MANAGED STAND ECOSITE [MSE]

MICROSOFT® ACCESS 2000 DATABASE

DATA DICTIONARY

WEST-CENTRAL ALBERTA CANADA

MARCH 2004

Todd Little - Tesera Systems Inc.

Natural Resources Canada / Ressources naturelles Canada
Canadian Forest Service / Service canadien des forêts

Weldwood

foothills model forest
a growing understanding

Weyerhaeuser Canada Ltd.

Ranger
SLAVE LAKE PULP

RANGER
Blue Ridge Lumber (1981) Ltd.
Ranger Board

Alberta Newsprint Company

MILLAR WESTERN

SUNPINE FOREST PRODUCTS

Ainsworth

tesera systems inc.

Limit of Liability Disclaimer

The author makes no representation or warranties with respect to the accuracy or completeness or structure of the ecological data contained in, or data collection methods used to compile the data for, the database; nor implies the fitness of the data for any particular purpose.

Acknowledgements

The author wishes to acknowledge the late *David Presslee* from Weldwood of Canada (Hinton Division), and the late *Dr. Ian Corns* from the Canadian Forest Service for the inception of the **Managed Stand Ecosite** (MSE) project (also known as the "Chronosequence project") – which brought about the creation of the MSE database. Ian and David shared a central role; David provided funding and support in kind as well as technical expertise, and Ian directed the project until illness made it impossible to continue this role.

The collection of data for the young managed forest ecosite database project was accomplished through the cooperation of the Canadian Forest Service, Weldwood of Canada (Hinton Division), the Foothills Model Forest, and Geographic Dynamics Corporation (GDC), as well as contributions from numerous other members of the Alberta forest industry: West Fraser Timber Co. (Blue Ridge and Slave Lake), Sunpine Forest Products, Weyerhaeuser Alberta (Grande Prairie, Grande Cache, Edson, and Drayton Valley), Alberta Newsprint Company, Millar Western Industries, and Ainsworth Lumber Co. Ltd..

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Abstract

The Managed Stand Ecosite (MSE) relational database contains ecological data (vegetation, soil and site characteristics) for young, post-harvest, forest ecosites, for 485 plots grouped into five age-classes; the compiled data resulting from three years of field work in West-central Alberta. The subset of plots used in the *Field guide to ecosites of west-central Alberta: supplement for managed stands <40 years old, first approximation* (Corns et al., 2004) is identified and the corresponding age-classes used in that document are included.

This report includes background information on the data collection program, relational database structure, and data table and field descriptions. The database was built in Microsoft® Access 2000 (version 9.0.4402 SR-1) format.

Keywords: ecosite, managed forest, post-harvest, West-central Alberta, ecological classification, ecological data, chronosequence, boreal forest, mixedwood, foothills, montane, subalpine, relational database.

Preface

This report provides background information about data collection protocols and describes the structure and contents of the relational database used in part to develop the *Field guide to ecosites of west-central Alberta: supplement for managed stands <40 years old, first approximation* (Corns et al., 2004). The database is a Microsoft® Access 2000 (version 9.0.4402 SR-1) database. Those who intend to use the database and this report should be familiar with Microsoft® Access 2000 software.

To those who intend to use the data for analyses, I must emphasize the following: ***carefully explore the data contained in this database with your objectives in mind.***

This manual can help users explore the potential uses and constraints of the Managed Stand Ecosite database in future analyses, or to continue to compile spatial and temporally explicit data for young managed forests in West-central Alberta. I believe there is knowledge/information in this database that has not been extracted, but as can be expected with a relational database of this size there may be issues such as data entry, sampling protocols and methods, and data property definitions.

Sincerely,

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1.0 Background: history and objectives of the managed stand ecosite project

1.1 Introduction

In the mid-1990s the Canadian Forest Service (CFS) published a series of ecological classification guides in Alberta (Archibald et al. 1996; Beckingham and Archibald 1996; Beckingham et al. 1996). These field guides were designed to integrate knowledge about grassland, bog, fen, and forestland ecosystems into one hierarchical ecological-classification system. This ecosite-based system of classification provides the basis for users to characterize mature ecosystems, efficiently collect landscape resource data, and communicate ecological information.

The ecological classification guides published by the CFS in the mid-1990s lacked information about the ecological characteristics of young managed forests, which have become common features of west-central Alberta landscapes over the last 45 years. The lack of information prompted Ian Corns (Canadian Forest Service) and David Presslee (Weldwood of Canada (Hinton Division)) to initiate and implement a program of data collection and analysis to address the information gap. The objective of data collection was to gather information that would reveal successional trends on post-harvest areas and to link these to moisture, nutrient and climatic conditions. Accordingly, a comprehensive set of ecological attributes (vegetation, site and soil characteristics) were collected at 485 plots distributed across west-central Alberta in 1998–2000. Subsequent data analyses contributed to the development of the *Field guide to ecosites of west-central Alberta: supplement for managed stands <40 years old, first approximation* (Corns et al., 2004) that characterizes young stand development on a variety of ecosites.

The Managed Stand Ecosite (MSE) Microsoft® Access 2000 database provides a structured way to retrieve the sample plot data, including the data that played an important role in the development of the supplemental field guide. This report describes the data collection methodology, database structure, and data table and field content descriptions of the relational database, in Microsoft® Access 2000 (version 9.0.4402 SR-1) format.

1.2 Reference Material

This database includes information collected over a three year period beginning in 1998 and ending in 2000. During the data collection phase, the methods used for sampling were continuously modified. Two sampling protocols were employed during the course of data collection. The sampling protocol used in 1998 was substantially modified for the 1999 and 2000 field seasons. This section contains a list of reference material for terms and definitions used during and after data collection, and the abridged 1998 *Detailed Ecological Plot Classification Methodology*: Schedule "A" of the GDC data collection contract. Subsequent modification to the 1998 protocol occurs as either a revision of the Schedule "A" in subsequent annual contracts for data collection, or as informal revision notes appended to the Schedule "A" attachments for 1999 and 2000. The following terms and definitions and the abridged sampling methods sections provides a useful context for the data contained in the database, and help to define its characteristics and reliability.

1.2.1 Terms and Definitions

In general, the *Ecological Land Survey Site Description Manual* (Alberta Environmental Protection 1994) was the established framework for the collection of ecological data (pers. comm., Louise Versteeg of GDC, 2001/05/22). Several other references were used for ecological classification, soil classification, plant identification, and species coding:

- The *Field Guide to Ecosites of West-central Alberta* (Beckingham et al. 1996) and the *Field guide to Ecosites of Northern Alberta* (Beckingham and Archibald 1996) were used to help assign ecosite classes to plots.
- Soils data were collected as specified in the *Ecological Land Survey Site Description Manual* (Alberta Environmental Protection 1994) and classified using to the *Canadian System of Soil Classification* (Soil Classification Working Group 1998).
- Several manuals were used for plant identification. The *Flora of Alberta* (Moss 1983) was used for vascular plant identification. Other plant identification references include *Mosses, Lichens & Ferns of Northwest North America* (Vitt et al. 1988), *Trees in Canada* (Farrar 1995), *Plants of the Western Boreal Forest & Aspen Parkland* (Johnson et al. 1995), and *Rare Vascular Plants of Alberta* (Kershaw et al. 2001).
- After data collection, plant species codes were reorganized to correspond with the *Alberta Plants and Fungi—Master Species List and Species Group Checklist* (Alberta Environmental Protection 1993). The Alberta master species list offers a standard reference for the names of Alberta plant species and a system of unique species coding. In general, the names used are compatible with the *Flora of Alberta* (Moss 1983).

1.2.2 Ecological Plot Establishment

In 1998, the protocol for establishing ecological plots stated that they would be pre-located by Canadian Forest Service staff. Each ecological plot was to be 0.05 ha. Ideally the dimensions of the ecological plot were 22.36 m by 22.36 m, but dimensions and orientation could be modified by field crews to ensure the plot contained a single polypedon, a single plant community, and other homogenous environmental factors: slope position, landform, silvicultural treatment, etc. The protocol also stated that plots were placed to avoid roads, seismic lines, and pipelines. The location of plots was determined from plot centre, as the average location of a minimum of 120 GPS point measurements.

In 1999 and 2000, the following amendments were made to the protocol for establishing ecological plots:

1. Survey crews were to use the orientation and location specified by Canadian Forest Service staff, and dimensions were to be recorded in field-data record sheets.
2. Plots established in harvested (cut block) areas were to have a roadside tie point marked with an orange and black striped ribbon. The ribbon was to be labeled with the plot identification number along with the distance and direction to the ecological plot.
3. One corner of each ecological plot was to be labeled with a description of the orientation of the plot. The other three corners were to be marked with blue and orange ribbon.

4. Within the ecological plot:
    - The 5.64m radius (99.93 m^2 or 0.01 ha) inventory plot centre was to be marked with orange flagging, and the perimeter marked with red tree paint.
    - The vegetation plot was to be 10 m by 10 m (100 m^2 or 0.01 ha), and established in an area that represented the vegetation of the ecological plot.
    - The soil pit was to be established in an area that would not interfere with the forest inventory and vegetation plots.

1.2.3 Plot Sampling Protocol

In 1998 the protocol for sampling consisted of seven data sets: (1) administrative, (2) landscape features, (3) ecological classification, (4) soil classification, (5) vegetation description, (6) forest inventory data, (7) site index determination, (8) silvicultural treatments, and (9) representative site photographs.

1.2.3.1 Administrative Data

In 1998, collection of administrative data included the following elements:

1. ***Project identification***
2. ***Plot number***
3. ***Date***
4. ***Location***
5. ***Surveyor***
6. ***Natural Region/Subregion*** (Achuff 1994)

No modifications were made to the administrative data collection protocol documents, but the contents of the electronic database do deviate from the *Detailed Ecological Plot Classification Methodology*: Schedule "A", subsequent revisions to Schedule "A", and informal revision notes. Plot dimensions were not recorded, and the surveyors' initials were recorded on the field data sheets but were not included in the electronic database.

1.2.3.2 Landscape Features

In 1998, collection of landscape features data included the following elements:

1. ***Aspect***
2. ***Slope***
3. ***Elevation***
4. ***Landform:*** As per Terrain Classification Guidelines. No further information was given, nor reference material cited, about how to access this data element.

