Sundance Forest Industries Ltd.

Forest Management Plan 2007

Development of the Landbase

April 27, 2007

EXECUTIVE SUMMARY

This document describes the data and processes used to develop the datasets used in the landbase classification process and to generate the classified landbase to meet the requirements of the Alberta Forest Management Planning Standard (Alberta Sustainable Resource Development 2006). The results, as described were used in the timber supply analysis (TSA). Separate documents describe the yield projection (Sundance 2007) and the forecasting (2007) stages of the TSA. Final versions of all three documents are included in the FMP submission.

The classified landbase describes the condition of the forest as of June 30, 2005. The extent of the gross landbase was all lands within the outer boundaries of the Forest Management Agreement (FMA) area for Sundance Forest Industries Ltd. also known as Forest Management Unit (FMU) R13.

The landbase classification defines the area available for forest management activities - the managed landbase - and area excluded from forest management activities (deletions from the managed landbase) - the unmanaged landbase. The classified landbase covers an area of 266,815 ha. The managed landbase, area available for harvest, covers 66% of the classified landbase, 175,008 ha.

Table 0-1 shows the classified landbase summary by area and either deletion group (unmanaged landbase) or species strata (managed strata). Section 7 list more detailed summaries.

Table 0-1. Classified landbase summary.

Description (F_DEL_GROUP)	Area(ha)	% Gross area
Area outside FMA	1,162	0%
Linear dispositions	9,700	4%
Non-linear dispositions	2,759	1%
Nonforest, Nonproductive	37,236	14%
Water buffers	7,227	3%
Subj deletions	29,140	11%
Horizontal stand deletion in managed landbase	4,583	2%
Unmanaged Landbase	**91,807**	**34%**

Description	F_YC	Area(ha)	% Gross area
Deciduous	DEC	9,971	4%
Aspen Pine mixedwood	AP	6,243	2%
Aspen Spruce mixedwood	AS	3,026	1%
Pine Aspen mixedwood	PA	7,985	3%
Spruce Aspen mixedwood	SA	1,991	1%
Pine	PL	125,835	47%
Black spruce	SB	2,496	1%
White spruce	SW	17,461	7%
Managed landbase	**Total**	**175,008**	66%

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1. Introduction

This document describes the data and processes used to develop the datasets used in the landbase classification process and to generate the classified landbase to meet the requirements of the Alberta Forest Management Planning Standard (Alberta Sustainable Resource Development 2006). The results, as described were used in the timber supply analysis (TSA). Separate documents describe the yield projection (Sundance 2007) and the forecasting (2007) stages of the TSA. Final versions of all three documents are included in the FMP submission.

The classified landbase describes the condition of the forest as of June 30, 2005. The extent of the gross landbase was all lands within the outer boundaries of the Forest Management Agreement (FMA) area for Sundance Forest Industries Ltd. also known as Forest Management Unit (FMU) R13.

The landbase classification defines the area available for forest management activities - the managed landbase - and area excluded from forest management activities (deletions from the managed landbase) - the unmanaged landbase. The forecasting stage of the TSA and review of the Spatial Harvest Sequence provides additional information that could be used to refine the landbase classification. The development of the TSA models evaluated the classified landbase and determined the final operability through the modelling process.

This document meets the Landbase Description Standards as outlined in Annex 1, item 3.0 of the Forest Management Planning Standard that state “describe the procedure and steps required to establish the net landbase and report the spatially classified landbase” (Alberta 2006). Developing the classified landbase is only one part of the multi-part TSA process. Figure 1-1 shows the landbase classification process.

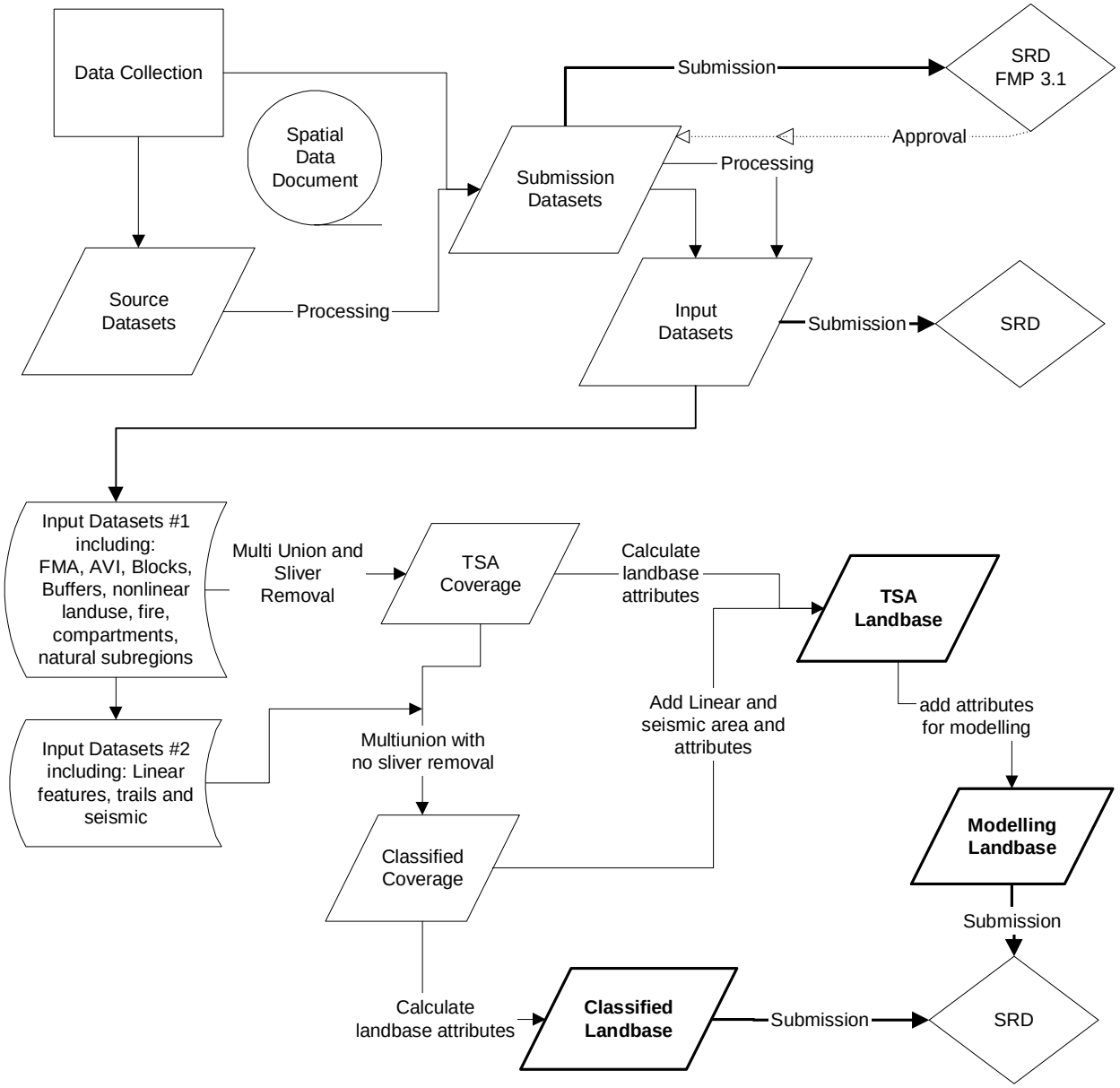

Figure 1-1. Landbase classification process.

The classified landbase covers an area of 266,815 ha. The managed landbase, area available for harvest, covers 65% of the classified landbase, 174656 ha.

1.1 Spatial Landbases

The landbase classification process defines the managed landbase and the unmanaged landbase. The Forestry Corp has generated 3 separate landbases that represent the same information in slightly different ways. Each landbase is designed to most efficiently meet a specific purpose and has the same extent, areas under deletions and species distribution. The extent of the gross landbase for all was the full extent of lands under Sundance Forest Management Agreement (FMA) tenure. Descriptions of the spatial landbases follow:

1. Classified landbase. This landbase was developed to satisfy the requirements listed in the Forest Management Planning Standard (Alberta, 2006). The landbase includes linework for linear features (seismic, roads and utilities). The classified landbase is also used to calculate the areas and identify the locations of linear features on the landbase and to generate the attributes for the TSA landbase. This landbase carries the largest number of polygons.

2. TSA landbase. The landbase forms the start point for TSA modelling. The TSA landbase carries all information in the classified landbase but does not include spatial linework for linear features. The unique key for the TSA landbase is carried on the classified landbase.

3. Modelling landbase. This landbase was developed to make the landbase suitable for both strategic and operational TSA modelling. The goal was to represent the necessary information with appropriate attributes but to simplify the assignments wherever possible. This landbase has the same spatial features as the TSA landbase but has a specific set of themes and attributes to meet TSA modelling requirements.

Specific descriptions and documentation of the unique characteristics of each landbase are described in more detail in Sections 4.3, 6.4 and 6.5.

1.2 Process Overview

A spatial landbase is the basis for all timber supply modelling. To optimize the analysis capabilities of the software, this spatial landbase should contain all information needed for the model to proceed toward a solution but carry a minimum number of polygons needed to clearly characterize the timber supply landbase. The spatial landbase created for input to the Patchwork timber supply model is termed the TSA landbase. This landbase is augmented with linear and seismic spatial information to generate a classified landbase as required for submission under the Alberta Forest Management Planning Standards (Alberta 2006). It is also expanded with additional attribute data to generate the modelling landbase. Each landbase is linked to the TSA landbase through the common attribute of UKEY#_TSA. This field is unique for the TSA and modelling landbase and is carried on the classified landbase.

This section outlines the spatial data process used to generate the Sundance landbase. As shown in Figure 1-1, spatial data was prioritized into 2 separate input data groups. Input 1 holds the coverages required to generate the TSA landbase. Input 2 has the linear landuse data (roads and utility corridors) and the seismic spatial data. These linear data are summarized by the UKEY#_TSA to generate the area under roads and linear features and the area under seismic for each polygon in the TSA landbase. These areas are stored as non-spatial attributes in separate "area" fields on the TSA landbase (See Section 6.4).

1.3 Spatial Landbase Process

Developing the spatial landbase for the FMP has 6 phases that continue through the development of the plan and may extend over multiple years. The main phases are:

- Identify and collect all available data to support the landbase classification process;

- Process data (spatial and attribute) to develop submission datasets;
- Prepare or combine datasets for input to spatial processing;
- Spatially process input datasets to generate spatial landbase;
- Process attributes of input datasets to characterize landbase; and
- Identify area available for forest management activities.

Each phase is addressed in detail in the following sections, Figure 1-2 illustrates the process:

- Submission Datasets (Section 2). All datasets used in the landbase classification stage of the TSA must be submitted for approval by Alberta. Each dataset was described fully and the processing steps required to generate the data were outlined. All spatial data used were processed or converted to an ArcInfo coverage format. Attribute data were stored as INFO, DBF, or ORACLE table formats. The processing steps completed to include this information as part of the input datasets was also outlined.
- Input Coverages and Tables (Section 3). With some initial processing or grouping of submission datasets the datasets used in the spatial data processing were generated. The actual coverages, attributes and related tables used to classify the landbase and the specific fields used in the classification process are described.
- Spatial Data Processing (Section 4). The spatial processing of input datasets used to generate the landbase coverages and further processing to generate the TSA and modelling landbases are described.
- AVI Attribute Processing (Section 5). The processing and definition of AVI attributes to calculate composite stand attributes, generate species groupings, define landbase classifications and assign strata are described in Section 5.
- Generated Attribute Processing (Section 6). The processing and definition of landbase attributes to generate final landbase classification is described in Section 6. This includes attributes for the classified landbase and additional attributes required for TSA and modelling landbases.
- Landbase Summaries (Section 7). The managed landbase and unmanaged landbase form the final classified landbase and are described in Section 8. This section also includes summaries for the TSA landbase and the modelling landbase.

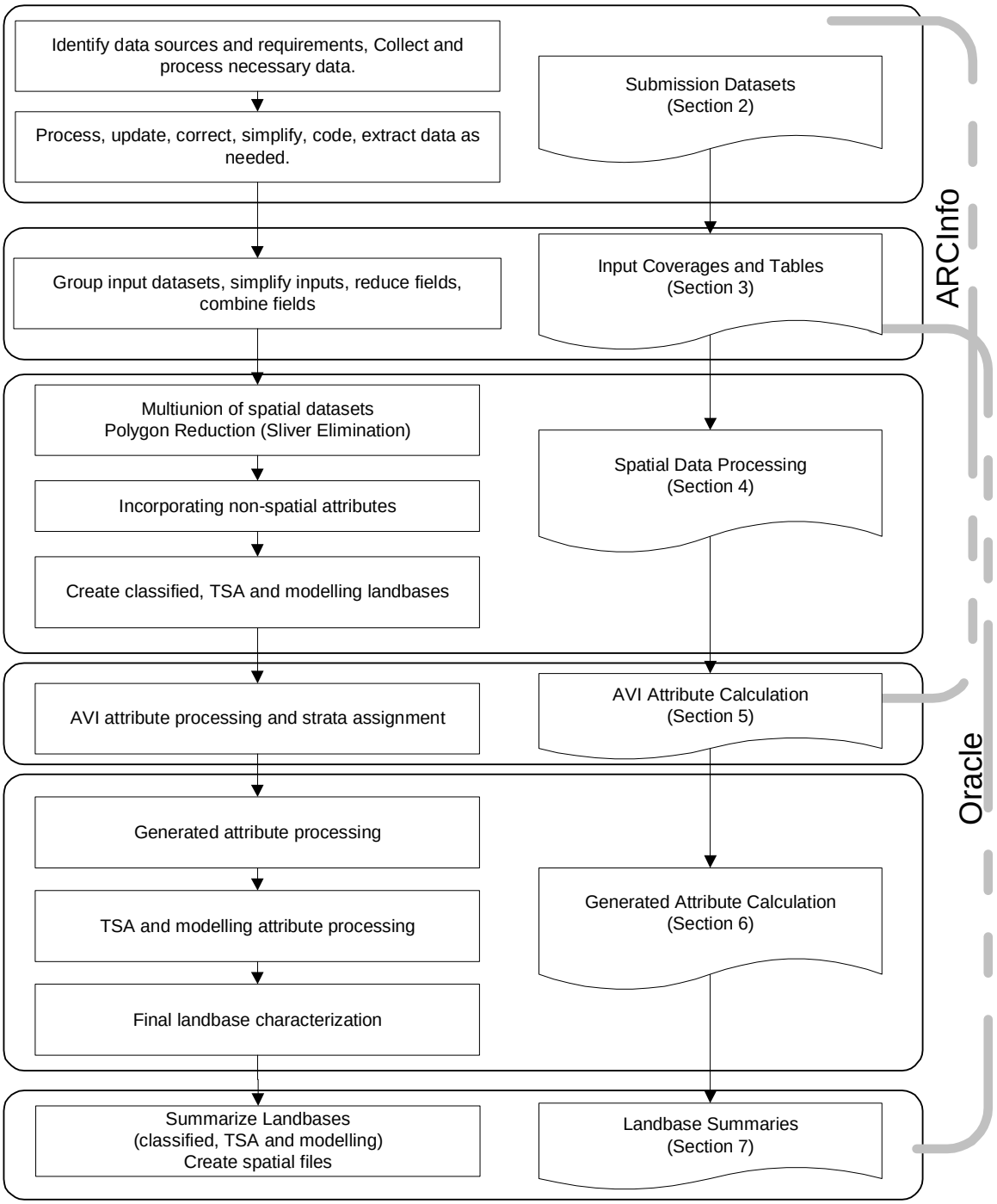

Figure 1-2. Classified landbase process flow.

1.4 Effective Date

This classified landbase described the condition of the forest as of the effective date of June 30, 2005. Spatial data for landuse, harvest and fire regeneration updated the condition of the forest defined in AVI to the effective date.

1.5 Terminology

In this document the following terms are used to classify the gross (full extent) landbase:

- Unmanaged: That portion of the gross landbase that is not available for forest management activities.
- Managed: That portion of the gross landbase that is available for forest management activities. It may include some areas where the current availability for timber harvest was uncertain. These areas will be evaluated in the forecasting stage of the TSA and during review of the Spatial Harvest Sequence.
- Deletions: This identified all areas excluded from the managed area and assigned a code identifying the reason for deletion.
- Submission Datasets: Datasets submitted for Alberta approval.
- Input Datasets: Datasets used in multi-union processing to generate spatial landbases.
- Timber Supply Analysis (TSA): Calculations/computer models with built-in assumptions regarding forest growth patterns, used to determine the annual allowable cut. (Also calculates the Spatial Harvest Sequence and other non-timber values). The landbase classification was the first of four stages in the TSA.
- Classified Landbase: The spatial landbase (including linework representing seismic and linear dispositions) and attribute classification generated as the first stage of the TSA process.
- Timber Supply Landbase. The spatial landbase developed to support the TSA. Spatial linework for linear dispositions, trails and seismic was not included in this landbase however the area and type of features was carried in attribute fields.
- Modelling landbase. The spatial landbase developed from the TSA with additional attribute fields required for modelling.

1.6 Document Standards

The following document standards are used in this landbase classification document:

- # sign when used with landbase name or ukey. This was a generic identifier for the spatial landbase iteration. The landbase classification process may have numerous iterations and a consecutive number was assigned to each multi-union of the input datasets. This ensured attribute and related spatial files could always be linked to the proper spatial landbase files. In the document the # sign was used to represent all or any of the iterations.

- All dataset names are presented in **lowercase** bold font in the text.

- All field names in the body text are presented in *UPPERCASE* italic font. Generally in tables and in title the italics are not used.

- All scripts (SQL and AML) are presented in *lowercase italic* font.

- Table 1-1 outlines the default table organization. Where possible tables follow this format.

Table 1-1. Default table layout.

Name	Description	Fields or Decision rules	As needed	As needed
Dataset name	Additional descriptive	Fields for classification	DATA[1]	
Field Name	information	Summary groupings		
Item Name		Decision rules		
Data group of interest				
Classification				

[1] Text to clarify or additional information may be contained in footnotes

- Figure 1-3 defines the shapes used in all flowcharts.

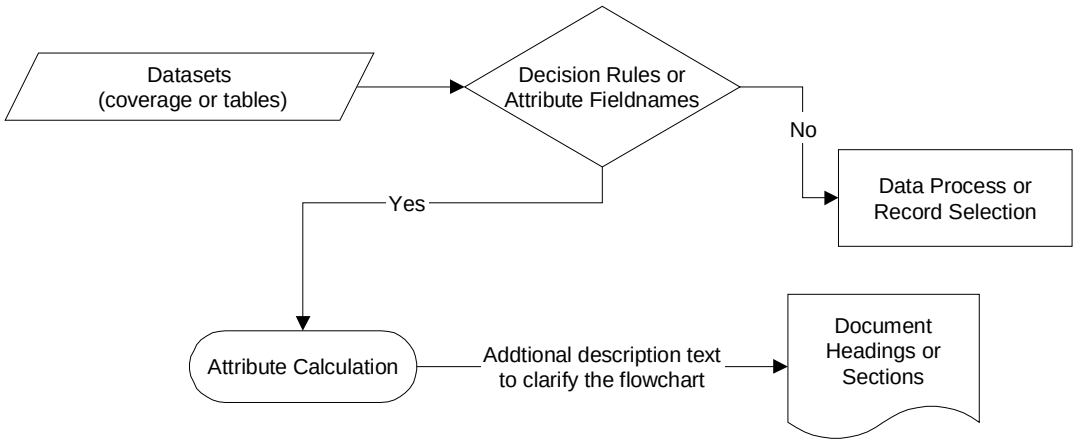

Figure 1-3. Shape definintion for figures.

2. Submission Datasets

The data collection steps identified a set of submission datasets and decision rules for classification. This section describes the datasets that contain all the spatial data used in the landbase classification process and attributes for landbase classification. It lists all datasets used including interim datasets created. It defines the information to be used to classify the landbase and lists the processing to generate the input datasets described separately in Section 3. It also identifies which datasets were used to determine the managed landbase and those datasets that provide additional information for TSA modelling. Datasets, descriptions and source are listed in Table 2-1.

Table 2-1 identified submission datasets used in spatial processing and attribute assignment. The spatial union group contained linework and attributes used to generate the input datasets and classify the landbase. The input datasets are described in Section 3. The processing and relationships amoung these submission datasets are outlined in Figure 2-1. .

Table 2-1. Submission datasets

Dataset Name	Description	Data Type	Source	Date
Administrative boundaries				
sundance_20061206	Updated FMA boundary (TTM projection)	coverage	Alberta	2006
sund_fma_2007	FMA boundary (UTM 11 projection)	coverage	Sundance	2007
compart_07	Operational compartments	coverage	Sundance	2007
sund_nsr	Natural subregion boundaries	coverage	Alberta	2005
AVI				
forest_fma	AVI inventory	coverage	Alberta	1994
net_strata_sd.dat	Generated attibutes from AVI including strata	INFO table	AVI	2007
Cutblocks				
cutblk_a	Sundance actual blocks	coverage	Sundance	2006
cutblk_p	Sundance planned and recent blocks	coverage	Sundance	2006
cutblk_a.att	Block attributes from Silvicultural Database System	Table	Sundance	2006
cutblk_p.att	Block attributes from Silvicultural Database System	Table	Sundance	2006
sund_blk3	Pre91 and Post90 existing and planned blocks	coverage	Sundance	2007
lb2_avi_cc.dat	block attributes from AVI	Table	AVI	1994
Landuse and seismic				
landuse_fma	All landuse dispositions	coverage	Sundance	2006
lu_calc	All landuse dispositions	coverage	Sundance	2006
linear	Linear landuse dispositions	coverage	Sundance	2006
non_lin	Nonlinear landuse dispositions	coverage	Sundance	2006
lin_diss	Linear dissolved on disposition type	coverage	Sundance	2006
nlin_diss	Nonlinear dissolved on disposition type	coverage	Sundance	2006
seis_fma	Cutlines - line features	coverage	Sundance	2006
seis_buf	Cutlines buffered to 5m width	coverage	generated	2006
Hydrology buffers and fire				
wbuf_fma	Combined stream, river and lake buffers	coverage	2002 FMP	2002
trump_lake	Trumpeter swan lake	coverage	Alberta	2000
trump_lkbuf	200m buffer on lake	coverage	generated	2007
wbuf_fma06	Updated water buffer coverage	coverage	generated	2006
fire1998	Fickle Lake Fire boundary	coverage	Alberta	2003

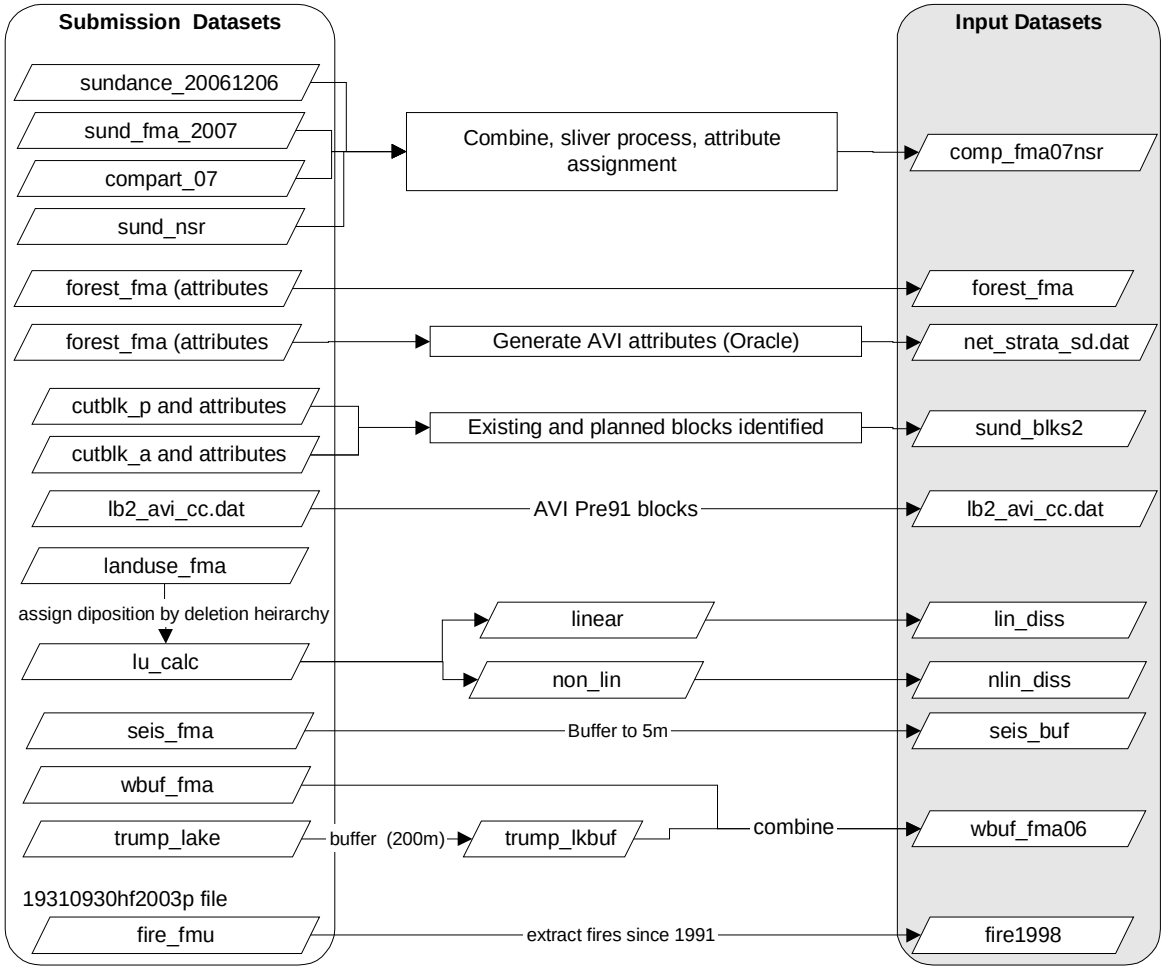

Figure 2-1. Dataset names and relationships for classification.

