblocks in Porcupine Hills area identified based on the classified landbase polygons from C5l5_BLOCK.SHP
UFS_LBRD9F.SHP	TFC	1:20 000	2005	Cutblocks in IRC1 compartment identified based on the classified landbase polygons from FIRE_SMART_YORK_OVRID.SHP
BLKS_TOCUT	TFC	1:20 000	2004	Planned blocks derived from CASTLE_HARDWIRE2.SHP, CROWSNEST_MPB_HARDWIRE.SHP, ELKHORN_HARDWIRE.SHP, LINDERMAN_HARDWIRE_REV.SHP, LYNDONCB.SHP, and MCGILLIVRAYCB.SHP
FIRESMT_CUT	TFC	1:20 000	2004	FireSmart blocks and treatments derived from FIRE_SMART_2004.SHP
Wildlife				
C5_WATERB400	TFC	1:20 000	2004	Created by applying 400 m buffer to C5WATERBODIES
TSA_RD8_4GRIDS_ATTRIBUTES.ATT	TFC	1:20 000	2004	Attribute table of ukeys within wildlife shapefiles derived from ROUGH_OLSEN_ELKTHEME.SHP, 2020RATING HIGH AND EXTREME.SHP, HARD_HSI.SHP, WOLV_HSI.SHP
Accessibility				
isol_stds_ukey.dbf	TFC	n/a	2004	list of isolated stands
inacc_stds_ukey.dbf	TFC	n/a	2004	list of inaccessible stands
Classified Landbases				
C5_NET3	FMB	1:20 000	2004	Interim classified landbase #1
C5_ELIM3S2_PW_BLK_INACC_ISOL_PLANFIX	TFC	1:20 000	2004	Interim classified landbase #2 used in initial timber supply analysis scenarios
TSA_LB_NEW	TFC	1:20 000	2004	Interim classified landbase #3 used in the initial interior old forest analysis
TSA_LB_BLK1A	TFC	1:20 000	2004	Interim classified landbase #4 including information from study watersheds
C5_NET5	FMB	1:20 000	2005	Interim classified landbase #5 with additional blocks and NSR information incorporated
TSA_LB_RD9F_06APR05	TFC	1:20 000	2005	Interim classified landbase #6 prior to AVI stand re-combination
C5_NET9	TFC	1:20 000	2005	Classified landbase containing all attributes
LB_RD9F_PWKEY.SHP	TFC	1:20 000	2005	Shapefile of classified landbase used in the TSA

1 The Forestry Corp

* Spatial data format is coverages unless otherwise specified.

3.2 Processed Data Description

The processed datasets requiring additional descriptions beyond what is provided in Table 3-2 are included in this section.

3.2.1 Administrative and Land Use Areas

Attribute tables, which linked to the interim classified landbases, were created for: adjusted compartments, highway wildlife corridors, high elevation wildlife corridors and special management zones as described below.

3.2.1.1 Adjusted Compartments

The original 56 compartment boundaries were adjusted in the classified landbase to create more operationally-feasible units that were used in the TSA. The adjusted compartments were used to control the availability of stands for potential forest management activities. In general, compartments with less than 20 hectares of managed landbase were merged into adjacent compartments and some of the larger compartments were divided into smaller compartments using roads, watercourses, age class differences, and managed landbase boundaries where possible.

3.2.1.2 Highway Wildlife Corridors

Highway wildlife corridors were extended for 1 mile within the FMU boundaries along the edges closest to Highways 3 and 22. These areas were given special consideration in the TSA.

3.2.1.3 High Elevation Wildlife Corridors

High elevation wildlife corridors were extended for 1 mile within the FMU boundaries near the high-elevation passes along the western boundary of the FMU.

3.2.1.4 Special Management Zones

Areas that required special consideration for harvesting treatments in the TSA were assigned to special management zones. They include:

- highway wildlife corridors,
- adjacent to Elkhorn Ranch (within 1 mile), and
- Syncline Ridge Ski Area.

3.2.2 Blocks

The block processing for C5 FMU was complex involving many different datasets and formats. A description of the blocks processing used for the final classified landbase is provided in this section. The number of additional polygons were minimized in all block processing and sliver removal occurred after each step.

Many of the blocks provided were already included in the inventory update process. Therefore, blocks that were already represented in the landbase (where the boundaries more or less matched), were not included in the block processing.

3.2.2.1 SRA Historic Blocks

The SRA maintained spatial information using a different orthophoto base than FMB. This proved to be a major issue when trying to incorporate historical block boundaries because it resulted in a shift in the block locations. Where possible, the block boundaries corresponding to the FMB AVI orthophotos were used. For those blocks that were only identified in the SRA historic blocks dataset, additional linework was added and the slight shift in the block location, due to the different orthophoto bases, was ignored.

The historic cutblocks coverage was unioned with the classified landbase coverage and the historic block attributes were incorporated into the final net landbase attributes.

ARIS identification numbers were provided in this dataset where available. ARIS is a provincial database of cutblock information.

3.2.2.2 Lost Creek Fire Blocks

Attributes for existing polygons in the classified landbase were updated and areas within the Lost Creek Fire block were added to the managed landbase. There were no spatial changes to the classified landbase as a result of adding these areas.

3.2.2.3 Blocks from Disposition Holders

The block information that came from the disposition holders was in many different formats and often conflicted. The datasets that were originally received as Microstation layers were converted to coverages using ArcInfo.

3.2.2.4 FireSmart Blocks

Block boundaries for FireSmart blocks were identified from existing linework or cut into the classified landbase as appropriate and resulting slivers removed.

3.3 Classified Landbases

The input datasets described above were combined in various ways to develop classified landbases. Some of the key interim classified landbases that were created throughout the landbase classification process can be seen in Figure 3-1. The figure also describes the processes that occurred to develop the final classified landbase.

Development of FMU C5 Net Landbase for TSA

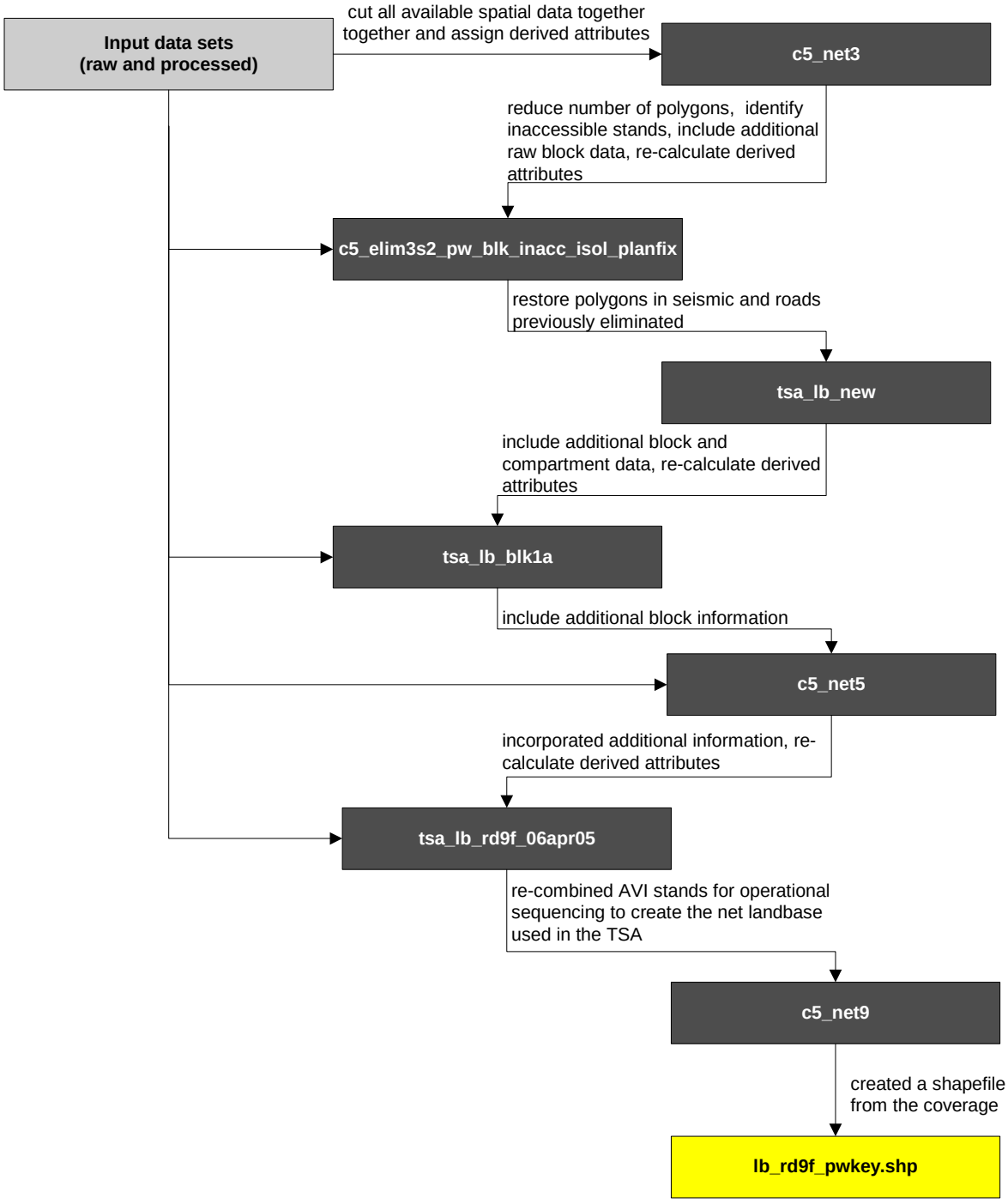


Figure 3-1: The steps undertaken during the development of the C5 FMU classified landbase.

In ArcInfo, a series of unions and spatial overlays were performed to create the final classified landbase coverage. Unions represent the joining of two datasets where the spatial features and attributes of both datasets were maintained. Boundaries of the input coverages during a union were considered ‘hard’. Spatial overlays represent the joining of two datasets where the spatial features and attributes of one dataset were maintained and the attributes of the other dataset were added without the spatial features. This was done by assigning attributes based on the largest represented area within a polygon. When a spatial overlay was completed, the boundaries of the dataset where the spatial features were not maintained were considered ‘soft’. The input spatial coverages used in the final classified landbase are outlined in Table 3-3. This table also shows the fields in which attribute data was included. For most of the spatial coverages, the field listed was present on the input coverages and the attributes were copied directly. For the spatial coverages listed in the next sections, there was some processing of the attributes required to populate the fields.

Table 3-3: Datasets used in the final classified landbase.

Classified Landbase Input Datasets			
Dataset	Descripton	Boundary Type	Field in Net Landbase
Administrative and Land Use			
C5_1MGEOESIP	ESIP (Eastern Slopes Integrated Policy) zones	Hard	***esipzone***
PASITES_OC	Created by extracting all OC (Order-in-Council) type polygons from C5_1PGEOPAS	Hard	***pa_name*** , ***pa_type*** , ***pa_status***
C5_1PGEOPRAP	Provincial Recreation Areas	Hard	***pra_name***
C5_1PGEOFRAP	Forest Recreation Areas	Hard	***fra_name***
OWNERSHIP	Created by extracting all F (freehold) and M (mixed) polygons from C5_1PGEOOWNQ	Hard	***ownership***
C5_1MGEOIRP	IRP (Integrated Resource Plan) areas	Hard	***irp_name*** , ***irp_code***
C5_ALLOT	Grazing allotments	Hard	***allotment***
C5_SUBREGION	Created by sub-dividing the three discrete areas of the FMU using some LMU and some compartment boundaries. Used for setting objectives and reporting.	Hard	***fmu_sub*** , ***fmu_subr, subr_name***
C5_COMPART	Landscape Management Units and Compartments	Hard	***lmu_name*** , ***lmu_ab, compart, comp_code***
additional compartments	map with additional units for harvest sequencing noted	Soft	***adj_subcom***
TSA_RD8_ADJCOMP.ATT	Attribute table of ukeys within adjusted copmartments	Soft	***adj_compco***
TSA_RD8_SPECIAL_MGT.ATT	Attribute table of ukeys within special management zones	Soft	***spc_mgt***
TSA_RD8_HWY_CORRIDORS.ATT	Attribute table of ukeys within highway wildlife corridors	Soft	***hwy_corr***
New Access Control Units	map with additional units for harvest sequencing noted	Soft	***new_comps***
LICENCE16POLYGONS.SHP	Shapefile identifying polygons of the classified landbase within licence 16	Soft	***lic16***
TSA_RD8_WILD_CORRIDORS.ATT	Attribute table of ukeys within high elevation wildlife corridors	Soft	***wildlife_c***
Base Features			
CUTLINEBUF	Created by applying 3 m buffer to C5_1PACCCUT	Hard	***cutlinebuf*** (with width of buffer)
ROADSBUF	Created by applying 3 m/8 m buffers to C5_1PACCALL	Hard	***roadbuf*** (with width of buffer)
LAKESBUF	Created by applying 100 m buffers to all lakes > 4 ha in C5_PHYDLAK	Hard	***hydpbuf***
STREAMBUF	Created by applying 30 or 60 m buffers to C5_1PHYDSLN	Hard	***hydlbuf***
PIPEBUF	Created by applying 10 m buffer to C5_1PFACPPL	Hard	***pipebuf***
Natural Subregions			
C5_NSR	A hybrid natural subregions coverage created by using the LPP modified subregions, where they existed (C5_LPPNSR), and the 1:1 million subregions (C5_1FGEONATR) where they didn't.	Hard	***nsr*** , ***nsrname***
Vegetation Inventory			
C5_1PAVI2001	Alberta Vegetation Inventory (AVI)	Hard	All AVI fields (including ***polynum***)
WETLANDSBUF	Created by applying 30 m buffer to WETLANDS	Hard	***wetlandsbu***
avi_polys.dbf	list of AVI polygons requiring reduced yield estimates in the TSA	Hard	***yc_reduc***
Inventory Updates			
C5_UPDATE_03	Composite coverage of updates to AVI, includes cutblock and range improvement updates to 2001-2002	Hard	***upd_type*** , ***upd_org***
Elevation			
C5_SLOPE451HA	Slopes > 45% and > 1ha in size derived from C5_SLOPE45	Hard	***slope45***
Visual Quality and Recreation			
C5_VQO	Areas with visual quality objectives	Hard	***vqo***
RANREC_BUF100	Created by applying 100 m buffer to RANDOM	Hard	***randombuf***