5. ***Terrain:*** More commonly known as Landform Classification in the Canadian System of Soil Classification (Soil Classification Working Group 1998)
    a. ***Genetic material***
    b. ***Surface expression***
6. ***Site Position***
    a. ***Macro-site position***
    b. ***Meso-site position***
    c. ***Microtopographic shape***

No modifications were made to the landscape features data-collection protocol documents, but the contents of the electronic database do deviate from the *Detailed Ecological Plot Classification Methodology*: Schedule "A", subsequent revisions to Schedule "A", and informal revision notes. Elevation data were not collected from the plots. Elevation data was generated by Canadian Forest Service staff using GIS technology (see Section 2.1.4, p. 94). Landform–Terrain Classification data were not collected. In addition, many of the plot attributes in the electronic database are beyond what was required according to the landscape features sampling protocol documents, e.g., exposure class, flood hazard rating, drainage class, soil perviousness etc. These extra plot attributes are described in detail in the *Ecological Land Survey Site Description Manual* (Alberta Environmental Protection 1994), but are also briefly described herein (see Section 2.1.2, p.22).

1.2.3.3 Ecological Classification

In 1998, collection of ecological classification data consisted of the following:

1. ***Ecological Moisture Regime***
2. ***Soil Nutrient Regime***
3. ***Ecosite/Ecosite Phase/Plant Community Type***

The only modifications to the ecological classification data sampling protocol were in 1999–2000. Ecosite phase and plant community type were removed from the sampling protocol[1], and the following note for field crews was added to clarify a critical concept for the collection of data for the MSE project:

> *Vegetation in this study is a response variable and is not to be used to determine ecosite for sampling purposes in seral stands.*

The above quote is a very important concept for establishing plots for this project because it appears to clarify a potential problem in the 1998 data collection methods; using the vegetation to identify the moisture and nutrient regime of a sample area, and then sampling that area to identify and document the plant community that was regenerating on the ecosite (i.e., a specific

[1] Ecosite phase and plant community type are not legitimate classifications for this database because they are based on dominant canopy species and understory composition of mature plant communities, respectively. Mature plant communities are typically greater than 60 years old (Alberta Environmental Protection 1994). For the MSE project, it is not feasible to extrapolate mature ecosite phase and plant community type classification from young ecosites, during the period of rapid change in plant community structure and composition prior to tree canopy closure.

range of moisture–nutrient regimes) is circular reasoning that may support a preconceived notion of vegetation–environment relationships.

1.2.3.4 Soil Classification

In 1998, collection of the soil classification and soil-profile description data included the following elements (comments after the data items are paraphrased from original documents):

1. ***Humus form and thickness***
2. ***Soil mineralogy (bedrock source)***
3. ***Soil texture & coarse fragment content/type:*** A 100 cm soil pit was dug and each horizon described using the Canadian System of Soil Classification (Soil Classification Working Group 1998). The soil horizon descriptions included soil texture, horizon depth, coarse fragment content and type.
4. ***Soil pH:*** Measured by a soil pH meter
5. ***Soil colour:*** Munsell colour evaluation system (Munsell Colour Company 1954)
6. ***Roots1 & Roots2:*** The most abundant size (roots1), secondary size of importance (roots2)
    a. ***Size***
    b. ***Abundance***
    c. ***Orientation***
    d. ***Effective rooting depth:*** The depth at which the number of roots declines to "few"
    e. ***Root restricting layer***
7. ***Depth to water table/seepage:*** If applicable
8. ***Depth to bedrock:*** If bedrock is ≤ 1m

In 1999–2000, the 1998 sampling protocol for soil pH measurement was refined. The revision stated that two soil pH samples were to be taken at each plot. One sample was to be extracted at the top of the effective rooting zone and the other at the bottom. For example, for an effective rooting depth of 30 cm a soil pH sample was to be extracted from 5–10 cm below the soil surface and a second from 25–30 cm. The pH sampling depth relative to rooting depth was not implemented (see Section 2.2.5, p. 89). Also, the protocol revisions gave instructions to leave soil pits open for auditing.

1.2.3.5 Vegetation Description

Vegetation sampling was conducted within the vegetation plot, which was a 10 m by 10 m (100 m^2 or 0.01 ha) plot established within the ecological plot. The position and orientation of the vegetation plot was selected to best represent the vegetation within the ecological plot. In 1998, the collection of vegetation description data was specified as follows:

1. ***Species list***
2. ***Percent cover:*** Percent plant species cover by plant community strata type, for vertical structure.

3. ***Distribution:*** Spatial distribution of species cover. No further information was given, nor reference material cited, about how to assess the spatial distribution of species cover at the plot level.

In 1999, the vegetation description sampling protocol specified that all known and unknown vascular plants were to be stored in a plant press, and all major non-vascular plants in small paper bags. The plant sample collections were to be cross-referenced with the percent covers on the sample plot data sheets. The collected plant samples were to be identified by Canadian Forest Service staff at a later date. Later in 1999 the sampling protocol was revised again. The new revisions gave instructions to inventory all species and assigned a percent cover, and only collect samples for unidentifiable plant species. The unidentifiable plant species were to be cross-referenced with the percent covers on the sample plot data sheets. The unidentified plant specimens were to be identified by the Canadian Forest Service staff at a later date.

No other modifications were made to the vegetation description data collection protocol documents, but the contents of the electronic database do deviate from the *Detailed Ecological Plot Classification Methodology*: Schedule "A", subsequent revisions to Schedule "A", and informal revision notes. Specifically, the horizontal distribution of species cover is absent from the database.

In addition, there was an unspecified species name coding convention applied during the collection of data. Unfortunately, there was difficulty interpreting some of the species codes used on the sample plot data sheets, since no master list was used for coding and several different plant identification manuals were used. As a result, the *Alberta Plants and Fungi—Master Species List and Species Group Checklist* (Alberta Environmental Protection 1993) was applied after fieldwork was completed (see Section 2.4.1, p. 94); subsequent taxonomic revisions for some species resulted in minor changes to species nomenclature.

1.2.3.6 Forest Inventory Data Collection

Forest inventory data was collected from a 5.64 m radius (99.93 m^2 or 0.01 ha) inventory plot. In 1998, the collection of forest inventory data included the following (comments after the data items are paraphrased from original documents):

1. ***Inventory species component:*** A representative location was selected within the ecological plot to measure stand density, and inventory forest species and measure individual tree attributes, such as top height, diameter at breast height (dbh), tree ages, etc.
2. ***Inventory plot location:*** Once the plot was located, the inventory plot was to be ribboned and tagged as the 5.64 m radius inventory plot with the bearing and distance from the ecological plot centre.
3. ***Species percent cover by layer:*** veteran, dominant, main canopy (co-dominants), understory, and regeneration. This is the Alberta Vegetation Inventory (AVI) species and cover type data.
4. ***Density:*** Both the diameter by species and the height within the inventory plot were measured. One height measurement was used to estimate the tree others heights. To avoid redundancy, the one measured height was determined on the top height tree.
5. ***Stand age:*** Use an increment borer to take both the breast height (bh) and root collar ages for the top height tree with the largest diameter, within the inventory plot. Core samples must contain the pith.

6. ***Stand height/site index:*** On the top height tree with the largest diameter (see point #5: Stand Age) the total tree height and the 3-, 4-, or 5-year growth intercept were recorded, if the tree met the criteria under Section 1.2.3.7 (Site Index Determination). The top height tree was to be tagged and label the as, the "#1" site index tree.
7. ***Crown closure:*** Ocular estimation
8. ***Mortality:*** The numbers of dead trees in the inventory plot were tallied by species, and the cause of mortality was recorded.

The 1998 forest inventory method revision notes set the following criteria and instructions for stand density tallies: tally living trees under <9.1 cm dbh into one of five height classes, and record what the average dbh was for each height class. The 1999 revisions of the 1998 criteria and instructions stated that both live and dead trees were to be tallied into respective categories, each with nine 30-cm height classes, for trees <270 cm tall. The 1999 protocol notes also specified that trees <1.3 m were to be included in the tally.

The 1998 forest inventory revision notes also set the criteria and sampling instructions for individual tree measurements as follows: all dead standing (leaning ≤70° from vertical) or rooted trees, and all live trees, with a dbh >9.0 cm would not be tallied in the stand density tally, but have individual dbh measurements recorded. Only a few of these trees were to have height measurements, and the rest were to be estimated. Trees were considered in the inventory plot if their midpoint at 1.3 m was within, or on, the forest inventory plot radius. Inventory trees with dbh >9.0 cm were to be numbered in clockwise order starting from due north. In 1999, the Schedule "A" and subsequent revision notes for sampling protocol changed the inventory tree selection criteria so that only live trees >270 cm tall were sampled for dbh and height. The change of inventory tree selection criteria appears to be in response to the amended 1999 stand density tally tree selection criteria, i.e., <270 cm tall.

There were no instructions in the 1999 sampling protocol for dealing with trees in the inventory plot with a tree height equal to 270 cm. There are 28 inventoried trees from the 1999 and 2000 fields seasons in the database that have a tree height equal to 270 cm, so for this report the assumption was made that the effective inventory tree selection criteria was live trees ≥270 cm tall for the 1999 and 2000 field seasons, and the effective stand density tally tree criteria was <270 cm tall.

The 1999 Schedule "A" and subsequent revision notes for sampling protocol also added:

- More specific instructions for establishing, marking, and labelling inventory plots in the field (see Section 1.2.2, p. 2), compared to the 1998 plot establishment protocol.
- The following quote for stand height/site index (refer to Section 2.5.1, p. 97, for more details):

  > *Note that there is the possibility of more than one whorl forming per year on pine, especially on better sites. This can be determined by presence of old bud scar collar on young trees but may require assessment of stem age by increment coring on older trees if there is doubt.*

- Collection of Alberta Vegetation Inventory (AVI) data: crown closure, dominant tree height, and tree species composition.

These additions to the 1999 protocol appear to clarify misinterpretations of the 1998 protocol, by providing more specific instruction for field crews collecting plot data.