2.1 Administrative Boundaries

2.1.1 FMA Boundary

The classified landbase includes all areas inside the Sundance FMA which is enclosed within FMU R13. The FMA boundary was updated by the Alberta Government in the fall of 2006. The update of the 1998 boundary included adjustments to the titled land deletions within the outer boundary and withdrawals for grazing leases and provincial recreation areas. The province also reviewed the height of land boundary with an updated DEM and aerial photography. This updated FMA boundary was received from Dianne Olson, Resource Information Management Branch, Alberta in December, 2006. The file, Sundance_20061205.e00 was imported to ArcInfo and projected from TTM, NAD83 with 500 000 offset to UTM 11, NAD83 values to match the Sundance data coordinate system. The FMA region class was exported to coverage for use in the landbase classification (**sund_fma_2007**).

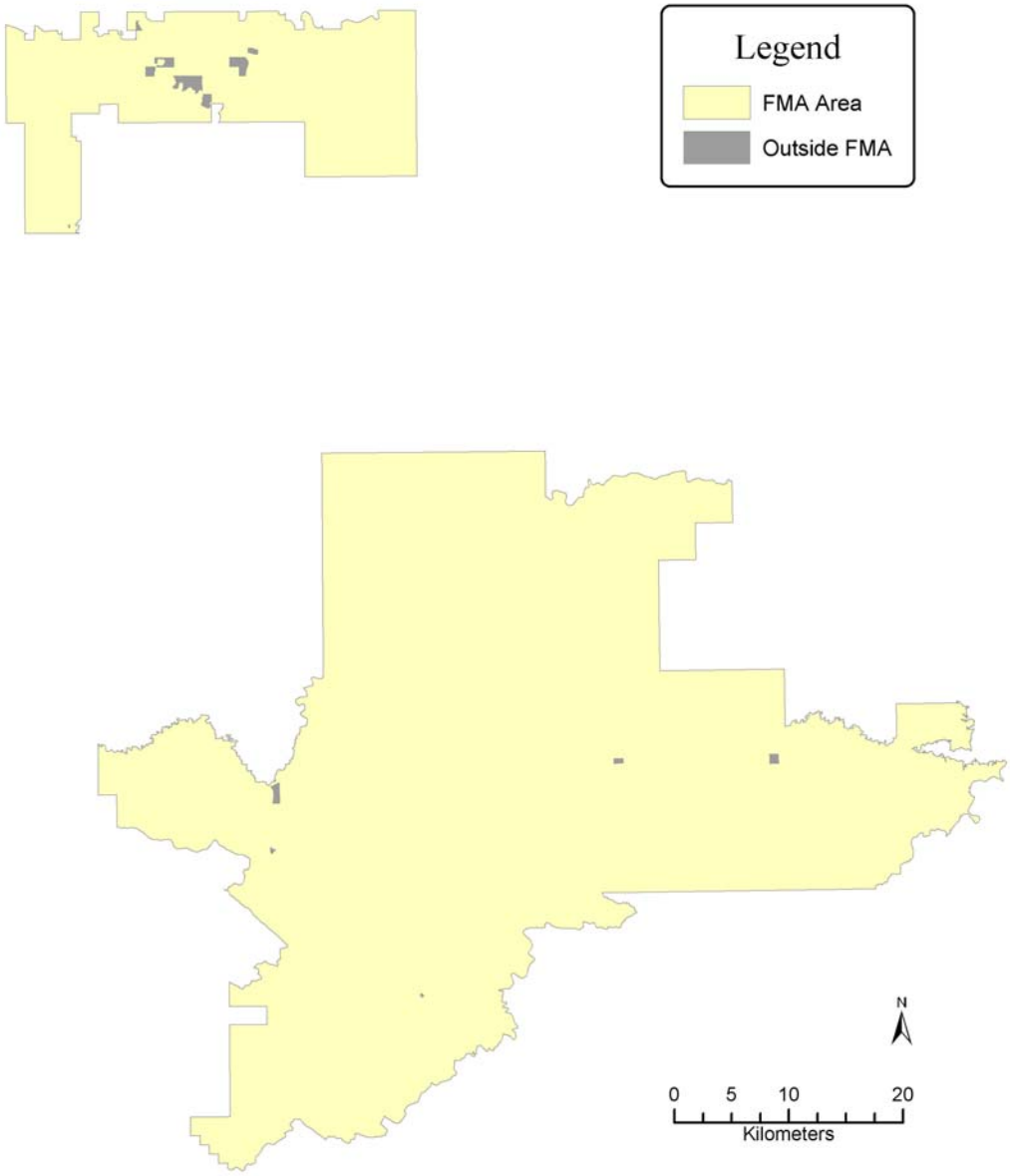

Figure 2-2. FMA boundary (sund_fma_2007).

2.1.2 Operational compartments

Sundance has identified 24 operational compartments within the FMA. The compartment coverages (**compart_07**) was extracted from the Sundance spatial data library. The field *COMPART* shows the compartment number. Figure 2-3 shows the compartment boundaries.

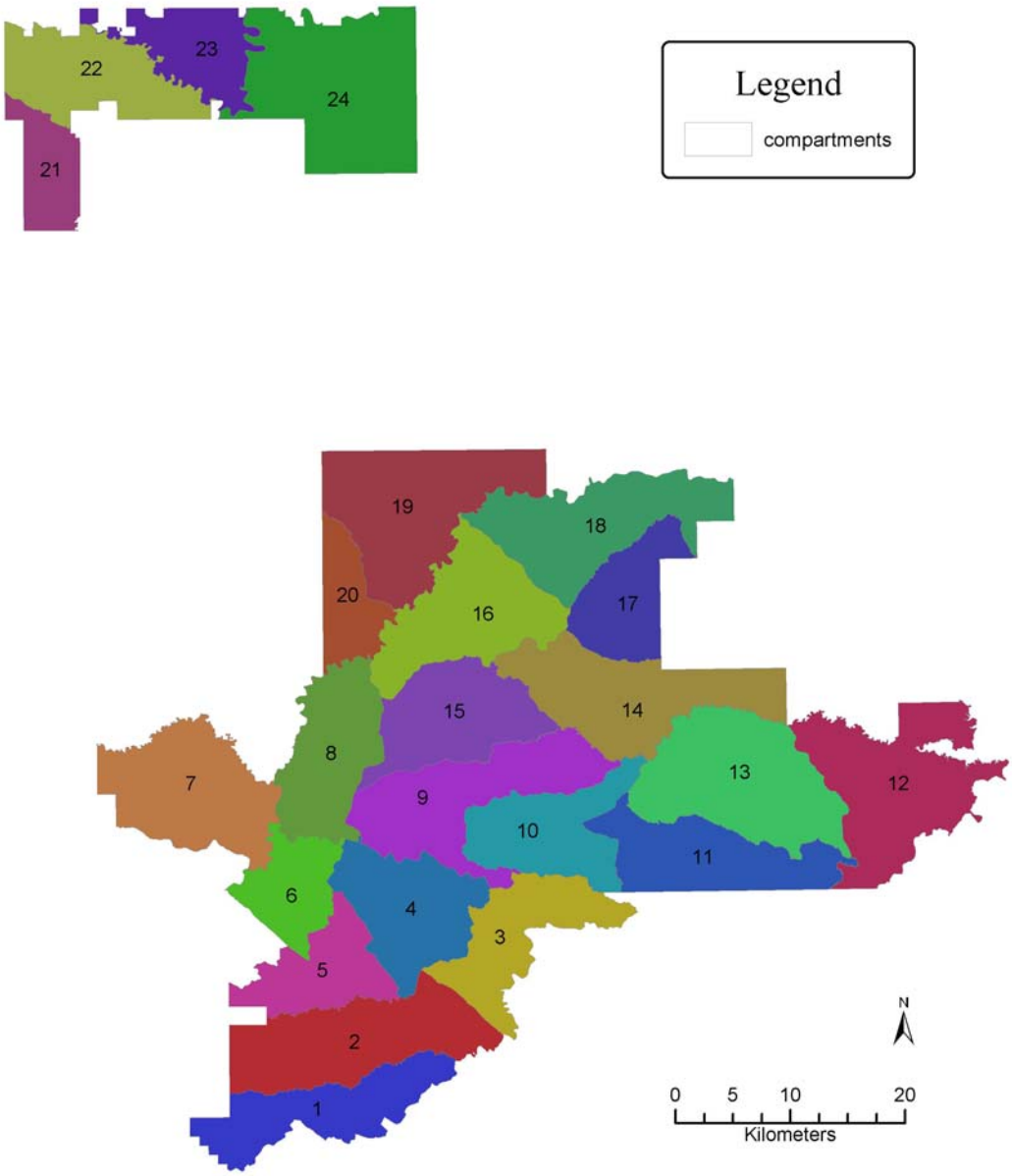

Figure 2-3. Operational compartments (compart_07).

2.1.3 Natural subregion

The natural subregion assignment for the Sundance FMA was generated from the 2005 Natural Regions and Subregions dataset dated June 2, 2005. This dataset was provided to the company in export format and then reprojected to UTM 11. The coverage (**sund_nsr**) shows the natural subregion assignment.

2.2 Alberta Vegetation Inventory (AVI)

The Sundance FMA area has complete AVI classification. Most of the inventory was completed by Alberta to provincial standards. The remainder was completed by a private company on behalf of Sundance following issuance of the FMA. The inventory was approved on June 12th 1998. Table 2-2 shows the different standards and dates of the photography used. Figure 2-3 shows the location of the compartments.

Table 2-2. AVI photography date and standard by compartment.

Compartment	AVI Standard	Date of Photography
21,22,23,24	1.0	1989
19,20	2.0	1989
1 through 18	2.1	1994

2.2.1 Spatial Data

Source

The AVI coverage (**forest_fma)** was extracted from the Sundance FOREST spatial library layer.

2.2.2 Attribute Data

Two strata were applied to all polygons within the AVI. These strata were the SRD extended strata and the Sundance species strata. The AVI attribute table was loaded to Oracle and both strata were calculated through SQL. Species groups, species distributions, broad cover groups, composite stand values for horizontal stands, ages for each layer and calculating the defining layer were assigned and are described in Section 5. The table **net_strata_sd.dat** holds all calculated values for the AVI attributes. This table joins to the AVI or to the spatial landbase coverage on *FMA-ID*. All AVI attribute processing and strata assignment is described in Section 5.

Figure 2-4 shows the AVI coverage grouped by species strata.

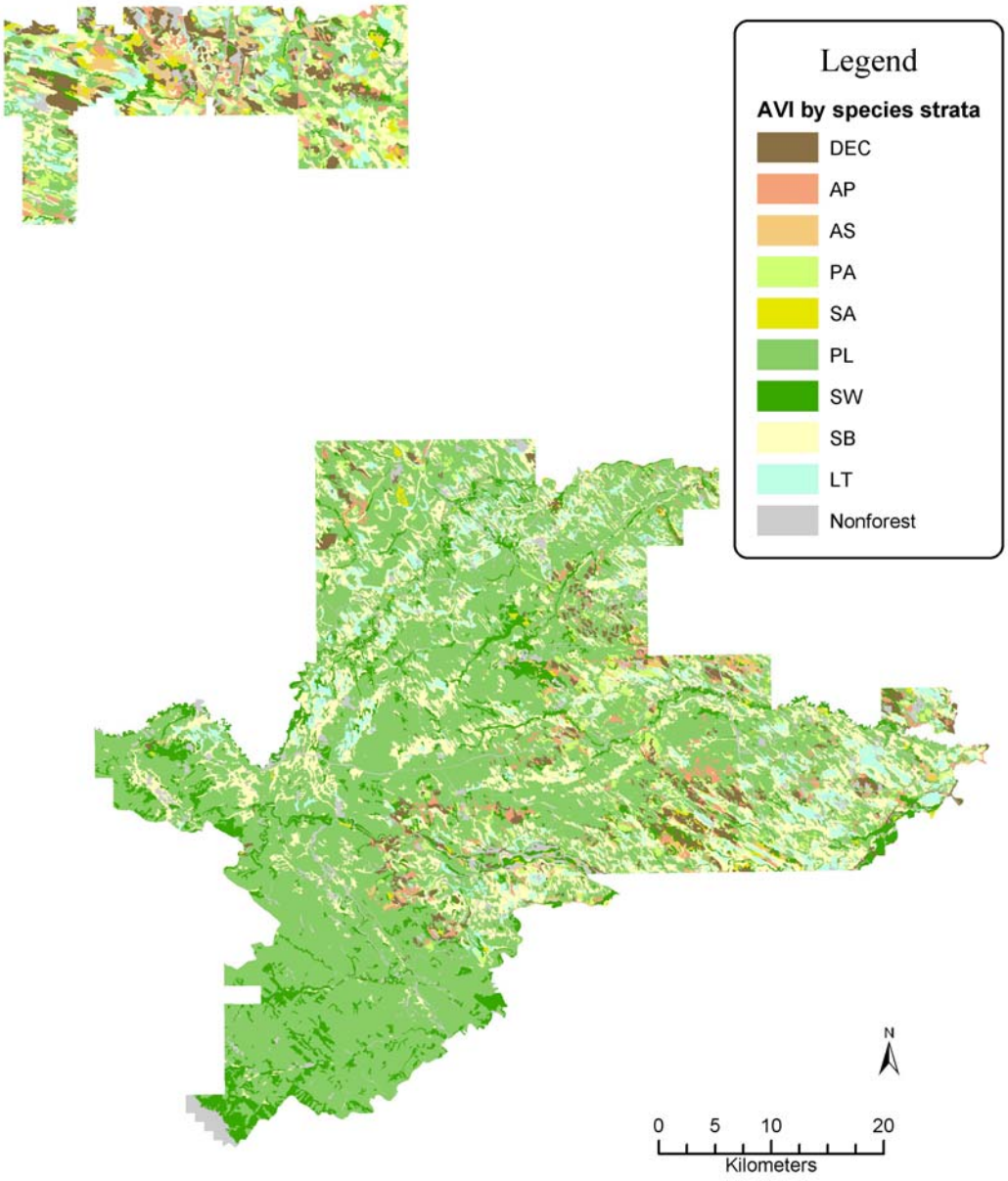

Figure 2-4. AVI by species strata (forest_fma).

2.3 Cutblocks

The FMP cutblock dataset included the existing cutblocks harvested before the FMP effective date that are to be managed as regenerated stands as well as planned cutblocks (existing and uncut cutblocks logged after June 30, 2005). Boundaries and attributes were from the Sundance Silvicultural Database System. The landbase classification process also considers historic cutblocks identified in AVI (*MOD1* = 'CC').

The creation of the cutblock coverage consists of five main phases:

- Identify and collect all available data to support the cutblock classification process;
- Process data (spatial and attribute) to develop submission datasets;
- Prepare and/or combine datasets for input to spatial processing;
- Process input attributes to characterize the cutblocks; and,
- Spatially process input datasets to generate the spatial cutblock dataset.

The classified cutblock layer describes the status of the harvested areas in the Sundance FMA as of the effective date of June 30, 2005. Existing cutblock boundaries have been digitized from aerial photography. Cutblocks harvested on or after June 30, 2005 are considered planned cutblocks in the 2007 forest management plan.

Table 2-3 and Figure 2-5 show the cutblock locations by source and by area. The procedures for identifying and classifying cutblocks follow.

Table 2-3. Block group area by species strata for managed landbase.

Block Group	Species strata (F_YC)									% managed
(BLK_GRP)	DEC	AP	AA	PA	SA	PL	SB	SW	TOTAL	landbase
AVI	1,252	286	175	482	175	659	12	213	3,253	2%
CONTINGENCY	280	68	73	169	9	3,627	72	213	4,557	3%
EXIST	602	822	395	1,213	13	13,964	41	463	17,513	10%
PLANNED	83	101	42	262	37	6,835	80	201	7,696	4%
PR91	248	60		80		290			678	0%
Total	**2,465**	**1,337**	**684**	**2,207**	**234**	**25,375**	**204**	**1,089**	**33,696**	**19%**

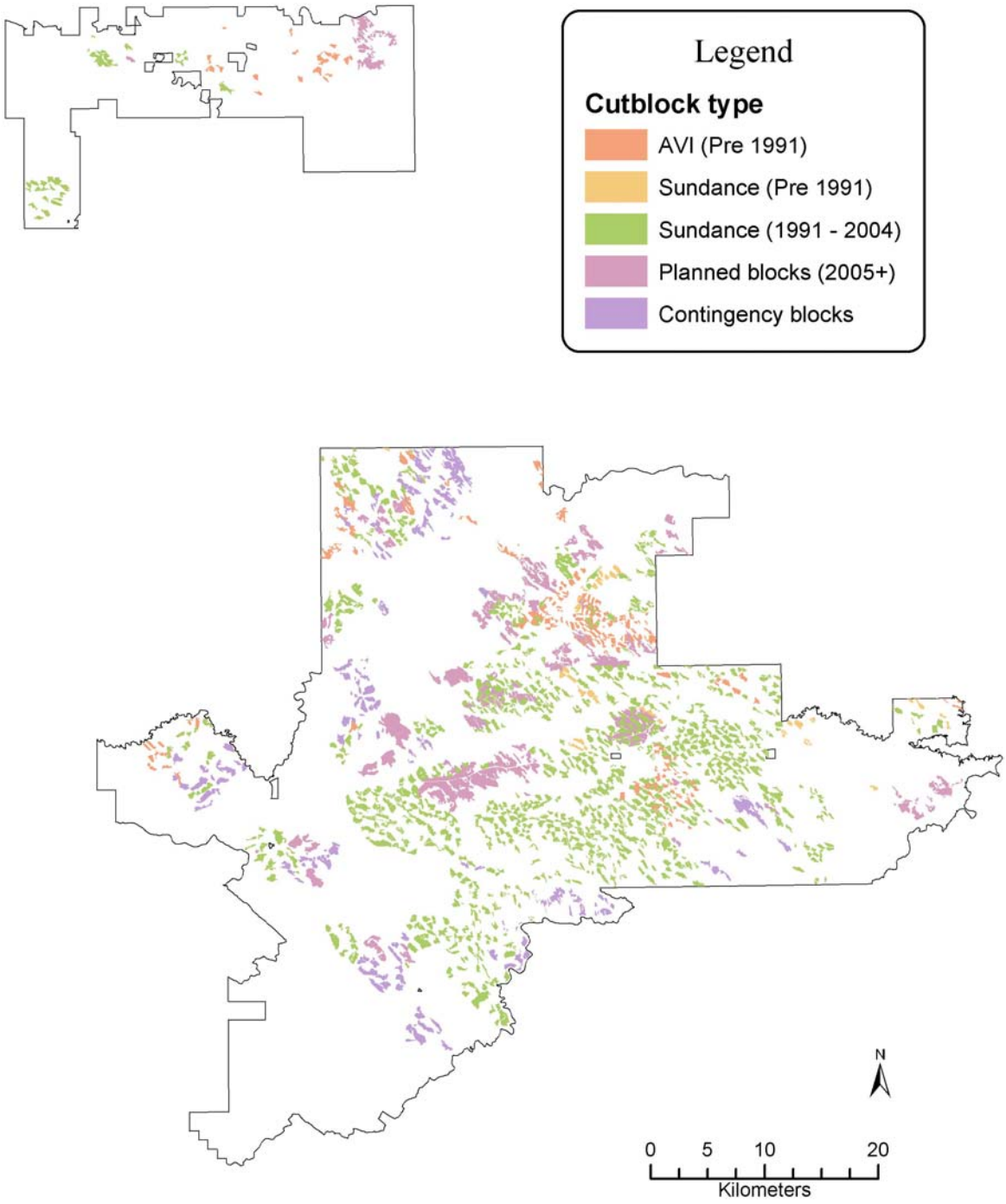

Figure 2-5. Cutblocks by type (block group).

2.3.1 Boundary and Attribute Source

To create a complete cutblock history spatial and attribute information was assembled from the following sources:

- Sundance existing cutblocks;

- Historical harvest blocks; and

- Additional SRD blocks.

The Sundance spatial library reflects the history of the cutblock activity occurring since the 1980s. Sundance began logging in this area in 1989. The Sundance Silvicultural Database System is used to track information and the activities that occur on these cutblocks. This includes all cutblocks harvested by Sundance since 1997, when Sundance started logging under their FMA agreement, cutblocks harvested by Sundance prior to 1997 under quota agreements and some cutblocks harvested by other operators within the FMA boundaries. Sundance has loaded historic cutblock information from AVI and from the government's Silviculture Record Management System (SRMS).

Attribute information describing cutblock strata, disturbance events, planting and seeding species, regeneration surveys and leave for natural events is available in the Sundance Silvicultural Database System. SRD staff were contacted to provide or update the existing information for blocks within the FMA boundary not harvested by Sundance and not stored in the Sundance Silvicultural Database System. This information was provided as notations on maps. This information was captured and where a link to attribute data in ARIS was identified these blocks were included.

The records were split into two sets for processing: those blocks harvested after March 1, 1991 (Post 1990) and those harvested before this date (PR91). An additional source for harvest information is AVI. AVI polygons with a "CC' (indicating clearcut) modifer and with a modifier extent of 3 or greater (indicating at least 50% harvest) were deemed to represent harvest areas. Any of these polygons which were not included within the Sundance blocks dataset and which had AVI forest cover information were assembled to represent additional harvest activity before March1, 1991.

Spatial Data

Sundance block information is carried in 2 spatial files – actual and planned. Attribute information is stored in the Sundance Silvicultural Database System. The primary source for spatial cutblock boundaries is the Sundance Spatial Library blocks layers, **cutblk_a** (actual) and **cutblk_p** (planned and recently captured). This is the most current and complete source for Sundance cutblock information and includes cutblocks identified in AVI. Figure 2-5 shows the cutblocks used from these datasets.

Attribute Data

The main source for cutblock attribute information is the Sundance Silvicultural Database System which stores attribute on the cutblocks. The unique key for this system is a character field, *KEY* that is a combination of compartment, meridian, range, township, block number and, if required a block alpha identifier to unique distinguish each block. Block information for existing blocks is also submitted and stored in the ARIS system. Although similar in intent, the OPENING_NUMBER in ARIS is a separate unique block identifier.

The first item extracted to identify cutblocks is the skid clearance date for the block. This information is used to calculate the timber year that is used to classify the blocks. Other information required is the species group code (pre harvest stand species composition), the stand modifier (regeneration standard assignment), establishment survey information and AVI inventory species composition. These are used to guide block strata assignment.

2.3.2 Classification

Areas harvested after March 1, 1991 are classified separately and have different stand development trajectories than stands harvested before March 1, 1991. The attributes for harvest date and for regenerating strata have different assignment rules. Figure 2-6 outlines the decision rules for timber year and for regenerating strata assignment for Sundance blocks and for AVI CC polygons. Areas for each of the data groups are also listed in the figure. Areas for subgroups are shown in brackets.

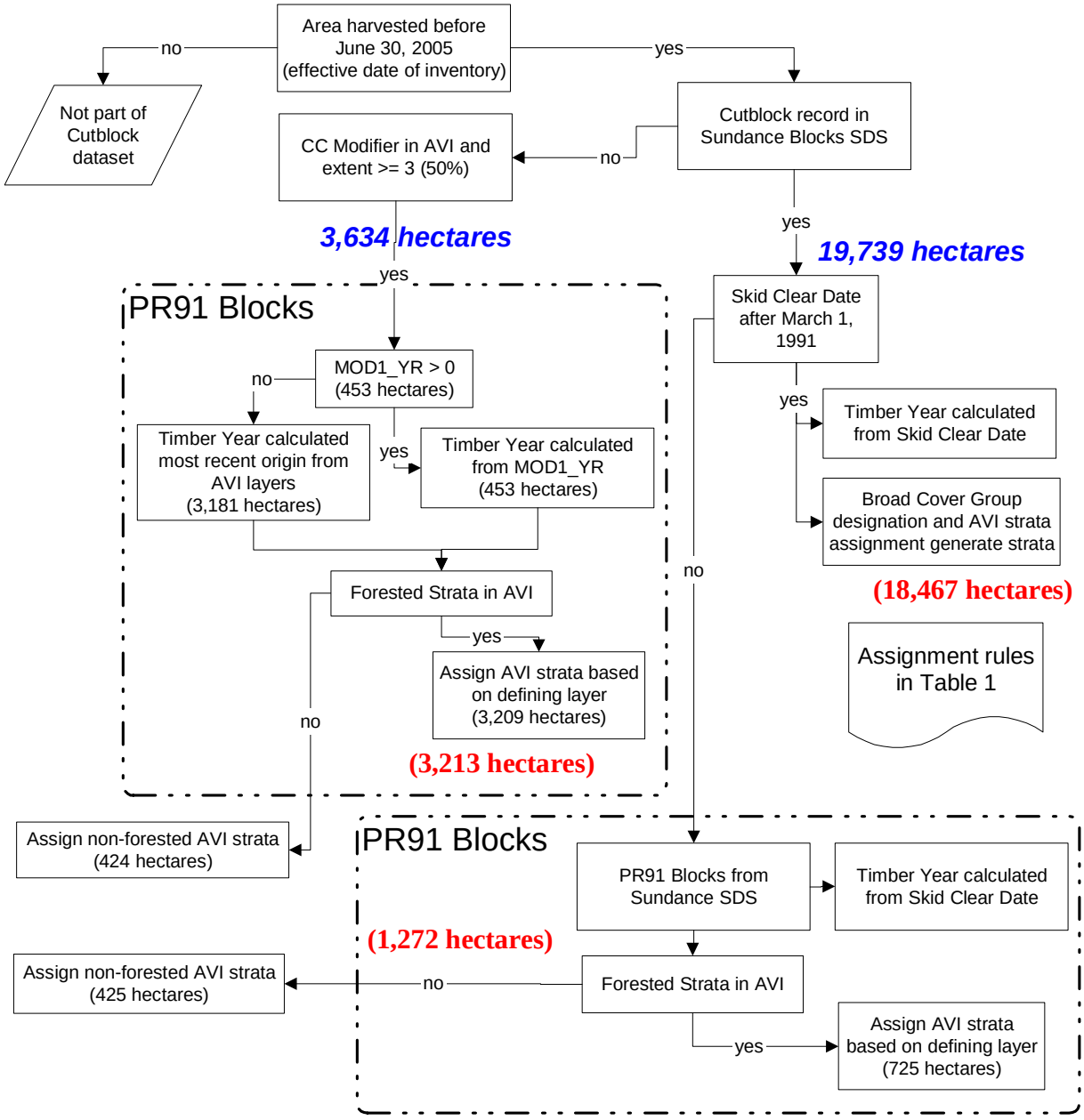

Figure 2-6. Cutblock classification process (to be updated (reference to Table 1)).