Dataset	Descripton	Boundary Type	Field in Net Landbase
Watersheds			
C5_SBASINS_PF	C5_SBASINS with 3 small watersheds incorporated. Small watersheds are part of a post-fire watershed study.	Hard	***basin_code***
study watersheds	map with watershed study areas and planned blocks within study watersheds	Hard	***blk_type, add_sub_ws***
Fires			
C5_FIRES	Composite coverage of fires P010212000, CWF-084-2003 and CWF-136-2003, clipped to FMU boundary	Hard	***firenumber*** , ***burncode***
Blocks			
PREBLOCKS_PF	Post-fire preblocks (removed some preblocks from previous PREBLOCKS coverage and added fire salvage blocks – September, 2003)	Hard	***pblk_no***
CWF081_CUTBLOCKS.SHP	Shapefile of regen blocks within the Lost Creek fire	Hard	***blk_source, blk_status, z_yr_tsa***
PROPBLKNOV26.SHP	Shapefile of salvage blocks within the Lost Creek fire	Hard	***blk_source, blk_status, z_yr_tsa***
SPRAY_PLAN	Spray Lakes blocks derived from FIRST PASS BLOCKS OCT 04.SHP and c5l70405harvest.xls	Hard	***blk_source, blk_status, z_yr_tsa***
SAVANA_PLAN	Atlas blocks in Savana Creek derived from BLOCKS_RDS and THEMES2004.DGN	Hard	***blk_source, blk_status, z_yr_tsa***
DUTCH_XPLAN	Atlas blocks in Dutch Creek derived from DUTCH_CREEK_2004.DGN	Hard	***blk_source, blk_status, z_yr_tsa***
LOW_LIV_PLAN	Atlas blocks in Lower Livingstone derived from LOWERLIVINGSTONE.DGN	Hard	***blk_source, blk_status, z_yr_tsa***
UP_LIV_PLAN	Atlas blocks in Upper Livingstone derived from UPPERLIVINGSTONE.DGN	Hard	***blk_source, blk_status, z_yr_tsa***
BLKS_TOCUT	Planned blocks derived from CASTLE_HARDWIRE2.SHP, CROWSNEST_MPB_HARDWIRE.SHP, ELKHORN_HARDWIRE.SHP, LINDERMAN_HARDWIRE_REV.SHP, LYNDONCB.SHP, and MCGILLIVRAYCB.SHP	Hard	***block_src, block_src_, block_id, z_yr_per***
UC515_LBRD9F.SHP	Cutblocks in Porcupine Hills area identified based on the classified landbase polygons from C5l5_BLOCK.SHP	Soft	***blk_src_hr, blk_status, z_yr_tsa***
UFS_LBRD9F.SHP	Cutblocks in IRC1 compartment identified based on the classified landbase polygons from FIRE_SMART_YORK_OVRID.SHP	Soft	***blk_src_hr, blk_status, z_yr_tsa***
050926YORKCREEKLINDERMAN.SHP	Shapefile of cutblocks in York Creek	Soft	***blk_src_hr, blk_status, z_yr_tsa***
050921STARWATERSHEDESIGN.SHP	Shapefile of the Star watershed design	Soft	***blk_src_hr, blk_status, z_yr_tsa***
050921DEFERALSTODECADE2.SHP	Shapefile of cutblocks to defer to decade 2	Soft	***blk_src_hr, blk_status, z_yr_tsa***
050926TP15RG3HARDWIRE1STPASS.SHP	Shapefile of cutblocks in Township 15 Range 3	Soft	***blk_src_hr, blk_status, z_yr_tsa***
050926TP15RG3HARDWIRE2NDPASS.SHP	Shapefile of cutblocks in Township 15 Range 3	Soft	***blk_src_hr, blk_status, z_yr_tsa***
050922ELKHORNLIVINSTONEHARDWIRE.SHP	Shapefile of cutblocks in Elkhorn / Livingstone areas	Soft	***blk_src_hr, blk_status, z_yr_tsa***
ALLISONTSA_HARDWIREVS02.SHP	Shapefile of cutblocks in the Allison area (updated)	Soft	***blk_src_hr, blk_status, z_yr_tsa***
FIRESMT_CUT	FireSmart blocks and treatments derived from FIRE_SMART_2004.SHP	Soft	***fs_src, fs_treat, fsmart_id, fs_prescri***
NSR_BLKS.SHP	Shapefile of not sufficiently restocked blocks in C5	Hard	***aris_id, r_status, z_year***
C5_HIST_CC.SHP	Shapefile of historical block information incorporated into the TSA landbase derived from NSR_BLKS.SHP and CUTBLKS2004BNAD83.SHP	Hard	***aris_id, r_status, z_year***
Wildlife			
C5_WATERB400	Created by applying 400 m buffer to C5WATERBODIES	Soft	***c5water_b4***
TSA_RD8_4GRIDS_ATTRIBUTES.ATT	Attribute table of ukeys within wildlife shapefiles derived from ROUGH_OLSEN_ELKTHEME.SHP, 2020RATING HIGH AND EXTREME.SHP, HARD_HSI.SHP, WOLV_HSI.SHP	Soft	***elkmax, hardmax, wolvmax, mpbmax***

3.3.1 Block Classification (blk_source, blk_src_hr, blk_status, z_yr_tsa)

Block classification consisted of identifying block status, type, source of information, and harvest year. The block classification had to reconcile the conflicting information provided by the many sources of block data. This was completed by creating a hierarchy that ranked the different sources of information. Generally, the more recent and more specific data sources were ranked higher in the hierarchy. Block information for historic blocks took precedence over planned block information.

3.3.1.1 **Historic Blocks**

Existing blocks were classified into one of the following seven categories. There were blocks that met more than one of the following categories; these classifications were done as a hierarchy so any information was overwritten from earlier categories when the blocks fell within later categories. All polygons that met any of the following criteria were assigned 'EXIST' in the ***blk_status*** field.

- The first category by which existing blocks were classified was a clearcut AVI 'CC' modifier. Any polygons where ***mod1*** was equal to 'CC', ***mod1_ext*** was greater than or equal to 4, and had not been burnt. The harvest year was then set based on the following rules in order of highest priority to the least:
    - If ***upd_org*** was greater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***upd_org***.
    - If ***mod1_yr*** was greater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***mod1_yr***.
    - If ***z_year*** was not equal to 0 than ***z_yr_tsa*** was equal to ***z_year***.
    - If ***z_yr_tsa*** was still blank then the harvest year was equal to the ***origin***.
    - Finally if ***z_yr_tsa*** was still blank then the harvest year was equal to 1990.
- The second category in which existing blocks were classified was Atlas Lumber or Spray Lakes Sawmills planned blocks. These blocks were identified by the ***blk_source*** field being filled with 'NOV_2004'. The harvest year was set based on the following rules.
    - If ***mod1_yr*** was greater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***mod1_yr***.
    - If ***upd_org*** was greater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***upd_org***.
    - If ***z_year*** was not equal to 0 then ***z_yr_tsa*** was equal to ***z_yr***.
    - Finally if ***z_yr_tsa*** was still blank the harvest year was set to 2004.
- The next classification of blocks was blocks that contained a ***z_yr_per*** of –1. These blocks were harvested by Linderman. The harvest year assigned to these blocks followed this hierarchy:

- If ***mod1_yr*** was greater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***mod1_yr***.
- If ***upd_org*** was greater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***upd_org***.
- If ***z_year*** was not equal to 0 than ***z_yr_tsa*** was equal to ***z_year***.
- Finally if ***z_yr_tsa*** was still blank it was set to 2004.

- The fourth existing block classification were polygons that had a 'CC' ***upd_type***. The harvest year for these blocks was set based on the following classification:
  - If ***mod1_yr*** was greater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***mod1_yr***.
  - If ***upd_org*** wasgreater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***upd_org***.
  - If ***z_year*** was not equal to 0 than ***z_yr_tsa*** was equal to ***z_year***.
  - Finally if ***z_yr_tsa*** was still blank then the harvest year was equal to the ***origin***.
- The next existing block classification was blocks that had an ***aris_id***. ARIS blocks had a harvest year assigned based on the following criterion:
  - If ***mod1_yr*** was greater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***mod1_yr***.
  - If ***upd_org*** was greater than 0 and less than 9999 then ***z_yr_tsa*** equalled ***upd_org***.
  - If there was no harvest year assigned after these two criterion than harvest year was set to the stand origin (***origin***).
- The sixth classification of existing blocks occurs when there was a valid ***z_year***. If the ***z_year*** was greater than 0 and less than 9999 the harvest year was set to the ***z_year***.
- Finally, blocks that were harvested in the Lost Creek Fire were identified by ***blk_source*** being equal to 'LOST_CRE'. The harvest year (***z_yr_tsa***) was set to 2003 for all blocks in this category.

3.3.1.2 Planned Blocks

There were four types of planned blocks identified in C5 FMU final classified landbase. These rules were also hierarchical, and blocks were identified by the latest type in this list. The ***blk_status*** field was set to 'PLAN' for all planned blocks.

- The first group of planned blocks identified were blocks in the Star watershed. These areas were identified based on the ***blk_type*** field being filled with 'STAR PLANNED' where ***adj_compco*** was not equal to 'SOLC', 'HEC1', 'MIC1', 'CPC', 'IRC1', 'FCR', or 'MIC2'; as there were over-riding hardwired blocks in these areas.

- The next group of planned blocks that were identified were areas that had a valid (not blank) planned block number (***pblk_no***) and where ***adj_compco*** was not equal to 'SOLC', 'HEC1', 'MIC1', 'CPC', 'IRC1', 'FCR', or 'MIC2'; as there were over-riding hardwired blocks in these areas.
- Additional to the previous two grouping of planned blocks there was a distinct set of blocks that were identified for FireSmart activities. These blocks were identified by the ***fs_src*** field not being blank and ***adj_compco*** not being equal to 'SOLC', 'HEC1', 'MIC1', 'CPC', 'IRC1', 'FCR', or 'MIC2'; as there were over-riding hardwired blocks in these areas.
- The next grouping of planned blocks that were identified were blocks that contained a ***block_src*** value and had a ***z_year_per*** that were not equal to 0 and where ***adj_compco*** was not equal to 'SOLC', 'HEC1', 'MIC1', 'CPC', 'IRC1', 'FCR', or 'MIC2'; as there were over-riding hardwired blocks in these areas.
- The final grouping of planned blocks were blocks that were hardwired into the spatial harvest sequence by quota holders and SRA staff. These blocks were identified by ***blk_src_hr*** being = 'HARDWIRE'.
- The harvest year (***z_yr_tsa***) for all planned blocks was set to:
    - 2005 if ***adj_compco*** was equal to 'MIU1', 'MIU2', or 'HEU1'
    - ***z_year*** if it was not equal to zero.
    - ***z_yr_per*** * 5 + 2003, when the ***z_yr_per*** was not equal to 0.
    - Finally if ***z_yr_tsa*** was still blank the harvest year was set to 2008 unless they occurred in the 'BMC' or 'SFRM' compartments in which case harvest year was set to 2018.

3.3.1.3 Block Sliver Update

There were a number of anomalies in the block information due to the different sources of block information. For the first interim landbase, the effective date was 2001, and planned blocks in this file were anything to be harvested after 2001. However, during the development of the final classified landbase and the change in effective date to 2005, some of the planned blocks became historic blocks.

In most cases, the spatial information used to define the original planned block and the final historic block were slightly different. Through a visual analysis of these areas, it was evident that they were sliver areas still called planned blocks surrounding a historic cutblock where the actual harvest area was slightly smaller than the planned block area. These areas should not be retained as planned blocks.

The identification of these areas was completed using only attributes, not spatial processing. First, the original planned blocks were selected (***pblk_no*** not blank). If the major portion of the area within a unique ***pblk_no*** was also within an existing block (***blk_status*** = 'EXIST'), then the ***pblk_no*** was deleted for the planned block. The sliver polygons remained, but they were no longer identified as planned blocks.

3.3.2 Inaccessible and Isolated Stands

Inaccessible and isolated stands were identified in independent analyses, although there were some stands that met the criteria for both.

Map 3-1 presents the inaccessible and isolated areas within C5 FMU. The landbase identified areas where slopes were greater than 45% and actual areas of steep slopes may deviate from those identified in the data. There may still be inaccessible and isolated stands in C5 FMU that have not been identified in this analysis. They will be dealt with during annual operating plan development.

The impact on harvest levels of removing both inaccessible and isolated areas from the managed landbase was determined in a TSA sensitivity analysis. The areas were small, and the impacts were not significant (The Forestry Corp, 2005).

This analysis was done prior to the addition of fire salvage and all regenerating blocks to the managed landbase, which might preclude the inaccessible/isolated flag on small areas. As well, stands were determined to be inaccessible or isolated based on the active landbase, and there might be small areas of leading conifer surrounded by D and DC stands that have not been flagged as inaccessible or isolated.

Only isolated stands were considered deletions in the landbase classification process. Inaccessible stands were not included in this analysis due to an oversight in the landbase classification process.