1.2.3.7 Site Index Determination

Site index determination was separate from the stand height/site index component of the forest inventory data collection section (see Section 1.2.3.6, p. 6). In 1998, the collection of site index determination data consisted of the following (comments after the data items are paraphrased from original documents):

1. ***Sample tree selection:*** Within the ecological plot, three additional inventory trees (i.e. the tallest trees with the largest diameters) were selected. These three additional site index trees, with the stand-height/site index tree from the forest inventory section, resulted in a total of four site index trees for a sample plot.

   The three additional site index trees that were selected should qualify as crop trees. These trees could be the same as the leading species of the forest inventory component but not necessarily. The inventory component leading species was not considered a reasonable site index species when it was silviculturally unacceptable, i.e., not a future crop tree species, had low vigour, was suppressed, or was scheduled for removal by silvicultural treatment such as brushing or weeding:

   a. ***Species:*** Crop species, healthy and likely to survive to rotation age
   b. ***Age:*** 5 to 30 years growth above breast height (bh)
   c. ***Stem condition:*** Undamaged stem, vigorous annual stem growth above bh
   d. ***Crown position:*** Dominant or co-dominant. Not overtopped by brush or trees, i.e., not suppressed, residual or veteran species
   e. ***Ring width:*** Vigorous, uniform widths from pith to bark taken at bh

2. ***Sample Tree Measurement:***

   a. ***3-, 4-, or 5-year growth increment:*** From the first node above bh, surveyors were to count up 3, 4 or preferably 5 whorls, and then measure and record the growth increment and number of whorls.
   b. ***Total height:*** Height measured from the ground surface to tip of the last years growth.
   c. ***Age:*** Tree age measured at bh. Instructions to field crew also required a check to confirm the measured age by counting the number of whorls above bh, plus 1. Increment core samples were not acceptable unless the increment core contained the centre of the pith.
   d. ***Diameter:*** Diameter measured at bh (dbh), using a diameter tape.
   e. ***Field cards:*** Should were to show the tree species; 3-, 4-, or 5-year incremental height; and total height, dbh and bh age.
   f. ***Tag and label trees:*** The three selected sample trees were to be tagged and labeled to reflect tree number, i.e. #2, #3 & #4 and plot number.

In the revision to the 1999 sampling protocol tree numbers 97, 98, and 99 were designated for the three sample site-index trees outside of the inventory plot area, but inside of the ecological plot.

1.2.3.8 Silvicultural Treatment

The 1998 sampling protocol simply gave instructions to record any evidence of the type of site preparation or stand tending activities which may have occurred, and provide an estimate of stand density removed, if applicable.

1.2.3.9 Representative Site Photos

In the 1998 sampling protocol, the collection of representative site photo specified three plot perspectives:

1. Forest inventory: Stand photographs
2. Vegetation: Site photographs
3. Soils: Soil profile photographs

1.3 Distribution of Sample Units

The sample plots were not evenly distributed among cells (Table 1). There was a complete range of age classes for only six of the 37 ecosites sampled for the MSE project, and only two of them have more than one sample plot (see Section 2.1.2 for details regarding database age class and ecosite data). Included in the distribution of sample plots are some ecosites not typically considered managed forest ecosites, such as bogs, fens, and meadows. These ecosites not typically considered as managed forest ecosites do occur on cut blocks, but they usually represent only a small portion of the overall cut block.

Table 1. Sample plot frequency among natural subregions, ecosites and age classes.

Ecosite	Age Classes					
	5	10	20	30	40	Total
Boreal Mixedwood						
d	12					12
e	3					3
f	3					3
g	1					1
h	1					1
Lower Foothills						
b	4		2			6
c	6	2	5	1	1	15
d	4	8	2	1	2	17
e	8	15	8	5	1	37
f	4	16	6	4		30
h	7	6	4		1	18

Table 1. Sample plot frequency among natural subregions, ecosites and age classes.

Ecosite	Age Classes					
	5	10	20	30	40	Total
i	3	10	1			14
j	6	8	2			16
k			1			1
l	3	2	5			10
m	5	4	1			10
Upper Foothills						
b	2					2
c	7	2	5			14
d	9	3	5	3	1	21
e	20	10	10	6	3	49
f	10	8	6	9		33
h	4	7	3	1		15
i	17	4	2	2		25
j	3	2	2			7
k	1	1	2			4
l	5	6	6	2		19
m	1					1
Montane						
c			2	8	6	16
e					1	1
f			1		2	3
Subalpine						
b	1					1
c	8	2	4	1		15
d	10	14	9	4	3	40
e				2		2
f	5		3	1		9
g	5	1	3			9
i	2		3			5
Total						
	180	131	103	50	21	485

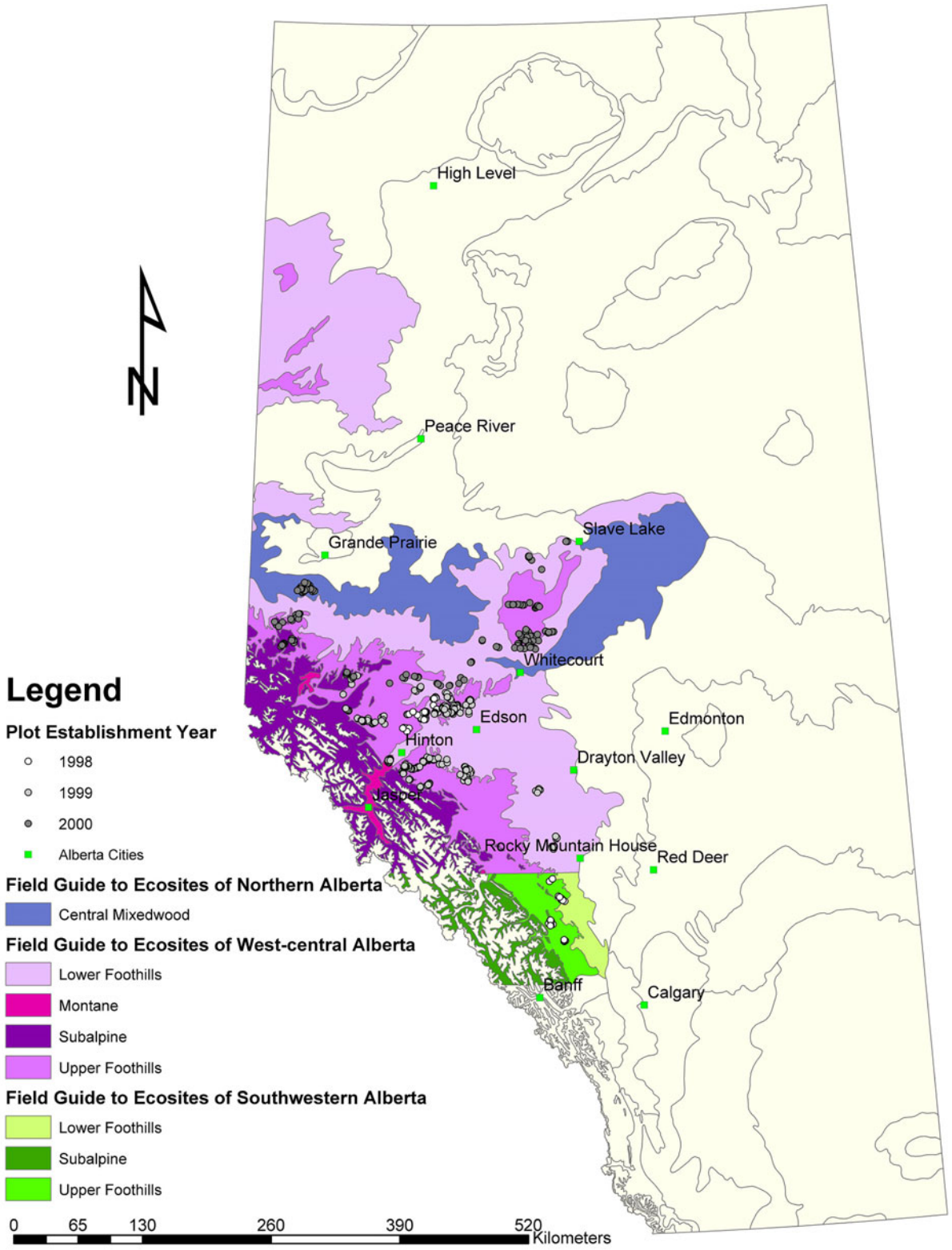

Figure 1. Map of the natural subregions and annual plot distribution of the Managed Stand Ecosite (MSE) project.

1.4 Relational Structure of the Database

This section describes the structure of the MSE relational database. Information is stored in two types of tables in the MSE database: data tables and lookup tables. Both data and lookup tables begin with the prefix "tbl" to distinguish them from other Microsoft® Access 2000 objects, such as database queries. The following table name convention was adopted to distinguish between data and lookup tables:

- Data table names are uppercase, after the lowercase prefix "tbl"

  For example, **tblVEG**

- Lookup table names are mixed lettercase (upper- and lowercases), after the lowercase prefix "tbl"

  For example, **tblVegSppCodeList**

Use of this naming convention simplifies data query programming in SQL and Visual Basic.

1.4.1 Data Tables

The data tables contain the sample plot data collected, as discussed in Section 1.2 – plus some additional data tables described only in Section 2.0: tblPSPs, tblFIELDGUIDEPLOTS, tblC&N, tblSI, and tblTREEDENSITY. There are 18 data tables in the database. The 18 data tables are grouped into five categories for organizational purposes (see Figure 2).

The data tables of these five categories are associated with each other through predefined and enforced relationships that will facilitate querying data for a variety of purposes, such as ecological classification (Figure 3). The master table is tblSITE, but for one exception: tblPLOTID. The tblPLOTID data is the source of plot identification for tblSITE. In turn, tblSITE is the master table of all other data tables, and is their source of plot identification labels. Other relationships exist between the data tables beyond those that are already defined, but they were generally not as useful for developing ecological classification queries.

1.4.2 Lookup Tables

In this database there are 54 lookup tables for qualitative data types. The lookup tables contain the codes for qualitative data, full names for each code, and in some cases short descriptions of each code. In general, the lookup tables were used (i) to limit the domain of field values, and (ii) to convert data codes into more descriptive labels for query and report making in Microsoft® Access 2000.