Post 1990 harvest areas

The classification process for areas harvested after March 1, 1991 is outlined in this section. The unique block *KEY_X*, *SKID_CLEAR* date, and *STD_MOD* (standard modifier) and ARIS *OPEN_NO* are carried from the block table in the Silviculture Database System. Four additional block attributes are calculated. These are *TIMBER_YEAR* (calculated from the *SKID_CLEAR* date), *BCG* (broad cover group calculated from the *STD_MOD*), *BLK_STRATA* (block strata) and *BLK_TPR* (block timber productivity rating). AVI is the first source for the calculated block attributes. Survey results and pre-harvest species compositions are also used. Generated

attribute processing for the cutblock classification takes place in ORACLE using Structured Query Language (SQL).

Timber Year (TIMBER_YEAR)

Timber year, the year of the cutblock start date, has been calculated based on skid clearance date. The timber year runs from May 1 to April 30 of the following year. Therefore, month and year are extracted from the start date and used in the calculation. Cutblocks without a timber year are not considered in this dataset. The SQL statement to assign timber year is:

decode(sign(extract(month from SKID_DATE) - 5), -1, (extract(year from SKID_DATE) - 1), (extract(year from SKID_DATE))) as TIMBER_YEAR

The logic is to identify the month of skid clearance. If this is before MAY then subtracting 5 from the month number will yield a negative number and the timber year should be the previous year. If not the listed year in the SKID_CLEAR date is the timber year. To correspond with the effective date skid clearance dates from May 1, 2005 to June 30, 2005 were assigned to the 2004 timber year.

Broad Cover Group (BCG)

The reforestation standard (*STD_MOD*) assigned to cutblocks is important for the assignment of cutblock strata. The broad cover group is the initial code of the standard, 'C', 'CD','DC', or 'D'. Stands with the "PR91" designation form the "Sundance Pre91" block dataset.

Cutblock Timber Productivity Rating (BLK_TPR)

A timber productivity rating has been assigned to each cutblock for inclusion in the landbase classification process. A default TPR of 'C' was assigned to all 'Post 1990' cutblock area.

Cutblock Strata (BLK_STRATA)

The broad cover group, derived from the regeneration standard assigned to the block was used to assign block strata. AVI information from the defining layer was used to generate a single dominant yield curve strata (by area) for the block as shown in Table 2-4. Where these strata fell within the assigned broad cover group, it became the block strata. Where the strata differed from the broad cover group, it was adjusted based on the decision rules in Table 2-4. Where no AVI forest cover was available the assigned pre-harvest species group (SPGRP) was used instead. Pine was considered the default conifer species in these assignments.

Table 2-4. Block strata assignment for Post 1990 cutblocks.

Yield Strata or Species group	Regeneration Standard / Broad Cover Group			
	C-2000	CD-2000	DC-2000	D-2000
	C	CD	DC	D
PL	PL	PA	AP	DEC
SW	SW	SA	AS	DEC
SB	SB	SA	AS	DEC
PN	PL	PA	AP	DEC
PA	PL	PA	AP	DEC
SA	SW	SA	AS	DEC
MX	PL	PA	AP	DEC
AP	PL	PA	AP	DEC
SA	SW	SA	AS	DEC
DEC	PL	PA	AP	DEC
A	PL	PA	AP	DEC
NULL	PL	PA	AP	DEC

2.3.3 Pre 1991 harvest areas from Sundance records

The classification process for areas harvested before March 1, 1991 with records in the Sundance Silvicultural Database System is outlined in this section. The unique block *KEY_X*, *SKID_CLEAR* date, and *STD_MOD* (standard modifier is PR91) and ARIS *OPEN_NO* are carried from the block table in the Silviculture Database System. Three additional block attributes are calculated. These are *TIMBER_YEAR* (calculated from the *SKID_CLEAR* date), *BLK_STRATA* (block strata) and *BLK_TPR* (block timber productivity rating). AVI is the source for the calculated block attributes for Pre 1991 cutblocks. Areas without forested strata in AVI are not considered part of the cutblock dataset. Generated attribute processing for the cutblock classification takes place in ORACLE using Structured Query Language (SQL).

Timber Year (TIMBER_YEAR)

Timber year, the year of the cutblock start date, has been calculated based on skid clearance date. The timber year runs from May 1 to April 30 of the following year. The same process documented for Post 1990 blocks was used.

Cutblock Timber Productivity Rating (BLK_TPR)

A timber productivity rating must be assigned to each cutblock for inclusion in the landbase classification process. A default TPR of 'B' was assigned to all 'PR91' cutblock area.

Cutblock Strata (BLK_STRATA)

AVI information from the defining layer was used to generate a single dominant yield curve strata for the block.

2.3.4 Pre 1991 harvest areas from AVI records

The classification process for areas harvested before March 1, 1991 with no record in the Sundance Silvicultural Database System is outlined in this section. AVI is the source for the calculated block attributes. Only polygons with forest AVI attributes in areas not part of the 'PR91' cutblocks are included. Generated attribute processing for the cutblock classification takes place in ORACLE using Structured Query Language (SQL). Cutblock assignment for AVI cutblocks are part of the **lb2_avi_cc.dat** table.

Harvest Year (CC_YEAR)

The year of the cutblock start date, has been calculated based on AVI information. Where a modifier year was identified this was used (*MOD1*_YR > 0). If no modifier year was listed the default year of 1991 was used.

Cutblock Timber Productivity Rating

A default TPR of medium, 'M', is assigned to AVI cutblocks.

Cutblock Strata (AVI_YC_STRAT)

AVI information from the defining layer was used to generate a single dominant yield curve strata for the block. Where no forest cover information was available the block was not considered regenerating and was assigned a non-forest strata and not part of the managed landbase. *AVI_YC_STRAT* holds the strata assignment.

2.3.5 Planned and contingency blocks

Harvest areas from 2005 and 2006 and Sundance planned harvest blocks after 2006 are identified on the landbase. Planned harvest blocks included on the landbase have laid-out boundaries and year of harvest assigned. Contingency blocks are planned blocks within the period 2007 to 2016 without a specific year of harvest assigned. Block attributes for planned and contingency blocks come from AVI.

2.4 Landuse

Sundance has captured all landuse updates as polygons for use in operations and the landbase description stage of the Forest Management Plan. All dispositions recorded in the Land Status Automated System (LSAS) in June 2005 which fall within the Sundance FMA boundary were identified. Dispositions were grouped into non-linear and linear groupings.

The goal in developing the landuse dataset was to identify disturbances within the FMA boundary that have occurred since the inventory photography was taken until the effective date of the inventory, June 30, 2005 that impact the potential for forest harvesting. The landbase classification process identified all dispositions which precluded timber harvest. This included dispositions which designate non-forest areas (surface leases, roads, pipelines) and dispositions

that identify lands committed to other uses and not available for timber harvest (government land reservations, grazing allotments).

Landuse disposition polygons were grouped into non-linear and linear groups as outlined in Table 2-5. The **nlin_diss** coverage is the non-linear grouping and contained non-linear dispositions including surface and mineral leases and government reservations. The **lin_diss** coverage is the linear grouping and contained linear dispositions including pipelines, utility corridors and transportation related dispositions. Figure 2-7 shows the disposition groups.

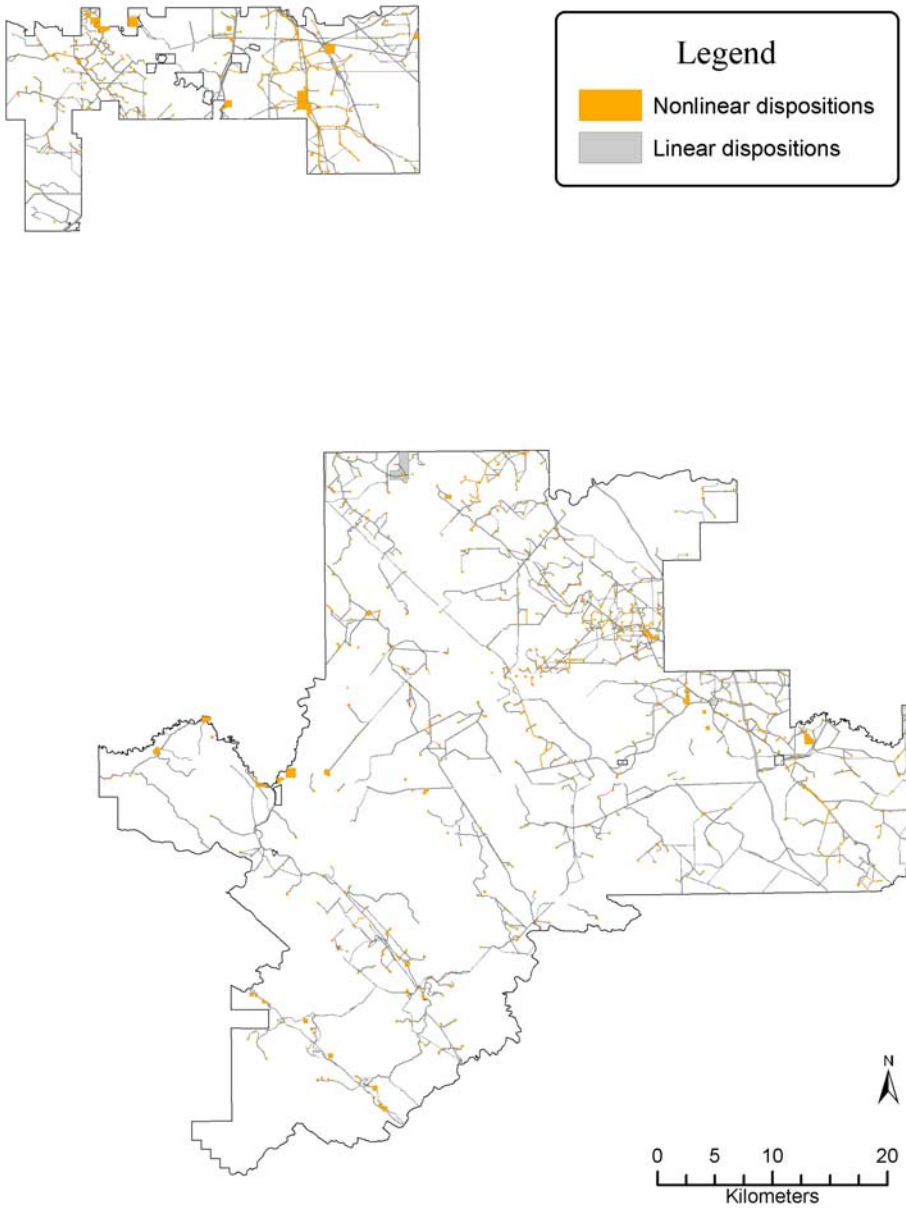

Figure 2-7. Landuse dispositions by group (nlin_diss, lin_diss).

2.4.1 Boundary Capture

Sundance has an on-going system to maintain current boundaries for landuse activities within the FMA. The Sundance landuse layer is maintained continuously by digitizing approved landbase withdrawals for industrial dispositions and incorporating them into the GIS system. Disposition boundaries are stored in the LANDUSE layer in the Sundance Spatial Library. Attributes from the provincial Land Status Automated System are attached to each disposition so that the information is current. New ortho-photography is completed every 5 years and used to check and adjust, if required, the boundaries of recent dispositions. The extracted layer was clipped to the FMA boundary (**landuse_fma)**.

2.4.2 Dataset Processing

More than one disposition can exist on a single area of land. Therefore the dispositions are stored in an ArcInfo regions coverage that allows overlapping polygons. In the landbase classification process it was desirable to have a single landuse designation for any area. Table 2-5 shows the landuse deletion hierarchy order for disposition types within the FMA considered in landbase classification. This provided the priority or order of assignment for disposition types. This hierarchy was used to generate a region subclass (**region.lu_calc)** with all listed disposition types (those considered in landbase classification) and assigned a single disposition code in any areas of overlap. This region subclass was then split to form non-linear (**region.non_lin)** and linear (**region.linear**) grouping. These regions were then extracted into ArcInfo coverages with the region name (**lu_calc, linear and non_lin)**. The ArcInfo coverages were dissolved on disposition type to simplify the linework. The coverage **nlin_diss** (all non-linear dispositions including government reservations, recreation and private leases) and **lin_diss** (all linear dispositions including pipelines, utlity corridors and transportation related dispositions) show dispositions considered in the landbase classification.

For the DRS and PNT dispositions not all instances were excluded. On review of the DRS dispositions, it was found that DRS790057 east of the Brazeau Reservoir does not restrict forestry operations. Similarly it was determined there are only eight PNTs that prohibit timber harvesting operations. The dispositions for inclusion were reviewed with ASRD staff to confirm dispositions to include.

Table 2-5. Landuse disposition codes and heirarchy.

Disposition code	Description	Disposition grouping	Heirarchy
LOC	License of Occupation	Linear	1
PLA	Pipeline Agreement	Linear	2
PIL	Pipeline Installation Lease	Linear	3
MSL	Mineral Surface Lease	Non-linear	4
SML	Surface Mineral Lease	Non-linear	5
MLL	Miscellaneous Lease	Non-linear	6
MLP	Miscellaneous Permit	Non-linear	7
SMC	Surface Mineral License	Non-linear	8
FRD	Forestry Road	Linear	9
RDS	Road	Linear	10
RRD	Registered Roadway	Linear	11
ROE	Right -of-Entry Agreement	Linear	12
EZE	Easement	Linear	13
DRS	Disposition Reservation	Non-linear	14
REA	Rural Electrification Association Easement	Linear	15
RIA	Range Improvement Agreement	Non-linear	16
GRL	Grazing Lease	Non-linear	17
PNT	Protective Notation	Non-linear	18

2.4.3 Seismic

Seismic disturbances are generally not wide enough to differentiate on the source photography as a polygon features and are stored as line features (**seis_fma)**. Seismic lines were buffered to spatially capture the areas disturbed. It was decided that, on average, seismic lines are 5 meters in width. All straight line work in the trails layer was buffered 2.5 meters on each side (5 meters in total) (**seis_buf**).

Sundance has been reforesting seismic lines inside cutblocks for many years. Of the 568 hectares of land used for seismic lines since 1997, only 62.8 hectares were not low impact/hand cut. As a result, all buffered seismic/trails area contained within Sundance cutblocks harvested after 1991 have not been removed as non-forested landbase exclusions.

Figure 2-8 shows the full seismic dataset including areas within cutblocks which were not considered deletions.

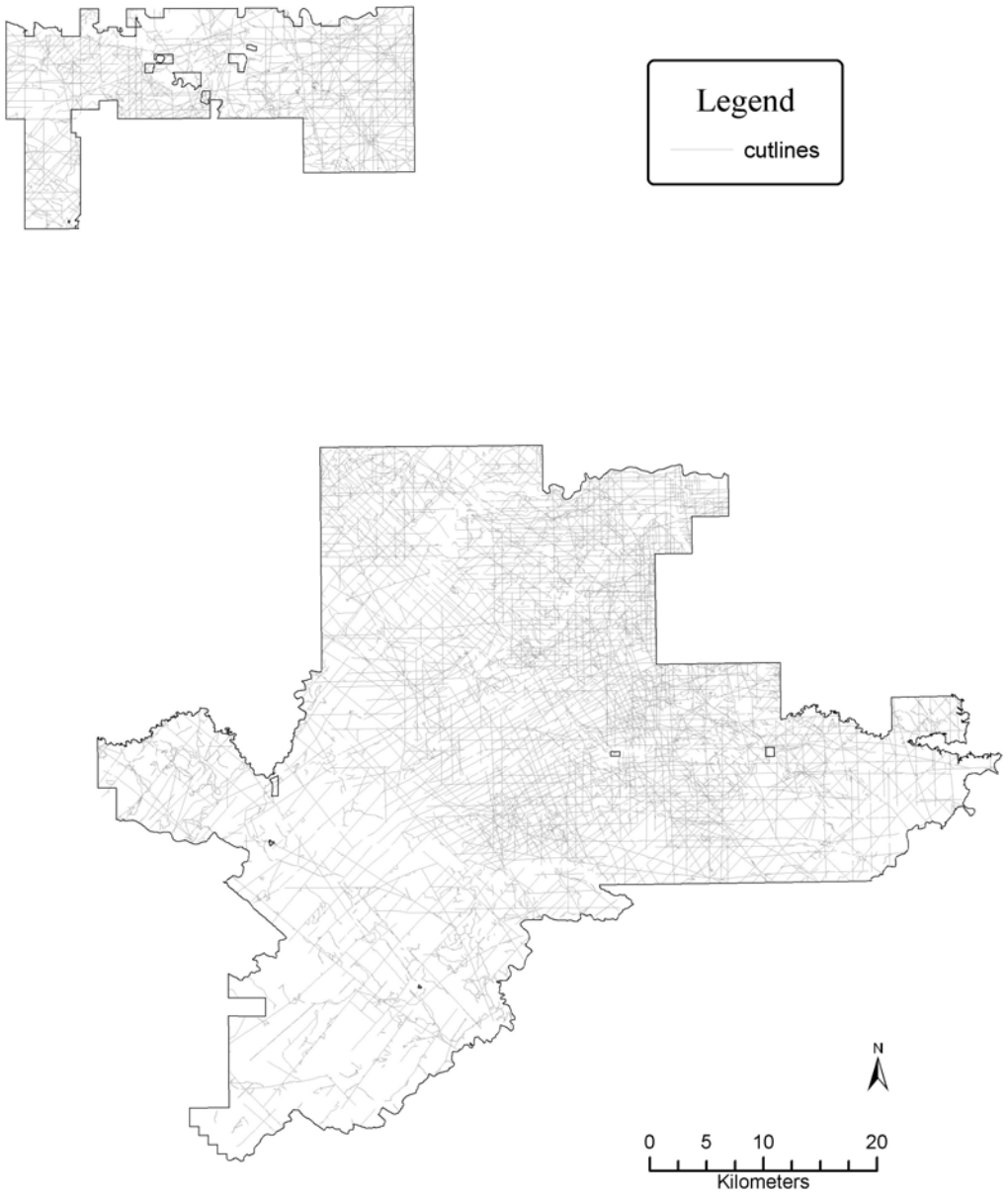

Figure 2-8. Seismic cutline distribution (seis_fma).

2.4.4 Water Course Buffers

The current Alberta Timber Harvest Planning and Operating Ground Rules Framework for Renewal (Alberta Sustainable Resource Development, 2006) exclude harvesting activity in areas adjacent to and surrounding water features. The Sundance watercourse buffer exclusion incorporates all rivers and lakes that currently exist in the AVI. It also incorporates stream data acquired from Alberta Base Data (NTS) maps. Lake, stream and river buffer coverages were generated in accordance with buffer definitions as described in Table 2-6.

Table 2-6. Watercourse classification and buffer distance.

Classification	Description	Distance
Large Permanent streams	Extracted from 3 sources: AVI (**forest_fma**), Sundance spatial library WATERBDY layer or STREAMS layers. (includes Pembina, McLeod, Brazeau, Blackstone, Elk and Swartz rivers)	60m
Small Permanent streams	All streams from Sundance STREAMS layer labeled 'Perennial' and not in large permanent classification	30m
Lakes	Lakes larger than 4 hectares captured in AVI (natnon = 'NWL') or Sundance WATERBDY layer (Includes Brazeau Reservoir).	100m
Wildfowl lakes	Lake identified for Trumpeter Swan Lake designation	200m

The watercourse buffer coverage (**wbuf_fma**) was the approved water buffer coverage from the Sundance TSA submission in 2002. During the FMP process one lake in the FMA was identified as having Trumpeter Swan habitat (**trump_lake**) and requiring additional buffer distances. The only change to the water buffer coverage from the 2002 FMP was the addition of the 200m buffer on the designated Trumpeter Swan Lakes (**trump_lkbuf**). The field *WBUF* identifies areas within buffers on the coverage (**wbuf_fma06**). Figure 2-9 shows the water buffers input files.

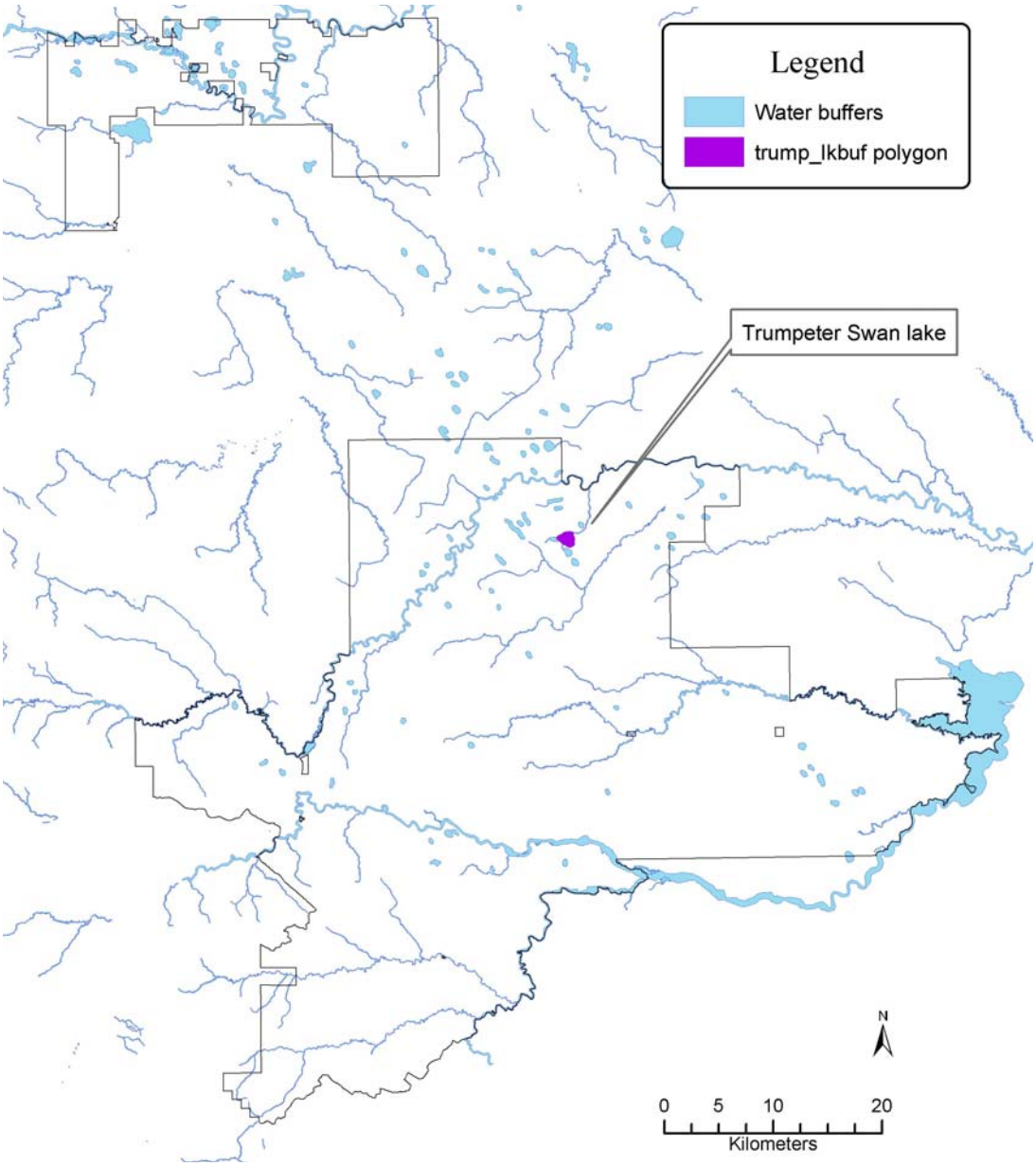

Figure 2-9. Watercourse buffers including Trumpeter Swan lake buffers (wbuf_fma06).

2.5 Wildfire

The impact of fire since the AVI was completed was identified on the classified landbase. The Fickle Lake Fire burned in 1998 in compartment 22. The boundary was extracted from the Alberta Government Historical Wildfire Coverage to 2003 (**19310930hf2003p)** and contained burnt polygons only (*BURNCODE* = 'B'). This boundary was used to exclude land from the managed landbase (**fire1998**).

3. Input Coverages and Tables

This section outlines the actual coverages, fields and related tables used to classify the landbase. The original data sources that were used to generate these coverages are described in detail in Section 2. Table 3-1 lists all datasets with a brief description and the landbase attributes on each dataset.

Table 3-1. Input datasets.

Dataset Name	Description	Fields Used
Administrative boundaries		
comp_fma07nsr	FMA,compartmentand natural subregion combined	*FMA,COMPART, NSR*
AVI		
forest_fma	AVI inventory	*FMA_ID* , AVI attributes
net_strata_sd.dat	Generated attibutes from AVI including strata	AVI generated attributes
Landuse and seismic		
nlin_diss	Non-linear landuse dissolved on disposition type	*NLIN_DISP*
lin_diss	Linear landuse dissolved on disposition type	*LLIN_DISP*
seis_buf	Seismic and trails buffered to 5m width	*IN_SEIS*
Cutblocks		
sund_blk3	Existing and planned cutblocks	*KEY_X, OPEN_NUM, TIMBER_YEAR, SP_GRP STD_MOD, YC_STRAT, BCG, BLK_STRATA*
lb2_avi_cc.dat	CC Modifier of 50% or more on managed landbase	*CC_YEAR, AVI_YC_STRAT, BLK_STORY*
Hydrology buffers and fire		
wbuf_fma06	Combined stream, river and lake buffers	*WBUF*
fire1998	Wildfire boundaries since 1994 and Windfall burn	*BURNCODE, FIREYEAR*

3.1 Spatial Input Data (from coverages)

A landbase classification was developed with spatial data from numerous sources. Often these source data have very slight differences in representation of boundaries. The scale of the photography or source used may indicate which boundary should be given priority. In these cases grouping of the submitted datasets prior to processing was the most efficient means to accomplish this. The Forestry Corp. has found it efficient to group some datasets into a single

input dataset and address the creation of slivers along shared borders before using these input datasets in the multiunion process to create the final landbase. For each input dataset the spatial data source(s) and any processing required was described.

3.1.1 COMP_FMA07NSR

This coverage classifies the gross landbase. The outside boundary was the Sundance FMA boundary. This was combined with the compartment coverages and the natural subregion coverage to create **comp_fma07nsr**. The outer boundary of the compartment coverage was adjusted to correspond to the FMA boundary. The attributes *NSR* and *COMPART* provide landbase information.

3.1.2 FOREST_FMA

The vegetation inventory for the FMA was the coverage **forest_fma**. This combined all sources of AVI as outlined in Section 2.2. The AVI polygon number was *FMA_ID*. AVI attributes were loaded separately to ORACLE for attribute processing (See Section 4).