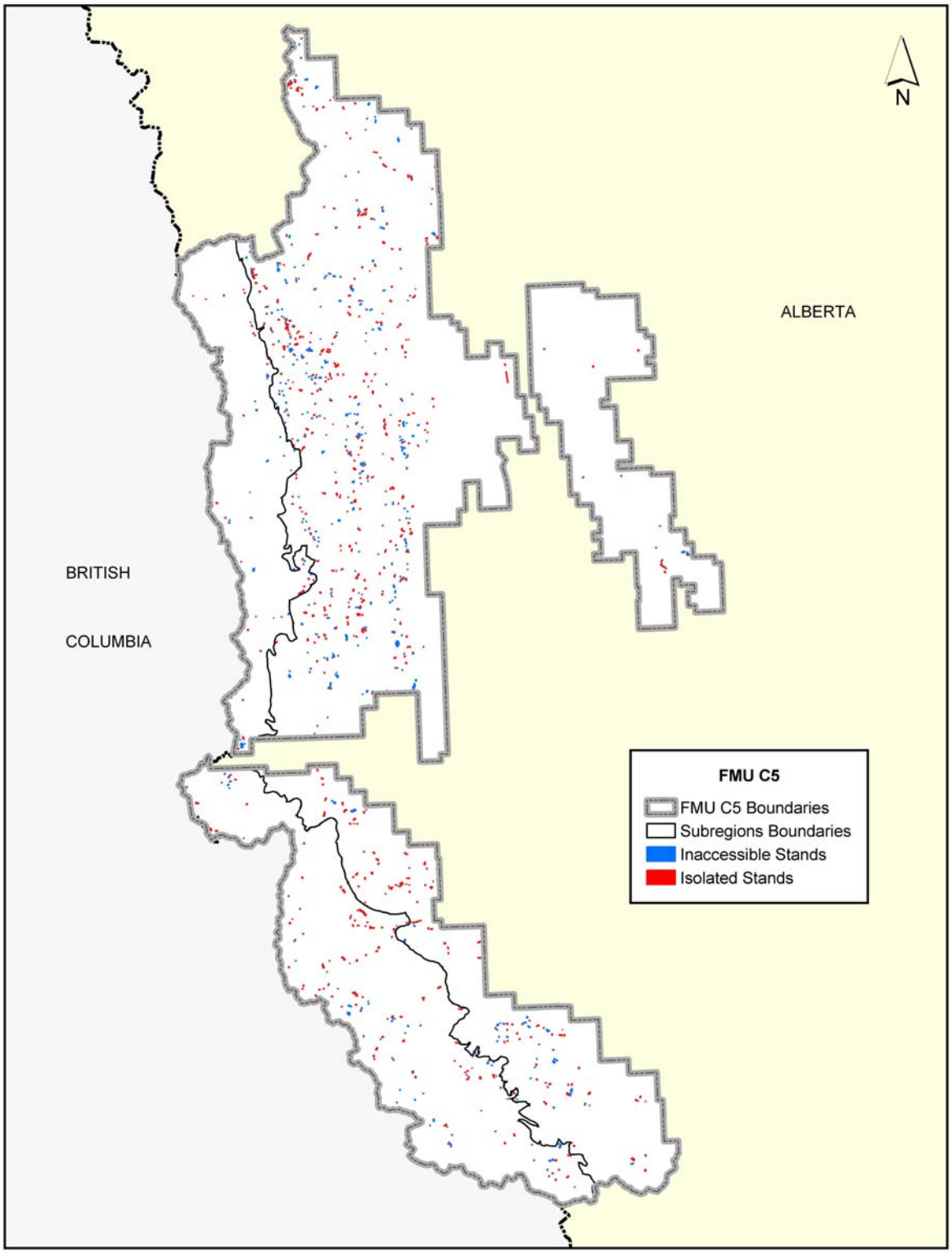
3.3.2.1 Inaccessible Stands

The topography and landbase classification processing of C5 FMU created small inaccessible areas of active landbase surrounded entirely by steep slopes that will likely never be harvested as it would be too difficult or costly to build roads to these areas. Inaccessible stands were defined only for the active landbase as areas entirely surrounded by steep slopes based on the following size classes:

- < 2 ha in size and entirely surrounded by steep slopes for 30 m,
- 2-5 ha in size and entirely surrounded by steep slopes for 40 m,
- > 5 ha in size and entirely surrounded by steep slopes for 50 m.

This analysis was completed using GIS tools: first, stand boundaries within the active landbase were dissolved and then each area was buffered by the appropriate distance to determine if there was any area within the specified distance that was not steep slopes. If buffered areas for two stands overlapped, then neither stand was identified as inaccessible.

There were 369 ha in the active landbase entirely surrounded by steep slopes, of which 234 ha met the minimum size/distance requirements to be inaccessible.



Note: Many of these areas were quite small and thick outlines were used to map them so they would be visible.

Map 3-1: Inaccessible and isolated stands within C5 FMU.

3.3.2.2 Isolated stands

Isolated stands were also assessed and these were areas < 1 ha in size that were more than 30 m from the nearest active landbase areas. 402 ha were found to be isolated, which included 107 ha that were also considered to be inaccessible.

3.4 Polygon Elimination Process

After all of the layers had been unioned in the first interim classified landbase, there were approximately 402,006 polygons. This was considered too many polygons for the purposes of the TSA. Reducing the number of polygons also helped speed of processing of shapefiles for summarizing, reporting and making maps.

The integrity of all the information included in the development of the net landbase was maintained as best as possible in the polygon elimination process. The number of polygons was reduced from 402,000 to 161,000 and the average polygon size on the managed landbase increased from 1.3 ha to 2.2 ha with virtually no change in the active landbase area. The aml code used in this process is provided on DVD in Addendum II.

The rules used in the polygon elimination process were:

- Polygons < 0.001 ha in size were removed by merging the areas into adjacent polygons;
- Land status boundaries including private land, protected areas, ESIP Zone 1 Prime Protection and Recreation areas were 'hard' (could not be removed);
- AVI polygon boundaries were 'hard' except within seismic, roads and pipelines;
- Forested/non-forested boundaries were 'hard'. These included the Lost Creek fire boundary, seismic, roads, pipelines and non-forested as defined by AVI;
- Steep slope boundaries were maintained where they determined the active/passive landbase split. Steep slope boundaries in the passive landbase were removed.

Whenever subsequent layers were unioned to an interim classified landbase, a similar polygon elimination was completed to remove any slivers that were created.

3.5 Re-combining AVI Stands

The last task to create the final classified landbase was to ensure that AVI stands in the managed landbase that were divided into multiple shapes by the landbase processing were re-combined. This step was necessary for the TSA models to behave in a desired manner to achieve an operationally feasible result. Typically, entire AVI stands are selected for harvest, and the only way to ensure that the TSA models achieve that was to re-combine the AVI stands.

This step was documented here because it described spatial processing, however chronologically, it occurred after the assignment of the derived attributes (Section 4).

Polygons with the same AVI stand number (***poly_num***), operational compartment (***pw_compart***), covertype (***theme8***), age (***tsaage_yrs***) and landbase code (***act_pas***) were grouped, or dissolved together. The re-combining of AVI stands was only completed for polygons in the managed landbase with a net area (***f_area***) > 0.000001 ha. All polygons on the unmanaged landbase and extremely small polygons in the managed landbase remained "as-is" in the final coverage.

The resulting AVI stands required all attribute information be available, so the attributes of the largest portion of the stand were assigned to the resulting polygon. Note that some information related to deletion codes such as 400 m buffers for long-toed salamanders and western toads, were not used in this dissolve. Therefore, the areas classified as deletions in the buffer surrounding important salamander habitat in the classified landbase may not represent exactly 400 m from the edge of the water bodies.

4 DERIVED ATTRIBUTES

After the spatial processing, additional attributes were required for TSA modelling. These attributes were derived using the information from the spatial and other input datasets.

The derived attributes were calculated at various stages during the landbase classification process. Scripts were used to provide a record of the rules used to calculate the derived attributes. The scripts took several shapes and included amls, SQL and FoxPro code. They are provided on DVD in Addendum II.

This section summarizes the final calculation for all derived attributes. Figure 4-1 outlines the generic approach taken to create the database containing all attributes for the final classified landbase.

All hierarchical used in the document shows the most important/overriding classification last except where otherwise stated.

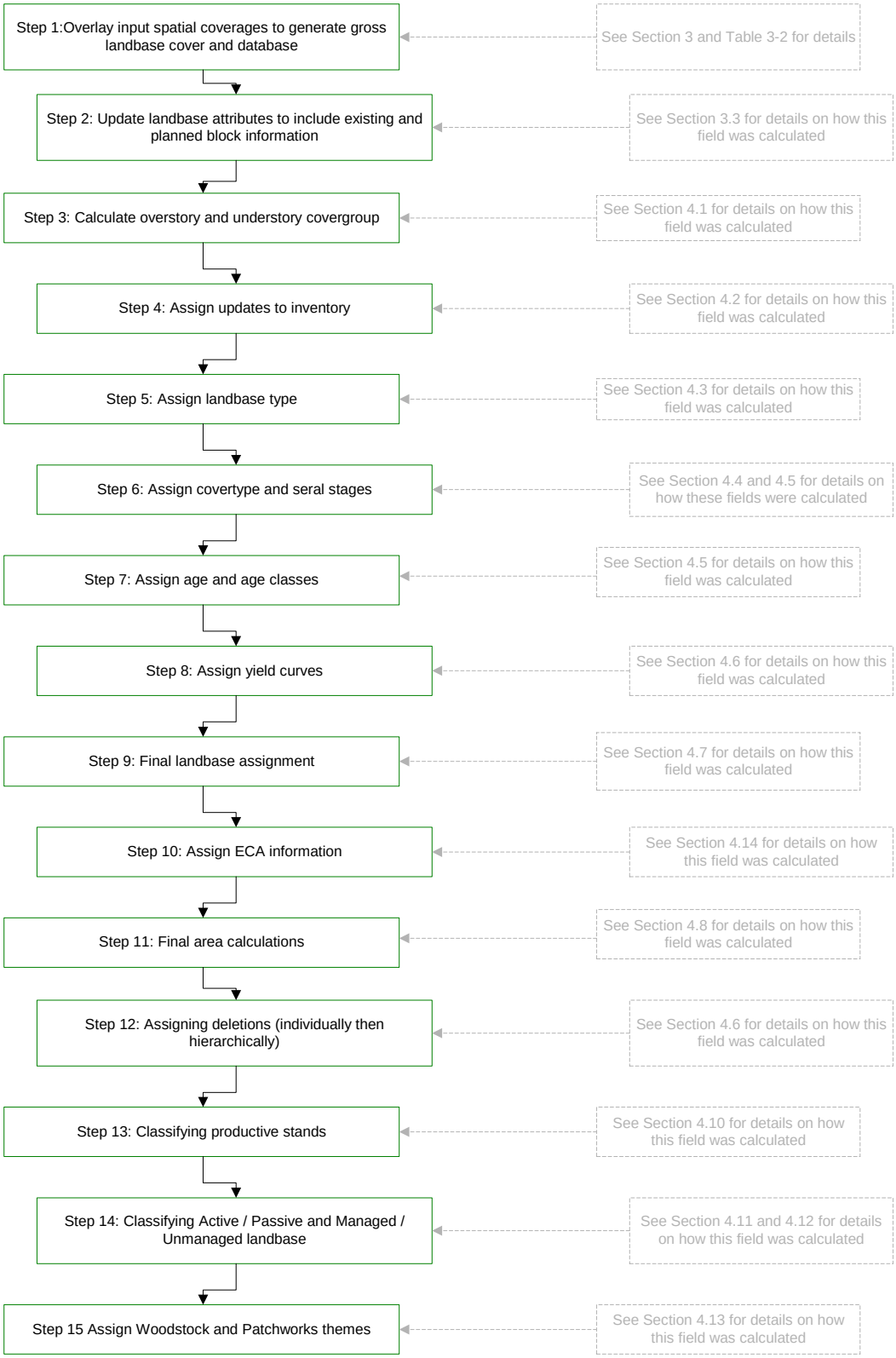


Figure 4-1: The classified landbase creation process for derived attributes.

4.1 Cover Group (tot_conifer, tot_decid, cov_grp, utot_conif, utot_decid, ucov_grp)

Cover group is a broad classification to identify pure and mixedwood stands and species types within them. Cover group was assigned to both the overstorey and understorey layers with a valid forested species composition.

The total percent of conifer was used to assign cover group. Table 4-1 shows the percent classes and the rules are described below.

Table 4-1: Cover group definitions.

Cover Group	% Conifer Crown Closure	Description
C	80-100	Pure Conifer
CD	50-70	Conifer-leading Mixedwood
DC	30-40	Deciduous-leading Mixedwood
D	0-20	Pure Deciduous

- The percent values (***sp1_per*** to ***sp5_per***) associated with conifer species ('P', 'Pl', 'Pa', 'Pf', 'Pj', 'Sw', 'Sb', 'Se', 'Fa', 'Fb', 'Fd', 'Lt', 'La', 'Lw in the ***sp1*** to ***sp5*** fields) were summed and placed in the ***tot_conife.*** This field was already calculated and provided in the AVI database.
- The ***tot_conife*** field was used to assign overstorey cover group (***cov_grp***). The percentage categories used to assign the various cover groups were based on those outlined in the Forest Mangement Planning Manual (2005) document and various FMA documents.
    - Polygons with an overstorey coniferous percent (***tot_conife***) greater than or equal to 8 were assigned to the 'C' cover group (***cov_grp*** was equal to 'C').
    - Polygons with an overstorey coniferous percent (***tot_conife***) less than 8 and greater than or equal to 5 were assigned to the 'CD' cover group (***cov_grp*** = 'CD'), even if the leading species was deciduous.
    - Polygons with an overstorey coniferous percent (***tot_conife***) less than 5 and greater than 2 were assigned to the 'DC' cover group (***cov_grp*** = 'DC').
    - Polygons with an overstorey coniferous percent (***tot_conife***) less than or equal to 2 were assigned to the 'D' cover group (***cov_grp*** = 'D').
- The percent values (***usp1_per*** to ***usp5_per***) associated with conifer species ('P', 'Pl', 'Pa', 'Pf', 'Pj', 'Sw', 'Sb', 'Se', 'Fa', 'Fb', 'Fd', 'Lt', 'La', 'Lw in the ***usp1*** to ***usp5*** fields) were summed and placed in the ***utot_conif.*** This field was already calculated and provided in the AVI database.
- The ***utot_conif*** field was used to assign an understorey cover group (***ucov_grp***).
    - Polygons with an understorey coniferous percent (***utot_conife***) greater than or equal to 8 were assigned to the 'C' understorey cover group (***ucov_grp*** was equal to 'C').

- Polygons with an understorey coniferous percent (***utot_conife***) less than 8 and greater than or equal to 5 were assigned to the 'CD' understorey cover group (***ucov_grp*** = 'CD'), even if the leading species was deciduous.
- Polygons with an understorey coniferous percent (***utot_conife***) less than 5 and greater than 2 were assigned to the 'DC' understorey cover group (***ucov_grp*** = 'DC').
- Polygons with an understorey coniferous percent (***utot_conife***) less than or equal to 2 were assigned to the 'D' understorey cover group (***ucov_grp*** = 'D').

4.2 Inventory Update (updt_type, fire_stand)

Updates to the original inventory must be taken into account. The original AVI calls are not overwritten. A new field ***updt_type*** was created and the field was populated using the AVI ***mod1*** and ***mod2*** fields as well as ***upd_type*** field from the update layer. Some updates were associated with grazing/range improvement activities. They were assigned to a naturally non-forested cover group.

- ***updt_type*** is filled with a 'CC' if the ***mod1***/***mod2*** fields equal 'CC' and the ***mod1_ext***/***mod2_ext*** field is greater than 3.
- ***updt_type*** is also filled with a 'CC' if the ***upd_type*** field equals 'CC'.
- In those cases where updates are the result of range improvement activities (***upd_type*** field equals 'GR'), ***updt_type*** is filled with 'GR'.

For the Lost Creek fire (***firenumber*** = 'CWF-084-2003'), burnt and unburnt areas within the gross fire boundary needed to be identified for timber supply modeling.

- ***fire_stand*** was filled with 'burnt' if ***burncode*** equaled 'B'
- ***fire_stand*** was filled with 'partial' if ***burncode*** equaled 'PB'
- ***fire_stand*** was filled with 'Green' if ***burncode*** equaled 'I'
- Additionally any areas within 150m of the outside boundary of the fire were identified by ***fire_stand*** being filled with 'buf150'.