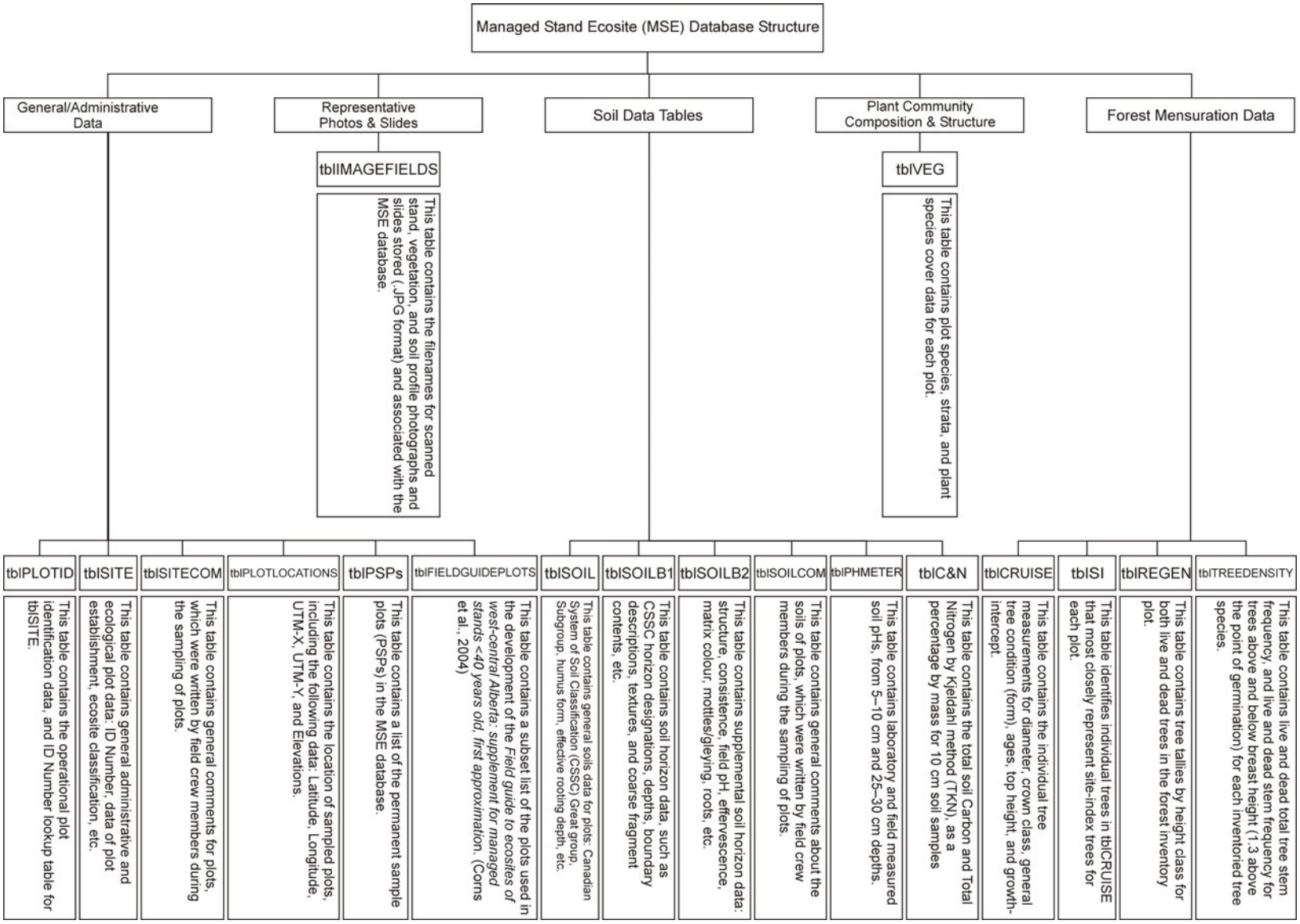

Figure 2. Functional hierarchy of the data tables in the database.

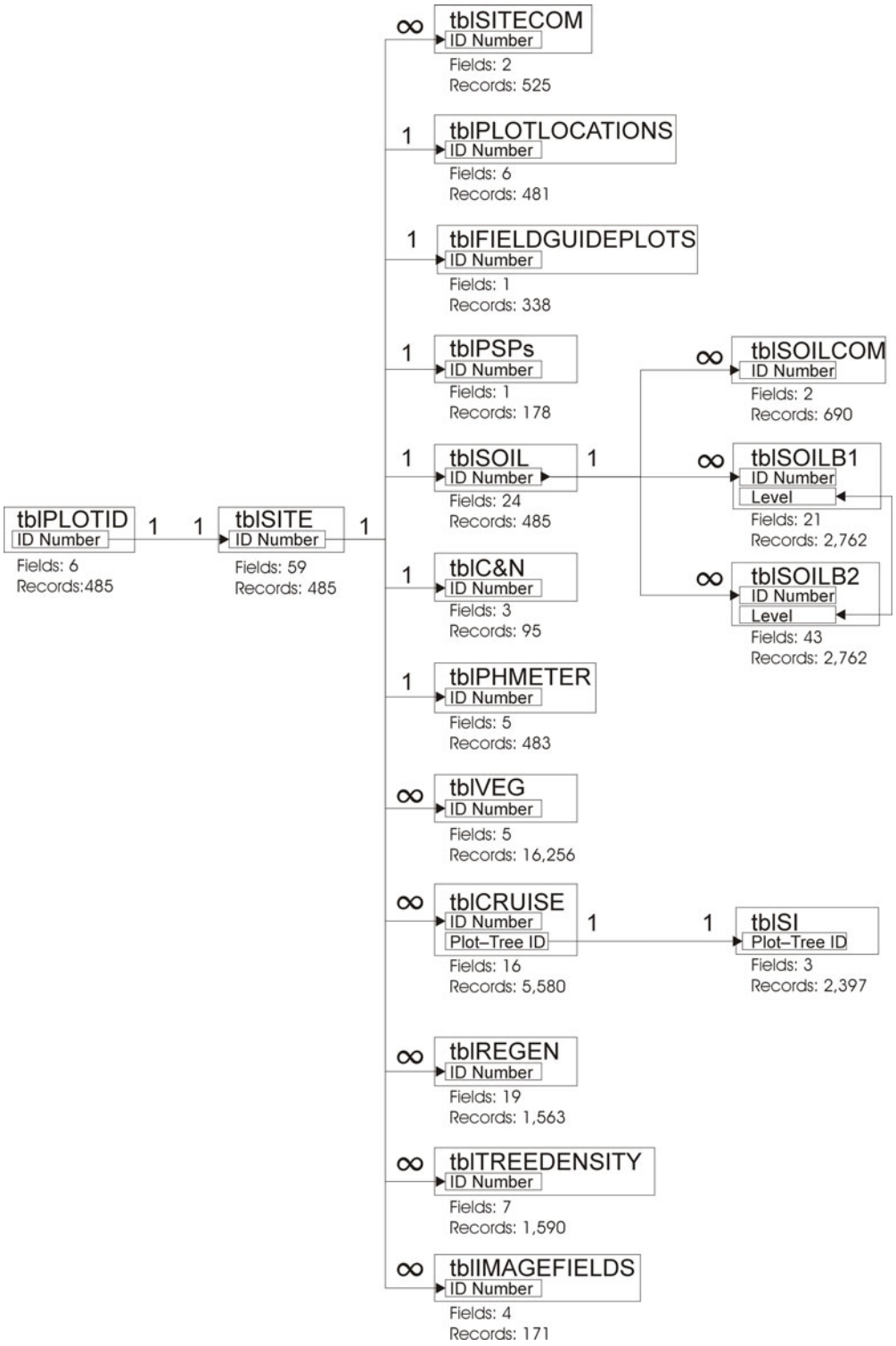

Figure 3. Key fields for joining tables and the types of predefined relationships among data tables: one-to-one (1 – 1) or one-to-many (1 – ∞).

The data table tblPLOTID is the source of plot identification values, i.e. ID Number, for tblSITE. In turn, tblSITE is the master table of all of the plot identification values in all other data tables, except tblSI. The size of the data table in terms of fields and records is also provided.

2.0 Data Tables

This section contains general information about the data tables, which is accompanied by more detailed tabular descriptions of each field. Data field descriptions include an indication of whether or not the cell values are required. Null values in cells should not exist when data values are required for a field. Each data field description also indicates if values are limited by the values in a lookup table, i.e., limited to a specific domain.

2.1 General/Administrative Data Tables

2.1.1 tblPLOTID

The tblPLOTID data table contains the plot identification information for all of the sample plots in this project (Table 6). There are 485 unique records in this table, one for each sample plot. In addition to being a data table, tblPLOTID is also a lookup table for ID Number in tblSITE (Figure 3).

ID Number is developed from the concatenation of the working circle, compartment, block, plot number, and company name fields in tblPLOTID. The following explains the derivation of ID Number by company, for each plot:

- For the Weldwood and Blue Ridge Lumber company plots, Working Circle-Compartment-Block-Plot-Company (Table 2) were concatenated to form a unique ID Number:

  e.g., 5-10-18-1-WLD

  identifies the first plot located in the Berland working circle (Table 3), compartment 10, block 18 of the Weldwood FMA; and

  e.g., JC-110-10-1-BRL

  identifies the second plot located in the Judy Creek working circle (Table 4), compartment 110, block 10 of the Blue Ridge Lumber FMA.

Table 2. Company codes and names used in the unique identifier for plots: ID Number.

Code	Company Name
ALC	Ainsworth Lumber Co. (Grande Prairie)
ANC	Alberta Newsprint Company (Whitecourt)
BRL	Blue Ridge Lumber (West Fraser Timber)
MWI	Millar Western Industries (Whitecourt)
SFP	Sunpine Forest Products (Sundre/Rocky Mtn House)
SLP	Slave Lake Pulp (West Fraser Timber)

Table 2. Company codes and names used in the unique identifier for plots: ID Number.

Code	Company Name
WDV	Weyerhaeuser Drayton Valley
WED	Weyerhaeuser Edson
WGC	Weyerhaeuser Grande Cache
WGP	Weyerhaeuser Grande Prairie
WLD	Weldwood (Hinton)

Table 3. Weldwood working circle codes.