3.1.3 FIRE1998

The wildfire boundary for the Fickle Lake fire in 1998 was included. The attributes *BURNCODE* and *FIRE_YEAR* provide landbase information.

3.1.4 NLIN_DISS

All non-linear dispositions that preclude land from timber harvesting are included in this coverage. The dataset was dissolved on disposition type to generate a simplified landuse input dataset. The *NLIN_DISP* field holds the disposition type.

3.1.5 SUND_BLK3

All cutblocks within the Sundance FMA with an assigned year of harvest and block species strata assignment are included in the classified landbase. This included all existing cutblocks (harvested before June 30, 2005) grouped into “PR91” blocks (harvest before March 1, 1991) and those harvested after March 1, 1991. This dataset also included planned cutblocks for the period 2005 to 2016 which included blocks harvested in 2005 and 2006 and those planned for the period 2007 to 2016. Fields KEY_X, TIMBER_YEAR, SPGRP, STD_MOD, OPEN_NUM (renamed from OPEN_NO on SDS tables), YC_STRAT, BCG and BLK_STRATA carry cutblock information. Cutblock fields are defined in Section 2.3.

3.1.6 WBUF_FMA06

The water buffer coverage created for the 2002 Sundance Forest Management Plan was augmented with a 200m wildfowl buffer on a designated Trumpeter Swan Lake. The *WBUF* field indicated area within water buffers.

3.1.7 LIN_DISS

All linear dispositions that preclude land from timber harvesting are included in this coverage. The dataset was dissolved on disposition type to generate a simplified landuse input dataset. The *LLIN_DISP* field holds the landuse disposition type.

3.1.8 SEIS_BUF

The coverage of buffered seismic information was dissolved on *IN_SEIS* field to simplify the input coverage. *IN_SEIS* = 100 identifies seismic areas.

3.2 Tabular Input Data (from INFO Tables)

3.2.1 NET_STRATA_SD.dat

AVI generated attributes (Section 5).

3.2.2 LB2_AVI_CC.DAT

AVI polygons with a clearcut modifier and a forested AVI strata were identified. Only polygons with a forested AVI species assigned and not part of the PR91 cutblock dataset were included. The fields *CC_YEAR, AVI_YC_STRAT* and *BLK_STORY* carry cutblock information for AVI harvest blocks.

4. Spatial Data Processing

4.1 Overview

This section outlines the spatial processing required to combine the input datasets into a single spatial landbase file. Standard processing involved four main steps:

- Multiunion to combine all input datasets (with the exception of linear landuse and seismic);
- Attribute processing to generate a preliminary identification of deletion areas;
- Polygon reduction to eliminate sliver polygons;
- Addition of linear landuse and seismic linework to generate the classified landbase;
- Summarize areas of linear features for TSA landbase, and;
- Adding attributes for modelling landbase.

Figure 4-1 shows the processing steps and interim coverages.

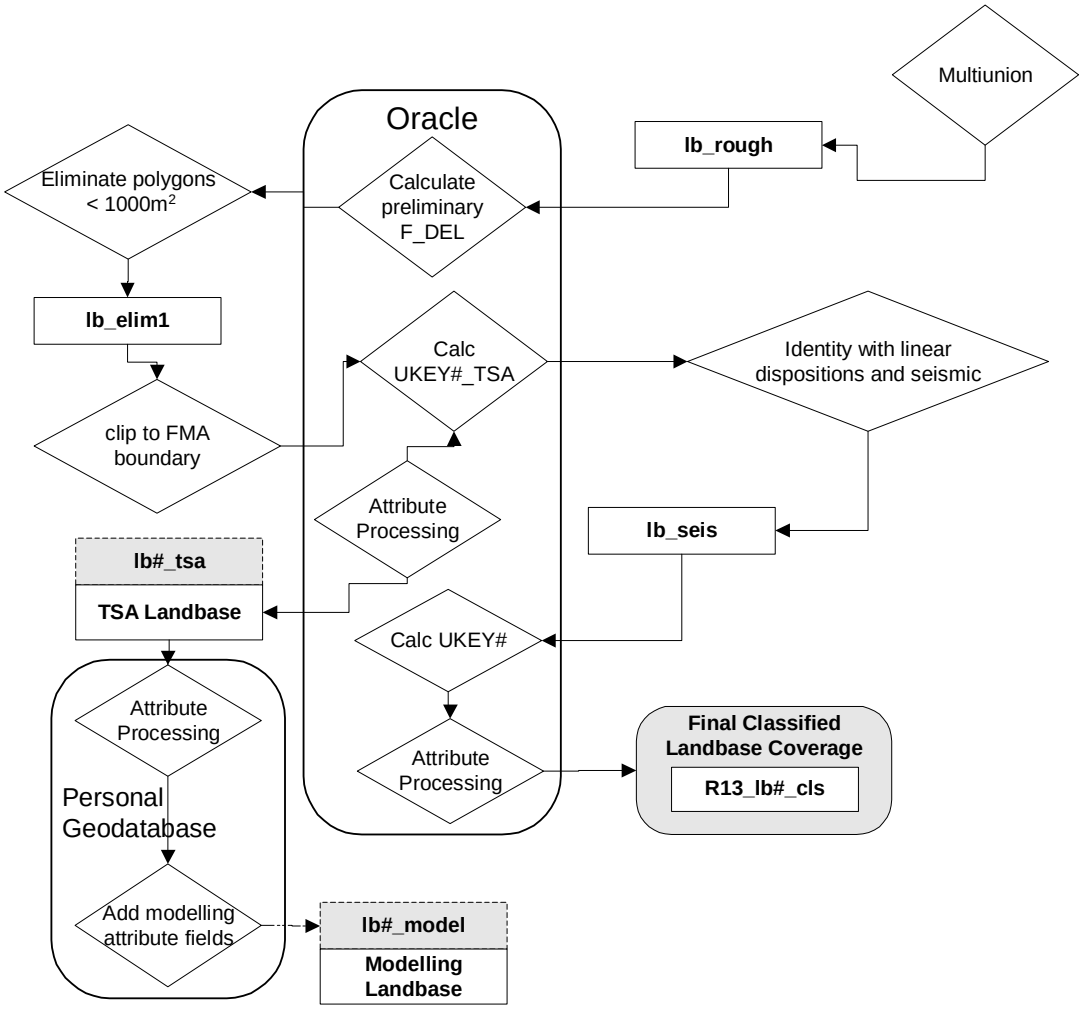

Figure 4-1. Spatial data processing.

4.2 Processing

4.2.1 Multiunion

A list of the input coverages was stored in an oracle table (**lb_net_table#**) accessed through ArcInfo. This table tracks the input coverages, date of processing and final output dataset for each run.

Table 4-1 lists the input coverages to the multi-union process for the spatial landbase. The Rank field identifies the order of union and the interim coverages are listed in Union Cover field. The table shows the two parts of the multiunion process. The first list is the spatial data for the TSA landbase and the second set shows the additional unions to create the classified landbase.

Table 4-1. Landbase netdown table.

Input Coverage Name	Cover type	Rank	Union Cover
comp_fma07nsr	poly	1	
wbuf_fma06	poly	2	zu_1_2
fire1998	poly	3	zu_2_3
forest_fma	poly	4	zu_3_4
nlin_diss	poly	5	zu_4_5
sund_blk3	poly	6	zu_5_6
Polygon reduction process creates **lb2_tsa**, TSA Landbase spatial files			
lb3_tsa	poly	12	zs_0_1
lin_diss	poly	13	zs_1_2
seis_buf	poly	14	zs_2_3

Using ArcInfo processing and the *multiunion_gdb.aml* all input datasets are unioned into a single coverage. The AML references the Oracle table to identify the coverages to union, the names to assign to the interim datasets and the order of processing. The multi-union output coverage name (**lb_rough**) was specified as an argument when running the aml. More than 30% of the polygons are < 1000m^2 in size. These polygons were available for deletion where the deletion type would not change (Section 4.2.2). Table 4-2 shows the changes in polygon numbers through the spatial processing steps. The **lb_rough** coverage was clipped to the FMA boundary (**fma_outside**) to form the **lb_clip** coverage.

Table 4-2. Coverage polygon numbers through spatial processing.

Coverage name	Description	# of polygons
lb_rough	Coverage resulting from multiunion	56,475
lb_clip	Clipped to FMA outer boundary	56,466
lb_elim1	Polygons < .01 ha eliminated	41,666
R13_lb3_tsa	TSA Landbase	41,666
R13_lb3_cls	Seismic and linear linework added (classified landbase)	196,193

4.2.2 Polygon Reduction

Sliver polygons generally result from slight differences in boundaries amoung input datasets and do not provide useful information to the landbase classification. Large numbers of polygons in the modelled datasets increases complexity. It also slows the mapping, querying and viewing of the landbase. To reduce the number of polygons in the landbase, especially the TSA landbase measures to address sliver polygons were completed before seismic linework was added.

The landbase was processed to reduce sliver polygons in 2 steps:

1. A preliminary assignment of deletion types was calculated on the results of the multiunion process (**lb_clip)** and assigned to the landbase.

2. An eliminate was done for slivers < 0.1ha but only for polygons where the deletion code or the cutblock opening number would not change if the sliver was eliminated.

Assign preliminary deletion types

The **lb_clip.pat** attribute file was loaded into oracle for processing. A preliminary assignment of deletion types was calculated. The *elim_calc_lb3.sql* script assigned deletions similar to those described in Section 6.3.2 although they were only a temporary assignment and were not considered past the second elimination step. The F_DEL_ELIM field calculated in ORACLE was added to the **lb_clip** coverage.

Eliminate slivers < 0.1 ha where deletions and cutblock opening numbers do not change

This step used the *eliminate* command in ArcInfo with the *nokeepedge* and *border* options. This allowed slivers on the boundary to be eliminated and merged eliminated polygons into the adjacent polygon that shared the longest border with the sliver. The eliminate was done for slivers < 0.1ha but only for polygons where the deletion code or cutblock boundary would not change if the sliver was eliminated. This was accomplished by hardcoding (calculating cover–id to -1) for any arcs that form the boundary between deletion types or opening_numbers. If the deletion code or opening_number on both sides of the boundary was the same then that arc was available for elimination if the polygon size was < 1000 m^2. The *findarc_elim1.aml* ran this process. The processing eliminated 14,800 sliver polygons and created **lb_elim1**.

Table 4-3 shows the area comparison after the eliminate was completed. The deletion code item (*F_DEL_ELIM*) was carried through the sliver removal process and the areas before and after the eliminate process were summarized on this item. These deletion types and areas are presented only to compare the coverages before and after sliver removal and do not represent the final assignments to the landbase. The sliver removal did not change the managed landbase area (*F_DEL_ELIM* = 'NONE').

Table 4-3. Sliver reduction comparison by preliminary deletion codes.

	Area (lb_clip)	Area(lb_elim1)	Difference (ha)	Difference (%)
F_DELELIM	**ha**	**ha**	**(lb_clip - lb_elim1)**	
FIRE	136	136	0.0000	0.0000%
GOVRES	677	677	0.0000	0.0000%
GRBUF	7,421	7,421	0.0000	0.0000%
LEASE	2,095	2,095	0.0000	0.0000%
LT	3,706	3,706	0.0000	0.0000%
NCSB	21,816	21,816	0.0000	0.0000%
NF	11,893	11,893	0.0000	0.0000%
SB_ADENS	4,528	1,528	0.0000	0.0000%
TPR	28,238	28,238	0.0000	0.0000%
XDFA	1,118	1,118	0.0000	0.0000%
NONE	185,186	185,186	0.0000	0.0000%

A second comparison summarizes the first AVI overstory species (*SP1*) in the coverages before and after the elimination. This summary includes only areas with an assigned Sp1 and is shown in Table 4-4. As the sliver removal did not allow changes in deletion assignments the slight differences in species strata distribution occur within deletion categories or within cutblocks.

Specifically the pine and black spruce differences mostly result from sliver deletions within the managed landbase along cutblock boundaries.

Table 4-4. Sliver reduction comparison by AVI Sp1 on preliminary landbases.

Sp1	Description	Area (lb_clip) ha	Area(lb_elim1) ha	Difference (ha) (lb_clip - lb_elim1)	Difference (%)
A	Aspen	51	51	0.00	0.0000%
Aw	Aspen	25698	25702	-4.00	-0.0016%
Bw	Birch	26	26	0.00	0.0000%
Fa	Fir	61	61	0.00	0.0000%
Lt	Larch	14712	14711	1.00	0.0004%
P	Pine	27809	27810	-1.00	-0.0004%
Pb	Poplar	1097	1097	0.00	0.0000%
Pl	Pine	111564	111586	-22.00	-0.0088%
Sb	Black spruce	47596	47564	32.00	0.0128%
Sw	White spruce	21640	21650	-10.00	-0.0040%

4.3 Landbase Description

4.3.1 TSA Landbase

The spatial linework generated for the TSA landbase was used as input to create both the classified and the modelling landbase. The spatial coverage for the TSA landbase has the same inputs as the classified landbase. The only difference was that no linework for linear landuse or seismic was included in the file. Linear landuse, trails and seismic information was carried as a attributes on the TSA landbase. This simplifies the linework of the TSA landbase but maintains the area impact of these features by polygon and reduces the total area available for harvest. All polygons in the classified landbase with seismic lines or with linear landuse dispositions intersecting them are flagged. The area of any polygons where the classified landbase deletion was 'SEIS', 'ROAD' or 'LINEAR' was carried on the TSA landbase and used to reduce the polygon area and exclude this area from the managed landbase area. The coverage **lb#_tsa** has the spatial linework for the TSA landbase and carries the unique key UKEY#_TSA. With landbase attributes attached it forms the **R13_lb3_tsa** coverage.

4.3.2 Classified Landbase

The addition of management area, linear landuse, trails and seismic linework to the TSA landbase to create the classified landbase increased the total number by over 150,000 polygons. Although many of these polygons would be considered slivers a final eliminate was not done in order to maintain the integrity of the seismic polygon boundaries. Also the number of polygons was less of a factor in the classified landbase as this landbase was not used for TSA modelling. The managed landbase area was the same on both the TSA and classified landbases. The classified landbase carries the unique key from the TSA landbase (UKEY#_TSA) to link to TSA results. The coverage **lb#_seis** has the spatial linework for the classified landbase. This spatial coverage is combined with the landbase attributes to form **R13_lb3_cls** with a unique key *UKEY3_SEIS*.

4.3.3 Modelling Landbase

The Forest Management Planning Standard (Alberta, 2006) requires companies to create a strategic model that is also capable of being an operational model. To make a strategic model operational, it is necessary to make the model create block shapes that companies are able to feasibly harvest. During the numerous iterations of the Sundance landbase process a number of changes to the TSA landbase to make it suitable for the TSA modelling were identified. The overall goal of the steps taken was to add the necessary fields for the TSA and to make the landbase as suitable as possible operational and strategic planning. The attribute assignments are described in Section 6.5.

The modelling landbase, used for the TSA modelling, was developed from the TSA landbase (Section 4.3.1). The additional processing steps to make the landbase as suitable as possible for operational and strategic planning were:

- Adjust the ages and cutblock attributes to reflect the 2007 start year for modelling and;
- Add fields required by TSA models.

This coverage with the modelling attributes is the **R13_lb3_mod** with a unique key of *UKEY3_TSA*.

5. AVI Attribute Processing

AVI attributes provide the base classification for the landbase. The AVI attribute table was loaded to Oracle and all strata were calculated through SQL. Two strata were applied to all polygons within the AVI. The SQL script *strata_srd_calc_os_us_hcs_ncsi.sql* calculated species groups, species distributions, broad cover groups, composite stand values and age for each layer. The final stratification includes landbase updates from a variety of sources and is outlined in Section 6.

The calculated attributes generated from AVI attributes are carried in the **net_strata_sd.dat** table. This table carries the AVI attribute data and all the generated attributes listed in this section. This includes species, species percent, species order, strata decision rules, age, broad cover group, and strata assignments for the overstory, understory and composite layer. Layer 1 (overstory) attributes receive basic field names. Layer 2 (understory) attributes have a 'U' prefix on the basic field name. Layer 3 (composite) attributes have a 'C' prefix with the basic field name (e.g. age, uage, cage).

The species groupings and distribution are listed in Section 5.1. The defining layer and processing of different stand structure types are outlined in Section 5.2. Composite layer attributes are described in Section 5.2.11. The stratification process and decision rules for each stratification type are documented in Section 5.3.

5.1 Species Groupings and Distribution

5.1.1 Species percents (PL_PCT, SW_PCT, FB_PCT, FD_PCT, SB_PCT, PB_PCT, AW_PCT, BW_PCT, LT_PCT)

Individual species from AVI species codes were combined into species groups (Table 5-1). The species percents from AVI where AVI species codes matched the species group were summed to generate the species distribution. Percent values were the same as AVI classes (*SP1P* to *SP5P*)

where classes 1 to 10 represented values 1 to 100 where each class represents 10 percent. Species percent fields for the understory have a 'U' prefix on the fields listed above.

Table 5-1. Species groups.

Species Type	Species Group	Description	AVI Species codes
Deciduous	AW	Aspen	A, Aw
	BW	Birch	Bw
	PB	Poplar	Pb
Conifer	FB	True fir	Fb, Fa
	FD	Douglas-fir	Fd
	LT	Larch	Lt, La, Lw
	PL	Pine	P, Pl, Pj, Pa, Pf
	SB	Black spruce	Sb
	SW	White spruce	Sw, Se

For example the aspen percent would be calculated as follows:

$$AW\_PCT = \sum \begin{pmatrix} (\text{SP1P where SP1 IN ('A','AW')}), (\text{SP2P where SP2 in ('A','AW')}), \\ (\text{SP3P where SP3 IN ('A','AW')}), (\text{SP4P where SP4 IN ('A','AW')}), \\ (\text{SP5P where SP5 IN ('A','AW')}) \end{pmatrix}$$

5.1.2 Species Order (PL_ORD, SW_ORD, FB_ORD, FD_ORD, SB_ORD, PB_ORD, AW_ORD, BW_ORD, LT_ORD)

The stratification rules in the following section consider the order of species as one of the decision criteria. To simplify coding the appropriate species order value was updated for each of the species in *SP1* to *SP5* fields. When a species was not present it was assigned an order value of 9. Species order fields for the understory have a 'U' prefix on the fields listed above.

For example a stand with species and percents 1 to 3 of "SW5PL3AW2" would have PL_ORD = 2, SW_ORD = 1, AW_ORD = 3, FB_ORD = 9, SB_ORD = 9, PB_ORD = 9 and all other species assigned an order of 9.

5.1.3 Species Type Percent (HARDPCT, SOFTPCT)

Deciduous species types (See Table 5-1) were summed to generate the deciduous (*HARDPCT*) and coniferous (*SOFTPCT*) species percents. Species type fields for the understory have a 'U' prefix on the fields listed above.

5.1.4 Stand Age (AGE, UAGE)

Stand age was calculated from the year of stand origin to the effective date as 2005 – *ORIGIN* for the overstory (layer 1). In the understory, *UAGE* was calculated as 2005 – *UORIGIN* where *UORIGIN* was greater than 0. Non-forested and stands with no origin are assigned a value of 0.

5.1.5 Leading Species by Species Type (LEAD_CON, LEAD_DEC)

The first listed deciduous species was stored as *LEAD_DEC* and can be identified as the minimum species order amoung *AW_PCT*, *BW_PCT* and *PB_PCT*. Where *HARDPCT* was 0, 'NO' was listed as the leading deciduous species. The first listed conifer species was stored as *LEAD_CON* and calculated as the minimum order amoung conifer species. Where *SOFTPCT* was 0, 'NO' was listed as the leading conifer species. Leading species fields for the understory have a 'U' prefix on the fields listed above.

5.1.6 Broad Cover Group (C_CODE, UC_CODE)

The species group and the species distribution (as calculated from the AVI species percent classes) were used to calculate the broad cover group for a forested layer (Table 5-2). Species group and distribution in the understory generated *UC_CODE*.

Table 5-2. Broad cover group assignment using hardwood and softwood species percents.

C_CODE	Description	Selection Criteria
'D'	Deciduous	*HARD_PCT* >= 8
'DC'	Deciduous-leading	(*HARD_PCT* < *8* and *HARD_PCT* > 5) or
	mixedwood	(*HARD_PCT* = 5 and *SP1* = ('AW', 'BW', 'PB'))
'CD'	Coniferous-leading	(*SOFT_PCT* < *8* and SOFT_*PCT* > 5) or
	mixedwood	*(SOFT_PCT = 5 and SP1 <> ('AW', 'BW', 'PB'))*
'C'	Coniferous	*SOFT_PCT* >= 8
NULL	Non-forested	*SOFT_PCT* = 0 and *HARD_PCT* = 0

5.2 Defining Layer for AVI (AVI_STORY)

5.2.1 AVI Defining Layer

A single defining layer was identified for each AVI stand. This was the layer that best characterized the stand. *AVI_STORY* can be layer 1 (overstory), layer 2 (understory) or layer 3 (a composite list combined from layers 1 and 2 for horizontal stands with 2 productive layers).

AVI stand structure type (*STRUC_TYPE*) was used to identify the defining layer for AVI stands. Multi-story stands with a forested understory (*USP1* is not NULL) also use *DENSITY*. Figure 5-1 shows the attributes required for a composite stand. The stand must have a horizontal structure type and have no productivity deletions for either layer 1 or layer 2. Productivity deletions are assigned for each layer and identify a stand with no forested species (non-productive) or assigned a timber productivity rating of 'Unproductive'. Subjective deletions considered when identifying horizontal stands evaluate larch species percents and black spruce stand productivity.

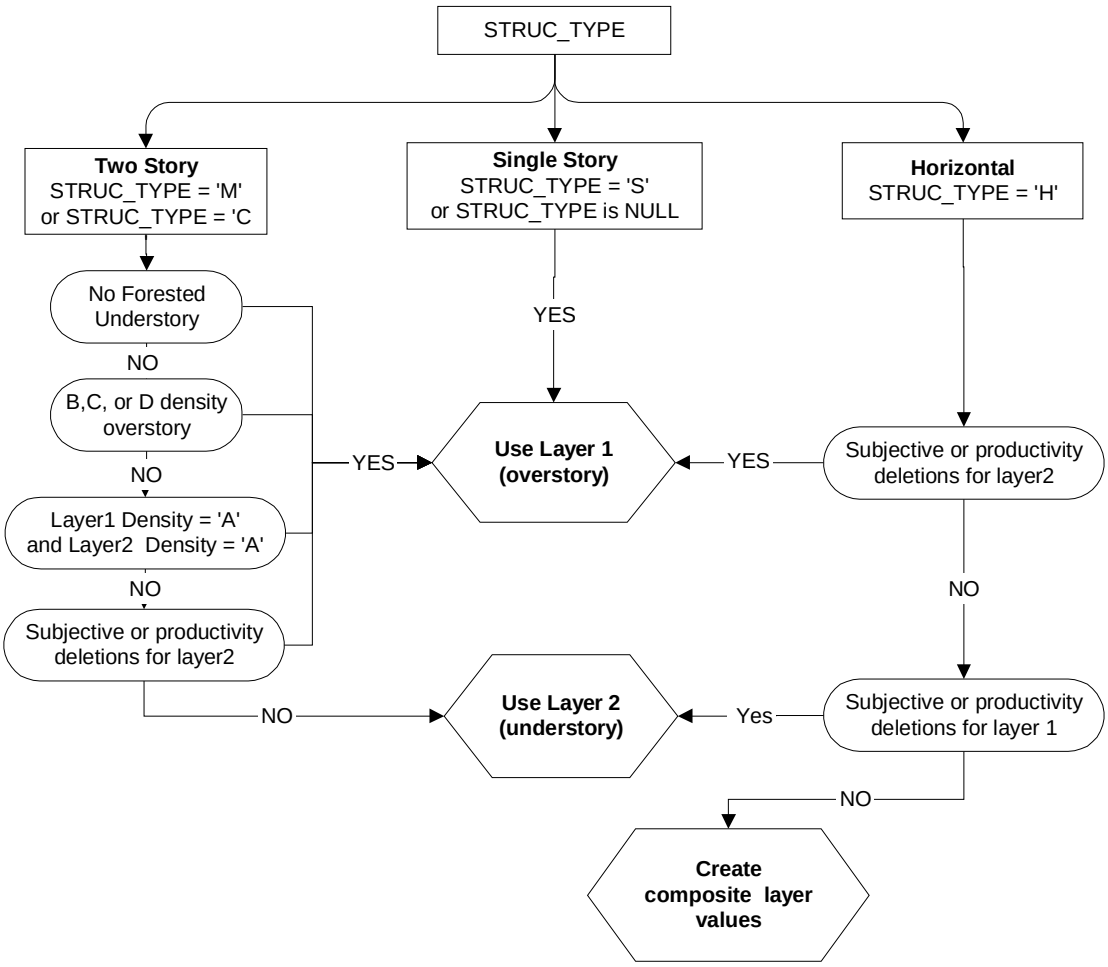

Figure 5-1. Defining AVI_STORY.

5.2.2 Multi-story Stands with Forested Understory

Stands with a forested understory were evaluated to determine the appropriate layer to use for classification. Multi-storied stands with an overstory density of 'B','C' or 'D' were classified using layer 1. Multi-storied stands with an overstory density of A, a productive understory, understory density higher than 'A' and an understory with no subjective or productivity deletions assigned were classified by layer 2. Figure 5-1 outlines the process to determine which information was used to assign strata.

5.2.3 Horizontal Stands

Horizontal stand structure was added as a structure type and identified as a means to aid in future timber volume sampling in the *Alberta Vegetation Inventory Standards Manual* (1991). Stands assigned a structure of horizontal had numerous homogeneous stands within other distinctly different homogeneous stands where both or each individual stand is too small to delineate independently (generally, less than 2 hectares) (Alberta, 1991). The stand detail is not identified spatially within the stand polygon. If a portion of the stand is not part of the managed landbase this area cannot be spatially identified. In the landbase classification this is often dealt with by

tracking the area for this portion as a horizontal stand deletion area (See Section 5.2.4). When both portions of the horizontal stand are productive this would result in a loss of productive area. As shown in Figure 5-1 horizontal stands are represented by a combination of attributes from both layer 1 and layer 2 where both layers are productive (See Section 2.4).