4.3 Landbase Type (lbtype)

Next a landbase type (***lbtype***) was assigned to each polygon. Landbase type was created as an intermediate step designed to classify horizontal stands or stands which will be managed for the understorey. The five landbase types were:

R	Regular
HO	Horizontal Overstorey (struc = 'H' and struc_val >= 50%)
HU	Horizontal Understorey (struc = 'H' and struc_val < 50%)
CCC	Clear Cut Conifer
CCD	Clear Cut Deciduous

Only the majority portion of each horizontal stand will contribute to the area used in all summaries and timber supply modeling. When the structural value was 5 or greater the preference was given to the overstorey portion of the horizontal stand. The overstorey portion was most likely to have a forested cover type since the tallest portion of the horizontal stand was listed first.

- If the polygon had a horizontal structure (***struc*** = 'H') and the overstorey structural value (***struc_val***) was greater than or equal to 5 then the polygon was assigned to the horizontal overstorey landbase type (***lbtype*** = 'HO'). This means that only the overstorey portion of the horizontal stand was considered during the remainder of the program.
- If the polygon had a horizontal structure (***struc*** = 'H') and the overstorey structural value (***struc_val***) was less than 5 then the polygon was assigned to the horizontal understorey landbase type (***lbtype*** = 'HU'). This meant that only the shorter, understorey portion of the horizontal stand was considered during the remainder of the program. All definitions provided in the following sections use only the overstorey fields, however the understorey fields must be substituted when ***lbtype*** = 'HU'.
    - There were two stands (***poly_num*** = 90450005 and 70650207) within C5 that prove to be somewhat problematic to classify, as the majority horizontal understorey layer was non-forested. However, the decision was made to treat the stands as being non-forested, so they were classified as 'HU' (as well as non-forested and non-productive).

Polygons were then assigned to the regular landbase type. The overstorey portion of the polygon was considered during the remainder of the program.

- ***lbtype*** was filled with 'R' for all other stands.

Polygons within fires were not assigned a landbase type.

- ***lbtype*** was blank if ***burncode*** was equal to 'B' or 'PB'.

Cutblocks were assigned to a landbase type based on the post harvest cover group.

- If existing blocks (***blk_status*** was equal to 'EXIST') currently have a coniferous leading cover group (***cov_grp*** was equal to 'C', 'CD', or ' '), they were placed in the clear cut conifer landbase type (***lbtype*** was filled with 'CCC'). Blank cov_grp was included as non-forested clear cuts were classified as blocks and were placed on the coniferous landbase
- Existing blocks currently having a deciduous leading cover group (***cov_grp*** was equal to 'DC' or 'D') were placed within the clear cut deciduous landbase type (***lbtype*** was filled with 'CCD').

4.4 Covertype and Pine/Pine-Englemann Spruce Mixes (c5_covtype, pl_plse)

As part of the landscape assessment for the C5 FMU, SRD staff developed eight forested covertypes and two non-forested covertypes. Subsequently, a ninth regenerating

covertype was created for post-1991 cutblocks (Forest Management Branch, 2005). Non-forested stands were classified as either naturally non-forested or anthropogenic non-forested. The defining layer of each stand was selected based on the landbase type. For regular, horizontal overstorey and clearcut (harvested prior to 1991) landbase types (*lbtype* = "R" or "HO" or "CCC" or "CCD"), the defining layer was the overstorey. For Horizontal Understorey landbase type (lbtype = "HU"), the understorey (specifically the understorey cover group and understorey leading species) was the defining layer.

Stands were classified according to Table 4-2 using the defining layer. The fields in the database related to the table are:

- Cover type (***c5_covtype***),
- Cover group (***cov_grp***), and
- Leading species (***sp1***).

Post-1991 cutblocks (***lbtype*** = "CCC" or "CCD" and ***z_yr_tsa*** > 1991) were assigned to the regenerating cover type (C-Re).

Burned areas were assigned to the naturally non-forested cover type where there had been forest cover prior to the fire (***sp1*** was not blank). Existing cutblocks within the burns overwrote the 'NNF' and the regenerating covertype ('C-Re') was assigned, unless they were within an access deletion. Further descriptions of cover types and seral stages can be found in the Landscape Assessment.

The 'Middle Ridges – Racehorse Creek' and 'Middle Ridges – Crowsnest River' compartments (***comp_code*** = 'MIR' or 'MIC') had areas that needed to be deferred from harvest for a period of time in the TSA as they were height suppressed. These stands were assumed to be eligible for forest management activities in the future. Any stand within these two compartments that met the any of the following species composition criteria and was less than or equal to 13 m tall (***height*** <= 13) was classified as a pine/pine-Engelmann spruce mix (***pl_plse*** = 'PL_P):

- The stand was 100% pine (***sp1*** = 'Pl', 'P', 'Pa', or 'Pf' and ***sp1_per*** = 10).
- The leading species was pine (***sp1*** = 'Pl', 'P', 'Pa', or 'Pf') and the second species was Engelmann spruce (***sp2*** = 'Se'). The stand was composed of 80 or 90% pine and the remainder of the stand was Engelmann spruce ((***sp1_per*** =9 and ***sp2_per*** = 1) or (***sp1_per*** = 8 and ***sp2_per*** = 2)).
- The leading species was pine (***sp1*** = 'Pl', 'P', 'Pa', or 'Pf') and the second species was Engelmann spruce (***sp2*** = 'Se'). The stand must have been comprised of 100% coniferous species (***tot_conife*** = 10), and the leading species must comprise 80% of the stand (***sp1_per*** = 8) and the second species must comprise 10% of the stand (***sp2_per*** = 1).

Table 4-2: Cover types definitions.

Cover Type[1]	Description	Cover Group	Leading Species
C-Fa	Forested areas with > 80% conifer species composition in the overstory layer with alpine or balsam fir as the leading species	C	Fa, Fb
C-La	Forested areas with > 80% conifer species composition in the overstory layer with alpine larch, tamarak or western larch as the leading species	C	La, Lt, Lw
C-Fd	Forested areas with > 80% conifer species composition in the overstory layer with Douglas-fir as the leading species	C	Fd
C-Px	Forested areas with > 80% conifer species composition in the overstory layer with lodgepole, whitebark, or limber pine as the leading species	C	Pl, P, Pa, Pf
C-Sx	Forested areas with > 80% conifer species composition in the overstory layer with white spruce or Engelmann spruce as the leading species	C	Sw, Se
C-Re	Forested cutblocks harvested post '91. These areas represent an aggregation of all areas harvested, the majority of which are C cover group.	C, CD, DC, D	Any
CD	Forested areas with 50% up to 80% conifer species composition in the overstory layer	CD	Any
DC	Forested areas with 30% to 40% conifer speices composition in the overstory layer	DC	Any
D	Forested areas with 20% or less conifer species composition in the overstory layer	D	Any
NNF	Non-Forested (areas that do not currently support forest growth)		None
ANF	Anthropogenic Non-Forested (man-made disturbances)		None

[1] Cover type C-Re applies only to post-1991 cutblocks (***z_yr_tsa*** > 1991). All other cover types apply to natural (fire-origin) stands and pre-1991 cutblocks.

Cover group was updated to include the inventory updates. Cover group (***cov_grp***) was assigned to naturally non-forested (***C5_covtype*** = 'NNF') when ***updt_type*** was equal to 'GR'.

The fires that occurred in 2000 and 2003 must also be considered "updates" to the inventory, so they were also dealt with. Any stands burnt within the fire were classified as non-forested.

- Polygons with ***burncode*** = 'B' or 'PB' were assigned to a naturally non-forested cover group (***C5_covtype*** = 'NNF').

4.5 Age (stand_age, f_agecls, agecls10)

Several age and age class fields were calculated.

In this analysis, final stand age (***stand_age***) was calculated using the current year, 2005.

- For stands in the regular landbase (***lbtype*** = 'R') or the horizontal overstorey landbase (***lbtype*** = 'HO'), ***stand_age*** was calculated by subtracting the ***origin*** from 2005.

- For stands in the horizontal understorey landbase (***lbtype*** = 'HU'), ***stand_age*** was calculated by subtracting the ***uorigin*** from 2005.
- Historic cutblocks (***blk_status*** was equal to 'EXIST") were assigned a final age based on the harvest year (***stand_age*** was filled with 2005 minus ***z_yr_tsa***).

Five-year age classes (***f_agecls***) were created using the final stand age. The first five-year age class (1) encompasses ages 0 to 5 because Woodstock does not allow for age class of 0. A function called CEILING is used to create age classes by rounding up to the nearest integer (in effect, the upper end of each age class). For example, ***f_agecls*** is filled with 9 when CEIL ((2005 - 1966)/5) = 9. For reporting purposes, ten-year age classes (***agecls10***) were also created using the CEILING function.

4.6 Yield Curve (f_yc)

The next step was to assign a valid yield curve to all polygons (***f_yc***). Stands in the regular landbase type (***lbtype*** = 'R'), the horizontal overstorey landbase type (***lbtype*** = 'HO'), of harvested landbase (***lbtype*** = 'CCC' or 'CCD') were classified based on the overstorey cover group (***cov_grp***), overstorey species (***sp1***,…), overstorey density (***density***) and natural subregion (***nsr***). The yield curves were assigned based on understory information when ***lbtype*** was equal to 'HU'. The yield curves developed for this analysis are outlined in Table 4-3 and below:

Table 4-3: Yield curve definitions.

Yield Curve	Cover Group	Leading Species	Crown Class	Natural Subregion
1 C-Fd-All[1]	C	Fd	All	All
2 C-Pl-All-M	C	Pl, P, Pa, Pf	All	Montane, Foothills Parkland, Foothills Fescue
3 C-Pl-AB-SA	C	Pl, P, Pa, Pf	A+B	Subalpine, Alpine
4 C-Pl-CD-SA	C	Pl, P, Pa, Pf	C+D	Subalpine, Alpine
5 C-Sx-All-M	C	Sw, Se, Fa, Fb	All	Montane, Foothills Parkland, Foothills Fescue
6 C-Sx-AB-SA	C	Sw, Se, Fa, Fb	A+B	Subalpine, Alpine
7 C-Sx-CD-SA	C	Sw, Se, Fa, Fb	C+D	Subalpine, Alpine
8 CD-All	CD	All	All	All
9 D/DC-All	DC, D	All	All	All
R Regen[2]	C, CD, DC, D	All	All	All
N Non-forested	C	Lt, La, Lw	All	All
	n/a	none	n/a	All

[1] Volume estimates were developed for A+B only, but applied to all crown classes. Validation of this assumption in provided in Appendix 3 of *Growth and Yield* (Forest Management Branch 2004a).

[2] Area-weighted yield curve developed for post-91 cutblocks.

Yield curves were then assigned as follows:

- Stands were assigned to YC 1 if ***cov_grp*** = 'C' and ***sp1***= 'Fd'
- Stands were assigned to YC 2 if ***cov_grp*** = 'C' and ***sp1*** = 'Pl' or 'P' or 'Pa' or 'Pf' and ***nsr*** = 9 or 14 or 18

- Stands were assigned to YC 3 if ***cov_grp*** = ‘C’ and ***sp1*** = ‘Pl’ or ‘P’ or ‘Pa’ or ‘Pf’ and ***nsr*** = 7 or 8 and density = ‘A’ or ‘B’
- Stands were assigned to YC 4 if ***cov_grp*** = ‘C’ and ***sp1*** = ‘Pl’ or ‘P’ or ‘Pa’ or ‘Pf’ and ***nsr*** = 7 or 8 and density = ‘C’ or ‘D’
- Stands were assigned to YC 5 if ***cov_grp*** = ‘C’ and ***sp1*** = ‘Sw’ or ‘Se’ or ‘Fa’ or ‘Fb’ and ***nsr*** = 9 or 14 or 18
- Stands were assigned to YC 6 if ***cov_grp*** = ‘C’ and ***sp1*** = ‘Sw’ or ‘Se’ or ‘Fa’ or ‘Fb’ and ***nsr*** = 7 or 8 and density = ‘A’ or ‘B’
- Stands were assigned to YC 7 if ***cov_grp*** = ‘C’ and ***sp1*** = ‘Sw’ or ‘Se’ or ‘Fa’ or ‘Fb’ and ***nsr*** = 7 or 8 and density = ‘C’ or ‘D’
- Stands were assigned to YC 8 if ***cov_grp*** = ‘CD’
- Stands were assigned to YC 9 if ***cov_grp*** = ‘D’ or ‘DC’
- Stands were assigned to YC ‘R’ if c***5_covtype*** = ‘C-Re’
- All remaining stands were assigned to ‘N’, so that all records were populated for timber supply modeling.

4.7 Landbase (f_lbase)

This part of the program assigns polygons to a final landbase (***f_lbase***).

- Stands were classified as being in the conifer landbase (***f_lbase*** = 1) if they were in the regular landbase or the horizontal overstorey landbase (***lbtype*** = ‘R’ or ‘HO’) and were in the conifer or conifer mixedwood cover groups (***cov_grp*** = ‘C’ or ‘CD’).
- If the stand was in the horizontal understorey landbase (***lbtype*** = ‘HU’) and the understorey cover group (***ucov_grp*** = ‘C’ or ‘CD’) was conifer or conifer mixedwood, the stand was also classified as being in the conifer landbase (***f_lbase*** = 1).
- Stands were considered part of the deciduous landbase (***f_lbase*** = 2) if they were in the regular landbase or the horizontal overstorey landbase (***lbtype*** = ‘R’ or ‘HO’) and the deciduous or deciduous mixedwood cover groups (***cov_grp*** = ‘D’ or ‘DC’).
- If the stand was in the horizontal understorey landbase (***lbtype*** = ‘HU’) and the understorey cover group was deciduous or deciduous mixedwood (***ucov_grp*** = ‘D’ or ‘DC’), the stand was also classified as being in the deciduous landbase (***f_lbase*** = 2).
- Cutblocks were assigned to the conifer cutblock landbase (***f_lbase*** = 4) if ***lbtype*** = ‘CCC’.
- Cutblocks on the deciduous landbase were assigned to the deciduous cutblock landbase (***f_lbase = 5***) if ***lbtype*** = ‘CCD’.

4.8 Areas (area, areaha, f_area, h_area)

The area of each polygon in square metres was generated by the GIS tools (***area***). This area was converted to hectares and placed in the ***areaha*** field.

The area of the classified portion of each stand was calculated for the timber modeling tools. If a stand structure was horizontal, the stand area was reduced to the percentage equal to that of the dominant portion of the horizontal stand (either 'HO' or 'HU' as determined by ***lbtype***). The area was reduced to reflect the classified portion of the stand. This final area was placed in the ***f_area*** field.

- ***f_area*** = ***areaha****(***struc_val***/10) where ***lbtype***='HO'
- ***f_area*** = ***areaha****(***ustruc_val***/10) where ***lbtype***='HU'
- ***f_area*** = ***areaha*** where ***lbtype***='R'

The unclassified area for each polygon was placed in the ***h_area*** field. ***h_area*** was only calculated for stands with a 'HO' or 'HU' ***lbtype***.