Code	Working Circle
1	Athabasca
2	Marlboro
3	Embarras
4	McLeod
5	Berland

Table 4. Blue Ridge Lumber working circles.

Code	Working Circle
VH	Virginia Hills
SH	Swan Hills
JC	Judy Creek

- For Ainsworth Lumber and Weyerhaeuser companies which do not use the same operational location system as Weldwood and Blue Ridge Lumber, Township-Range-Compartment-Plot-Company were concatenated to form unique ID Numbers:

  e.g., 67-7-3358-1-ALC

  identifies the first plot established in township 67, range 7, compartment 3358 of the Ainsworth Lumber Company FMA; and

  e.g., 41-10-1215-1-WDV

  identifies the first plot established in township 4, range 10, compartment 1215, of the Weyerhaeuser Drayton Valley FMA.

- Sunpine Forest Products do not use working circles, nor do they refer to townships and ranges, but they do refer to compartments. The ID Number code of the Sunpine plots is formed by concatenating the number one as a filler value in the Working circle-Compartment-Block-Plot-Company:

  e.g., 1-PC-3285-1-SFP

  identifies the first plot established in the Prairie Creek compartment (Table 5), block 3285 of the Sunpine Forest Products FMA.

Table 5. Sunpine Forest Products compartment names.

Code	Compartment
BH	Blue Hills
PC	Prairie Creek
TR	Tay River
WC	Wilson Creek

Table 6. Data dictionary table for tblPLOTID.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	The indexed, unique plot identification value. No duplicate values are allowed in this field.	Y	N		Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot: fields 2 to 6 of tblPLOTID.
2	Working Circle	This is the company's working area: working circle for Weldwood and Blue Ridge Lumber, township for Ainsworth and Weyerhaeuser, and disposition identity for ANC and Millar Western Forest Products.	Y	N		Various number values (Townships numbers, which include 41, 42, 47, 57, 58, 59, 62, 64, 65, 67, 68, 70, 71, and 73)	Township numbers (Ainsworth and Weyerhaeuser)
						1	Athabasca (Weldwood) or a placeholder character for Sunpine Forest Products, as Sunpine does not employ Working Circles.
						2	Marlboro (Weldwood)
						3	Embarras (Weldwood)
						4	McLeod (Weldwood)
						5	Berland (Weldwood)
						E6	Alberta Newsprint Company
						E7	Alberta Newsprint Company

Table 6. Data dictionary table for tblPLOTID.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						JC	Judy Creek (Blue Ridge Lumber)
						SH	Swan Hills (Blue Ridge Lumber)
						VH	Virginia Hills (Blue Ridge Lumber)
						W1	Disposition identity (Alberta Newsprint Company and Millar Western Forest Products)
						W4	
						W8	
3	Comp	Compartment/smaller working unit or Range number.	Y	N		Various number values (e.g., 1, 330, etc.)	
						BH	Blue Hills (Sunpine Forest Products)
						PC	Prairie Creek (Sunpine Forest Products)
						TR	Tay River (Sunpine Forest Products)
						WC	Wilson Creek (Sunpine Forest Products)
4	Block	Company cut block number.	Y	N		Various values (e.g., 1, 102X, 3481, 35A, etc.)	

Table 6. Data dictionary table for tblPLOTID.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
5	Plot Number	Unique plot identifier, since more than one plot may occur in a cut block.	Y	N		Various values (e.g., 1, 4, etc.)	
6	Company	Company code names	Y	Y	tblCompanyList	ALC	Ainsworth Lumber Co. (Grande Prairie)
						ANC	Alberta Newsprint Company (Whitecourt)
						BRL	Blue Ridge Lumber (West Fraser Timber)
						MWI	Millar Western Industries (Whitecourt)
						SFP	Sunpine Forest Products (Sundre/Rocky Mtn House)
						SLP	Slave Lake Pulp (West Fraser Timber)
						WDV	Weyerhaeuser Drayton Valley
						WED	Weyerhaeuser Edson
						WGC	Weyerhaeuser Grande Cache
						WGP	Weyerhaeuser Grande Prairie
						WLD	Weldwood (Hinton)

2.1.2 tblSITE

The tblSITE is the master data table for this database, and it contains the administrative and general plot information for all 485 plots. The tblSITE table links the other data tables to the ecological classifications and ages (Figure 3), and it contains the master table ID Number for all other data tables except tblPLOTID. ID Number is the primary key field for most of the relationships formed with tblSITE (Figure 3).

There are a total of 59 data fields in tblSITE (Table 7). These 59 fields are categorized as (i) administrative (1-11), and (ii) general plot features (12-59). The administrative data describe the date of plot establishment, age class, applicable references, and ecological classification. The general plot features section of tblSITE describes the general ecological attributes of a plot.

Fields 26–31 describe the surface substrate cover of the plot: decaying wood, bedrock, cobbles & stones, mineral soil, organic matter, and water. These six fields should sum to 100% of the plot area, but this is not always the case. For example, plot 5-18-19-1-WLD substrate cover is the highest among all sample plots; its substrate cover sums to 127%. Plot 5-1-26-1-WLD has the lowest substrate cover among all sample plots; its total substrate cover is 80%. Only 333 of the total 485 plots in this database that have total percentage substrate cover between 99 and 101%.

Fields 32–35 indicate the application of silvicultural practices, and type of silvicultural treatments applied. Fields 36–59 describe the general tree canopy using Alberta Vegetation Inventory variables. These fields can be used to construct AVI vegetation labels for plots (Figure 4).

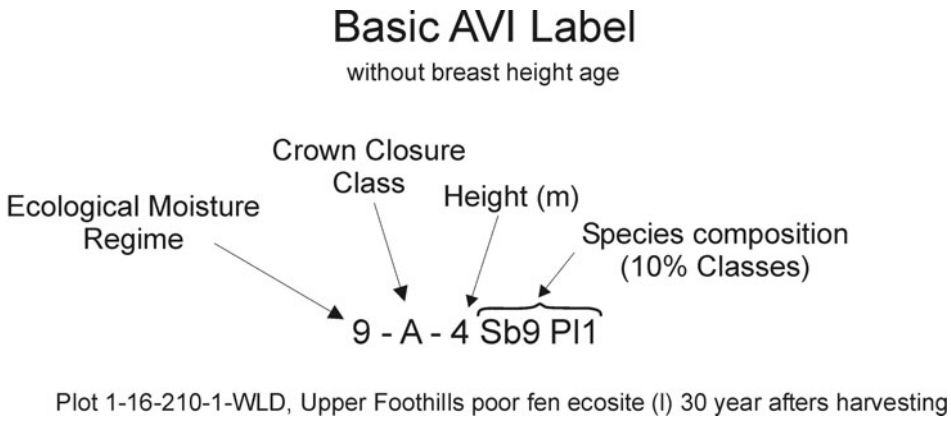

Figure 4. AVI vegetation label.

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Indexed, and unique, plot identifier for each of the 485 records in this table.	Y	Y	tblPLOTID	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	GPS Filename	Contains the filename of the GPS data for each plot. Cell values are mandatory.	Y	N		Various values (e.g., H062518A, C062614A, etc.)	
3	Year	Year of plot establishment	Y	Y	tblYearList	98	1998 field season
						99	1999 field season
						00	2000 field season
4	Month	Month of plot establishment	Y	N		06	June
						07	July
						08	August
						09	September
						10	October
5	Day	Day of plot establishment.	Y	N		Various values (e.g., 01, 31)	The day of the month
6	Age Class	Age category of cut block referenced to the year of harvesting at the time of	Y	Y	tblAgeClassList	5	
						10	

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		sampling.				20	
						30	
						40	
7	Field Guide	Field guide to ecosites (one of three Alberta guides) used for determination of subregion and ecosites.	N	Y	tblFieldGuideList	NO	Field guide to Ecosites of Northern Alberta
						WC	Field guide to Ecosites of West-central Alberta
8	Natural Subregion	Natural subregion/ecological area/ecoregion as defined in the Field Guides.	Y	Y	tblNatRegionList	BM	Boreal Mixedwood
						LF	Lower Foothills
						MN	Montane
						SA	Subalpine
						UF	Upper Foothills
9	Ecosite	Operational ecosite classification of the plot determined solely by moisture and nutrient regime, on the edatopic grid for a Natural Subregion.	Y	Y	tblEcositeList	b	
						c	
						d	
						e	
						f	
						g	
						h	
						i	
						j	

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						k	
						l	
						m	
10	Ecosite Phase	Ecosite phase number. A subdivision of ecosite and based on the mature ecosite guide. It is only pertinent for plots near successional maturity. There are 31 unpopulated records in this field.	N	N		[Blank]	Undefined
						1	
						2	
						3	
						4	
						5	
11	Plant comm Type	Plant community number. This is a subdivision of ecosite phase, and similarly it can only apply to plots near to mature plant community composition and structure. There are 88 unpopulated cells in this field.	N	N		[Blank]	Undefined
						1	
						2	
						3	
						4	
						5	
						6	

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
12	Aspect	Azimuth of plot slope. There are 86 cells that are unpopulated.	N	N		Various values (e.g., 001, 360, etc.)	In general, the cells in the field are unpopulated when the percentage slope is zero. There is one exception, plot 1-Tr-3395-1-SFP, has a zero percent slope, and an aspect of 210°. There is no explanation given for this anomaly.
13	Slope	Percentage slope gradient of the plot.	Y	N		Various values (e.g., 0, 61, etc.)	
14	Exposure	Exposure (plot area) category explains the causes for the deviation from the normal climate of the natural subregion. The lookup table briefly describes of each of the categories (Alberta Environmental Protection 1994).	Y	Y	tblExposureTypeList	1	Not applicable
						2	Wind
						4	Frost
						5	Cold air drainage
15	Flood Hazard	Flood hazard category. Susceptibility of the plot to flooding by watercourses, not ground	Y	Y	tblFloodHazardList	1	No hazard
						2	Rare
						3	May be expected