Horizontal stand structure was assigned to 15% of stand area within the Sundance FMA. Horizontal stands cover an area near 39,500 hectares and occur mostly in the northern portion of the FMA. A procedure to develop a set of composite attributes was developed to properly account for information from both layers in horizontal stand where both layers were forested and part of the managed landbase. Once a composite, single set of attributes was developed the stands were processed by the same set of rules developed for single and multi-layer stands.

5.2.4 Productivity and subjective deletions to horizontal stands

Each layer of the horizontal stand was evaluated individually to identify the productive layers. Status codes reflecting subjective deletions and unproductive stands were assigned to each layer (fields *CSUBJ1* and *CSUBJ2*). Table 5-3 shows the assignment and codes for layer 1 of a horizontal stand. The process for layer 2 is the same however the selection criteria will use the fields from the "understory" (all field names preceded by a "U").

Table 5-3. Horizontal stand layer deletion assignment.

CSUBJ1	Description	Selection Criteria	Order
	Assignment for horizontal stands only	All selection for only STRUC_TYPE = 'H'	
'U'	Unproductive layer	TPR = 'U'	1
'X'	Non-productive (no forested strata)	STRATA_SRD = 'X'	2
'LT'	Larch stands	STRATA_SRD = 'C12'	3
'ASB'	A' density black spruce	STRATA_SRD = ('C9','C10','C11') and DENSITY = 'A'	4
'NCSB'	Non-commercial black spruce	STRATA_SRD = ('C9','C10','C11') and (HGT <= 6 and AGE >= 55 or HGT <= 12 and AGE >= 75 or HGT <= 18 and AGE >= 105)	5
'H'	Productive layer (no deletions)		6

The codes from fields *CSUBJ1* and *CSUBJ2* were combined into a single code in field *CSUBJ* that was used to determine how the horizontal stand would be assigned. Stands with only one productive layer (only *CSUBJ1* = 'H' or *CSUBJ2* = 'H') were assigned attributes of the productive layer and the area updated based on the *STRUC_PCT* or portion of the stand that is productive. Table 5-4 shows examples. As shown in Example 'B' in the table a horizontal stand with a noncommercial black spruce layer 1 and a productive layer 2 would be classed based on layer 2 and the area reduced by the structure percent to reflect only the productive horizontal stand area.

Table 5-4. Horizontal stand defining layer assignment.

	STRUC_PCT	USTRUC_PCT	Polygon area(ha)	CSUBJ1	CSUBJ2	CSUBJ	Defining layer	Landbase area (ha)
A	7	3	100	LT	U	H_LT_U	1	100
B	7	3	100	NCSB	H	H1_NCSB	2	30
C	7	3	100	H	ASB	H2_ASB	1	70
D	7	3	100	H	H	HCOMP	3	100

Where both layers of a horizontal stand are productive the stand was processed as a composite stand and attributes reflect a combination of the attributes for each layer.

A composite layer was created for all horizontal stands with two forested layers where the second layer had no productivity or subjective deletions. A composite layer receives an AVI_STORY value of 3. A set of composite layer attributes was generated by combining both layer attributes for crown closure class, height class, species composition, stand origin and timber productivity rating. As shown in Figure 5-1 composite layer values will be calculated only for stands that meet all of the following conditions:

- *STRUC_TYPE* = 'H'
- Both "overstory" and "understory" layers in inventory are forested and productive, *CSUBJ1* = 'H' and *CSUBJ2* = 'H'.

Stands that meet these criteria will be assigned stand and species composition values that combine attributes from both the "overstory" and "understory" AVI layers. Composite values of the following AVI fields will be created and used to characterize the stand:

- DENSITY
- HEIGHT
- ORIGIN
- TPR
- SP1 to SP6
- SP1P to SP6P

All composite fields will have a prefix of "C" attached to the AVI fieldname.

5.2.5 Midpoint density values (MIDPT, UMIDPT, CMIDPT)

Each horizontal layer is weighted by the portion of the stand area it represents. Composite values also need to reflect the relative density of each portion of the stand. This is done with a numeric representation of the crown closure class. The fields for *MIDPT* and *UMIDPT* are additional numeric fields that represent the midpoint of the crown closure class as outlined in Table 5-5. These numbers are used to apportion attributes from the two layers of a horizontal stand to create composite stand values as shown in the following sections.

Table 5-5. Midpoint values of crown closure class.

Crown Closure Class	Range of Crown Closure	Midpoint of Class
A	6 - 30 %	18
B	31 - 50 %	40
C	51 - 70 %	60
D	71 - 100 %	85

The *CMIDPT* field is the single value that combines the crown closure values for overstory and understory by proportion as based on *STRUC_PCT*. It is calculated as:

$$CMIDPT = ((STRUC\_PCT/10)*MIDPT)+((USTRUC\_PCT/10)*UMIDPT)$$

5.2.6 Density (Crown Closure Class) - CDENSITY

Composite crown closure class is assigned based on overstory and understory crown closure class, stored in the DENSITY and UDENSITY fields. Density (represented by the midpoint value) for each layer is assigned based on the proportion of the stand it occupies. The calculated value for *CMIDPT* is assigned a crown closure class according to the range it falls within (see Table 5-5).

5.2.7 Composite height of stands – CHEIGHT

Composite height for the defining layer is developed by weighting both the understory and overstory heights by their respective crown closure classes and percent of stand area. The midpoint value for each crown closure class (Table 5-5) is used to proportion stand values. The composite height is calculated as follows:

$$CHEIGHT = \frac{(HEIGHT*MIDPT*(STRUC\_PCT/10))+(UHEIGHT*UMIDPT*(USTRUC\_PCT/10))}{(MIDPT*(STRUC\_PCT/10)+UMIDPT*(USTRUC\_PCT/10))}$$

Where:
CHEIGHT = composite layer height in m
HEIGHT = height of the AVI layer 1
UHEIGHT = height of the AVI layer 2
MIDPT = midpoint of the layer 1 crown closure class
UMIDPT = midpoint of the layer 2 crown closure class
STRUC_PCT = percent of area for horizontal stand (10-percent class)

Composite height is then rounded to the nearest meter. Where structure percents are equal the "overstory" height is used.

5.2.8 Stand Origin - CORIGIN

Composite origin is assigned by weighting the year of origin for both layers by the percent of the stand they represent. The composite origin is calculated as follows:

$$CORIGIN = ((STRUC\_PCT/10)*ORIGIN)+((USTRUC\_PCT/10)*UORIGIN)$$

A composite age (*CAGE)* is calculated for the FMP from a base year of 2005 where age is calculated as 2005 minus the origin year.

$$CAGE = ((STRUC\_PCT/10) * AGE) + ((USTRUC\_PCT/10) * UAGE)$$

5.2.9 Timber Productivity Rating - CTPR

The most productive TPR is assigned to the composite layer.

An alternate strategy to assign TPR for the layer containing the leading composite species instead of the most productive layer was also investigated at the request of SRD staff. Figure 5-2 shows the process used to assign this value.

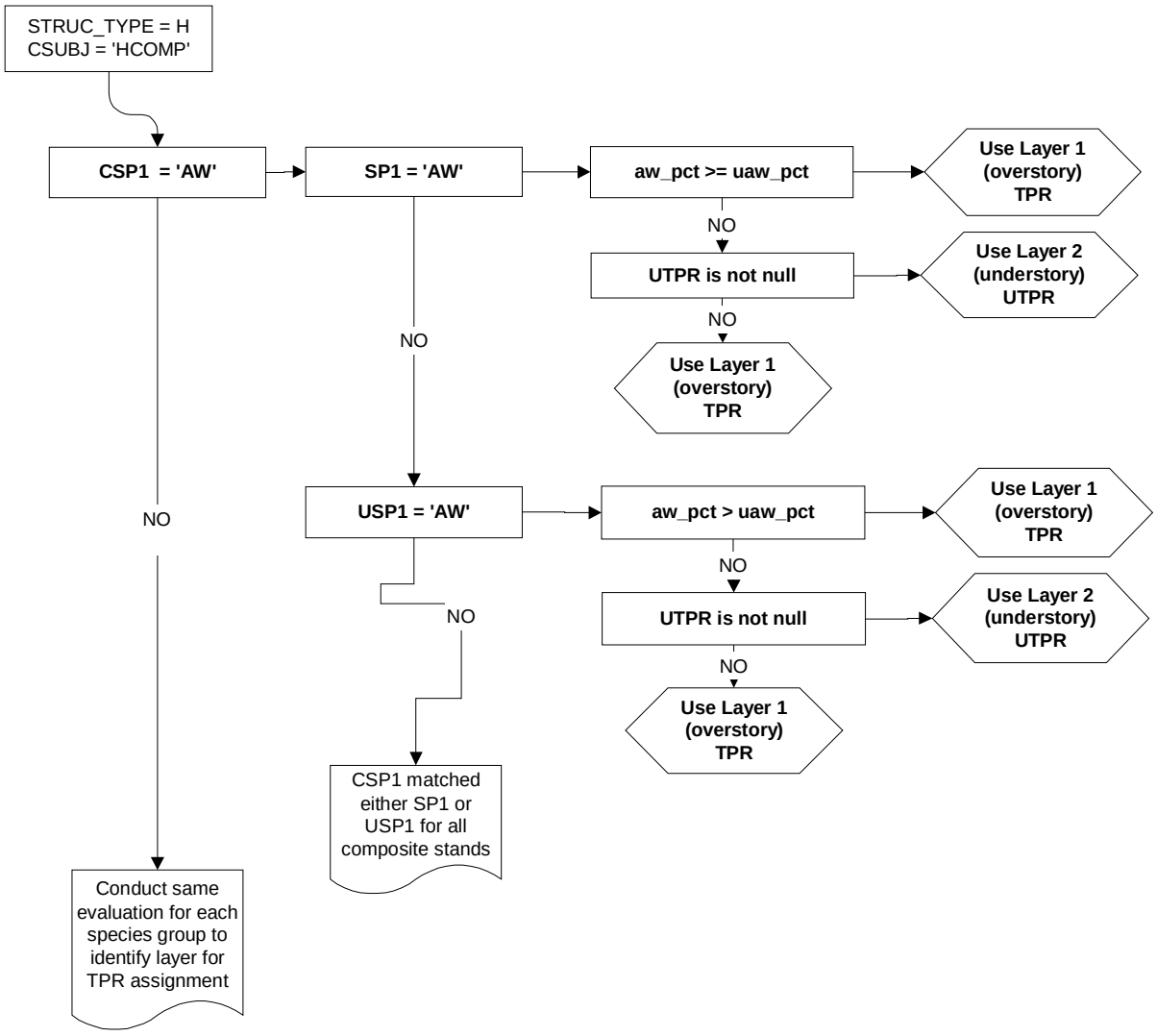

Figure 5-2. Alternate TPR assignment using TPR of layer containing the leading species

Using the assumptions listed in Figure 5-2 a second value for composite TPR was calculated. Composite TPR for approximately 1800 ha of horizontal stands would be changed by this

method, dropping from good to medium or medium to fair. This represents 4.5% of the composite stands. The marginal change and the inherent challenges in using TPR led to the decision to use the simple method of assigning the most productive timber productivity rating to *CTPR*.

5.2.10 Species groupings and distribution

Species Percents by species group

Some species codes are grouped together as shown in Table 5-1. The species group percents for the composite layer are calculated based on the combined species percentages in the overstory and understory. The percent by species is calculated separately for each species in the overstory and understory. For example a stand with a PL7AW3 overstory and SB10 understory would have values for PL_PCT = 7, AW_PCT = 3 and USB_PCT = 10. All other species percent values would be 0. After calculating individual species percents for each layer a composite percent for each species is calculated which is weighted by the midpoint of the crown closure class and both layers are combined to provide the overall percentages for each species. *E.g.*, for white spruce:

$$CSW\_PCT = \frac{(SW\_PCT * MIDPT * (STRUC\_PCT/10)) = (USW\_PCT * UMIDPT * (USTRUC\_PCT/10))}{(MIDPT * (STRUC\_PCT/10) + UMIDPT * (USTRUC\_PCT/10))}$$

Where: *CSW_PCT* = composite percent SW (10-percent AVI class, no rounding)
SW_PCT = percent SW, AVI layer1 (10-percent AVI class)
USW_PCT = percent SW, AVI layer 2 (10-percent AVI class)
MIDPT = midpoint of the layer 1 crown closure class
UMIDPT = midpoint of the layer 2 crown closure class
STRUC_PCT = percent of area for horizontal stand (10-percent class)

Species order

The composite species group percents are then ranked in order of descending percent from species 1 to species 6 (if needed). If two species have the same composite percent, species present in layer 1 takes priority over those in layer 2, and the original species order takes precedence where both species were present in the same layer. Species percents are not rounded.

Species composition

Species, order and percent are combined to fill values for *CSP1*, *CSP1P* to *CSP5*, *CSP5P*.

Table 5-6 shows the species strata distribution on the operable landbase. Areas for the entire landbase and for just horizontal structure stands are given. This includes all composite stands and horizontal stands with only a single productive layer. The operable area reflects only the productive portions of horizontal stands.

Table 5-6. Comparison of operable area by stratum for landbase and horizontal stands.

	All areas on operable landbase		Horizontal stands on operable landbase	
F_YC	F_AREAHA_TSA	Operable area	F_AREAHA_TSA	Operable area
DEC	9,898.86	6%	2,733.89	16%
AP	6,233.06	4%	1,575.45	9%
AS	2,994.18	2%	878.16	5%
PA	8,030.65	5%	2,420.81	14%
PL	126,046.34	72%	7,506.08	44%
SA	1,985.52	1%	703.48	4%
SB	2,485.07	1%	257.33	2%
SW	17,377.74	10%	829.20	5%
Total	175,051.42	100%	16,904.41	100%

5.2.11 Composite Species Groupings and Distribution (All "C" Species Percents, Orders, Types, CAGE, CC_CODE).

Composite values for species percents, species orders, softwood and hardwood percents, age, leading species and broad cover group were assigned with the same process outlined in Section 5.1. Fields for the composite layer have a 'C' prefix on the fields listed.

5.2.12 Area assignments

As outlined in Table 5-6 horizontal stands will be processed in 3 ways depending on the deletion categories of the overstory and understory AVI. Composite layer area will reflect the full area of the polygon. However, where one portion of the stand is assigned as a subjective or nonproductive deletion that portion of the stand would not be included in the landbase area and will need to be accounted for. This area is assigned to the *AREA_H_DEL* (Area under horizontal deletion) field and the productivity deletion can be identified from the *CSUBJ* field. This deletion area for horizontal stands is not part of the F_DEL (Final Deletion category) assignment but can be calculated separately.

5.3 Stratification

Stratification assigns a single stratum code to classify each layer. Polygon strata were the strata for the defining layer. The strata reflect species distribution. Initially the stratification for yield projections (SRD extended strata, Alberta (2005)) was assigned to all forested areas covered by AVI. These strata were then grouped to Sundance species (YC) strata.

5.3.1 Strata Decision Rules (DRULE, CRULE)

To simplify the code developed to assign strata, decision rules to group species and indicate species order were assigned. These strata decision rules group the broad cover group assignment, and leading species (or species group) into a single "rule". The deciduous decision rule (*DRULE*) identifies the first listed (lead) deciduous species in the layer or shows no deciduous species in the layer (i.e. AW_LEAD or NO_D). The conifer decision rule (*CRULE*) identifies both the first listed conifer species or species group in the layer (i.e. 'SW_LEAD',

'SBLT_LEAD') and also whether the layer is a mixedwood cover group (i.e. 'PL_LEAD_MW'). Rules for the understory have a prefix of 'U'. Rules for the composite layer have a prefix of 'C'. The rules are only used in the data processing for assigning SRD extended strata. Table 5-7 lists the assignment rules.

Table 5-7. SRD deciduous (DRULE) and coniferous (CRULE) strata decision rules.

DRULE	**Description**	**Selection Criteria**
'AW_LEAD'	Aspen leading deciduous	*HARDPCT* > 0 and *AW_ORD* < *BW_ORD* and *AW_ORD* < *PB_ORD*
'BW_LEAD'	Birch leading deciduous	*HARDPCT* > 0 and *BW_ORD* < *AW_ORD* and *BW_ORD* < *PB_ORD*
'PB_LEAD'	Poplar leading deciduous	*HARDPCT* > 0 and *PB_ORD* < *AW_ORD* and *PB_ORD* < *BW_ORD*
'NO_D'	No deciduous present	*HARDPCT* = 0

CRULE	Description	Selection Criteria
'FBFD_LEAD_MW'	True fir or Douglas-fir leading conifer in mixedwood	*C_CODE* = ('DC', 'CD') and (((*FB_PCT* + *FD_PCT*) > *PL_PCT* and (*FB_PCT* + *FD_PCT*) > (*SB_PCT* + *LT_PCT*) and (*FB_PCT* + *FD_PCT*) > *SW_PCT*) or (*LEAD_CON* = ('FB','FD') and (*FB_PCT* + *FD_PCT*) >= *PL_PCT* and (*FB_PCT* + *FD_PCT*) >= (*SB_PCT* + *LT_PCT*) and (*FB_PCT* + *FD_PCT*) >=
'PL_LEAD_MW'	Pine leading conifer in mixedwood	*C_CODE* = ('DC', 'CD') and ((*PL_PCT* > (*FB_PCT* + *FD_PCT*) and *PL_PCT* > (*SB_PCT* + *LT_PCT*) and *PL_PCT* > *SW_PCT*) or (LEAD_CON = 'PL' and *PL_PCT* >= (*FB_PCT* + *FD_PCT*) and *PL_PCT* >= (*SB_PCT* + *LT_PCT*) and *PL_PCT* >= *SW_PCT*))
'SBLT_LEAD_MW'	Black spruce or larch leading conifer in mixedwood	*C_CODE* = ('DC', 'CD') and (((*SB_PCT* + *LT_PCT*) > (*FB_PCT* + *FD_PCT*) and (*SB_PCT* + *LT_PCT*) > *PL_PCT* and (*SB_PCT* + *LT_PCT*) > *SW_PCT*) or (*LEAD_CON* = ('SB', 'LT') and (*SB_PCT* + *LT_PCT*) >= (*FB_PCT* + *FD_PCT*) and (*SB_PCT* + *LT_PCT*) >= *PL_PCT* and (*SB_PCT* + *LT_PCT*)
'SW_LEAD_MW'	White spruce leading conifer in mixedwood	*C_CODE* = ('DC', 'CD') and ((*SW_PCT* > (*FB_PCT*+*FD_PCT*) and *SW_PCT* > *PL_PCT* and *SW_PCT* > (*SB_PCT* + *LT_PCT*)) or (*LEAD_CON* = 'SW' and *SW_PCT* >= (*FB_PCT*+*FD_PCT*) and *SW_PCT* >= *PL_PCT* and *SW_PCT* >= (*SB_PCT* + *LT_PCT*)))
'FB_LEAD'	True fir leading conifer in pure stand	*C_CODE* = ('C', 'D') and ((*FB_PCT* > *FD_PCT* and *FB_PCT* > *LT_PCT* and *FB_PCT* > *PL_PCT* and *FB_PCT* > *SB_PCT* and *FB_PCT* > *SW_PCT*) or (*LEAD_CON* = 'FB' and *FB_PCT* >= *FD_PCT* and *FB_PCT* >= *LT_PCT* and *FB_PCT* >= *PL_PCT* and *FB_PCT* >= *SB_PCT* and *FB_PCT* >= *SW_PCT*))
'FD_LEAD'	Douglas-fir leading conifer in pure stand	*C_CODE* = ('C', 'D') and ((*FD_PCT* > *FB_PCT* and *FD_PCT* > *LT_PCT* and *FD_PCT* > *PL_PCT* and *FD_PCT* > *SB_PCT* and *FD_PCT* > *SW_PCT*) or (*LEAD_CON* = 'FD' and *FD_PCT* >= *FB_PCT* and *FD_PCT* >= *LT_PCT* and *FD_PCT* >= *PL_PCT* and *FD_PCT* >= *SB_PCT* and *FD_PCT* >= *SW_PCT*))
'LT_LEAD'	Larch leading conifer in pure stand	*C_CODE* = ('C', 'D') and ((*LT_PCT* > *FB_PCT* and *LT_PCT* > *FD_PCT* and *LT_PCT* > *PL_PCT* and *LT_PCT* > *SB_PCT* and *LT_PCT* > *SW_PCT*) or (*LEAD_CON* = 'LT' and *LT_PCT* >= *FB_PCT* and *LT_PCT* >= *FD_PCT* and *LT_PCT* >= *PL_PCT* and *LT_PCT* >= *SB_PCT* and *LT_PCT* >= *SW_PCT*))
'PL_LEAD'	Pine leading conifer in pure stand	*C_CODE* = ('C', 'D') and ((*PL_PCT* > *FB_PCT* and *PL_PCT* > *FD_PCT* and *PL_PCT* > *LT_PCT* and *PL_PCT* > *SB_PCT* and *PL_PCT* > *SW_PCT*) or (*LEAD_CON* = 'PL' and *PL_PCT* >= *FB_PCT* and *PL_PCT* >= *FD_PCT* and *PL_PCT* >= *LT_PCT* and *PL_PCT* >= *SB_PCT* and *PL_PCT* >= *SW_PCT*))
'SB_LEAD'	Black spruce leading conifer in pure stand	*C_CODE* = ('C', 'D') and ((*SB_PCT* > *FB_PCT* and *SB_PCT* > *FD_PCT* and *SB_PCT* > *LT_PCT* and *SB_PCT* > *PL_PCT* and *SB_PCT* > *SW_PCT*) or (*LEAD_CON* = 'SB' and *SB_PCT* >= *FB_PCT* and *SB_PCT* >= *FD_PCT* and *SB_PCT* >= *LT_PCT* and *SB_PCT* >= PL_*PCT* and *SB_PCT* >= *SW_PCT*))
'SW_LEAD'	White spruce leading conifer in pure stand	*C_CODE* = ('C', 'D') and ((*SW_PCT* > *FB_PCT* and *SW_PCT* > *FD_PCT* and *SW_PCT* > *LT_PCT* and *SW_PCT* > *PL_PCT* and *SW_PCT* > *SB_PCT*) or (*LEAD_CON* = 'SW' and *SW_PCT* >= *FB_PCT* and *SW_PCT* >= *FD_PCT* and *SW_PCT* >= *LT_PCT* and *SW_PCT* >= PL_*PCT* and *SW_PCT* >= *SB_PCT*))
'NO_C'	No coniferous present	*SOFTPCT* = 0

5.3.2 Forested Stratification (STRATA_SRD, STRATA_BAP, STRATA_YC)

Each AVI polygon has two vegetation strata assigned to it. The SRD Extended Strata was the most detailed and was generated for each forested layer in the AVI coverage. There are 44 potential SRD strata for forested layers. The species strata grouped the treed strata into 10 species strata (YC). Table 5-8 outlines the relationships between the strata and broad cover group.

Table 5-8. Forested strata.

Broad Cover Group	Species Stratum (YC)	SRD Extended Stratum (SRD)
D	DEC	D1, D2, D3, D4, D5
DC	AP	DC2, DC6, DC10
	AS	DC1, DC3, DC4, DC5, DC6, DC7, DC8, DC9, DC11, DC12
CD	PA	CD4, CD5,CD6
	SA	CD1,CD2,CD3,CD7, CD8, CD9,CD10,CD11,CD12
C	PL	C4, C5, C6, C7, C8
	SB	C9, C10, C11
	SW	C1, C2, C3, C13, C14, C15, C16, C17
	LT	C12

5.3.3 SRD Extended Strata (STRATA_SRD)

SRD extended strata were assigned to all forested overstory, understory and composite layers for each AVI stand using the decision rules provided in Table 5-9. These rules define the SRD extended strata as documented in the Interpretive Bulletin – Yield Projection Guidelines for Alberta in the Alberta Forest Management Planning Standard (Alberta 2006). SRD staff has reviewed this table and agreed with the updates of the table located in Version 3 of the planning manual (D. Aitkin, pers comm., 2005). SRD extended strata for the understory have a prefix of 'U'. SRD extended strata for the composite layer have a prefix of 'C'. Non-forested stands are assigned *STRATA_SRD* code of 'XX0'.

Table 5-9. SRD extended strata by broad cover group.