- ***h_area*** was the difference between ***areaha*** and ***f_area***.

4.9 Timber Harvest Landbase Exclusions

All land that will not be contributing to the annual allowable cut (AAC) needed to be removed from the gross landbase, leaving the timber harvest or active landbase. This part of the program created a series of interim deletion fields, classified based on the data created through GIS processing. The classifications and fields are unique to each analysis. There were many reasons to exclude lands from the active landbase, including but not limited to, land status, operating ground rules (i.e. hydrography buffers), steep slopes, productivity, and recent fires.

4.9.1 Wildlife Deletions (*d_hsi*)

Areas that were assessed to have high habitat values for specific animals were removed from the timber harvest landbase. Within the FMU, areas highly suitable for harlequin duck, wolverine, and long-toed salamander and western toad were removed from the active landbase.

- ***d_hsi*** was filled with 'D' when ***hardmax*** is equal to 4 and the polygon was not within an planned or existing block.
- ***d_hsi*** was filled with 'V' when ***wolvmax*** is equal to 4 and the polygon was not within an planned or existing block.
- ***d_hsi*** was filled with 'M' when ***c5water_b4*** is equal to 100 and the polygon was not within an existing block.

4.9.2 Isolated Stands Deletions (*d_isol*)

Stands that were in the active landbase but were in remote location with no access features near them were removed from the harvest schedule.

- The isolated stand deletion field (***d_isol***) was filled with 'L' when the unique stand identifier was included in isol_stds_ukey.dbf.

4.9.3 Productivity and Subjective Deletions

Productivity deletions (***d_tpr*** and ***d_nonfor***) and subjective deletions (***d_subj***) needed to be calculated.

4.9.3.1 Non-forested (*d_nonfor*)

Stands that were cleared for range improvement/grazing needed to be considered non-forested, as range improvement and timber production were considered incompatible uses.

- ***d_nonfor*** was filled with 'X' when ***nfl***, ***nat_non***, ***anth_veg***, ***anth_non*** were not blank or when ***upd_type*** was 'GR'.

4.9.3.2 Timber Productivity Rating (*d_tpr*)

Stands with unproductive timber productivity rating were identified as deletions.

When ***lbtype*** = 'R' or 'HO':

- ***d_tpr*** was filled with 'U' when ***tpr*** was 'U'.

When ***lbtype*** = 'HU':

- ***d_tpr*** was filled with 'U' when ***utpr*** was equal to 'U'.

4.9.3.3 Subjective Deletions (*d_subj*)

Subjective deletions were generally applied to low productivity stands; stagnant stands (***origin***/***height*** combinations); stands with undesirable species; or with species requiring protection. These deletions were not applied to existing cutblocks.

When ***lbtype*** = 'R' or 'HO'and ***f_lbase*** = 1:

- ***d_subj*** was filled with 'J1' when ***sp1*** through ***sp5*** was 'La' or 'Lt'.
- ***d_subj*** was filled with 'J2' when ***sp1*** through ***sp5*** was 'Pa' or 'Pf'.
- ***d_subj*** was filled with 'J3' when ***sp1*** or ***sp2*** was 'P' or 'Pl' and ***height*** was less than or equal to 6 and ***origin*** was less than 1945.
- ***d_subj*** was filled with 'J4' when ***sp1*** or ***sp2*** was 'P' or 'Pl' and ***height*** was less than or equal to 12 and ***origin*** was less than 1925.
- ***d_subj*** was filled with 'J5' when ***lbtype*** = 'R' and ***sp1*** was 'Fd' and ***density*** was 'A' or 'B' and ***usp1*** was blank or ***ucov_grp*** was 'D' (not applicable where ***lbtype*** = 'HO').
- ***d_subj*** was filled with 'J6' when ***sp1*** was 'Sb' or ***sp2*** was 'Sb'.

When ***lbtype*** = 'HU' and ***flbase*** = 1:

- ***d_subj*** was filled with 'J1' when ***usp1*** through ***usp5*** was 'La'.
- ***d_subj*** was filled with 'J2' when ***usp1*** through ***usp5*** was 'Pa' or 'Pf'.
- ***d_subj*** was filled with 'J3' when ***usp1*** or ***usp2*** was 'P' or 'Pl' and ***uheight*** was less than or equal to 6 and ***uorigin*** was less than1945.
- ***d_subj*** was filled with 'J4' when ***usp1*** or ***usp2*** was 'P' or 'Pl' and ***uheight*** was less than or equal to 12 and ***uorigin*** was less than 1925.
- ***d_subj*** was filled with 'J6' when ***usp1*** was 'Sb' or ***usp2*** was 'Sb'.

4.9.4 Standard Deletions

The buffer, slope, burn and land status data provided through GIS processing were combined into a buffer deletion field (***d_buf***), slope deletion field (***d_slope***), burn deletion field (***d_burn***) and a land status deletion field (***d_status***). Buffer, slope, and burn deletions were not applied to existing cutblocks while land status deletions were applied to all polygons.

4.9.4.1 Buffers (*d_buf*)

Hydrography buffers were applied in accordance with the provincial Operating Ground Rules. Other buffers were applied in accordance with management objectives and strategies. Table 4-4 outlines the buffer widths used in this analysis.

Table 4-4: Buffer widths used for water bodies and random campsites.

Feature	Buffer Width (in m)	Code
Perennial Streams (***feature_code*** = GA61900000)	30	H
Lakes (***feature_code*** = GB37950000)	100	H
Random Camping Sites	100	E
Wetlands	30	W

- The buffer deletion field (***d_buf***) was filled with 'H' when a perennial stream buffer was present (***hydlbuf*** = 100) and the polygon was not within an existing block.
- The buffer deletion field (***d_buf***) was filled with 'H' when a major river buffer or lake buffer was present (***hydpbuf*** = 100) and the polygon was not within an existing block.
- The buffer deletion field (***d_buf***) was filled with 'E' when a random camping site buffer was present (***randombuf*** = 'Y') and the polygon was not within an existing block.
- The buffer deletion field (***d_buf***) was filled with 'W' when a wetlands buffer was present (***wetlandsbu*** = 100) and the polygon was not within an existing block.

4.9.4.2 Operability (*d_slope*)

Generally speaking, the companies operating in the C5 FMU did not want to operate on slopes greater than 45%, so a slope coverage was created (using the DEM) to classify all slopes greater than 45% that were at least 1 ha in area.

- The slope deletion field (***d_slope***) is filled with 'S' when slopes area greater the 45% and at least 1 ha in area (***slope45*** = 1) and the polygon was not within an existing block.

4.9.4.3 Land Status (*d_status*)

Land status deletions were generally those areas that have an existing status that precludes timber harvesting. In C5 FMU, this includes private land, protected areas, both provincial and forest recreation areas and ESIP (Eastern Slopes Integrated Policy) Zone 1 (Prime Protection).

The land status deletion field (***d_status***) had several codes.

- ***d_status*** was filled with 'R' when ***pra_name*** was not blank or ***fra_name*** was not blank.
- ***d_status*** was filled with 'Z' when ***esipzone*** was equal to 1.
- ***d_status*** was filled with 'P' when ***pa_status*** was equal to 'OC'.
- ***d_status*** was filled with 'F' when ***ownership*** was not equal to blank.

4.9.4.4 Recent Fires (*d_burn*)

Burned over areas cannot be returned to the active landbase until the burned areas were verified to have acceptable forest cover by re-inventory or regeneration liability is assumed.

- The recent burn field (***d_burn***) was filled with 'B' when ***burncode*** was equal to 'B' or 'PB' and ***blk_source*** <> 'LOST_CRE'.

4.9.5 Access-related Deletions (*d_access*)

Lineal features such as roads, cutlines and pipelines were too small to be captured in the inventory as polygon features with associated areas. The BUFFER function in ArcInfo was used to create an estimate of the true area of the cutline, pipeline or road features. Table 4-5 outlines the buffer widths used in this analysis.

Table 4-5: Buffer widths for access-related features in C5 FMU.

Feature	Buffer Width (in m)	D_ACCESS code
Roads (feature_codes DA62200010, DA62200020, DA62200200, DA62200210)	8	A
Cutlines (feature_codes DA62700000, DA62700200, DC76100000, DC7616000, DC76500000, DC76500200)	3	C
Pipelines (feature code EA52550000)	3	O

Areas inside the created buffer were assigned a value of 100 by ArcInfo. This was subsequently updated to reflect the width of roads and seismic (not pipelines) for the interior old forest analysis (***roadbuf*** = 6 or 16 and ***cutlinebuf*** = 6). This area was considered non-forested and as a result did not contribute to the active landbase.

- The buffer deletion field (***d_access***) was filled with 'C' when a seismic line buffer was present (***cutlinebuf*** > 1).
- The buffer deletion field (***d_access***) was filled with 'A' when a road buffer was present (***roadbuf*** > 1).
- The buffer deletion field (***d_access***) was filled with 'O' when a pipeline buffer was present (***pipebuf*** = 100).

4.9.6 Final Deletions (*f_del*)

This part of the program populates the ***f_del*** (final deletion type) field with the appropriate code from the temporary deletion fields. This was based on a "hierarchy of deletions", so that a polygon was only deleted once (no double-counting), based on which deletion type was higher in the hierarchy. For example, if a polygon had both a subjective deletion (***d_subj*** = 'J1') and was a land status deletion (***d_status*** ='Z'), the land status deletion (***d_status)*** would take precedence.

- Initially all polygons initially received a 'N' (not deleted) in the ***f_del*** field.
- 'D', 'V' or 'M' was placed in the ***f_del*** field when ***d_hsi*** was not blank and the polygon was not within an existing block.
- 'L' was placed in the ***f_del*** field when ***d_isol*** was not blank and the polygon was not within an existing block.
- 'X' was placed in the ***f_del*** field when ***d_nonfor*** was not blank and the polygon was not within an existing block.
- 'J' was placed in the ***f_del*** field when ***d_subj*** was not blank.
- Next, the 'U' designation in the ***d_tpr*** field overwrites both the 'N' and subjective deletion calls when not within an existing block.
- Then the previous deletions were replaced with the 'H', 'E' and 'W' designations from the ***d_buf*** field.
- The previous deletions were replaced with the 'A', 'C' and 'O' designations from the ***d_access*** field.
- The previous deletions were replaced with 'B' when ***d_burn*** was 'B'.
- The previous deletions were replaced with 'S' when ***d_slope*** was not blank and it was not within an existing block.
- Finally, land status deletions (***d_status*** is not blank) took priority over all other deletions.

The hierarchy of deletions is outlined in Table 4-6, in order of most constraining to least constraining.

Table 4-6: Hierarchy of deletions used for the C5 landbase classification.

Deletion Code	Description	Priority
M	Western Frog/Long-toed Salamander	19
V	Wolverine	18
D	Harlequin duck	17
L	Isolated stands	16
X	Non-forested	15
J	Subjective deletions	14
U	Unproductive stands	13
H	Hydrography buffer	12
E	Random camping sites	11
W	Wetlands buffer	10
C	Cutlines (Seismic)	9
A	Access (Roads)	8
O	Pipeline	7
B	Burned Area (not including CC)	6
S	Slope >45% and > 1 ha	5
R	Recreation Areas	4
Z	ESIP Zone 1	3
P	Protected Areas	2
F	Private Land (Freehold)	1

4.10 Productive Stands and Final Cover Group (f_prod, f_covgrp)

It was necessary to do a final check to determine which stands were productive forested stands. In addition, a final cover group was determined for reporting purposes.

- All polygons where ***d_nonfor*** was equal to 'X' were classified as unproductive (***f_prod*** was equal to 'N')
- Polygons with ***lbtype*** of 'R' or 'HO' and with an overstorey cover group (***cov_grp*** was not blank) that do not have data entered into the ***nfl***, ***nat_non***, ***anth_non***, or ***anth_veg*** fields were considered productive (***f_prod*** is equal to 'Y'). In this case, ***f_covgrp*** was replaced with ***cov_grp***.
- Polygons with ***lbtype*** of 'HU' and with an understorey cover group (***ucov_grp*** was not blank) that do not have data entered into the ***unfl***, ***unat_non***, ***uanth_non***, or ***uanth_veg*** fields were considered productive (***f_prod*** was equal to 'Y'). In this case, ***f_covgrp*** was replaced with ***ucov_grp***.
- All cutblocks were considered productive (***f_prod*** was equal to 'Y').
- All polygons within burned areas (***d_burn*** = 'B') were classified as non-productive (***f_prod*** is equal to 'N').

4.11 Active/Passive Landbase (act_pas)

Forest Protection Division (FPD) has a need to identify areas that were being actively managed (the "active" landbase) as well as those that were not being actively managed (the "passive" landbase) for fire management and planning purposes.

- All those lands in the active landbase (***act_pas*** = 'A') did not have a final deletion assigned (***f_del*** = 'N').
- The passive landbase (***act_pas*** = 'P') were areas deleted from the active landbase (***f_del*** <> 'N').

4.12 Managed/Unmanaged Landbase (managedlb)

For the TSA for the 2005 FMP for C5 FMU, the active landbase did not correspond with the managed landbase. Deciduous, deciduous leading mixedwood and non-forested cutblocks were not included in the managed landbase for the TSA.

- The managed/unmanaged landbase (***managedlb***) field was filled with 'M' when the ***act_pas*** was equal to 'A' and ***cov_grp*** equaled 'C' or 'CD'.
- The managed/unmanaged landbase (***managedlb***) field was filled with 'U' for all other polygons.

4.13 TSA Attributes

Additional fields were required to accommodate the TSA modelling and create fields for TSA outputs. These fields included themes, ages, access compartments, treatments and timing, and volumes.

4.13.1 Woodstock Themes (*theme1, theme2…*)

The next step was to create and populate the "themes" required for Woodstock modeling. Each theme represents a characteristic which is of interest in the TSA and which can be classified into discreet classes. Woodstock required that ***theme1***, ***theme2*** and so on appear as a group (ordered sequentially) in the database. The themes used in the TSA model are listed in Table 4-7. Attributes for all themes were assigned to all polygons as Woodstock requires all records to be filled in.

Table 4-7: TSA themes for the C5 FMU.

Theme	Description
Theme 1	Subregion
Theme 2	Landscape Management Unit
Theme 3	Adjusted Compartment
Theme 4	Watershed Sub-basin
Theme 5	Deletion
Theme 6	Mountain Pine Beetle Hazard
Theme 7	Status
Theme 8	Yield Curve
Theme 9	Cover Type
Theme 10	Special Management Zone

4.13.1.1 Theme 1: C5 Subregion

Five C5 subregions were created for reporting purposes and were used as the basis for ecological indicator targets. Theme 1, C5 subregion, was assigned using the attributes in the field ***fmu_subr***. A map of the C5 subregions is shown in Map 4-1.