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		water table fluctuations. It is rated by assessing litter cover, over bank deposits and debris transported by fluvial action, etc. The criteria defining each category are described in *Ecological Land Survey Site Description Manual* (Alberta Environmental Protection 1994).				4	Frequent
16	Drainage	Soil drainage class. This field describes the actual moisture content of the soil relative to field capacity and the period of soil drainage in seven classes. A detailed description of the drainage data can be found in the *Ecological Land Survey Site Classification Manual* (Alberta Environmental Protection 1994), or the *Field Guide to Ecosites of West-central Alberta* (Beckingham et al. 1996).	Y	Y	tblDrainageList	1	Very Rapidly
						2	Rapidly
						3	Well
						4	Moderately Well
						5	Imperfectly
						6	Poorly
						7	Very Poorly
17	Perviousness	Soil perviousness (to water) category, which describes the potential of	Y	Y	tblPerviousnessList	1	Rapidly
						2	Moderately

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		the soil to vertically transmit water.				3	Slowly
18	Site - macro	Macro topography site position (local landscape). This field describes the plot position on the landscape at a vertical scale of >300 m. There are 191 unpopulated cells.	N	Y	tblSiteMacroList.	[Blank]	Undefined
						1	Apex
						3	Upper slope
						4	Middle slope
						5	Lower slope
						6	Valley floor
						7	Plain
						8	Plateau
19	Site - meso	Meso topography site position (plot vicinity). This field describes the Plot position on the local landscape at a vertical scale of <300 m.	Y	Y	tblSiteMesoList	1	Crest
						2	Upper slope
						3	Middle slope
						4	Lower slope
						5	Toe
						6	Depression
						7	Level
						8	Undefined. There are two plots with meso-slope class 8, which does not correspond with the standard meso-slope classification values.

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
20	Site shape	Site surface shape (plot vicinity). This field describes shape of the plot's surface within the local landscape. There is one unpopulated record in this field.	N	Y	tblSiteShapeList	[Blank]	Undefined
						1	Straight
						2	Concave
						3	Convex
21	Moisture regime	Edatopic grid moisture regime or the ecological moisture regime of the plot.	Y	Y	tblMoistureList	2	Xeric
						3	Subxeric
						4	Submesic
						5	Mesic
						6	Subhygric
						7	Hygric
						8	Subhydric
						9	Hydric
22	Nutrient regime	Edatopic grid nutrient regime or ecological nutrient regime of the plot.	Y	Y	tblNutrientList	2	Poor
						3	Medium
						4	Rich

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
23	Factor1	Primary historical factor affecting stand establishment and plant community appearance. In all case the primary factor was Cutting and Disturbance; more specifically clear-cut logging.	Y	Y	tblEstablishmentList	2	Cutting and soil disturbance
24	Factor2	Secondary historical factors affecting stand establishment. There are 236 unpopulated cells in this field. Examples of the plant community establishment factors are given in the lookup table.	N	Y	tblEstablishmentList	[Blank]	Undefined
						1	Atmospheric
						4	Fire
						6	Terrain related
						7	Vegetation and site improvement related effects
						8	Water related
25	Succ Status1	Successional status of stand (plot area), which described State of change in plant community composition and structure.	Y	Y	tblSuccessionList	1	Pioneer seral
						2	Young seral
						3	Mature seral
						5	Young edaphic climax
						6	Mature edaphic climax
						7	Young climatic climax

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
26	Decaying wood	Percent cover of decaying wood: large branches, partially buried stumps, and not recently fallen trees. It includes decaying wood >10 cm thick covered by an organic layer.	Y	N		Various values between 0 to 65% (e.g., 0, 65, etc.)	
27	Bedrock	Percent cover of exposed bedrock: bedrock exposed at the surface, or covered by organic (O, L, F, or H) horizons with a total thickness of <2 cm.	Y	N		Various values between 0 to 17% (e.g., 0, 17, etc.)	
28	Cobbles & stones	Percent cover of (exposed) cobbles and stones: cobbles and stones (coarse fragments >7.5 cm in diameter) exposed at the surface, or covered by organic (O, L, F, or H) horizons with a total thickness of <2 cm.	Y	N		Various values between 0 to 15% (e.g., 0, 15, etc.)	
29	Mineral soil	Percent cover of bare mineral soil: exposed, or bare, mineral soil at the surface.	Y	N		Various values between 0 to 96% (e.g., 0, 96, etc.)	

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
30	Organic matter	Percent cover of organic matter: organic (O, L, F, or H) horizons surface overlying mineral soil or the percentage of organic (O, L, F, or H) horizons with a total thickness of >2 cm thick overlying cobbles and stones and bedrock, or decaying wood <10 cm thick.	Y	N		Various values between 0 to 100% (e.g., 0, 100, etc.)	
31	Water	Percent cover of surface water: open areas of water such as streams or puddles due to high water tables.	Y	N		Various values between 0 to 27% (e.g., 0, 27, etc.)	
32	StdTend Y/N	Indicates whether or not a site received silvicultural treatments. There are 118 unpopulated cell values in this field.	N	N		[Blank]	Undefined
						N	No silvicultural treatment applied to plot
						Y	Silvicultural treatments applied to plot
33	Tending Code	Type of silviculture treatment applied to site. Type of stand tending operation, if any, used on a plot. There are 118 plots without cell values.	N	Y	tblTendingList	[Blank]	Undefined
						GIRD	Girdling
						HERB	Herbicide
						NOTR	No treatment
						THIN	Thinning

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
34	SitePrep Y/N	Indicates whether or not a site received site preparation. There are 119 unpopulated values in this field.	N	N		[Blank]	Undefined
						N	No site preparation applied to plot
						Y	Site preparation applied to plot
35	SitePrep Code	Type of site preparation, if any, used on a plot. There are 119 plots (records) without site preparation codes.	N	Y	tblSitePrepList	[Blank]	Undefined
						BRMD	Bracke mound
						BRSC	Bracke scalp
						DONM	Donaren mound
						DRSF	Chain drag & shark fin
						DTPO	Power disk trench
						EXMD	Excavtor mound
						MCBD	Method cannot be determined
						NSP	No site preparation
						RPCS	Ripper plow
36	AVI Over Dens	AVI overstory density, describes crown closure class as a character label. The character labels are categories of the percentage of ground area	Y	Y	tblAVIDensityList	A	6 to 30%
						B	31 to 50%
						C	51 to 75%
						D	76 to 100%

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		covered by the vertical projection of the tree canopy onto the ground surface.				N	0 to 6%
37	Ht	Average rounded height of the dominant and/or codominant overstory trees in metres. There are 219 plots (records) in this field with height measurements, and they are not perfectly correlated with crown closure code "N" (0–6%); thus, not all canopies (>6% tree species cover) have height measurements.	N	N		Various values (e.g., [Blank], 0, 15, etc.)	
38	Sp1	First overstory species: Tree species that contributes the greatest amount to the overall overstory canopy closure. There are 217 plots with unpopulated cell values in this field.	N	Y	tblTreeSppList	[Blank]	Undefined
						AW	Trembling aspen
						BW	White birch
						FA	Subalpine fir
						FB	Balsam fir
						LT	Tamarack
						PB	Balsam poplar
						PL	Lodgepole pine

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						SB	Black spruce
						SE	Engelmann spruce
						SW	White spruce
						SX	Hybrid spruce
39	Sp1Cv	First overstory species percent cover. This field describes the crown closure, expressed as a decile, that Sp1 contributes to the overall overstory canopy closure. There are 190 plots with unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 10)	
40	Sp2	Second overstory species: Tree species that contributes the second greatest amount to the overall overstory canopy closure. There are 351 plots with unpopulated cell values in this field.	N	Y	tblTreeSppList	[Blank]	Undefined
						AW	Trembling aspen
						BW	White birch
						FA	Subalpine fir
						FB	Balsam fir
						PB	Balsam poplar
						PL	Lodgepole pine
						SB	Black spruce
						SE	Engelmann spruce
						SW	White spruce

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						SX	Hybrid spruce
41	Sp2Cv	Second overstory species percent cover. This field describes the crown closure, expressed as a decile, that Sp2 contributes to the overall overstory canopy closure. There are 255 plots with unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 5, etc.)	
42	Sp3	Third overstory species: Tree species that contributes the third greatest amount to the overall overstory canopy closure. There are 457 plots with unpopulated cell values in this field.	N	Y	tblTreeSppList	[Blank]	Undefined
						AW	Trembling aspen
						BW	White birch
						FA	Subalpine fir
						FB	Balsam fir
						PB	Balsam polar
						PL	Lodgepole pine
						SB	Black spruce
						SW	White spruce

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
43	Sp3Cv	Third overstory species percent cover. This field describes the crown closure, expressed as a decile, that Sp3 contributes to the overall overstory canopy closure. There are 321 plots with unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 3, etc.)	
44	Sp4	Fourth overstory species: Tree species that contributes the fourth greatest amount to the overall overstory canopy closure. There are 480 plots with unpopulated cell values in this field.	N	Y	tblTreeSppList	[Blank]	Undefined
						PB	Balsam poplar
						SB	Black spruce
						SW	White spruce
45	Sp4Cv	Fourth overstory species percent cover. This field describes the crown closure, expressed as a decile, that Sp4 contributes to the overall overstory canopy closure. There are 336 plots with unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, or 1)	

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
46	Sp5	Fifth overstory species: Tree species that contributes the fifth greatest amount to the overall overstory canopy closure. There are 485 plots with unpopulated cell values in this field.	N	Y	tblTreeSppList	[Blank]	Undefined
47	Sp5Cv	Fifth overstory species percent cover. This field describes the crown closure, expressed as a decile, that Sp5 contributes to the overall overstory canopy closure. There are 337 plots with unpopulated cells in this field.	N	N		[Blank] or 0	
48	AVI Under Dens	AVI understory density, describes crown closure class as a character label. The character labels are categories of the percentage of ground area covered by the vertical projection of the tree canopy onto the ground surface.	N	Y	tblAVIDensityList	[Blank]	Undefined
						A	6 to 30%
						B	31 to 50%
						C	51 to 75%
						D	76 to 100%