STRATA_SRD	Description	Selection Criteria
'D1'	Pure aspen	*C_CODE* = 'D' and *AW_PCT* >= 9
'D2'	Aspen leading with poplar	*C_CODE* = 'D' and *DRULE* = 'AW_LEAD' and *AW_PCT* < 9 and *PB_PCT* > 1
'D3'	Aspen leading without poplar	*C_CODE* = 'D' and *DRULE* = 'AW_LEAD' and *AW_PCT* < 9 and *PB_PCT* <= 1
'D4'	Poplar leading	*C_CODE* = 'D' and *DRULE* = 'PB_LEAD'
'D5'	Birch leading	*C_CODE* = 'D' and *DRULE* = 'BW_LEAD'
'DC1'	Aspen/white spruce	*C_CODE* = 'DC' and *DRULE* = 'AW_LEAD' and *CRULE* = 'SW_LEAD_MW'
'DC2'	Aspen/pine	*C_CODE* = 'DC' and *DRULE* = 'AW_LEAD' and *CRULE* = 'PL_LEAD_MW'
'DC3'	Aspen/black spruce	*C_CODE* = 'DC' and *DRULE* = 'AW_LEAD' and *CRULE* = 'SBLT_LEAD_MW'
'DC4'	Aspen/fir	*C_CODE* = 'DC' and *DRULE* = 'AW_LEAD' and *CRULE* = 'FBFD_LEAD_MW'
'DC5'	Poplar/white spruce	*C_CODE* = 'DC' and *DRULE* = 'PB_LEAD' and *CRULE* = 'SW_LEAD_MW'
'DC6'	Poplar/pine	*C_CODE* = 'DC' and *DRULE* = 'PB_LEAD' and *CRULE* = 'PL_LEAD_MW'
'DC7'	Poplar/black spruce	*C_CODE* = 'DC' and *DRULE* = 'PB_LEAD' and *CRULE* = 'SBLT_LEAD_MW'
'DC8'	Poplar/fir	*C_CODE* = 'DC' and *DRULE* = 'PB_LEAD' and *CRULE* = 'FBFD_LEAD_MW'
'DC9'	Birch/white spruce	*C_CODE* = 'DC' and *DRULE* = 'BW_LEAD' and *CRULE* = 'SW_LEAD_MW'
'DC10'	Birch/pine	*C_CODE* = 'DC' and *DRULE* = 'BW_LEAD' and *CRULE* = 'PL_LEAD_MW'
'DC11'	Birch/black spruce	*C_CODE* = 'DC' and *DRULE* = 'BW_LEAD' and *CRULE* = 'SBLT_LEAD_MW'
'DC12'	Birch/fir	*C_CODE* = 'DC' and *DRULE* = 'BW_LEAD' and *CRULE* = 'FBFD_LEAD_MW'
'CD1'	White spruce/aspen	*C_CODE* = 'CD' and *CRULE* = 'SW_LEAD_MW' and *DRULE* = 'AW_LEAD'
'CD2'	White spruce/poplar	*C_CODE* = 'CD' and *CRULE* = 'SW_LEAD_MW' and *DRULE* = 'PB_LEAD'
'CD3'	White spruce/birch	*C_CODE* = 'CD' and *CRULE* = 'SW_LEAD_MW' and *DRULE* = 'BW_LEAD'
'CD4'	Pine/aspen	*C_CODE* = 'CD' and *CRULE* = 'PL_LEAD_MW' and *DRULE* = 'AW_LEAD'
'CD5'	Pine/poplar	*C_CODE* = 'CD' and *CRULE* = 'PL_LEAD_MW' and *DRULE* = 'PB_LEAD'
'CD6'	Pine/birch	*C_CODE* = 'CD' and *CRULE* = 'PL_LEAD_MW' and *DRULE* = 'BW_LEAD'
'CD7'	Black spruce/aspen	*C_CODE* = 'CD' and *CRULE* = 'SBLT_LEAD_MW' and *DRULE* = 'AW_LEAD'
'CD8'	Black spruce/poplar	*C_CODE* = 'CD' and *CRULE* = 'SBLT_LEAD_MW' and *DRULE* = 'PB_LEAD'
'CD9'	Black spruce/birch	*C_CODE* = 'CD' and *CRULE* = 'SBLT_LEAD_MW' and *DRULE* = 'BW_LEAD'
'CD10'	Fir/aspen	*C_CODE* = 'CD' and *CRULE* = 'FBFD_LEAD_MW' and *DRULE* = 'AW_LEAD'
'CD11'	Fir/poplar	*C_CODE* = 'CD' and *CRULE* = 'FBFD_LEAD_MW' and *DRULE* = 'PB_LEAD'
'CD12'	Fir/birch	*C_CODE* = 'CD' and *CRULE* = 'FBFD_LEAD_MW' and *DRULE* = 'BW_LEAD'
'C1'	Pure white spruce	*C_CODE* = 'C' and *SW_PCT* >= 9
'C2'	White spruce leading with pine	*C_CODE* = 'C' and *CRULE* = 'SW_LEAD' and *SW_PCT* < 9 and *PL_PCT* > 1
'C3'	White spruce leading without pine	*C_CODE* = 'C' and *CRULE* = 'SW_LEAD' and *SW_PCT* < 9 and *PL_PCT* <= 1
'C4'	Pure pine	*C_CODE* = 'C' and *PL_PCT* >= 9
'C5'	Pine leading with white spruce	*C_CODE* = 'C' and *CRULE* = 'PL_LEAD' and *PL_PCT* < 9 and *SW_PCT* > 1 and *SW_ORD* < *FB_ORD* and *SW_ORD* < *SB_ORD*
'C6'	Pine leading with black spruce	*C_CODE* = 'C' and *CRULE* = 'PL_LEAD' and *PL_PCT* < 9 and *SB_PCT* > 1 and *SB_ORD* < *FB_ORD* and *SB_ORD* < *SW_ORD*
'C7'	Pine leading with fir	*C_CODE* = 'C' and *CRULE* = 'PL_LEAD' and *PL_PCT* < 9 and *FB_PCT* > 1 and *FB_ORD* < *SB_ORD* and *FB_ORD* < *SW_ORD*
'C8'	Pine leading without spruce and fir	*C_CODE* = 'C' and *CRULE* = 'PL_LEAD' and *PL_PCT* < 9 and *FB_PCT* <= 1 and *SB_PCT* <=1 and *SW_PCT* <= 1
'C9'	Pure black spruce	*C_CODE* = 'C' and *SB_PCT* >= 9
'C10'	Black spruce leading with pine	*C_CODE* = 'C' and *CRULE* = 'SB_LEAD' and *SB_PCT* < 9 and *PL_PCT* > 1
'C11'	Black spruce leading without pine	*C_CODE* = 'C' and *CRULE* = 'SB_LEAD' and *SB_PCT* < 9 and *PL_PCT* <= 1
'C12'	Larch leading	*C_CODE* = 'C' and *CRULE* = 'LT_LEAD'
'C13'	Pure Douglas-fir	*C_CODE* = 'C' and *FD_PCT* >= 9
'C14'	Douglas-fir leading	*C_CODE* = 'C' and *CRULE* = 'FD_LEAD' and *FD_PCT* < 9
'C15'	Pure balsam fir	*C_CODE* = 'C' and *FB_PCT* >= 9
'C16'	Balsam fir leading with pine	*C_CODE* = 'C' and *CRULE* = 'FB_LEAD' and *FB_PCT* < 9 and *PL_PCT* > 1
'C17'	Balsam fir leading without pine	*C_CODE* = 'C' and *CRULE* = 'FB_LEAD' and *FB_PCT* < 9 and *PL_PCT* <= 1
'XX0'	Non-forested	*C_CODE* = NULL

5.3.4 Non-Forest Classification (NONFOREST, UNONFOREST)

The AVI fields for naturally non-forested areas (*NFL, NFLP, NATNON*) and anthropogenic non-forested (*ANTHVEG, ANTHNONVEG)* are combined to a single field *NONFOREST* in the order listed. These fields in the understory are assigned to *UNONFOREST*.

5.3.5 AVI Species Composition (SP_COMP)

The full AVI species composition was not carried on the TSA landbase. The species composition was a concatenated string of the density, height, species composition, origin and TPR for each layer from the AVI attributes.

5.3.6 Landbase Code (LB_CODE)

The landbase code was assigned from the broad cover group values from the AVI defining layer. Deciduous cover groups are assigned a landbase code of 'D' and mixedwood and conifer cover groups are assigned to 'C'.

6. Generated Attributes

All calculations to generate the final attributes for the classified landbase take place in ORACLE and are done using Structured Query Language (SQL). The fields of interest from the polygon attribute table of the classified landbase coverage are loaded into Oracle. The AVI 2.1 attributes were stored in a related table in the database as was the table of attributes calculated from AVI attributes. Some attributes were adjusted or added to create the TSA landbase and then the modelling landbase. This processing is described in Sections 6.4 and 6.5.

6.1 Generated Attributes from Landbase Attributes

6.1.1 Disposition Type and Grouping (DISP_TYPE, DISP_GRP)

The *DISP_TYPE* field holds the disposition types listed in the *NLIN_DISP* and *LIN_DISP* fields in a single attribute field for the classified landbase. As each input field is unique the fields were used to populate *DISP_TYPE* whenever *NLIN_DISP* or *LIN_DISP* was not NULL. Disposition type codes are defined in Table 2-5.

The *DISP_GRP* field groups the disposition types into broad groupings as outlined in Table 6-1. Areas without dispositions were assigned NULL.

Table 6-1. Disposition groupings (DISP_GRP)

DISP_GRP	Description	Selection Criteria
'GOVRES'	Government reservation types	*DISP_TYPE* IN ('DRS','PNT','HRS','RIA','GRL')
'LEASE/PERMIT'	Mineral and surface leases and permits	*DISP_TYPE* IN ('MSL','MLL','SMC','SML','MLP')
'LINEAR'	Utility corridors	*DISP_TYPE* IN ('PLA','PIL','REA')
'ROADS'	Roads	*DISP_TYPE* IN ('LOC','FRD','RDS','RRD','ROE','EZE')
NULL	No dispositions present	

6.1.2 Seismic (WITH_SEIS, STRATA_SEIS)

Sundance reforests seismic lines within cutblocks. Seismic area within cutblocks is not removed from the managed landbase. Table 6-2 shows the rules to identify seismic areas. *WITH_SEIS* was set to 100 for all areas within seismic (*IN_SEIS* = 100) except for seismic lines within post 1990 existing blocks.

Table 6-2. WITH_SEIS assignment

WITH_SEIS	Description	Selection criteria	Order
0	Seismic area through recent blocks	*IN_SEIS* = 100 and *TIMBER_YEAR* > 1991 and *TIMBER_YEAR* < 2005	1
100	Seismic area outside recent blocks	*IN_SEIS* = 100	2
0	Area without seismic		3

The field *STRATA_SEIS* holds the strata for areas within seismic. The strata were assigned based on species strata for the defining layer. Where the defining layer had forested strata the nonforest code 'SC' (Closed Shrub) was assigned and where the defining layer had no forested strata the nonforest code 'HG' was assigned.

6.1.3 Area fields (AREA_HORIZ, AREA_H_DEL, AREAHA_POL)

The area for polygons classified by AVI attributes, with a horizontal stand structure and only one productive layer must be updated to delete the unmanaged portion of the stand from the polygon area values. The area of the portion of the stand used to characterize the stand was the layer listed in *AVI_STORY* and was part of the *CSUBJ* calculation. The value 'H1' or 'H2' in the first 2 letters of the *CSUBJ* attribute indicated a productive layer ('H') and the layer that was considered the deletion portion (layer 1 or layer 2). These stands require adjustments for stand area to reflect the single productive layer. Table 6-3 shows the *AREAHA_HORIZ* calculation as the *AREA* (polygon area in m^2) times *STRUC_PCT*/10 (percentage of the stand assigned to that layer). *AREA_HORIZ* holds this area as hectares. *AREA_H_ DEL* was the remaining stand area that was deleted from the classified landbase (also in hectares). Structure for regenerating stands (cutblocks) was not reflected in the AVI attributes. These stands are all considered to be single story stands. The ArcInfo calculated area was converted to hectares (*AREA* / 10000) and stored in the *AREAHA_POL* field. This was referenced as the polygon area or the spatial area of the polygon. Table 6-3 outlines area calculations.

Table 6-3. Horizontal and stand area calculations.

Area field	Description	Selection criteria	Calculation
AREAHA_HORIZ	Area of horizontal stands defined by layer 1 attributes	substr*(CSUBJ,0,2)* = 'H2' [extract first 2 letters]	*AREA*/10000 * *USTRUC_PCT/10*
	Area of horizontal stands defined by layer 2 attributes	substr*(CSUBJ,0,2)* = 'H1' [extract first 2 letters]	*AREA*/10000 * *STRUC_PCT/10*
AREA_H_DEL	Area deleted from horizontal stands in layer 1 or 2	*AREAHA_HORIZ* > 0	*AREA/10000 - AREAHA_HORIZ*
AREAHA_POL	Spatial area (ha) from ARCInfo	ALL	*AREA*/10000

For example, a horizontal stand (STRUC = 'H') with only layer 1 productive and an *AREA* of 20,000 m² and a *STRUC_VAL* of 6 would be assigned AREAHA_POL = 2, AREA_HORIZ = 1.2 and AREA_H_DEL = 0.8.

6.1.4 Cutblock group (BLK_GRP)

This field groups the cutblock information into five groups. Cutblocks were assigned block groups based on regeneration standards, year of harvest or AVI harvest dates. *BLK_GRP* = 'EXIST' has *TIMBER_YEAR* < 2005 and 'PLANNED' blocks have *TIMBER_YEAR* >= 2005. Polygons characterized by AVI on the managed landbase with the clearcut modifier and an extent greater than 2 were identified separately as regenerating stands. These stands characterized by AVI where *CC_YEAR* is > 0 were assigned the code 'AVI'. Table 6-4 outlines the cutblock group assignment.

Table 6-4. Cutblock group assignment.

BLK_GRP	Description	Selection criteria	Order
'PR91'	Pre91 harvest	STD_MOD = 'PR91' and AVI_STORY = 1 and STRATA_SRD <> 'XX0' or	1
		STD_MOD = 'PR91' and AVI_STORY = 2 and USTRATA_SRD <> 'XX0' or	2
		STD_MOD = 'PR91' and AVI_STORY = 3 and CSTRATA_SRD <> 'XX0'	3
'PLANNED'	Planned blocks	TIMBER_YEAR > 2004 and TIMBER_YEAR < 2016	4
'CONTINGENCY'	Contingency blocks	TIMBER_YEAR = 2016	5
'AVI'	AVI harvest polygons	CC_YEAR > 0	6
'EXIST'	Existing blocks	TIMBER_YEAR > 0 and TIMBER_YEAR < 2005	7
NULL	Not a block		

6.2 Attributes to Classify Deletions

Information from input datasets used to classify the landbase and identify the managed and unmanaged polygons was assigned to a list of deletion codes. A polygon may have more than one deletion code assigned. In each field the polygons without the listed deletion code remain NULL.

6.2.1 Landuse Deletion (D_LAND)

This deletion was developed from the disposition code groups. *D_LAND* codes identify the dispositions groups (*DISP_GRP*) that identify unmanaged areas as outlined in Table 2-5. As shown in Table 6-5 a road created under an 'LOC' disposition was assigned a *D_LAND* of 'ROAD'.

Table 6-5. Landuse deletion codes.

D_LAND	Description	Disposition Groups
'GOVRES'	Government Reservations	*DISP_GRP* = 'GOVRES'
'ROADS'	Roads	*DISP_GRP* = 'ROADS'
'LINEAR'	Utility corridors	*DISP_GRP* = 'LINEAR'
'LEASE'	Miscellaneous and Surface Leases	*DISP_GRP* = 'LEASE/PERMIT'
NULL	No dispositions assigned	

6.2.2 Seismic Deletion (D_SEIS)

This deletion indicated lands covered by seismic. Any areas classified as *WITH_SEIS* = 100 are seismic deletions and receive the code 'SEIS'. Seismic within existing cutblocks (post 1991) are not considered deletions.

6.2.3 Non-forest Deletion (D_NONFOR)

This deletion indicated lands without forest cover. The information came from AVI attributes for non-forest attributes. Areas with *AVI_STORY* = 1 where *NONFOREST* is not NULL were assigned the *NONFOREST* code.

6.2.4 Burn Deletion (D_BURN)

This deletion identified additional stands burnt since the AVI inventory was completed (*FIREYEAR* > 1991). Areas within fire boundaries (*BURNCODE* = 'B' and *FIREYEAR* > 1991) were assigned the code 'B'.

6.2.5 TPR Deletion (D_TPR)

This deletion identified all stands characterized as unproductive in AVI. The deletion does not reclassify TPR for lands updated through landuse information. D_TPR was assigned to 'U' for all polygons where the TPR of the defining layer was 'U' (*F_TPR* = 'U').

6.2.6 Riparian Buffer Deletion (D_BUF)

This deletion identified areas within riparian buffers defined in the operating ground rules or with extended riparian buffers on waterfowl lakes. D_BUF assigns codes where *WBUF* = 1 and identified lands assigned the ground rule buffers or extended waterfowl buffer.

6.2.7 Subjective Deletion (D_SUBJ)

This deletion identified forested stands that are not considered productive based on the AVI stand composition. Larch strata and some black spruce strata stands are identified as subjective deletions. Table 6-6 lists the decision rules for subjective deletion codes.

Table 6-6. Subjective deletion codes.

D_SUBJ	Description	Selection criteria	Order
'LT'	Larch stands	*F_YC* = 'LT' and *F_STORY* in (1,2,3)	1
'SB_ADENS'	A density black spruce stands	*F_DEN* = 'A' and F_YC = 'SB' and F_STORY in (1,2,3)	2
'NCSB'	Non-commercial black spruce	F_YC = 'SB' and F_STORY in (1,2,3) and	
		(*F_HGT* > 0 and *F_HGT* <= 6) and *F_AGE* > 55 or	3
		(*F_HGT* > 6 and *F_HGT* <= 12) and *F_AGE* > 75 or	4
		(*F_HGT* > 12 and *F_HGT* <= 18) and *F_AGE* > 105	5

For stands characterized by AVI (*F_STORY* = 1, 2 or 3) the subjective deletion codes are:

- All larch strata (*F_YC* = 'LT') are assigned 'LT';
- For black spruce strata (F_YC = 'SB')
    - All 'A' density stands (*F_DEN* = 'A') are assigned 'SB_ADENS',
    - Stands with F_HGT > 0 and F_HGT <= 6 and F_AGE > 55 are assigned 'NCSI'
    - Stands with F_HGT > 6 and F_HGT <= 12 and F_AGE > 75 are assigned 'NCSI'
    - Stands with F_HGT > 12 and F_HGT <= 18 and F_AGE > 105 are assigned 'NCSI'

6.2.8 Defined Forest Area Deletion (D_DFA)

This deletion identified areas outside the FMA boundary. Areas where FMA < 100 or where FMA_ID = 0 were assigned the code 'OUT_FMA'.

6.3 Final characterization for classified landbase

The fields identified by 'F_' indicate the final classification for a polygon and reflect all updates to the inventory. They show the classification based on a single source of information.

6.3.1 Final Defining Layer (F_STORY)

F_STORY identified the source of information used to characterize a polygon. As outlined in Section 5.2, each AVI stand had strata calculated for the overstory (layer 1), the understory (layer 2) and if required the composite horizontal layer (layer 3). For each stand a single layer was identified as the defining layer, the layer used to characterize the AVI stand. This value was stored in AVI_STORY. AVI_STORY was assigned to F_STORY for all polygons that will be characterized by AVI.

The classified landbase also includes areas that have been updated from the AVI attributes. Polygons which fall within an existing cutblock groups ('PR91','AVI','EXIST') are assigned F_STORY = 4. Linear features (roads and utility corridors) and surface leases established since AVI are assigned F_STORY = 5. Seismic polygons carry the *F_STORY* of the underlying stand. Table 6-7 outlines the assignment of F_STORY. This identified the AVI defining layer or source of update information used to assign attributes for stands.

Table 6-7. F_STORY assignment.

F_STORY	Stand Description	Selection criteria	Order
4	Existing harvest blocks	*BLK_GRP* IN ('PR91','AVI','EXIST')	1
5	Non-forested landuse disposition	*NLIN_DISP* <> ('DRS','PNT','GRL','HRS','RIA')	2
AVI_STORY	Areas assigned by AVI attributes	*AVI_STORY* > 0	3
1	No inventory or other vegetation information		

6.3.2 Final Stand Deletion Code (F_DEL)

A hierarchy of assignment was used to identify the final deletion code for the polygon as indicated in the F_DEL attribute. Each polygon in the unmanaged landbase was assigned a single deletion code. This code was derived from the information contained in the fields classifying deletions (the D_ fields). The hierarchy of assignment is listed in Table 6-8. Those stands with no assigned deletions are given the *F_DEL* = 'NONE' code and are considered the managed landbase. Table 6-5 lists and describes the deletion codes in order of assignment.

Table 6-8. F_DEL deletion order and codes.

F_DEL Code	Description	Selection criteria	Order
'XDFA'	Outside FMA or without AVI	*D_DFA* <> NULL	1
ROAD	Roads	*D_LAND* = 'ROAD'	2
LINE	Linear Features and Utility Corridors	*D_LAND* = 'LINE'	3
LEASE	Mineral and Surface Leases	*D_LAND* = 'LEASE'	4
SEIS	Seismic	*D_SEIS* = 'SEIS'	5
GOVRES	Government Disposition Reservations and Protective Notations	*D_LAND* = 'GOVRES'	6
NF	Nonforest Areas	*D_NONFOR* IS NOT NULL	7
FIRE	Areas burned since AVI and not in cutblocks or fire survey areas	*D_BURN* IS NOT NULL	8
GRBUF	Ground rule water and waterfowl lake buffers	*D_BUF* IS NOT NULL	9
TPR	Unproductive TPR	*D_TPR* = 'U'	10
LT	Larch stands	*D_SUBJ* = 'LT'	11
SB_ADENS	A density black spruce stands	*D_SUBJ* = 'SB_ADENS'	12
NCSB	Noncommercial black spruce stands	*D_SUBJ* = 'NCSB'	13
NONE	Remaining polygons (managed landbase)		

For example, areas within a riparian buffer (*D_BUF* = 'GRBUF') that are part of a government disposition (*D_LAND* = 'GOVRES') would be assigned *F_DEL* = 'GOVRES'.

6.3.3 Final species strata (F_YC)

Species strata are only assigned to forested stands, nonforested areas are assigned 'X'. Table 6-9 shows the assignment rules.

Table 6-9. F_YC assignment for stands.

F_YC	Description	Selection criteria	Order
STRATA_YC	Layer 1 stands	*F_STORY* = 1	1
USTRATA_YC	Layer 2 stands	*F_STORY* = 2	2
CSTRATA_YC	Layer 3 stands	*F_STORY = 3*	3
'X'	Nonforest dispositions	*F_STORY* = 5	*4*
BLK_STRATA	Existing blocks	F_STORY = 4 and BLK_GRP = 'EXIST'	5
STRATA_YC	PR91 stands layer 1	F_STORY = 4 and BLK_GRP = 'PR91' and AVI_STORY = 1	6
USTRATA_YC	PR91 stands layer 2	F_STORY = 4 and BLK_GRP = 'PR91' and AVI_STORY = 2	7
CSTRATA_YC	PR91 stands layer 3	F_STORY = 4 and BLK_GRP = 'PR91' and AVI_STORY = 3	8
AVI_YC_STRAT	AVI polygons blocks	F_STORY = 4 and BLK_GRP = 'AVI'	9
'X'	All remaining stands		

6.3.4 Final SRD extended strata (F_SRD)

This indicated the SRD extended strata (*F_SRD*) calculated from AVI attributes and described in Section 5.3.3. Stands not classified by AVI (F_STORY in (4,5)) were converted from the assigned YC strata to the SRD strata as listed in Table 6-10.

Table 6-10. F_SRD assignment for stands.

F_SRD	Description	Selection Criteria	Order
'X'	Area with nonforest dispositions	*F_STORY* = 5	1
'C4'	Pine cutblock strata	*F_STORY* = 4 and *F_YC* = *'PL'*	2
'C1'	White spruce cutblock strata	*F_STORY* = 4 and *F_YC* = *'SW'*	3
'C9'	Black spruce cutblock strata	*F_STORY* = 4 and *F_YC* = *'SB'*	4
'CD2'	Pine-aspen cutblock strata	*F_STORY* = 4 and *F_YC* = *'PA'*	5
'CD1'	Spruce-aspen cutblock strata	*F_STORY* = 4 and *F_YC* = *'SA'*	6
'DC2'	Aspen-pine cutblock strata	*F_STORY* = 4 and *F_YC* = *'AP'*	7
'DC1'	Aspen-spruce cutblock strata	*F_STORY* = 4 and *F_YC* = *'AS'*	8
'D1'	Deciduous cutblock strata	*F_STORY* = 4 and *F_YC* = *'DEC'*	9
X'	Nonforest areas	*F_STORY* = 1 and *NONFOREST* IS NOT NULL	10
STRATA_YC	Layer 1 stands	*F_STORY* = 1 and STRATA_SRD IS NOT NULL	11
USTRATA_YC	Layer 2 stands	*F_STORY* = 2 and USTRATA_SRD IS NOT NULL	12
CSTRATA_YC	Layer 3 stands	*F_STORY* = 3 and CSTRATA_SRD IS NOT NULL	13
'X'	Remaining stands		

6.3.5 Leading species (F_LEAD_SP)

A single leading species was identified for each polygon. In coniferous and coniferous-leading mixedwood broad cover groups this was the leading conifer species of the defining layer. In deciduous and deciduous-leading mixedwoods it was the leading deciduous species.

In cutblocks *F_LEAD_SP* was generated from the *BLK_STRATA* strata as shown in Table 6-11. For example *F_LEAD_SP* was 'AW' where *BLK_STRATA* was in ('DEC','AP','AS'). In areas characterized by AVI, the species from the appropriate field (*LEAD_CON*, *ULEAD_CON*, *CLEAD_CON* or *LEAD_DEC*, *ULEAD_DEC*, *CLEAD_DEC*) of the layer's cover group (*C_CODE*, *UC_CODE*, *CC_CODE*) as indicated by F*_STORY* were assigned.

Table 6-11. Leading species assignment (F_LEAD_SP).

F_LEAD_SP	Description	Selection criteria	Order
'X'	Nonforest dispositions	*F_STORY* = 5	1
'PL'	Pine or Pine-mixedwood blocks	*F_STORY* = 4 and *BLK_STRATA* IN ('PL','PA')	2
'SW'	Spruce or Spruce mixedwood blocks	*F_STORY* = 4 and *BLK_STRATA* IN ('SW','SA')	3
'SB'	Black spruce blocks	*F_STORY* = 4 and *BLK_STRATA* = 'SB'	*4*
'AW'	Deciduous or Deciduous mixedwood blocks	*F_STORY* = 4 and *BLK_STRATA* IN ('DEC','AP','AS')	5
LEAD_DEC	Leading deciduous layer 1	F_STORY = 1 and C_CODE IN ('D','DC') and LEAD_DEC <> 'NO'	6
LEAD_CON	Leading coniferous layer 1	F_STORY = 1 and C_CODE IN ('C','CD') and LEAD_CON <> 'NO'	7
ULEAD_DEC	Leading decidous layer 2	F_STORY = 2 and UC_CODE IN ('D','DC') and ULEAD_DEC <> 'NO'	8
ULEAD_CON	Leading coniferous layer 2	F_STORY = 2 and UC_CODE IN ('C','CD') and ULEAD_CON <> 'NO	9
CLEAD_DEC	Leading decidous layer 3	F_STORY = 3 and CC_CODE IN ('D','DC') and CLEAD_DEC <> 'NO'	10
CLEAD_CON	Leading coniferous layer 3	F_STORY = 3 and CC_CODE IN ('C','CD') and CLEAD_CON <> 'NO'	11
'X'	All remaining stands		

6.3.6 Final Stand density (F_DEN)

This indicated the final density (*F_DEN*) assigned to the polygon. Table 6-12 shows the fields used to assign density. The source of the information was dependent upon F_STORY assignment. Existing cutblocks (*F_STORY* = 4 and *BLK_GRP* = 'EXIST') are assigned 'C' density. The remaining existing cutblocks (*F_STORY* = 4 and *BLK_GRP* in ('PR91','AVI')) are assigned to 'B' density. Stands characterized by AVI (F_STORY = 1, 2 or 3) are assigned the density from the appropriate layer. Areas without assigned density are given the value 'X'.

Table 6-12. Final density assignment (F_DEN).