4.13.1.2 Theme 2: Landscape Management Unit

The landscape was further divided into Landscape Management Units that were used for reporting purposes only (Map 4-2). Theme 2 Landscape Management Unit was assigned the attributes in the field ***lmu_ab,*** where the LMU was relevant, all others were grouped to simplify the model.

4.13.1.3 Theme 3: Adjusted Compartment

Compartments were used for reporting purposes and access scheduling in the spatial timber supply model (Map 4-3). Theme 3 Compartment was assigned the attributes in the field ***adj_compco***.

4.13.1.4 Theme 4: Watershed Sub-basin

Watershed sub-basins were used for calculating water yields and to identify areas with higher minimum harvest ages in the TSA (Map 4-4). Theme 4 Watershed Sub-basin was assigned the attributes in the field ***basin_code***.

4.13.1.5 Theme 5: Deletion

The deletion code identifies the reason each stand was removed from the active landbase and stands with no deletion were in the active landbase (Map 4-5). Theme 5 Deletion was assigned using the attributes in the field ***f_del***.

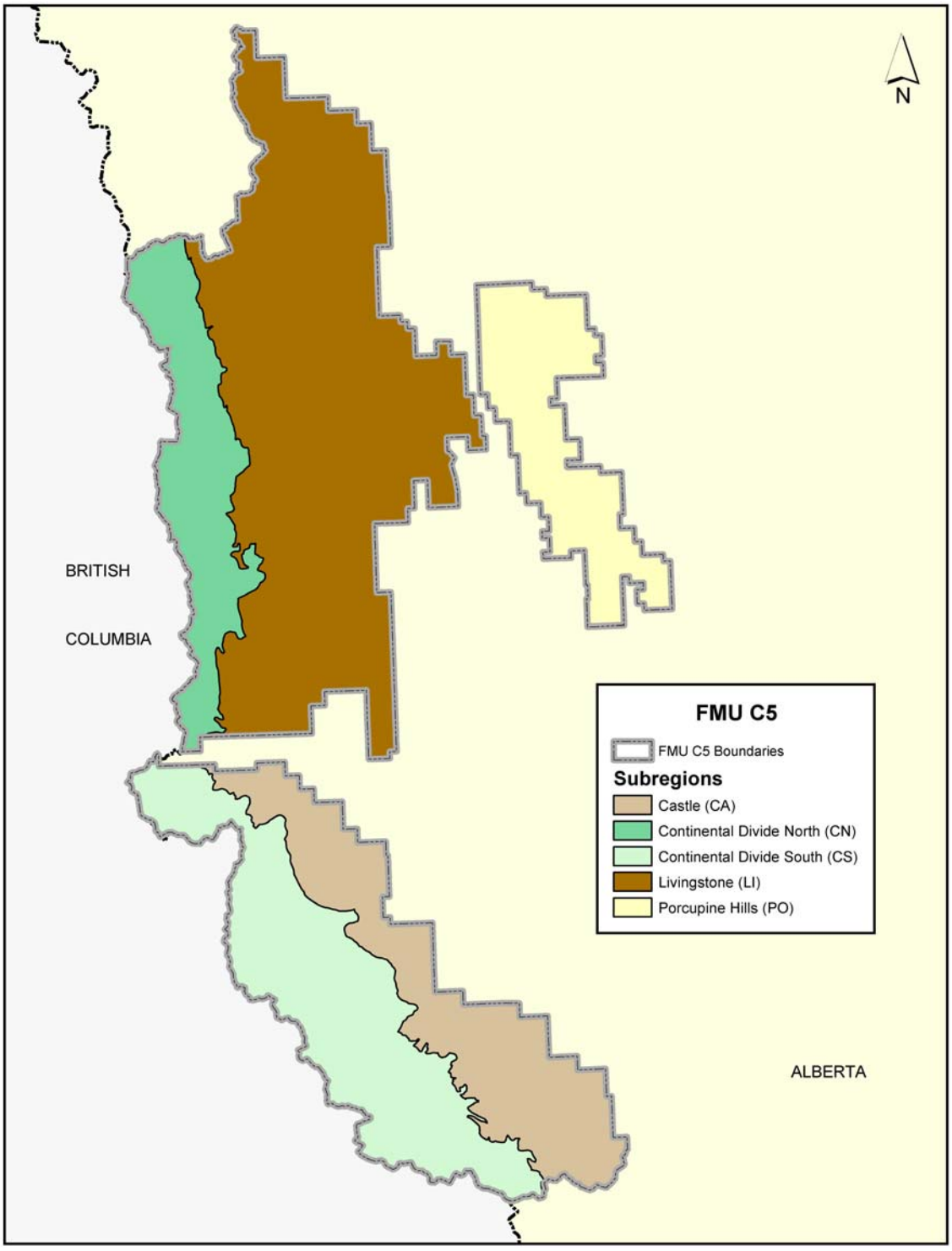
- If ***f_del*** = 'N' the ***theme5*** = 'N'
- Else ***theme5*** = 'X'.

4.13.1.6 Theme 6: Mountain Pine Beetle Hazard

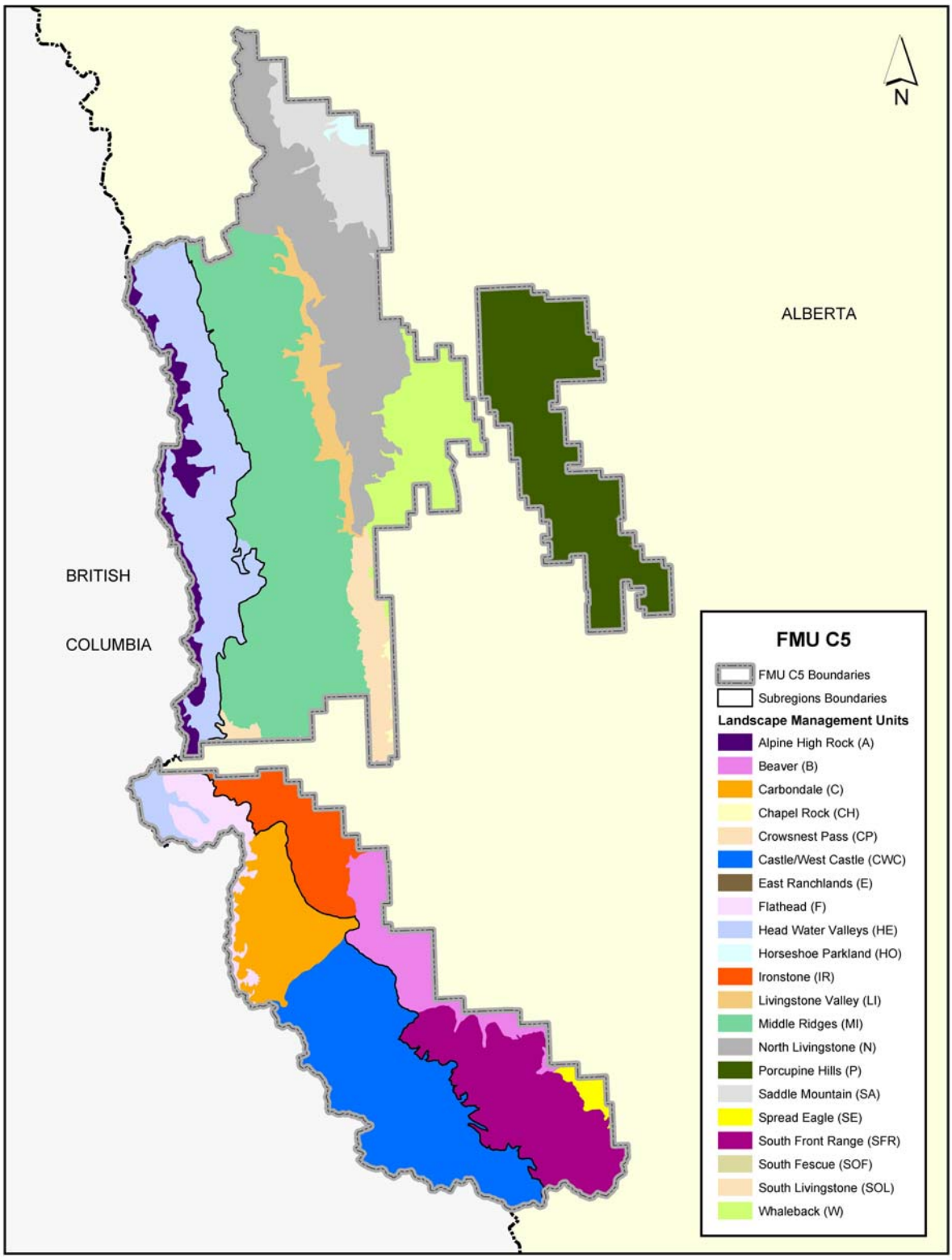
Mountain pine beetle hazard codes were only provided for the extreme and high hazard stands. Attributes codes are listed in Table 4-8. Theme 6 Mountain Pine Beetle Hazard was assigned using the attributes in the field ***mpbmax***. Subsequently any post 1991 cutblocks were assigned a mountain pine beetle hazard rating of 'N'.

Table 4-8: Theme 6: Mountain pine beetle hazard values used in the C5 TSA.

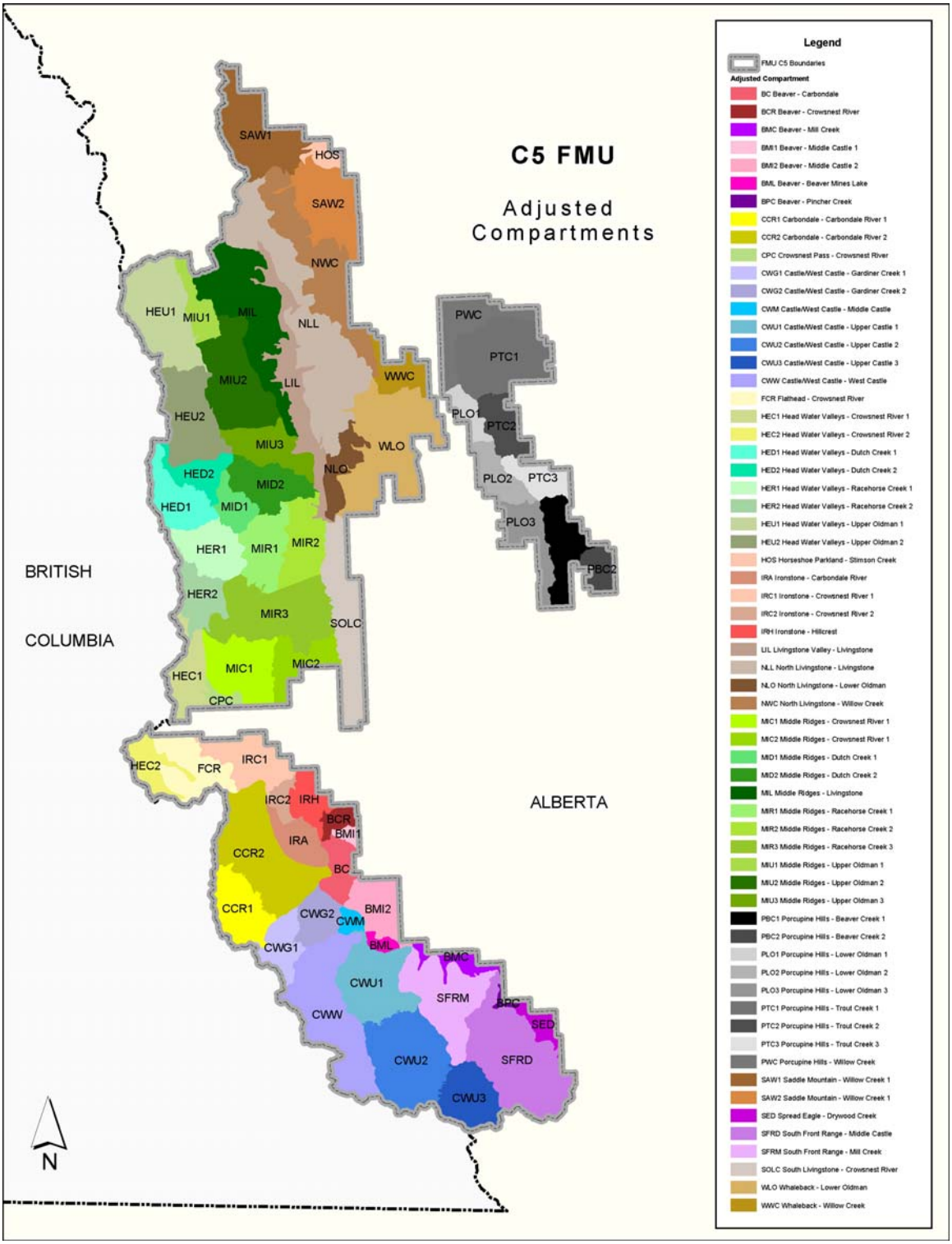
Code	MPB Hazard
E	Exteme
H	High
N	Unclassified