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
49	UndHt	Average rounded height of the dominant and/or codominant understory trees in metres. There are 441 plots (records) in this field with height measurements, and they are not perfectly correlated with crown closure code "N" (0–6%); thus, not all canopies (>6% tree species cover) have height measurements.	N	N		Various values (e.g., [Blank], 0, 9, etc.)	
50	UndSp1	First understory species: Tree species that contributes the greatest amount to the overall understory canopy closure. There are 439 plots with unpopulated cell values in this field.	N	Y	tblTreeSppList	[Blank]	Undefined
						AW	Trembling aspen
						BW	White birch
						FB	Balsam fir
						PB	Balsam poplar
						PL	Lodgepole pine
						SB	Black spruce
						SE	Engelmann spruce
						SW	White spruce
						SX	Hybrid spruce

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
51	UndSp1Cv	First understory species percent cover. This field describes the crown closure, expressed as a decile, that UndSp1 contributes to the overall understory canopy closure. There are 303 plots with unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 10, etc.)	
52	UndSp2	Second understory species: Tree species that contributes the second greatest amount to the overall understory canopy closure. There are 451 plots with unpopulated cell values in this field.	N	Y	tblTreeSppList	[Blank]	Undefined
						AW	Trembling aspen
						FA	Subalpine fir
						FB	Balsam fir
						LT	Tamarack
						PB	Balsam poplar
						PL	Lodgepole pine
						SB	Black spruce
						SW	White spruce

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
53	UndSp2Cv	Second understory species percent cover. This field describes the crown closure, expressed as a decile, that UndSp2 contributes to the overall understory canopy closure. There are 312 plots with unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 5, etc.)	
54	UndSp3	Third understory species: Tree species that contributes the third greatest amount to the overall understory canopy closure. There are 476 plots with unpopulated cell values in this field.	N	Y	tblTreeSppList	[Blank]	Undefined
						FA	Subalpine fir
						FB	Balsam fir
						PL	Lodgepole pine
						SW	White spruce
55	UndSp3Cv	Third understory species percent cover. This field describes the crown closure, expressed as a decile, that UndSp3 contributes to the overall understory canopy closure. There are 330 plots with unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 3, etc.)	
56	UndSp4	Fourth understory species: Tree species that contributes the fourth	N	Y	tblTreeSppList	[Blank]	Undefined
						AW	Trembling aspen

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		greatest amount to the overall understory canopy closure. There are 483 plots with unpopulated cell values in this field.				SB	Black spruce
57	UndSp4Cv	Fourth understory species percent cover. This field describes the crown closure, expressed as a decile, that UndSp4 contributes to the overall understory canopy closure. There are 336 plots with unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 2, etc.)	
58	UndSp5	Fifth understory species: Tree species that contributes the fifth greatest amount to the overall understory canopy closure. There are 485 plots with unpopulated cell values in this field.	N	Y	tblTreeSppList	[Blank]	Undefined

Table 7. Data dictionary table for tblSITE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
59	UndSp5Cv	Fifth understory species percent cover. This field describes the crown closure, expressed as a decile, that UndSp5 contributes to the overall understory canopy closure. There are 337 plots with unpopulated cells in this field.	N	N		[Blank] or 0	

2.1.3 tblSITECOM

The tblSITECOM data table contains comments by field crews (Table 8). This table has a predefined and enforced one-to-many relationship with tblSITE (Figure 3). There are 525 records in this table. Twenty-six plots have no comments. It is worth noting that some plot comments allude to unique site conditions not otherwise recorded in other data fields, and indicate ecological plot conditions contrary to the Sampling Protocol (see Sections 1.2.2 and 1.2.3). For example, plot 1-WC-1772-1SFP is adjacent to a logging road, plot 1-PC-379-2-SFP is bisected by a skid trail, the northwest corner of plot 4-1-45W-1-WLD is bisected by an old cut block road, and plot 2-8-440-1-WLD has an old cut block road crossing it on southern edge.

Table 8. Data dictionary table for tblSITECOM.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 525 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Comments	General site comments	Y	N		Various entries from field datasheets regarding the plot in general.	The field is a memo data type.

2.1.4 tblPLOTLOCATIONS

The tblPLOTLOCATIONS data table (Table 9) contains the location of plots, acquired using the average of a minimum of 120 points from a geographic positioning system (GPS). The point sampling was done at the centre of each 0.05 ha ecological plot.

The tblPLOTLOCATIONS data table has a predefined and enforced relationship one-to-one relationship with tblSITE (Figure 3). There are 481 records and six fields in this table. For undetermined reasons, four of the 485 sampled plots do not have geographic location and elevation data. Eleven of the 485 sampled plots do have the geographic location, but no associated elevation data. These 11 plots were outside of the range of the digital elevation model (DEM) from which the plot elevations were extracted.

Note: The four plots that do not have geographic locations are 1-BH-2615-1-SFP, 4-21-48-1-WLD, E6-1-1028-1-ANC, and VH-210-45-1-BRL.

Table 9. Data dictionary table for tblPLOTLOCATIONS.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Indexed, and unique, plot identifier for each of the 481 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot
2	DDLONG	Decimal degrees longitude	Y	N		Various values (e.g., -119.582, -119.556, etc.)	
3	DDLAT	Decimal degrees latitude	Y	N		Various value (e.g., 51.6742, 51.6797, etc.)	
4	UTM_X	UTM NAD83 Zone11 easting	Y	N		Various values (e.g., 333038, 334636, etc.)	
5	UTM_Y	UTM NAD83 Zone11 northing	Y	N		Various values (e.g., 5726350, 5727000, etc.)	

Table 9. Data dictionary table for tblPLOTLOCATIONS.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
6	Elev	Elevation, in meters, derived from a DEM (by Brad Case, CFS) using TOPOGRID and NTS contour data—50 m resolution	N	N		Various values (e.g., [Blank], 698.971, 1617.51, etc.)	There are 15 plots without elevation data: 4 plots without locations plus 11 plots with locations, but beyond the border of the DEM dataset.

2.1.5 tblPSPs

The tblPSPs data table is a list of 178 plots (ID Numbers) that were marked as Permanent Sample Plots (PSPs; Table 10). This table has a predefined and enforced one-to-one relationship with tblSITE (Figure 3). When using the predefined relationship, the inner join between tblSITE and tblPSPs queries plot data for PSPs only. The PSPs are all located within the Weldwood FMA, and were selected from among submesic to hygric ecosites (Table 11).

Table 10. Data dictionary table for tblPSPs.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 178 permanent sample plots in the Weldwood FMU.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.

Table 11. Number of plots selected as permanent sample plots in the Weldwood FMA.

	Age Class					
Ecosite	5	10	20	30	40	Total
Lower Foothills						
d	4	6	2	1	2	15
e[1]	3	8	4	4	1	20
f	3	4	3	1		11

Table 11. Number of plots selected as permanent sample plots in the Weldwood FMA.

	Age Class					
Ecosite	**5**	**10**	**20**	**30**	**40**	**Total**
Upper Foothills						
d	8	1	3	3	1	16
e	12	8	5	6	3	34
f	10	8	5	7		30
i		1				1
Montane						
c			2	8	6	16
Subalpine						
c		1		1		2
d	3	9	7	3	3	25
e				2		2
f	2		2	1		5
i	1					1
Total						
	46	46	33	37	16	178

[1]For undetermined reasons, the plot location data (in tblPLOTLOCATIONS) is not available for 4-21-48-1-WLD (LF e 10-year age class), which was selected as a PSP; thus, effectively reducing the number of PSPs to 177.

2.1.6 tblFIELDGUIDEPLOTS

The tblFIELDGUIDEPLOTS data table is a list of 338 plots ID Numbers (Table 12) that were selected for data analysis for the *Field guide to ecosites of west-central Alberta: supplement for managed stands <40 years old, first approximation* (Corns et al., 2004)[2]. Plots that were not used in the analysis for the guide had the following attributes:

- Plots located in the Montane natural subregion. It was realized that there were not enough plots for analysis. In addition the sample plots were from the 20-year age class or older, and were all collected within a relatively small area west of Hinton.
- Plots located in the Boreal Mixedwood natural subregion. Sample size was limited to the five-year age class, and plots were sampled within a relatively small area south of Grande Prairie.
- Plot located in non-merchantable ecosites such as meadows, bog, and fens.
- Plots in the zone classified by the *Field Guide to Ecosites of Southwestern Alberta* (Archibald et al. 1996)

The relationship between tblFIELDGUIDEPLOTS and tlbSITE is predefined with enforced one-to-one relationship (Figure 3). When using the predefined relationship, the inner join between tblSITE and tblFIELDGUIDEPLOTS queries only the data for plots used for analysis in the young MSE guide (Table 13).

A printable report of the sample plot frequency among natural subregions, ecosites, and age classes of the *Field Guide Age Class* set is available in the MSE database. For comparison with the field guide sample plot distribution refer to Table 1 in this report, or a printable report of the sample plot frequency among natural subregions, ecosites, and age classes of tblSITE in the MSE database is also available, in the database.

[2] For the *Field guide to ecosites of west-central Alberta: supplement for managed stands <40 years old, first approximation* (Corns et al., 2004), plots were selected from the Managed Stand Ecosite (MSE) Microsoft® Access 2000 database and amalgamated into four age classes, instead of the five age classes in tblSITE (see Section 2.1.2) of the MSE database. The alternative age-class set was developed in order to provide sufficient plot populations to present a reasonable number of ecosites for the supplemental field guide. The alternative age class set is referred to as the *Field Guide Age Class* set, and is available in lookup table tblAgeClassList in the MSE database.

Table 12. Data dictionary table for tblFIELDGUIDEPLOTS.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 338 plots selected for analysis in *Field guide to ecosites of west-central Alberta: supplement for managed stands <40 years old, first approximation* (Corns et al., 2004)	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.

Table 13. Number of plots selected for analysis in the *Field guide to ecosites of west-central Alberta: supplement for managed stands <40 years old, first approximation* (Corns et al., 2004).

	Age Class					
Ecosite	5	10	20	30	40	Total
Lower Foothills						
c	6	2	5	1	1	15
d	4	8	2	1	2	17
e	8	15	8	5	1	37
f	4	16	6	4		30
h	7	6	4		1	18
i	3	10	1			14
j	6	8	2			16

Table 13. Number of plots selected for analysis in the *Field guide to ecosites of west-central Alberta: supplement for managed stands <40 years old, first approximation* (Corns et al., 2004).