F_DEN	Description	Selection criteria	Order
'C'	Existing blocks	*F_STORY* = 4 and BLK_GRP = 'EXIST'	1
'B'	AVI and PR91 blocks	*F_STORY* = 4 and BLK_GRP <> 'EXIST'	2
DENSITY	Area with density assigned by AVI overstory	*F_STORY* = 1 and *DENSITY* is not NULL	3
UDENSITY	Area with density assigned by AVI understory	*F_STORY* = 2 and *UDENSITY* is not NULL	4
CDENSITY	Area with density assigned by composite values	*F_STORY* = 9 and *CDENSITY* is not NULL	5
'X'	No density assigned		

6.3.7 Final Age (F_AGE)

This indicated the assigned age (F_AGE) for the polygon. Table 6-13 shows the fields used to assign age. The source of the information was dependent upon F_STORY assignment but all calculations used a base year of 2005, the year of the effective date. Existing cutblocks (*F_STORY* = 4) were assigned an age reflecting the years since harvest. Non-forest polygons had an age of 0 but were assigned an *F_AGE* of 1 due to modelling requirements for non-zero values. Polygons where age cannot be calculated were assigned a value of –99.

Table 6-13. Fields used to populate final age (F_AGE) calculation .

F_AGE	Description	Selection criteria	Order
1	Nonforest dispositions	F_STORY = 5	1
2005 - TIMBER_YEAR	Existing clearcut blocks	'B'	2
2005 - FIREYEAR	Blocks burnt since AVI	F_STORY = 4 and BLK_GRP <> 'AVI' and BURNCODE = 'B'	3
2005 - CC_YEAR	AVI cutblocks	F_STORY = 4 and BLK_GRP = 'AVI'	4
2005 - FIREYEAR	Areas burnt since AVI	BURNCODE = 'B' and FIREYEAR >= 1991	5
UAGE	AVI Layer 2	F_STORY = 2 and UAGE > 0	6
CAGE	AVI Layer 3	F_STORY = 3 and CAGE > 0	7
AGE	AVI Layer 1 age	AGE > 0	8
-99	No age assigned		

6.3.8 Final Timber Productivity (F_TPR)

Table 6-14 shows the fields used to assign a final timber productivity rating (*F_TPR*). The source of the information was dependent upon *F_STORY* assignment. Stands with *F_STORY* assignment of 1, 2 or 3 are based on AVI assignments of TPR for the layer. Existing cutblocks (*F_STORY* = 4) were assigned to *BLK_TPR* if available or *TPR* if not.

Table 6-14. Fields used to populate final TPR (F_TPR) classification.

F_TPR	Description	Selection criteria	Order
'X'	Nonforest dispositions	*F_STORY* = 5	1
BLK_TPR	Existing blocks	*F_STORY* = 4 and BLK_TPR IS NOT NULL	2
CTPR	Area with tpr assigned from layer 3	*F_STORY* = 3 and *CTPR* is not NULL	3
UTPR	Area with tpr assigned from layer 2	*F_STORY* = 2 and *UTPR* is not NULL	4
TPR	TPR from layer 1	*TPR* IS NOT NULL	5
'X'	No TPR assigned		

6.3.9 Final Stand Origin (F_ORIGIN)

Origin is the disturbance that established the stand. The field *F_ORIGIN* indicates the origin code assigned to the polygon. Table 6-15 shows the criteria used to assign *F_ORIGIN* and the order of assignment.

Table 6-15. F_ORIGIN criteria in order of assignment

F_ORIGIN	Description	Selection Criteria	Order
'X'	Nonforest areas	*F_STORY* = 1 and *NONFOREST* IS NOT NULL	1
'X'	Nonforest dispositions	*F_STORY = 5*	2
'MGD'	Existing cutblocks	*F_STORY* = 4	3
RECBURN'	Recently burned areas	*BURNCODE* = 'B' and FIREYEAR > 1991	4
'X'	Areas without AVI	*FMA_ID = 0*	5
'NAT'	All remaining areas		

6.3.10 Final Stand Height (F_HGT)

This indicated the height of the stand. Height was based on the defining layer from AVI (or *HEIGHT* if understory height was 0) with some exceptions. Regenerating cutblocks after AVI

(timber year between 1991 and 2004) were assigned a height of 0. Any non-forest areas (including linear landuse updates) were assigned a height of 0. Where no height can be assigned a value of –99 was assigned to fill the entries. Table 6-16 shows the criteria used to assign *F_HGT* and the order of assignment.

Table 6-16. F_HGT Assignment.

F_HGT	Description	Selection Criteria	Order
0	Nonforest dispositions	*F_STORY* = *5*	1
HEIGHT	AVI height for PR91 blocks	*F_STORY* = 4 and *BLK_GRP* = 'PR91' and *TIMBER_YEAR* < 1991 and *HEIGHT* > 0	2
0	Existing cutblocks (Post 1990)	*F_STORY = 4 and BLK_GRP = 'EXIST'*	
HEIGHT	AVI layer 1 height for AVI blocks	*CC_YEAR* < 1991 and *BLK_GRP* = 'AVI' and *BLK_STORY* = 1 and *HEIGHT* > 0	3
UHEIGHT	AVI layer 2 height for AVI blocks	*CC_YEAR* < 1991 and *BLK_GRP* = 'AVI' and *BLK_STORY* = 2 and *UHEIGHT* > 0	4
CHEIGHT	AVI layer 3 height for AVI blocks	*CC_YEAR* < 1991 and *BLK_GRP* = 'AVI' and *BLK_STORY* = 3 and C*HEIGHT* > 0	5
0	Recently burnt areas	*BURNCODE* = 'B' and *FIRE_YEAR* > 1991 and *F_STORY* <> 4	6
UHEIGHT	AVI layer 2 height	*F_STORY* = 2 and *UHEIGHT* > 0	7
CHEIGHT	AVI layer 3 height	*F_STORY* = 3 and *CHEIGHT* > 0	8
HEIGHT	AVI layer 1 height	*HEIGHT* > 0	9
-99	No height value		

6.3.11 Final Stand Area (F_AREAHA)

This indicated the final stand area assigned to the classified landbase polygon. This is equivalent to the area of the polygon in hectares unless the polygon is a horizontal stand with only one productive layer. Table 6-17 shows the F_AREAHA assignment.

Table 6-17. Final stand area assignment.

F_AREAHA	Description	Selection criteria
AREAHA_HORIZ	Final area (ha) of single layer horizontal stands	*AREAHA_HORIZ* > 0
AREAHA_POL	Final area (ha) of remaining stands	

6.3.12 Unique Key (UKEY#_SEIS)

This indicated unique key for the classified landbase. It was calculated equal to the coverage # sign on the LB2_SEIS coverage.

6.4 Additional fields or updates for TSA Landbase

6.4.1 Unique key (UKEY#_TSA)

The unique key for the TSA landbase is calculated from the coverage # sign on the LB2_TSA coverage.

6.4.2 Subunit (SUBUNIT)

This is a grouping of compartments into operational units. Compartments 1-7, 8-18, 19-24 were grouping into separate subunits.

6.4.3 Seismic on TSA Landbase (AREAHA_0M, AREAHA_5M, WIDTH_5M, WITH_SEIS, STRATA_SEIS, AREAHA_SEIS)

The seismic information from the classified landbase (Section 6.1.2) is carried on the TSA landbase. The Oracle SQL script *seis_create_sum_table.sql* groups classified landbase polygons by *UKEY#_TSA* and summarizes the area under seismic for each TSA landbase polygon. This information is carried in the fields AREAHA_0M (stand area without seismic) and AREAHA_5M (stand area crossed by 5 metre wide seismic lines). The WIDTH_5M field identified the occurrence of seismic lines (WIDTH_5M is set to 5 if seismic lines cross that particular TSA landbase polygon). The WITH_SEIS field is set to 100 for all TSA polygons which contain classified landbase polygons where *F_DEL* = 'SEIS'. The *STRATA_SEIS* field identifies the species strata assigned to the seismic. The AREAHA_SEIS is calculated as the sum of area under seismic within each TSA polygons (AREAHA_5M).

6.4.4 Linear features on TSA Landbase (WITH_LIN, AREA_ROAD, AREA_LINE, AREA_XLIN)

The field *WITH_LIN* is set to 100 for all TSA polygons which contain classified landbase polygons where *F_DEL* = 'ROAD' or 'LINEAR'. The area for each group of features is carried in the *AREA_ROAD* and *AREA_LINE* fields. The field *AREA_XLIN* identifies the TSA polygon area which is not part of a road or linear disposition. It is calculated as the sum of area of classified landbase polygons with the TSA polygon boundary where F_DEL is not assigned to 'ROAD' or 'LINEAR'.

6.4.5 Horizontal area calculations on TSA Landbase (AREAHA_HORIZ, AREA_H_DEL)

Horizontal stand area for horizontal stands with only one productive layer is calculated only for the managed area of the landbase. On the TSA Landbase the horizontal area is calculated after the area covered by roads, linear dispositions and seismic has been removed. The remaining stand area is then adjusted by the structure percents listed in AVI to assign the *AREA_HORIZ* and *AREA_H_DEL* as listed in Table 6-3.

6.4.6 D_LAND and D_SEIS adjustments

An additional code was added to the *D_LAND* calculations to account for the area of TSA polygons where the full polygon area is accounted for in the *AREA_ROAD* and *AREA_LIN* fields. These TSA landbase polygons have no available managed area and are assigned the *D_LAND* code of 'LINEAR'.

The *D_SEIS* field on the TSA landbase is set to 'SEIS' where *AREAHA_0M* = 0 indicating the full polygon is assigned to 'SEISMIC' deletion.

6.4.7 F_DEL Adjustments

F_DEL is recalculated to reflect the updates to *D_SEIS* and *D_LAND*. Areas are calculated on the basis of deletion assignments. *F_DEL* is assigned based on a heirarchy so each polygon is assigned to only one grouping. This is reflected in the *WITH_SEIS*, *WITH_TR* and *WITH_LIN* fields.

6.4.8 F_AREAHA_TSA Calculations

This area identifies the final stand area assigned to the TSA landbase polygon. This is equivalent to the area of the polygon in hectares unless the polygon is a horizontal stand or is crossed by roads, linear dispositions, trails or seismic. For horizontal stands with only one productive layer on the managed landbase the area of the productive layer is assigned (*AREAHA_HORIZ*). For non-horizontal stands, the seismic area is removed from the area without linear features to provide the final stand area. This is calculated as *F_AREAHA_TSA = AREA_XLIN – AREAHA_SEIS.*

6.4.9 Sliver polygon F_DEL adjustment

The sliver removal process on the TSA landbase removed many but not all sliver polygons. Any polygons with a F_AREAHA_TSA assignment of 0 were assigned an F_DEL = '0_HA'. This ensured the managed landbase had no 0 ha polygons which Patchworks, the TSA modelling software, does not easily process.

6.4.10 Pine Priority Stands (PINE_SUND)

Sundance identified priority pine stands relating to management for mountain pine beetle susceptibility. Stands characterized by AVI with *F_YC* = 'PL' and F_HGT >= 20 metres were assigned the code of 'P'. All other stands were assigned to NULL.

6.5 Modelling Fields

6.5.1 Adjust for the start date of TSA modelling

The effective year of the landbase is 2005 for this FMP. The start date of the TSA is 2007. The boundaries and location for blocks harvested or planned for harvest between 2005 and 2007 must be accounted for. These blocks must also be adjusted to reflect the BLK_STRATA or regenerating strata assignment. Landbase attributes calculated using effective date were updated on the modelling landbase to reflect a base year of 2007. Planned blocks for the years 2005 and 2006 were considered existing harvest in the TSA models.

6.5.2 Modelling Action (ACTION)

The action field in the landbase was meant to allow the TSA model to determine what action should occur to each stand. Each action code corresponded to a different action or silvicultural

system in the TSA model. Actions included thinning, deciduous harvest and clearcutting. The specific rules used to assign each polygon to an are developed as part of the modelling process.

6.5.3 Planned Block designation in model (PREBLOCK)

The *PREBLOCK* field identifies areas that were planned for future harvest actions before the start of modelling. In the TSA model two sets of planned blocks were designated. The first set of planned blocks identifies areas that are planned for harvest after 2006. The second set of planned blocks identifies blocks identified as contingency blocks. The PREBLOCK assignment rules area listed in Table 6-18.

Table 6-18. PREBLOCK assignment rules.

PREBLOCK	Description	Selection criteria	Order
'C'	Contingency blocks	*F_DE* L = 'NONE' and (*TIMBER_YEAR* >= 2005 and BLK_GRP = 'CONTINGENCY')	1
'Y'	Planned harvest after 2006	*F_DEL* = 'NONE' and (*TIMBER_YEAR* > 2006 and BLK_GRP = 'PLANNED')	2
NULL	Not a planned block		3

6.5.4 Cutting Period (CUT_PERIOD)

The CUT_PERIOD field code groups planned harvest into 5 year periods beginning in 2007 for use in TSA modelling. Table 6-19 shows the *CUT_PERIOD* assignment rules.

Table 6-19. CUT_PERIOD assignment rules.

CUT_PERIOD	Description	Selection Criteria	Order
CEIL(*TIMBER_YEAR* - 2006) / 5)	Remaining planned blocks	*PREBLOCK* IS NOT NULL	1
NULL	Not a planned block		2

6.5.5 TSA model theme assignments (THEME1 to THEME13)

Theme fields are used for input to the TSA model. These fields are calculated directly from attributes on the landbase or represent groupings of landbase attributes fields.

THEME1

THEME1 identified the compartment. *THEME1* assignment rules are shown in Table 6-20.

Table 6-20. THEME1 assignment rules.

THEME1	Description	Selection Criteria	Order
COMPART	Compartment number	*COMPART* IS NOT NULL	1
MISSING	No compartment number		2

THEME2

THEME2 identified the species.strata assignment. Areas with no species strata were assigned to 'X'. Planned 2005 and 2006 cutblocks were updated to reflect the regenerating strata. Any 'SB' strata for natural stands became a 'PL' regenerating strata. Table 6-21 shows the assignment rules.

Table 6-21. THEME2 assignment rules.

THEME2	Description	Selection Criteria	Order
'PL'	2005 and 2006 planned blocks with 'SB' strata	*BLK_GRP* = 'PLANNED' and *TIMBER_YEAR* IN (2005, 2006) and (*BLK_STRATA* = 'SB' or (BLK_STRATA *IS NULL AND F_YC* = 'SB'))	1
BLK_STRATA	2005 and 2006 planned blocks	*BLK_GRP* = 'PLANNED' and *TIMBER_YEAR* IN (2005, 2006) and *BLK_STRATA* IS NOT NULL	2
F_YC	Species strata	*F_YC* IS NOT NULL	3
'X'			4

THEME3

THEME3 reflected the pine priority developed by Sundance. It was set equal to PINE_SUND.

THEME4

THEME4 grouped the final density into 2 classes as shown in Table 6-22

Table 6-22. THEME4 assignment rules.

THEME4 Code	Description	Selection Criteria	Order
'AB'	A or B density	*F_DEN IN('A' , 'B')*	1
'CD'	C or D density	*F_DEN IN ('C' , 'D')*	2
'X'	all remaining		3

THEME5

THEME5 identified the stand origin process as shown in Table 6-23.

Table 6-23. THEME5 assignment rules.

THEME5	Description	Selection Criteria	Order
'REGEN'	Regnerating stands	*F_ORIGIN = 'MGD'*	1
'REGEN'	2005 and 2006 blocks	*BLK_GRP* = 'PLANNED' and *TIMBER_YEAR* IN (2005, 2006)	2
'RECBURN'	Recent Burns	*F_ORIGIN = 'RECBURN'*	3
'NAT'	remaining stands		4

THEME6

THEME6 identified the operability for polygons and showed the managed landbase (Table 6-24).

Table 6-24. THEME6 assignment rules.

THEME6	Description	Selection Criteria	Order
'OP'	Operable	*F_DEL* = 'NONE'	1
'NONOP'	Remaining stands		2

6.5.6 Patchworks Compartment (PW_COMPART)

Patchworks compartments are used to allow or disallow the Patchworks model to schedule harvest in certain areas during certain periods of times. Table 6-25 shows the assignment rules.

Table 6-25. PW_COMPART assignment rules.

PW_COMPART	Description	Selection Criteria	Order
'PLN_BLK'	Planned blocks	*PREBLOCK* = 'Y'	1
'CNTGY_BLK'	Contingency blocks	*PREBLOCK* = 'C'	2
COMPART	Compartment codes	*COMPART* IS NOT NULL	3
'X'	Remaining stands		4

6.5.7 Stand Age for TSA model (TSA_AGE)

F_AGE is increased by 2 years on the modelling landbase to reflect the TSA start date. Stands harvested in 2005 and 2006 were updated to show as existing harvest. TSA_AGE for the TSA landbase was assigned based on F_AGE from the classified landbase. It was the adjusted on the modelling landbase to reflect the TSA start date. Stands with no species strata (i.e. nonforest) were not updated.

Table 6-26. TSA_AGE calculation.

TSA_AGE	Description	Selection Criteria	Order
2007 - *TIMBER_YEAR*	Update for 2005 and 2006 cutblocks	*F_DEL* = 'NONE' and *TIMBER_YEAR* in (2005, 2006)	1
TSA_AGE	Non forest areas not updated	*F_YC* = 'X'	2
TSA_AGE + 2	Update for TSA start year	*F_AGE* >= 0	3
-99	Stands without age	*F_AGE* = *-99*	4

6.5.8 TSA Age represented in 5 year periods (TSA_PER)

TSA_PER was calculated by dividing the TSA_AGE by 5 and then rounding up.

6.5.9 Volume fields (CONVOL and DECVOL)

The standing merchantable 2007 coniferous and deciduous volumes are shown in these fields

6.5.10 Patchworks results fields (PROP_TREAT and PROP_DELTA)

The Patchworks PFMS schedule for years 2007 – 2026 are attached to the landbase in these fields. The PROP_DELTA field shows the year of harvest and the PROP_TREAT field shows whether the stand was scheduled for clearcutting or thinning.

6.5.11 Harvest Volume fields (CONHARVOL and DECHARVOL)

The coniferous and deciduous volume harvested from each polygon, associated with the PROP_TREAT and PROP_DELTA actions were shown in these fields.

6.5.12 Seral Stage (SERALSTAGE)

The seral stage assigned to each polygon is stored in the SERALSTAGE field. The assignment rules for seral stage are found in the TSA document.

7. Landbase Summary

Summaries for the classified and TSA landbases are presented in this section. The modelling landbase differs from the TSA landbase only in the attribute list.

7.1 Classified Landbase

The final classified landbase consisted of 196,192 polygons with a total area of 266,815 ha. The managed landbase was 66% of the classified landbase, 175,008 ha. Table 7-1 and Table 7-2 summarized the managed and unmanaged landbase by broad groupings. The tables can be duplicated by grouping the landbase on the F_YC or F_DEL_GRP fields and summarizing on F_AREAHA. The horizontal stand deletion area is the sum of AREA_H_DEL on the managed landbase only (F_DEL = 'NONE).

Table 7-1. Managed classified landbase summary (by F_YC).

Description	F_YC	Area(ha)	% Managed Landbase	% Gross Landbase
Deciduous	DEC	9,971	6%	4%
Aspen Pine mixedwood	AP	6,243	4%	2%
Aspen Spruce mixedwood	AS	3,026	2%	1%
Pine Aspen mixedwood	PA	7,985	5%	3%
Spruce Aspen mixedwood	SA	1,991	1%	1%
Pine	PL	125,835	72%	47%
Black spruce	SB	2,496	1%	1%
White spruce	SW	17,461	10%	7%
Managed landbase	**Total**	**175,008**	**100%**	66%

As shown in Table 7-1 72% of the managed landbase was pine and the pine species strata covered almost half of the total landbase area.

Table 7-2. Unmanaged classified landbase (by F_DEL_GROUP).

Description (F_DEL_GROUP)	Area(ha)	% Unmanaged Landbase	% Gross Landbase
Area outside FMA	1,162	1%	0%
Linear dispositions	9,700	11%	4%
Non-linear dispositions	2,759	3%	1%
Nonforest, Nonproductive	37,236	41%	14%
Water buffers	7,227	8%	3%
Subj deletions	29,140	32%	11%
Horizontal stand deletion in managed landbase	4,583	5%	2%
Unmanaged Landbase	**91,807**	**100%**	**34%**

Figure 7-1 shows the managed classified landbase species strata (F_YC).

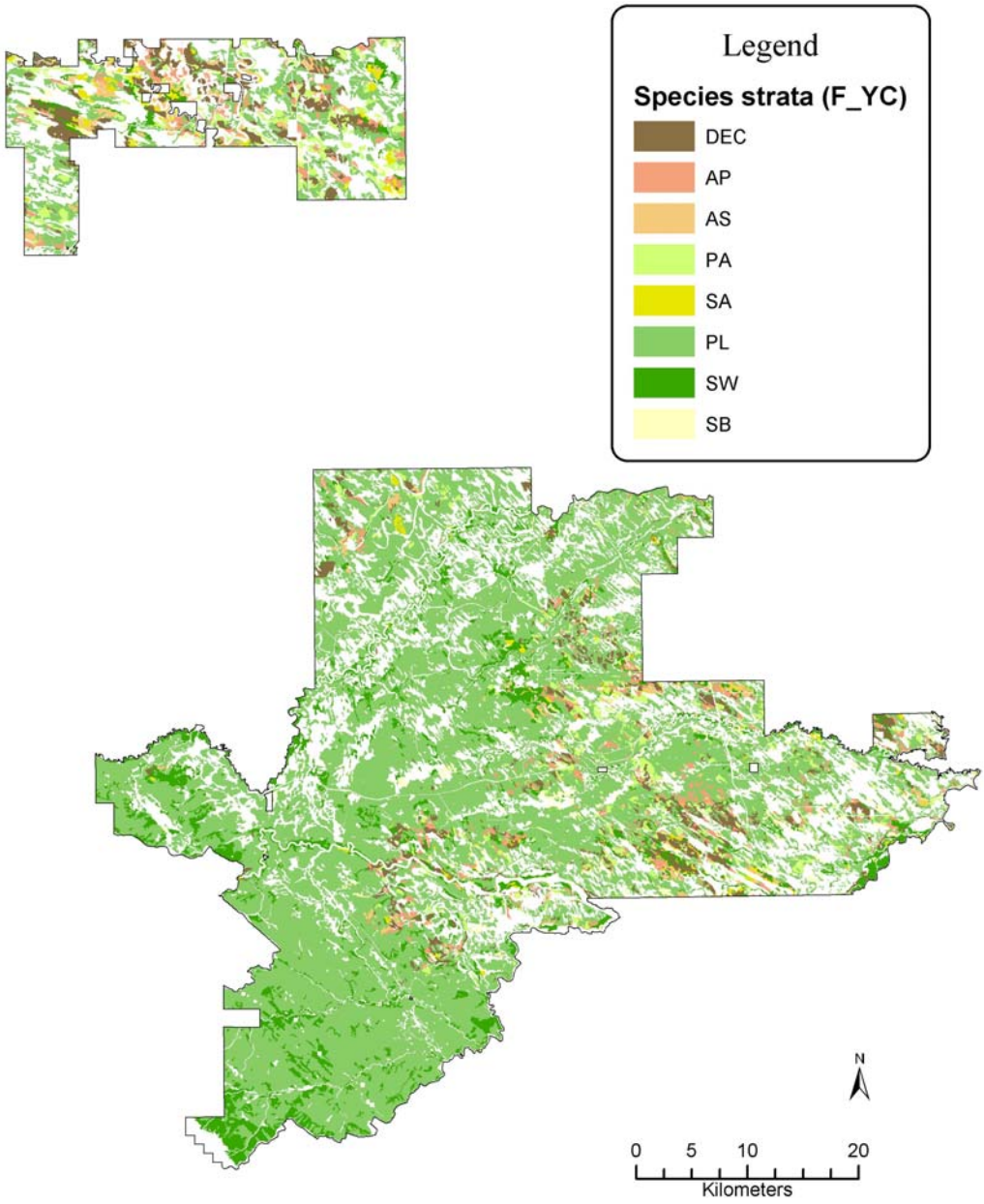

Figure 7-1. Managed landbase by species strata.

7.1.1 Classified Landbase

Table 7-3 shows a detailed summary of the classified managed landbase by stand origin, cutblock groupings and species strata. The table can be created by grouping *F_ORIGIN*, *BLK_GRP* and *F_YC* by *F_AREAHA* for the managed landbase (*F_DEL* = 'NONE'). Table 7-4 shows a summary of the unmanaged landbase by deletion type and area.

Table 7-3. Managed landbase detailed summary (by F_ORIGIN, BLK_GRP, F_YC).

Stand origin	Block group	F_YC	Area(ha)	% Managed landbase	
Natural stands		DEC	7,636	4%	
		AP	4,955	3%	
		AS	2,363	1%	
		PA	5,867	3%	
		PL	101,030	58%	
		SA	1,789	1%	
		SB	2,411	1%	
		SW	16,412	9%	
	Natural, non-planned area		142,462		82%
	Planned blocks (2007+)	DEC	79	0%	
		AP	96	0%	
		AS	42	0%	
		PA	248	0%	
		PL	6,616	4%	
		SA	36	0%	
		SB	31	0%	
		SW	189	0%	
	TotalpPlanned blocks (2007+)		7,337		3%
	Contingency blocks	DEC	273	0%	
		AP	66	0%	
		AS	71	0%	
		PA	161	0%	
		PL	3,542	2%	
		SA	9	0%	
		SB	3	0%	
		SW	209	0%	
	Contingency blocks (2007-2016)		4,334		3%
Regenerating stands	Existing blocks (Post 1990)	DEC	588	0%	
		AP	804	0%	
		AS	388	0%	
		PA	1,193	1%	
		PL	13,778	8%	
		SA	13	0%	
		SB	39	0%	
		SW	456	0%	
	Total existing post 1990 blocks		17,260		10%
	Pre91 blocks (Sundance)	DEC	234	0%	
		AP	57	0%	
		PA	76	0%	
		PL	266	0%	
	Total pre 1991 Sundance blocks		633		0%
	AVI Pre 1991 blocks	DEC	1,162	1%	
		AP	264	0%	
		AS	162	0%	
		PA	440	0%	
		PL	603	0%	
		SA	144	0%	
		SB	12	0%	
		SW	195	0%	
	Total AVI pre 1991 blocks		2,982		2%
Managed landbase		**Total**	**175,008**	**100%**	**100%**

Table 7-4. Unmanaged landbase detailed summary (by F_DEL).