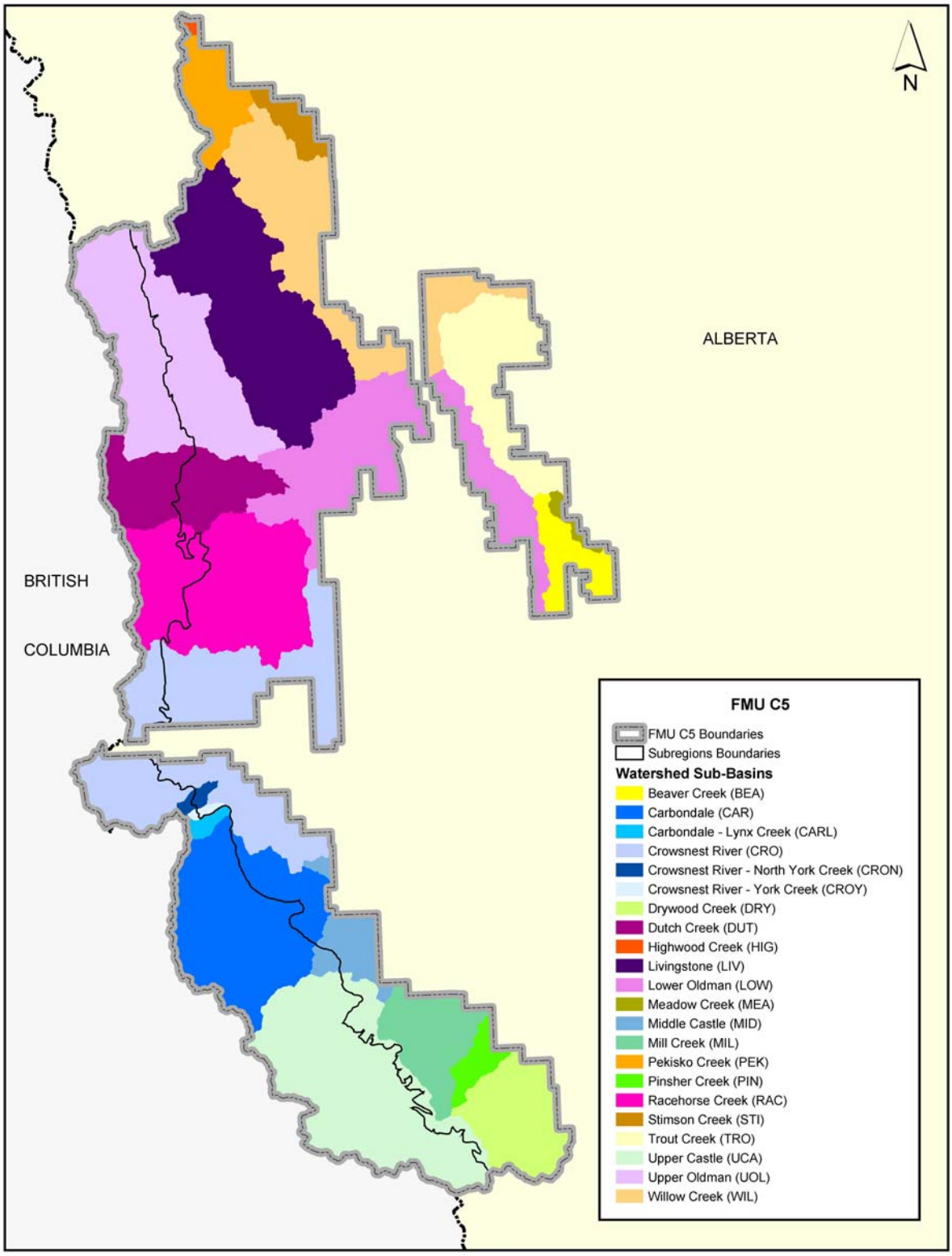
Map 4-1: C5 Subregions within the FMU.



Map 4-2: Landscape Management Units in C5 FMU.



Map 4-3: Adjusted compartments in C5 FMU.



Map 4-4: Watershed sub-basins in C5 FMU.

4.13.1.7 Theme 7: Status

Status was used in the Woodstock TSA modelling tool to identify the establishment method for a stand or the current state. Attributes codes are listed in Table 4-9. All stands were initially assigned to 'ST'. Subsequently stands under the length of their regeneration delay were assigned to 'DE' (Delay for Fd cover type = 10 years, Other types = 5 years). Finally polygons where ***yc_reduc*** was not blank were assigned a status of 'UB'.

Table 4-9: Theme 7: Status values used in the C5 TSA.

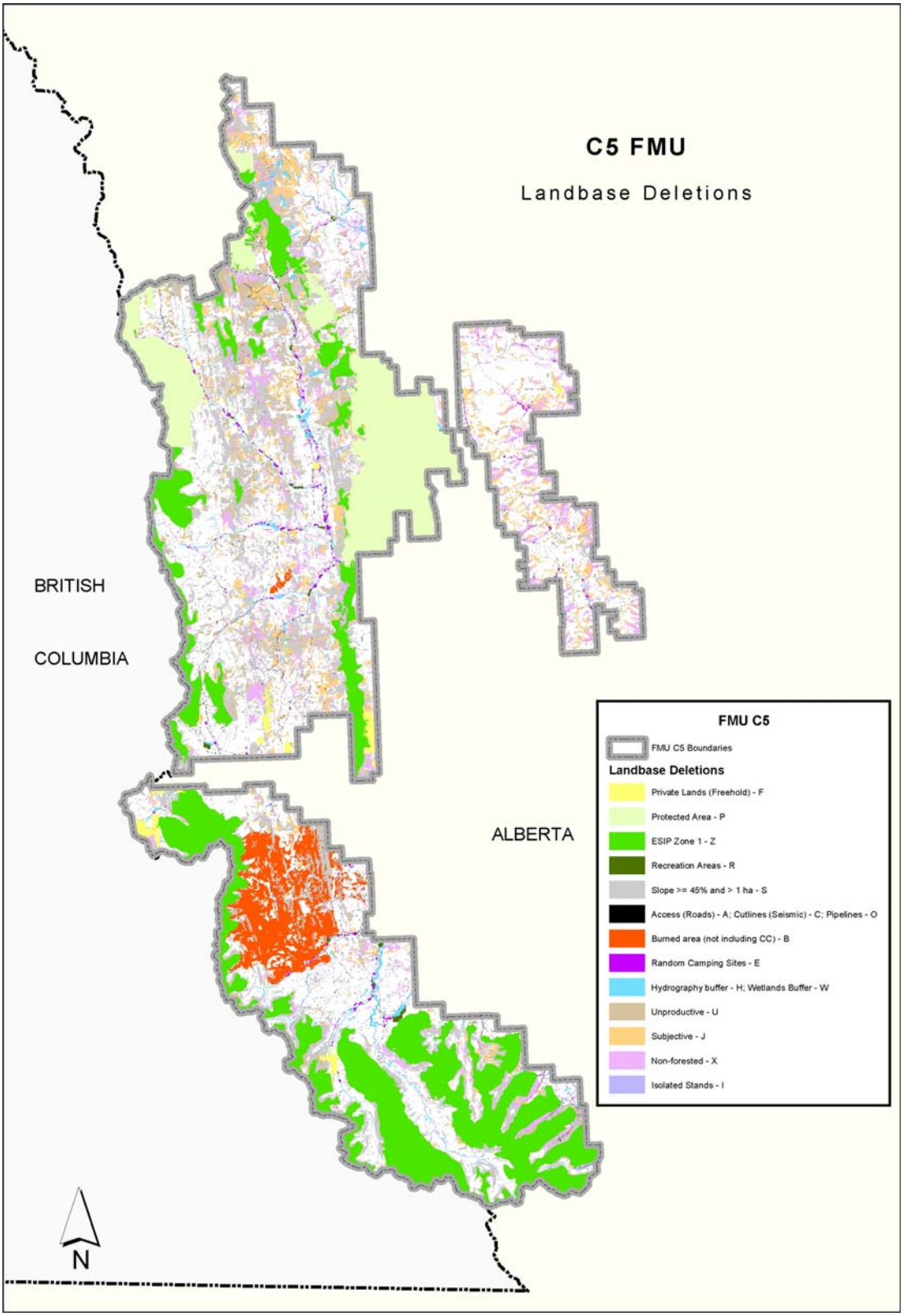
Code	Status
ST	Natural, unthinned stands and managed stands after regen delay
DE	Managed stands younger than regen delay (5 or 10 years)
TH	Natural origin, thinned stands
UB	Managed stands with unknown regen status

4.13.1.8 Theme 8: Yield Curve

The yield curve theme was used in the timber supply modelling tools to identify which yield curve to apply to each polygon. An attribute list for theme 8 can be found in Table 4-10. Theme 8 Yield curve was assigned using the attributes in the ***f_yc*** field.

Table 4-10: Theme 8: Yield Curve values used in the C5 TSA.

Code	Yield Curve
1	C-Fd-All
2	C-Pl-All-M
3	C-Pl-AB-SA
4	C-Pl-CD-SA
5	C-Sx-All-M
6	C-Sx-AB-SA
7	C-Sx-CD-SA
8	CD-All
9	D/DC-All
R	Regen post '91 existing blocks
N	C-La / Non forested



Map 4-5: Deletions from the C5 classified landbase.

4.13.1.9 Theme 9: Cover Type

The cover type of each stand was identified in theme 9. This field was calculated by deriving using the ***c5_covtype*** field, which contained the attributes seen in Table 4-11.

Table 4-11: Theme 9: Cover Type values used in the C5 TSA.

Code	Cover Type
C-Fa	Pure Conifer - Fa, Fb, La, Lt, Lw leading species
C-La	Pure Conifer - La, Lt, Lw leading species
C-Fd	Pure Conifer - Fd leading species
C-Px	Pure Conifer - Pl, P, Pa, Pf leading species
C-Sx	Pure Conifer - Sw, Se leading species
C-Re	Regenerating Cutblock
CD	Conifer-leading Mixedwood
DC	Deciduous-leading Mixedwood
D	Pure Deciduous
NNF	Naturally Non-forested
ANF	Anthropogenicly Non-forested

4.13.1.10 Theme 10: Special management zones

Theme 10 represented special management zones in the TSA which were used in the TSA to determine the management actions that would be completed on a particular area. The special management zones used can be seen in Table 4-12

Table 4-12: Theme 10: Special management zone values used in the C5 TSA.

Code	Special Management Zone
ADJRANCH	Adjacent to Elkhorn Ranch
HWYCORR	Highway wildlife corridor
SKIHILL	Syncline Mountain Ski area
T10R3	Two sections in Twp 10 Rge 3
HWYANDPOND	Both in the highway and pond buffer zone
PONDBUFFER	Buffers for Long Toed Salamander / Western Toad
X	No special management zone
FIRESMARTC	Firesmart planned Clearcut
HWYFRSMRTC	Firesmart planned Clearcut within the highway corridor
FIRESMARTP	Firesmart planned Partialcut
HWYFRSMRTP	Firesmart planned Partialcut within the highway corridor
FIRESMARTB	Firesmart planned burn
HWYFRSMRTB	Firesmart planned burn within the highway corridor
RANCH	In the Elkhorn Ranch

4.13.2 Timber Supply Modeling Ages (*tsaage_yrs, tsaage_per, age_area, c5_seral*)

The timber supply modeling ages differed from the final ages (***stand_age***), as there was a maximum age in the timber supply models that could not be violated. Therefore the age of any stands that were greater than the maximum ages listed in Table 4-13 were reduced

to the maximum age. Also the timber supply modelling ages for existing blocks were offset by –10 (Douglas-fir) or –5 (all other cover types) years to mimic a regeneration delay. Two ages were calculated, one in years (***tsaage_yrs***) and the other in 5-year periods (***tsaage_per***).

Table 4-13: Lifespan by yield curve used for the C5 TSA.

Yield Curve	Lifespan	
	(Periods)	(Years)
1	65	325
2	50	250
3	55	275
4	55	275
5	55	275
6	70	350
7	70	350
8	45	225
9	35	175
R	52	260
C-La	80	400

The field ***age_area*** was created to aid in area-weighted average age calculations. It was calculated by multiplying ***tsaage_yrs*** and ***f_area***.

Seral stages were assigned to each stand using a combination of cover type and timber supply modelling ages. Seral stages were assigned to the landbase in the timber supply modelling tools and joined to the classified landbase using the join key. Due to the manner in which Patchworks deals with succession, any stands that were the maximum age were assigned to a regenerating seral stage. Seral stage definitions are provided in Table 4-14.

Table 4-14: Seral stage definitions.

Cover Type	Seral Stage				
	Regen-eration 'R'	Young 'Y'	Mature 'M'	Early Old Growth 'E'	Late Old Growth 'L'
C-Fa	< 40	41-100	101-160	161-200	201-350
C-La	< 40	41-100	101-200	200-250	251-400
C-Fd	< 30	31-90	91-200	201-250	251-325
C-Px	< 25	26-80	81-150	151-200	201-275
C-Sx	< 30	31-90	91-180	181-230	231-350
C-Re	< 25	26-85	86-160	161-210	211-260
CD	< 25	26-80	81-150	151-200	201-225
DC	< 25	26-80	81-150	151-175	n/a
D	< 30	31-70	70-130	131-175	n/a
NNF	n/a	n/a	n/a	n/a	n/a
ANF	n/a	n/a	n/a	n/a	n/a

4.13.3 Merchantability (*curr_avail*)

The merchantability field provides a quick and simple assessment to determine if the stand is mature and available for timber harvesting. Stands were considered merchantable in the classified landbase if they were greater than 90 years old. The actual merchantability in the TSA depends on the assumptions made in the specific model.

- ***curr_avail*** is filled with 'Y' when ***managedlb*** is equal to 'M' and ***tsaage_yrs*** > 90.

4.13.4 Planned Blocks (*pln_treat, pln_delta*)

Harvest actions and timing of harvest for planned blocks were identified in two separate fields. Planned treatment was assumed to be clearcut unless otherwise specified.

- ***pln_treat*** was filled with "CLEARCUT' for all planned blocks (***blk_status*** = 'PLAN').
- ***pln_treat*** was filled with "BURN' for all planned FireSmart burns (***fs_treat*** = 'BURN').
- ***pln_treat*** was filled with 'PARTIALCUT' for all FireSmart partial cut treatments (***blk_status*** = 'PLAN' and ***fs_treat*** not equal to 'BURN' and ***fs_treat*** not equal to 'HARVEST').

The timing of the forest management activities was based on the current year, 2005.

pln_delta was filled with ***z_yr_tsa*** – 2005 for all planned blocks (***blk_status*** = 'PLAN').

4.13.5 Access Control Units (*pw_compart*)

Access control units allow the timber supply modelling tools to control availability of all areas within the unit for timber harvest activities. Accessibility depended upon many factors, therefore nine different fields were combined into one access control unit. The following fields were used where they were not blank:

- Initially the access control unit field was filled with the adjusted compartment values (***pw_compart*** = ***adj_compco***). There were a small number of polygons within the 'Beaver – Mill Creek' compartment that did not contain a value in the adjusted compartment field. These polygons were assigned to this compartment in the code (***pw_compart*** = 'BMC' where ***adj_compco*** = null).
- For all polygons where the new sub-compartment field was not blank, the value of this field was joined to the end of the access control unit field, separated by a '-' (***pw_compart*** + '-' + ***new_comps***).
- There are two watersheds within the FMU in which an research study was being conducted. Therefore the areas affected by the study where identified in the access control unit so the harvest sequencing could be manually controlled (***pw_compart*** + '-' + ***add_sub_ws***). This was only completed for the 'Star' and 'North York' watersheds (***add_sub_ws*** = 'STAR' or 'N-York').