Description	F_DEL	Area(ha)	% Unmanaged Landbase	% Gross Landbase
Area outside FMA	XDFA	1,162	1%	0%
Linear features and utility corridors	LINEAR	2,100	2%	1%
Roads	ROADS	3,496	4%	1%
Seismic	SEIS	4,103	4%	2%
Government reservations	GOVRES	664	1%	0%
Mineral and surface leases	LEASE	2,095	2%	1%
Areas burnt since AVI	FIRE	121	0%	0%
Nonforest area	NF	9,709	11%	4%
Nonproductive areas	TPR	27,406	30%	10%
Water buffers	GRBUF	7,227	8%	3%
Larch stands	LT	3,616	4%	1%
Non-commercial black spruce	NCSB	21,133	23%	8%
'A' density black spruce	SB_ADENS	4,391	5%	2%
Horizontal stand deletion in managed landbase		4,583	5%	2%
Unmanaged Landbase	**Total**	**91,807**	**100%**	**34%**

7.1.2 TSA Landbase

The final TSA landbase consisted of 41,666 polygons with a total area of 266,815 ha. The managed landbase was 65% of the TSA landbase, 175,008 ha. Table 7-5 shows the summary of the TSA landbase by broad groupings. The managed area summaries duplicate the classified landbase. On the unmanaged landbase most of the area of seismic, roads and other linear dispositions are carried as attributes so the area is distributed slightly differently. The tables can be duplicated by grouping the landbase on the F_YC or F_DEL_GRP fields and summarizing on *F_AREAHA_TSA*. The horizontal stand deletion area is the sum of *AREA_H_DEL* on the managed landbase only (*F_DEL* = 'NONE). The utility corridor deletion is the sum of *AREA_LINE* on the managed landbase; the roads deletion is the sum of *AREA_ROAD* on the managed landbase; and the seismic area is the sum of *AREAHA_SEIS* on the managed landbase.

Table 7-5. TSA Landbase summary.

Deletion groupings	Area(ha)	% landbase
Area outside FMA	1,162	0%
Linear dispositions	82	0%
Non-linear dispositions	2,772	1%
Nonforest, Nonproductive	39,342	15%
Water buffers	7,336	3%
Subj deletions	30,042	11%
Sliver polygons	1,000	0%
Horizontal stand deletion	4,583	2%
Utility corridor deletion	1,012	0%
Roads deletion	1,824	1%
Seismic area deletion	2,653	1%
Unmanaged landbase	**91,807**	**34%**

Species strata	Area(ha)	% landbase
Deciduous	9,971	4%
Aspen Pine mixedwood	6,243	2%
Aspen Spruce mixedwood	3,026	1%
Pine Aspen mixedwood	7,985	3%
Spruce Aspen mixedwood	1,991	1%
Pine	125,835	47%
Black spruce	2,496	1%
White spruce	17,461	7%
Managed landbase	**175,008**	**66%**

Total TSA landbase	**266,815**

8. References

Alberta, 1991. Alberta Vegetation Inventory Standards Manual. Alberta Environmental Protection, Resource Data Division, Data Acquisition Branch. Version 2.1, November 1991.

Alberta Sustainable Resource Development. 2006. *Alberta Forest Management Planning Standard*. Version 4.1 - April 2006. Forest Management Branch, Public Lands and Forests Division, Alberta Sustainable Resource Development, Edmonton, Alberta.

Timberline Forest Inventory Consultants, 2001. Timber Supply Analysis Landbase Determination Process, September 2001. Prepared for Sundance Forest Industries Ltd.

Appendix I Classified landbase Dataset Description

The Sundance classified landbase file is named **R13_lb3_cls**.

Dataset Information **R13_lb3_cls** (Cover)

Description: Classified landbase for Sundance 2007 Forest Management Plan

Data Source: Generated by The Forestry Corp

Date Generated: 27/04/2007

Data Format: ArcInfo Coverage

Software Used: ESRI ArcInfo and Oracle

Projection: UTM 11

Datum: GRS80

Units: metres

Data Precision: Double

Tolerance: .001

Extent: All lands with FMU R13.

R13_lb3_cls.shp is a shapefile created directly from R13_lb3_cls coverage.

Appendix II Data Dictionary for Classified Landbase

Dataset Name: **R13_lb3_CLS**

Description: **Table describing R13_LB3_CLS**

Column Name	*Order*	*Type*	*Width*	*Decimal*	*Description*	
					Value	*Definition*
UKEY3_SEIS	1	Integer	0	0	Unique key for seismic landbase	
UKEY3_TSA	2	Integer	0	0	Unique key for TSA landbase	
FMA_ID	3	Integer	10	0	AVI polygon key	
FMA	4	Integer	5	0	Inside FMA designation	
					0	Area outside FMA
					100	Areas within FMA
COMPART	5	Integer	5	0	Compartment Number	
NSR	6	Integer	5	0	Natural subregion code	
					0	Areas without NSR
					10	Upper Foothills
					11	Lower Foothills
					8	Subalpine
WBUF	7	Integer	5	0	Hydrology buffer assignment	
					0	Areas not in buffer
					1	Areas inside water buffer
BURNCODE	8	Character	6	0	Wildfire burn designation	
					B	Areas burned since AVI
FIREYEAR	9	Integer	5	0	Year of wildfire (since inventory)	
NLIN_DISP	10	Character	3	0	Non-linear disposition type	
					DRS	Disposition reservation
					GRL	Grazing lease
					MLL	Miscellaneous lease
					MLP	Miscellaneous permit
					MSL	Mineral Surface lease
					PNT	Protective notation
					RIA	Range improvement agreement
					SMC	Surface material license
					SML	Surface material lease
BLK_GRP	11	Character	15	0	Cutblock grouping	
					AVI	AVI harvest areas
					CONTINGENCY	Contingency planned blocks
					EXIST	Existing cutblocks
					PLANNED	Planned harvest blocks
					PR91	Pre-1991 cutblocks
KEY_X	12	Character	50	0	Block key	
OPEN_NUM	13	Character	20	0	ARIS cutblock opening number	
TIMBER_YEAR	14	FloatingPt	22	0	Block origin year	
SPGRP	15	Character	4	0	Pre-harvest species group assignment	
					DE	Deciduous
					MX	Mixedwood
					PN	Pine
					SW	Spruce
STD_MOD	16	Character	8	0	Standard modifier	
					C-2000	Conifer 2000 standard
					CD-2000	Conifer-deciduous 2000 standard
					D-2000	Deciduous 2000 standard
					DC-2000	Deciduous - conifer 2000 standard
					PR91	Pre-1991 standard
BCG	17	Character	2	0	Cutblock broad cover group assignment	
					C	Conifer

Column Name	Order	Type	Width	Decimal	Description	
					Value	*Definition*
					CD	Conifer/deciduous mixedwood
					D	Deciduous
					DC	Deciduous/conifer mixedwood
BLK_STRATA	18	Character	4	0	Cutblock strata	
					AP	Aspen leading pine mixedwood
					AS	Aspen leading spruce mixedwood
					DEC	Dedicuous
					PA	Pine leading aspen mixedwood1
					PL	Lodgepole pine
					SA	Spruce leading aspen mixedwood
					SB	Black spruce
					SW	White spruce
CC_YEAR	19	Integer	5	0	Harvest year for AVI cutblocks	
AVI_YC_STRAT	20	Character	4	0	Block strata from dominant AVI layer	
					AP	Aspen leading pine mixedwood
					AS	Aspen leading spruce mixedwood
					DEC	Deciduous
					PA	Pine leading aspen mixedwood
					PL	Lodgepole pine
					SA	Spruce leading aspen mixedwood
					SB	Black spruce
					SW	White spruce
BLK_STORY	21	Integer	5	0	AVI layer used for block attributes	
					1	AVI overstory
					2	AVI understory
					3	Composite layer
BLK_TPR	22	Character	2	0	Cutblock productivity assignment	
					F	Fair
					G	Good
					M	Medium
MOIST	23	Character	1	0	AVI moisture classification	
					a	Aquatic (hydric)
					d	Dry (xeric)
					m	Mesic
					w	Wet (hydric)
STRUC_TYPE	24	Character	1	0	Stand structure type	
					C	Complex
					H	Horizontal
					M	Two story
					S	Single story
STRUC_PCT	25	Integer	5	0	Stand structure value	
DENSITY	26	Character	1	0	Stand density	
					A	Crown closure 6-30%
					B	Crown closure 31-50%
					C	Crown closure 51-70%
					D	Crown closure 71-100%
HEIGHT	27	Integer	5	0	Stand height	
ORIGIN	28	Integer	5	0	Stand origin	
TPR	29	Character	1	0	Timber productivity rating	
					F	Fair
					G	Good
					M	Medium
					U	Unproductive
USTRUC_TYPE	30	Character	1	0	Stand structure code (understory)	
					H	Horizontal
					M	Two story

Column Name	Order	Type	Width	Decimal	Description	
					Value	Definition
USTRUC_PCT	31	Integer	5	0	Stand structure value (understory)	
UDENSITY	32	Character	1	0	Stand density (understory)	
					A	Crown closure 6-30%
					B	Crown closure 31-50%
					C	Crown closure 51-70%
					D	Crown closure 71-100%
UHEIGHT	33	Integer	5	0	Stand height (understory)	
UORIGIN	34	Integer	5	0	Stand origin (understory)	
UTPR	35	Character	1	0	Timber productivity rating (understory)	
					F	Fair
					G	Good
					M	Medium
					U	Unproductive
CSUBJ	36	Character	15	0	Horizontal stand deletions	
					H_ASB_U	A density black spruce (1) and unproductive (2)
					H_ASB_X	A density black spruce (1) and non-forested (2)
					H_LT_U	Larch (1) and unproductive (2)
					H_NCSB	Non-commercial Sb site index
					H_NCSB_LT	Non-commercial Sb site index (1) and larch (2)
					H_NCSB_U	Non-commercial Sb site index (1) and unproductive (2)
					H_NCSB_X	Non-commercial Sb site index (1) and non-forested (2)
					H_U	Unproductive
					H_U_NCSB	Unproductive (1) and non-commercial Sb site index (2)
					H_U_X	Unproductive (1) and non-forested (2)
					H_X	Non-forested
					H_X_U	Non-forested (1) and unproductive (2)
					H1_NCSB	Non-commercial Sb site index (layer 1)
					H1_U	Unproductive tpr (layer 1)
					H2_ASB	A density black spruce (layer 2)
					H2_LT	Larch (layer 2)
					H2_NCSB	Non-commercial Sb site index (layer 2)
					H2_U	Unproductive tpr (layer 2)
					H2_X	Non-forested (layer 2)
					HCOMP	Stand appropriate for composite assignment
					NONE	Not a horizontal stand
CDENSITY	37	Character	2	0	Composite stand density	
					A	Crown closure 6-30%
					B	Crown closure 31-50%
					C	Crown closure 51-70%
					D	Crown closure 71-100%
CHEIGHT	38	FloatingPt	5	2	Stand height (composite)	
CORIGIN	39	Integer	5	0	Stand origin (composite)	
CTPR	40	Character	2	0	Composite stand timber productivity rating	
					F	Fair
					G	Good
					M	Medium
STRATA_SRD	41	Character	5	0	Stand SRD extended strata	
					C1	Pure white spruce
					C10	Black spruce leading with pine
					C11	Black spruce leading without pine
					C12	Larch leading

Column Name	Order	Type	Width	Decimal	Description	
					Value	Definition
					C15	Pure balsam fir
					C16	Balsam fir leading with pine
					C17	Balsam fir leading without pine
					C2	White spruce leading with pine
					C3	White spruce leading without pine
					C4	Pure pine
					C5	Pine leading with white spruce
					C6	Pine leading with black spruce
					C7	Pine leading with fir
					C8	Pine leading without spruce and fir
					C9	Pure black spruce
					CD1	White spruce/aspen
					CD2	White spruce/poplar
					CD3	White spruce/birch
					CD4	Pine/aspen
					CD5	Pine/poplar
					CD6	Pine/birch
					CD7	Black spruce/aspen
					CD8	Black spruce/poplar
					CD9	Black spruce/birch
					D1	Pure aspen
					D2	Aspen leading with poplar
					D3	Aspen leading without poplar
					D4	Poplar leading
					D5	Birch leading
					DC1	Aspen/white spruce
					DC2	Aspen/pine
					DC3	Aspen/black spruce
					DC5	Poplar/white spruce
					DC6	Poplar/pine
					DC7	Poplar/black spruce
					DC9	Birch/white spruce
					XX0	Non forest
USTRATA_SRD	42	Character	5	0	Stand SRD extended strata (understory)	
					C1	Pure white spruce
					C10	Black spruce leading with pine
					C11	Black spruce leading without pine
					C12	Larch leading
					C15	Pure balsam fir
					C16	Balsam fir leading with pine
					C17	Balsam fir leading without pine
					C2	White spruce leading with pine
					C3	White spruce leading without pine
					C4	Pure pine
					C5	Pine leading with white spruce
					C6	Pine leading with black spruce
					C7	Pine leading with fir
					C8	Pine leading without spruce and fir
					C9	Pure black spruce
					CD1	White spruce/aspen
					CD2	White spruce/poplar
					CD3	White spruce/birch
					CD4	Pine/aspen
					CD5	Pine/poplar
					CD7	Black spruce/aspen
					CD8	Black spruce/poplar
					CD9	Black spruce/birch
					D1	Pure aspen
					D2	Aspen leading with poplar
					D3	Aspen leading without poplar

Column Name	Order	Type	Width	Decimal	Description
					Value: Definition
					D4: Poplar leading
					D5: Birch leading
					DC1: Aspen/white spruce
					DC2: Aspen/pine
					DC3: Aspen/black spruce
					DC5: Poplar/white spruce
					DC9: Birch/white spruce
					XX0: Non forest
CSTRATA_SRD	43	Character	5	0	Stand SRD extended strata (composite)
					C10: Black spruce leading with pine
					C11: Black spruce leading without pine
					C2: White spruce leading with pine
					C3: White spruce leading without pine
					C4: Pure pine
					C5: Pine leading with white spruce
					C6: Pine leading with black spruce
					C8: Pine leading without spruce and fir
					C9: Pure black spruce
					CD1: White spruce/aspen
					CD2: White spruce/poplar
					CD3: White spruce/birch
					CD4: Pine/aspen
					CD7: Black spruce/aspen
					D1: Pure aspen
					D2: Aspen leading with poplar
					D3: Aspen leading without poplar
					D4: Poplar leading
					DC1: Aspen/white spruce
					DC11: Birch/black spruce
					DC2: Aspen/pine
					DC3: Aspen/black spruce
					DC5: Poplar/white spruce
					DC6: Poplar/pine
					DC7: Poplar/black spruce
					XX0: Non forest
AGE	44	Integer	5	0	Overstory age (in 2005)
UAGE	45	Integer	5	0	Understory age (in 2005)
CAGE	46	Integer	5	0	Composite age (in 2005)
C_CODE	47	Character	4	0	Broad cover group
					C: Conifer
					CD: Conifer/deciduous mixedwood
					D: Deciduous
					DC: Deciduous/conifer mixedwood
UC_CODE	48	Character	4	0	Broad cover group (understory)
					C: Conifer
					CD: Conifer/deciduous mixedwood
					D: Deciduous
					DC: Deciduous/conifer mixedwood
CC_CODE	49	Character	4	0	Broad cover group (composite)
					C: Conifer
					CD: Conifer/deciduous mixedwood
					D: Deciduous
					DC: Deciduous/conifer mixedwood
LEAD_CON	50	Character	2	0	Leading conifer
					FB: Balsam fir
					LT: Larch
					NO: No appropriate species present
					PL: Lodgepole pine

Column Name	Order	Type	Width	Decimal	Description	
					Value	Definition
					SB	Black spruce
					SW	White spruce
ULEAD_CON	51	Character	2	0	Leading conifer (understory)	
					FB	Balsam fir
					LT	Larch
					NO	No appropriate species present
					PL	Lodgepole pine
					SB	Black spruce
					SW	White spruce
CLEAD_CON	52	Character	2	0	Leading conifer (composite)	
					NO	No appropriate species present
					PL	Lodgepole pine
					SB	Black spruce
					SW	White spruce
					X	No tree species
LEAD_DEC	53	Character	2	0	Leading deciduous	
					AW	Aspen
					BW	Birch
					NO	No appropriate species present
					PB	Poplar1
ULEAD_DEC	54	Character	2	0	Leading deciduous (understory)	
					AW	Aspen
					BW	Birch
					NO	No appropriate species present
					PB	Poplar
CLEAD_DEC	55	Character	2	0	Leading deciduous (composite)	
					AW	Aspen
					BW	Birch
					NO	No appropriate species present
					PB	Poplar
					X	No tree species
SOFTPCT	56	Integer	2	0	Coniferous species percent (overstory)	
HARDPCT	57	Integer	2	0	Deciduous species percent (overstory)	
USOFTPCT	58	Integer	2	0	Coniferous species percent (understory)	
UHARDPCT	59	Integer	2	0	Deciduous species percent (understory)	
SP_COMP	60	Character	30	0	AVI overstory string of attributes	
USP_COMP	61	Character	30	0	AVI understory string of attributes	
CSP_COMP	62	Character	80	0	AVI composite layer string of attributes	
NONFOREST	63	Character	4	0	Nonforest code assignment	
					AIG	gravel pits
					AIH	permanent right of way, roads, highways, railways
					AII	industrial plant sites
					BR	bryophyte mosses and liverworts
					CIP	pipelines, transmission lines, grass airstrips
					CIW	well sites, geophysical
					CP	cropland perennial
					HF	herbaceous forbs
					HG	herbaceous grasslands
					NMC	cutbank - watercourse related
					NMR	rock barren - bedrock, talus
					NMS	sand-dunes, beaches
					NWF	flooded, beaver ponds
					NWL	lakes, ponds
					NWR	rivers

Column Name	Order	Type	Width	Decimal	Description	
					Value	**Definition**
					SC	shrub closed
					SO	shrub open
UNONFOREST	64	Character	4	0	Nonforest code assignment (understory)	
					AIF	farmsteads
					AIG	gravel pits
					AIH	permanent right of way, roads, highways, railways
					ASR	ribbon development
					BR	bryophyte mosses and liverworts
					CIP	pipelines, transmission lines, grass airstrips
					CIW	well sites, geophysical
					CP	cropland perennial
					HF	herbaceous forbs
					HG	herbaceous grasslands
					NMC	cutbank - watercourse related
					NMR	rock barren - bedrock, talus
					NMS	sand-dunes, beaches
					NWF	flooded, beaver ponds
					NWL	lakes, ponds
					NWR	rock barren - bedrock, talus
					SC	shrub closed
					SO	shrub open
STRATA_YC	65	Character	5	0	Stand yield strata assignment	
					AP	Aspen leading pine mixedwood
					AS	Aspen leading spruce mixedwood
					DEC	Deciduous
					LT	Larch
					PA	Pine leading aspen mixedwood
					PL	Lodgepole pine
					SA	Spruce leading aspen mixedwood
					SB	Black spruce
					SW	White spruce
USTRATA_YC	66	Character	5	0	Stand yield strata assignment (understory)	
					AP	Aspen leading pine mixedwood
					AS	Aspen leading spruce mixedwood
					DEC	Deciduous
					LT	Larch
					PA	Pine leading aspen mixedwood
					PL	Lodgepole pine
					SA	Spruce leading aspen mixedwood
					SB	Black spruce
					SW	White spruce
CSTRATA_YC	67	Character	5	0	Stand yield strata assignment (composite)	
					AP	Aspen leading pine mixedwood
					AS	Aspen leading spruce mixedwood
					DEC	Deciduous
					PA	Pine leading aspen mixedwood
					PL	Lodgepole pine
					SA	Spruce leading aspen mixedwood
					SB	Black spruce
					SW	White spruce
AVI_STORY	68	Integer	2	0	AVI layer used for strata assignment	
					1	AVI overstory
					2	AVI understory
					3	Composite layer
WITH_SEIS	69	Integer	4	0	Polygons with seismic area	
					0	Areas without seismic
					100	Areas with seismic

Column Name	Order	Type	Width	Decimal	Description	
					Value	Definition
STRATA_SEIS	70	Character	8	0	Strata assigned to seismic areas	
					HG	Herbaceous grasslands
					SC	Shrub closed
AREA_HORIZ	71	FloatingPt	12	6	Area of classified portion of horizontal stands (ha)	
AREA_H_DEL	72	FloatingPt	12	6	Area of unclassified portion of horizontal stands (ha)	
AREAHA_POL	73	FloatingPt	12	6	Polygon area (ha)	
D_TPR	74	Character	4	0	Deletion for unproductive areas	
					U	Unproductive
D_DFA	75	Character	8	0	Deletion for areas outside DFA	
					OUT_FMA	Outside FMA
D_LAND	76	Character	8	0	Deletion for Landuse	
					GOVRES	Government assigned dispositions
					LEASE	Surface and mineral leases
					LINEAR	Linear features
					ROADS	Roads
D_ACCESS	77	Character	8	0	Deletion for access	
D_BUF	78	Character	8	0	Deletion for hydrologic buffers	
					GRBUF	Ground rule buffers
D_ISO	79	Character	8	0	Deletion for isolated/inaccessible stands	
D_SUBJ	80	Character	16	0	Subjective deletions	
					LT	Larch stands
					NCSB	Non-commercial site index Sb stands
					SB_ADENS	A density Sb stands
D_BURN	81	Character	8	0	Deletion for areas burnt since AVI	
					B	Areas burned since inventory
D_NONFOR	82	Character	8	0	Deletion for nonforest lands	
					AIG	gravel pits
					AIH	permanent right of way, roads, highways, railways,
					AII	industrial plant sites
					BR	bryophyte mosses and liverworts
					CIP	pipelines, transmission lines, grass airstrips
					CIW	well sites, geophysical
					CP	cropland perennial
					HF	herbaceous forbs
					HG	herbaceous grasslands
					NMC	cutbank - watercourse related
					NMR	Rock barren - bedrock, talus
					NMS	sand - dunes, beaches
					NWF	flooded, beaver ponds
					NWL	lakes, ponds
					NWR	rivers
					SC	shrub closed
					SO	shrub open
D_SEIS	83	Character	4	0	Deletion for seismic	
					SEIS	Deletion for seismic
F_ORIGIN	84	Character	8	0	Final stand origin assignment	
					MGD	Managed stands
					NAT	Natural stands
					RECBURN	Recently burned stands (post inventory)
					X	Non forest
F_LEAD_SP	85	Character	8	0	Leading species	
					AW	Aspen
					BW	Birch

Column Name	Order	Type	Width	Decimal	Description
					Value — **Definition**
					FB — Balsam fir
					LT — Larch
					NO — No appropriate species present
					PB — Poplar
					PL — Lodgepole pine
					SB — Black spruce
					SW — White spruce
					X — No species found
F_AGE	86	Integer	4	0	Final stand age assignment
F_YC	87	Character	8	0	Final stand species strata assignment
					AP — Aspen leading pine mixedwood
					AS — Aspen leading spruce mixedwood
					DEC — Deciduous
					LT — Larch
					PA — Pine leading aspen mixedwood
					PL — Lodgepole pine
					SA — Spruce leading aspen mixedwood
					SB — Black spruce
					SW — White spruce
					X — No strata assigned
F_SRD	88	Character	8	0	Final stand SRD extended strata assignment
					C1 — Pure white spruce
					C10 — Black spruce leading with pine
					C11 — Black spruce leading without pine
					C12 — Larch leading
					C15 — Pure balsam fir
					C16 — Balsam fir leading with pine
					C17 — Balsam fir leading without pine
					C2 — White spruce leading with pine
					C3 — White spruce leading without pine
					C4 — Pure pine
					C5 — Pine leading with white spruce
					C6 — Pine leading with black spruce
					C7 — Pine leading with fir
					C8 — Pine leading without spruce and fir
					C9 — Pure black spruce
					CD1 — White spruce/aspen
					CD2 — White spruce/poplar
					CD3 — White spruce/birch
					CD4 — Pine/aspen
					CD5 — Pine/poplar
					CD6 — Pine/birch
					CD7 — Black spruce/aspen
					CD8 — Black spruce/poplar
					CD9 — Black spruce/birch
					D1 — Pure aspen
					D2 — Aspen leading with poplar
					D3 — Aspen leading without poplar
					D4 — Poplar leading
					D5 — Birch leading
					DC1 — Aspen/white spruce
					DC11 — Birch/black spruce
					DC2 — Aspen/pine
					DC3 — Aspen/black spruce
					DC5 — Poplar/white spruce
					DC6 — Poplar/pine
					DC7 — Poplar/black spruce
					DC9 — Birch/white spruce
					X — No tree species

Column Name	Order	Type	Width	Decimal	Description	
					Value	**Definition**
					XX0	No strata assigned
F_STORY	89	Integer	4	0	Inventory source used for stand classification	
					1	AVI overstory
					2	AVI understory
					3	Composite horizontal stand
					4	Existing cutblocks
					5	Linear features established since AVI
F_DEN	90	Character	8	0	Final stand density assignment	
					A	Crown closure 6-30%
					B	Crown closure 31-50%
					C	Crown closure 51-70%
					D	Crown closure 71-100%
					X	No crown closure
F_TPR	91	Character	8	0	Final stand timber productivity assignment	
					F	Fair
					G	Good
					M	Medium
					U	Unproductive
					X	No TPR
F_HGT	92	Integer	5	0	Final stand height assignment	
F_DEL	93	Character	12	0	Final stand deletion classification	
					FIRE	Areas burned since 1994
					GOVRES	Government assigned dispositions
					GRBUF	Ground rule buffers
					LEASE	Mineral and surface leases
					LINEAR	Linear features
					LT	Larch
					NCSB	Non-commercial black spruce
					NF	Non forest areas
					NONE	Managed area - no deletions
					ROADS	Roads
					SB_ADENS	Black spruce 'A' density stands
					SEIS	Seismic
					TPR	Unproductive timber productivity rating
					XDFA	Private lands and non-classified areas outside FMA
F_AREAHA	94	FloatingPt	12	6	Final stand area in hectares	
F_DEL_GROUP	95	Character	30	0	Grouping of deletion codes	
F_DEL_ORD	96	Integer	0	0	Order of display for deletion types	
YC_ORD	97	Integer	0	0	Order of display for species strata	

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