- Next areas that were adjacent (within 150m) to recent fires were deferred from harvest for the next 40 years therefore they were identified in the access control unit field (***pw_compart*** + '-' + 'FIRE'). This was completed when the ***fire_stand*** field was not blank.
- Stands that fall within the 'PL_PLSE' designation were also uniquely identified in the access control unit. This was done by joining the ***pl_plse*** field with the ***pw_compart*** field, separated by a '-' when the ***pl_plse*** field was not blank (***pw_compart*** + '-' + ***pl_plse***).
- Stands that had a 'H' or 'E' mountain pine beetle hazard rating were identified by a 'MPB' at the end of the access control unit (***pw_compart*** + '-' + 'MPB' where ***theme6*** = 'E' or 'H')
- Stands with a leading species were identified in the access control unit by adding a 'PL' separated by a '-' (***pw_compart*** + '-' + 'PL' where ***lead_sp*** was = 'Pl').
- Stands that were partially or entirely within the license 16 area were identified in the access control units by adding 'LIC16' to the existing code separated by a '-' (***pw_compart*** + '-' + 'LIC16' where ***lic16*** is not blank).
- Finally the access control unit was set to 'HRD_BLK' for any stands that were within planned blocks.

4.13.6 Growing Stock (*con_vol, dec_vol*)

Net (15/11) coniferous and deciduous volumes (***con_vol, dec_vol***) were assigned in a similar fashion to seral stages using the TSA modelling tool. Due to the manner in which Patchworks deals with succession, any stands that were the maximum age were assigned zero volumes. The yield curves are discussed in detail in Growth and Yield (Forest Management Branch, 2005).

4.13.7 Proposed Treatments (*prop_delta, prop_treat*)

The proposed treatment fields were created for TSA reporting only. These fields will be populated after the TSA analysis is completed.

4.13.8 Harvest Volume (*har_convol, har_decvol*)

The harvest volume fields will contain the volume harvested by the proposed. These fields will be populated after the TSA analysis is completed.

4.13.9 Quota Spheres (*quota_dec1*, *quota_dec2*)

The quota spheres represent the areas in which the quota holders have been delegated timber from based on the results of the spatial harvest sequence. These fields will be populated after the TSA analysis is completed.

4.14 ECA Information (f_tpr, lead_sp)

A cumulative watershed disturbance and hydrologic recovery simulator, the Equivalent Clearcut Area Simulator for Alberta (ECA-Alberta) will be used to evaluate TSA scenarios. Two pieces of information are required to run this model, timber productivity rating and leading species.

- Leading species (***lead_sp***) was filled with ***sp1***
- The leading species (***lead_sp***) of all post-91 cutblocks was set to 'Pl'
- ***f_tpr*** was filled with ***tpr*** for all stands.
- Subesquently ***f_tpr*** was set to 'F' when ***f_lbase*** = 4 and ***tpr*** was equal to 'U' or blank and the stand was forested (c***5_covtype*** <> 'NNF' or 'ANF').

4.15 Unique Polygon Identifier (pwkey_a, pwkey_b, ukey9, ukey_blk1a, pwkey_)

Each polygon in the classified landbases required a unique identifier in the TSA modelling tools. For the final classified landbase, ***pwkey_a*** and ***pwkey_b*** were the unique polygon identifiers; ***pwkey_a*** was a string representation of the key for use in Patchworks and ***pwkey_b*** was a numeric representation used for spatial processing. Prior to the creation of the ***pwkey_a*** and ***pwkey_b*** keys a unique ***pwkey_*** was assigned to each field. For interim classified landbases, other unique identifiers were created, and two of those were retained in the final landbase (***ukey9, ukey_blk1a***).

5 CLASSIFIED LANDBASE SUMMARY

The end product of the landbase classification was digital files containing spatial and attribute information. Addendum 1 defines all of the fields in the classified landbase shapefile with the unique values they contain and a description of the values.

Table 5-1 identifies the areas by deletion categories. From a total area of 351,823ha in the FMU, 217,873ha were deleted for the identified reasons. The active landbase was 133,949ha, and the managed landbase was 114,184ha. The difference between the active and managed landbases were the deciduous landbase and non-forested areas resulting from historic clearcuts.

The breakdown of the area in the active landbase by yield strata can be seen in Table 5-2. The percentage of the productive/unproductive and active/passive landbases can be seen in Figure 5-1. Detailed distributions of the percent areas in each landbase deletion category for the unproductive, coniferous and deciduous landbases are provided in Figure 5-2, Figure 5-3, and Figure 5-4, respectively.

Table 5-1: Classified landbase summary from the C5 net landbase.

Landbase Netdown Category	Area (ha)[1]			Percent Area		
	Forested	Non-forested	Total	Forested	Non-forested	Total
Gross FMU Area	**247,695**	**104,128**	**351,823**	**100%**	**100%**	**100%**
Deletions						
Land Status						
Private Land (Freehold)	1,747	898	2,645	1%	1%	1%
Protected Areas	23,612	11,834	35,446	10%	11%	10%
ESIP Zone 1 (Prime Protection)	25,721	38,193	63,913	10%	37%	18%
Recreation Areas	250	89	340	0%	0%	0%
Subtotal: Land status	51,330	51,014	102,344	21%	49%	29%
Steep Slopes (>= 45)	30,245	9,243	39,488	12%	9%	11%
Burned Areas in Recent Fires	917	13,434	14,352	0%	13%	4%
Access						
Roads	0	660	660	0%	1%	0%
Cutlines (Seismic)	0	1,685	1,685	0%	2%	0%
Pipeline	0	392	392	0%	0%	0%
Subtotal: Access	0	2,737	2,737	0%	3%	1%
Buffers						
Wetlands	509	987	1,495	0%	1%	0%
Random Camping Sites	552	311	863	0%	0%	0%
Hydrography	1,709	864	2,573	1%	1%	1%
Subtotal: Buffers	2,770	2,161	4,931	1%	2%	1%
Productivity						
Unproductive	12,954	0	12,954	5%	0%	4%
Subjective Deletions	16,850	0	16,850	7%	0%	5%
Non-forested	0	21,891	21,891	0%	21%	6%
Subtotal: Productivity	29,804	21,891	51,695	12%	21%	15%
Isolated Stands	399	3	402	0%	0%	0%
Wildlife Habitat						
Harlequin Duck	71	0	71	0%	0%	0%
Wolverine	2	0	2	0%	0%	0%
Western Frog/Long-toed Salamandar	1,762	90	1,853	1%	0%	1%
Subtotal: Wildlife Habitat	1,835	90	1,925	1%	0%	1%
Passive Landbase (Total Deletions)	**117,300**	**100,573**	**217,873**	**47%**	**97%**	**62%**
Active Landbase[2]	**130,395**	**3,555**	**133,949**	**53%**	**3%**	**38%**
Unmanaged Area on Active Landbase						
Deciduous Landbase						
D Cover Type	14,486	0	14,486	6%	0%	4%
DC Cover Type	1,725	0	1,725	1%	0%	0%
Non-forested	0	3,555	3,555	0%	3%	1%
Subtotal: Unmanaged Area	16,210	3,555	19,765	7%	3%	6%
Managed Landbase	**114,184**	**0**	**114,184**	**46%**	**0%**	**32%**

[1] The total area within FMU C5 is 351,886 ha. There are 63 ha in the unclassified portion of horizontal stands that are not included in this area summary.

[2] Non-forested stands in the active landbase are a result of non-forested AVI stand attributes on pre-91 cutblocks.

Table 5-2: Active landbase summary by yield strata for C5 FMU.

Landbase	Yield Strata	Area (ha)	% of Active Landbase
Conifer	1 C-Fd-All	11,920	9%
	2 C-Pl-All-M	19,827	15%
	3 C-Pl-AB-SA	8,386	6%
	4 C-Pl-CD-SA	27,692	21%
	5 C-Sx-All-M	8,452	6%
	6 C-Sx-AB-SA	14,738	11%
	7 C-Sx-CD-SA	9,379	7%
	8 CD-All	2,013	2%
	R Regen	11,778	9%
	N Non-Forested	3,555	3%
	Active Conifer Landbase	**117,739**	**88%**
Deciduous	9 D/DC-All	16,210	12%
	Active Deciduous Landbase	**16,210**	**12%**
	Active Landbase Total	**133,949**	**100%**

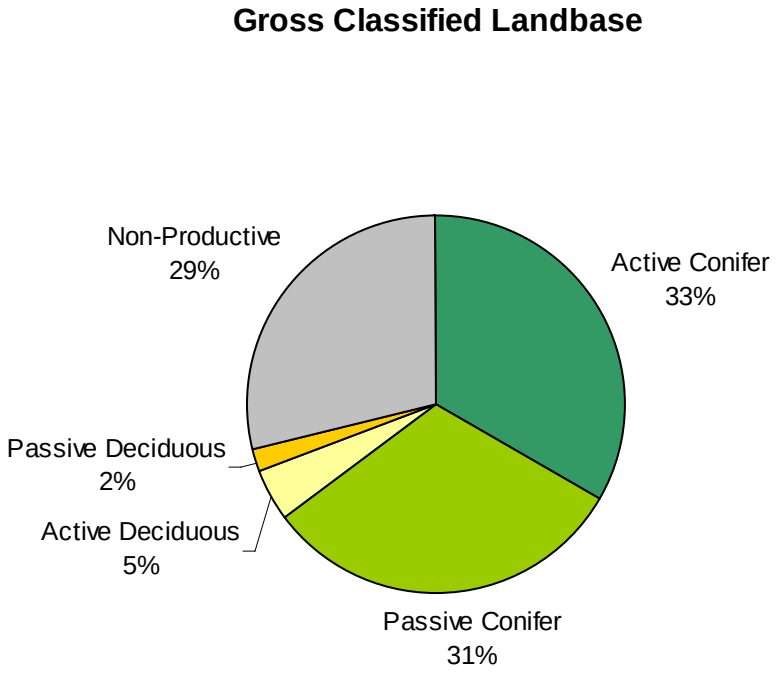


Figure 5-1: Gross classified landbase from the C5 classified landbase.

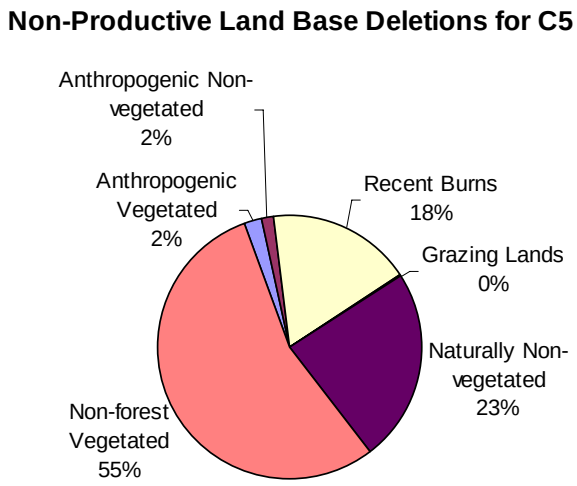


Figure 5-2: Non-productive landbase deletions from the C5 classified landbase.

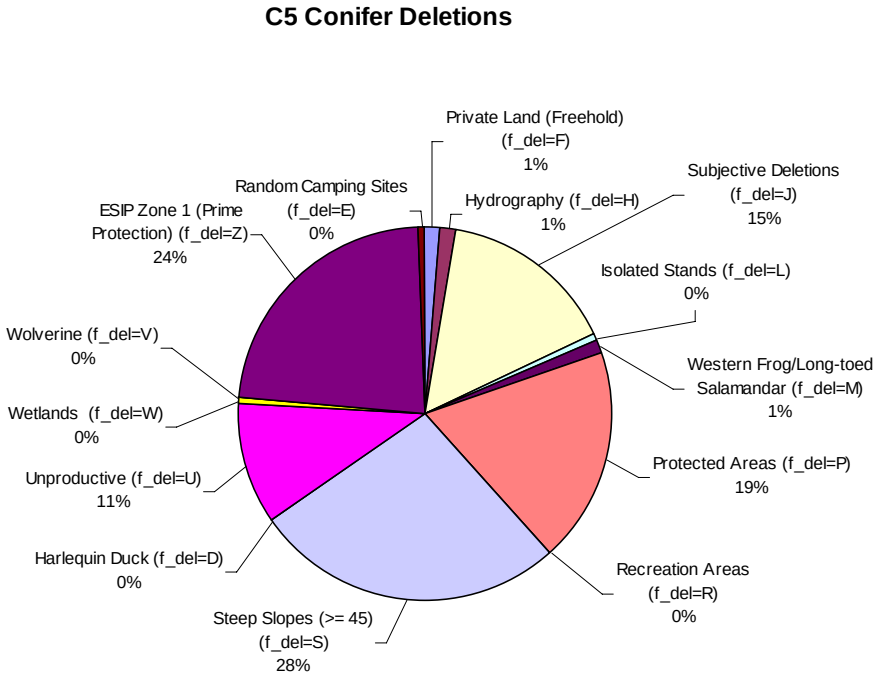


Figure 5-3: Conifer landbase deletions from the C5 classified landbase.

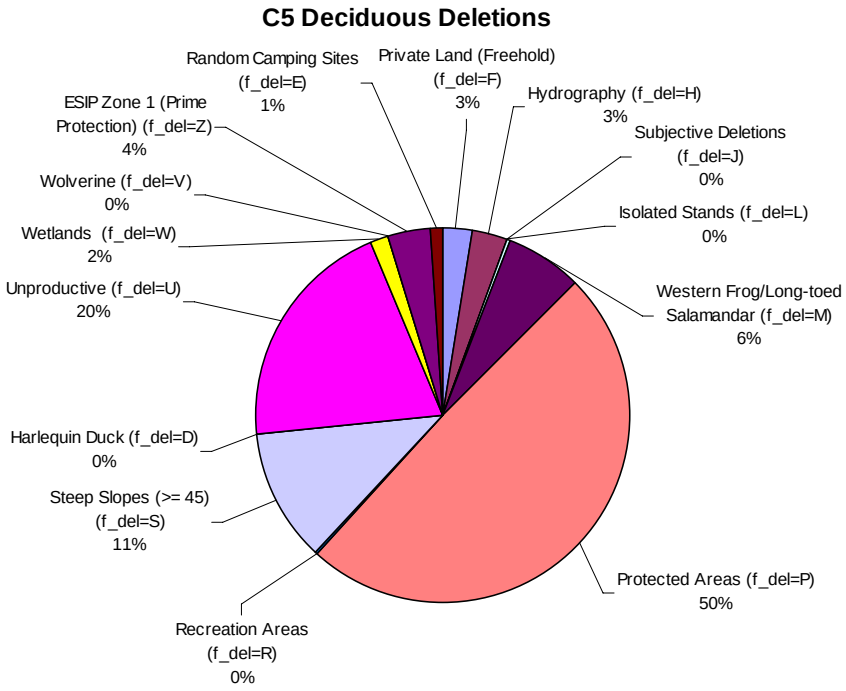


Figure 5-4: Deciduous landbase deletions from the C5 classified landbase.

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Addendum I Metadata Report

Addendum II Digital Data

Attached to the SRD submitted document for the review process only.

Addendum III Southern Slopes AVI Verification

Addendum IV Non-Digital Maps

Attached to the SRD submitted document for the review process only.