	Age Class					
Ecosite	**5**	**10**	**20**	**30**	**40**	**Total**
Upper Foothills						
c	5	2	5			12
d	9	3	5	3	1	21
e	15	10	10	6	3	44
f	10	8	6	9		33
h	4	7	3	1		15
i	14	4	2	2		22
Subalpine						
d	7	14	9	4	3	37
f	3		3	1		7
Total						
	105	113	71	37	12	338

2.2 Soil Profile Data

2.2.1 tblSOIL

The tblSOIL data table describes the general soil characteristics of the each plot (Table 14). The tblSOIL data table had a predefined and enforced one-to-one relationship with tblSITE, and one-to-many relationships with tblSOILCOM, tblSOILB1 and tblSOILB2 (Figure 5).

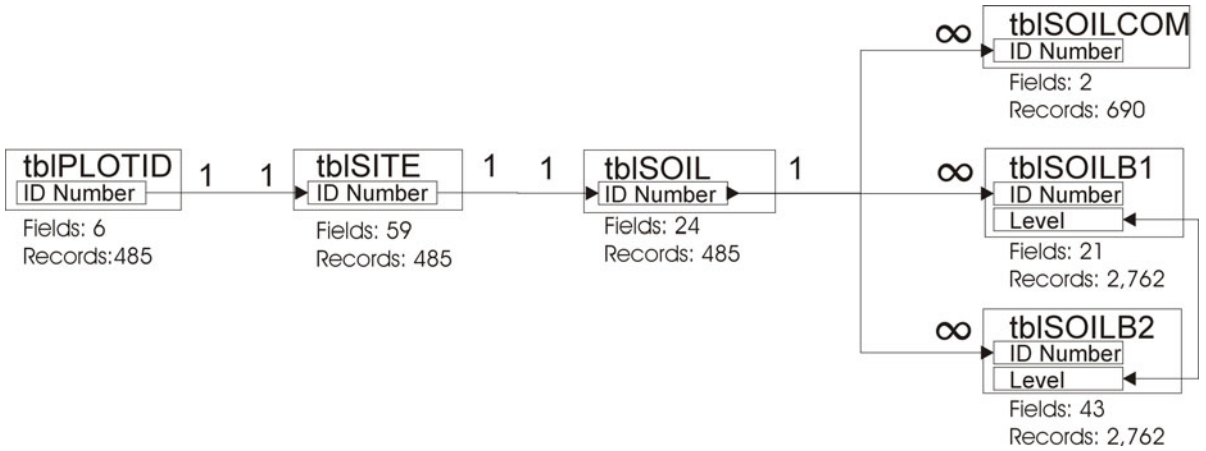

Figure 5. Relationships of tblSOIL

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Indexed, and unique, plot identifier for each of the 485 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Greatgroup	*Canadian System of Soil Classification* (Soil Classification Working Group 1998) great group.	Y	N		DB	Undefined
						DYB	Dystric Brunisol
						EB	Eutric Brunisol
						F	Fibrisol
						G	Gleysol
						GL	Gray Luvisol
						H	Humisol
						HG	Humic Gleysol
						HG/LG	Undefined
						HR	Humic Regosol
						L	Undefined
						LG	Luvic Gleysol
						M	Mesisol
						MB	Melanic Brunisol
						R	Regosol

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						SB	Sombric Brunisol
3	Subgroup	*Canadian System of Soil Classification* (Soil Classification Working Group 1998) subgroup.	Y	N		B.GL	Undefined
						BR.GL	Brunisolic Gray Luvisol
						CU.H	Cumulo Humisol
						CU.HR	Cumulic Humic Regosol
						CU.M	Cumulo Mesisol
						CU.R	Cumulic Regosol
						D.GL	Dark Gray Luvisol
						DG.GL	Undefined
						DG.L	Undefined
						E.DB	Undefined
						E.DYB	Eluviated Dystric Brunisol
						E.EB	Eluviated Eutric Brunisol
						E.MB	Eluviated Melanic Brunisol
						GE.EB	Undefined
						GL.BR	Undefined
						GL.DYB	Gleyed Dystric Brunisol
						GL.EB	Gleyed Eutric Brunisol
						GL.GL	Gleyed Gray Luvisol
						GLBR.GL	Gleyed Brunisolic Gray Luvisol

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						GLCU.HR	Gleyed Cumulic Humic Regosol
						GLCU.R	Gleyed Cumulic Regosol
						GLD.GL	Gleyed Dark Gray Luvisol
						GLE.DYB	Gleyed Eluviated Dystric Brunisol
						GLE.EB	Gleyed Eluviated Eutric Brunisol
						GLE.GL	Undefined
						H.LG	Undefined
						HU.LG	Humic Luvic Gleysol
						O.DYB	Orthic Dystric Brunisol
						O.EB	Orthic Eutric Bunisol
						O.G	Orthic Gleysol
						O.GL	Orthic Gray Luvisol
						O.HG	Orthic Humic Gleysol
						O.HG.	Undefined
						O.HR	Orthic Humic Regosol
						O.LG	Orthic Luvic Gleysol
						O.MB	Orthic Melanic Brunisol
						O.R	Orthic Regosol
						O.SB	Orthic Sombric Brunisol

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						PZ.GL	Podzolic Gray Luvisol
						R.G	Rego Gleysol
						R.HG	Rego Humic Gleysol
						R.HG/O.L	Undefined
						T.F	Terric Fibrisol
						T.H	Terric Humisol
						T.M	Terric Mesisol
						TF.M	Undefined
						THU.F	Terric Humic Mesisol
						TY.M	Typic Mesisol
4	Std Humusform	Standardized humus form classification. The humus form was standardized to the *Ecological Land Survey Site Description Manual* (Alberta Environmental Protection 1994). There are three unpopulated cells in this field.	N	Y	tblHumusFormList	[Blank]	Undefined
						.MR	Mor
						F.MR	Fibrimor
						FH.MR	Fibrihumimor
						FP.MR	Fibric peatymor
						HF.MR	Humifibrimor
						HP.MR	Humic peatymor
						ML.MD	Mull-like moder
						MP.MR	Mesic peatymor
						T.MD	Typic moder
						W.MD	Raw moder

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
5	Effroot depth	Effective rooting depth of the soil profile, in cm. There are eight unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 100)	Effective rooting depth is the depth to which the abundance of roots declines to few. Few roots category is defined as <10 very fine (<1 mm) or fine (1–2 mm) roots, or <1 medium (2–5 mm) or coarse (>5 mm) root.
6	Water table depth	Depth to the water table in the soil profile, in cm. There are 353 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 120)	Water table depth is measured by allowing the water level to reach equilibrium in the soil pit. Then measure the depth from the soil surface to the water surface in the soil pit.
7	Bedrock depth	Depth to bedrock in the soil profile in cm. There are 477 plots without depth to bedrock data.	N	N		Various values (e.g., [Blank], 58, 110)	
8	Frozen depth	Depth to frozen unconsolidated material in the soil profile, in cm, at the time of sampling. All 485 cells in this field are unpopulated.	N	N		[Blank]	Undefined

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
9	Root restrict depth	Depth to a root growth restriction in the soil profile. There are 447 plots without root restricting data.	N	N		Various values (e.g., [Blank], 9, 90)	The cause of root restriction can be anything, e.g., bedrock, water table, cemented horizons (Duric, Ortstein, or Placic), or fragipan.
10	Carbonates depth	Depth to inherent or secondary carbonate accumulation in the soil profile, in cm. There are 356 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 180)	Carbonate depth is based on strong effervescence resulting from the application of 10% HCl.
11	Charcoal (Y/N)	Presence or absence of charcoal in the soil profile.	Y	N		N	No charcoal is present.
						Y	Charcoal is present.
12	Seepage (Y/N)	Presence or absence of seepage in the soil profile.	Y	N		N	No evidence of seepage present.
						Y	Evidence of seepage is present.
13	PM1	Parent Material 1, which is the parent material nearest to the soil surface. There are 336 unpopulated cells.	N	Y	tblParentMaterialList	[Blank]	Undefined
						C	Colluvial
						E	Eolian
						F	Fluvial
						FL	Fluviolacustrine
						GF	Glaciofluvial
						GL	Glaciolacustrine

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						L	Lacustrine
						M	Morainal
						N	Fen
						O	Undifferentiated organic
14	SurfExp1	Surface expression of the PM1, e.g., hummocky, inclined, etc. There are 336 unpopulated cells.	N	Y	tblSurfaceExpressionList	[Blank]	Undefined
						e	Depressional
						h	Hummocky
						i	Inclined
						k	Subdued
						l	Level
						o	Floodplain
						u	Undulating
						v	Veneer
15	Depth1	Depth of the PM1, in cm. There are 336 unpopulated cells.	N	N		Various values (e.g., [Blank], 0, 118)	
16	Texture1	Texture of the PM1. There are 339 unpopulated cells in this field	N	N	tblTextureList	[Blank]	
						C	Clay
						CL	Clay loam
						CS	Coarse sand
						FSL	Fine sandy loam

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						L	Loam
						LFS	Loamy fine sand
						LS	Loamy sand
						OM	Undefined
						SC	Sandy clay
						SCL	Sandy clay loam
						SI	Silt
						SIC	Silty clay
						SICL	Silty clay loam
						SIL	Silt loam
						SIS	Silty sand
						SL	Sandy loam
						SlS	Undefined
17	PM2	Parent Material 2, which is the parent material second closest, after PM1, to the soil surface. There are 443 unpopulated cells.	N	Y	tblParentMaterialList	[Blank]	Undefined
						F	Fluvial
						FL	Fluviolacustrine
						GF	Glaciofluvial
						L	Lacustrine
						M	Morainal
						P	Saprolite
						X	Residual

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
18	SurfExp2	Surface expression of the PM2, e.g., hummocky, inclined, etc. There are 443 unpopulated cells.	N	Y	tblSurfaceExpressionList	[Blank]	Undefined
						e	Depressional
						h	Hummocky
						i	Inclined
						k	Subdued
						l	Level
						o	Floodplain
						s	Steep
19	Depth2	Depth of the PM2, in cm. There are 341 unpopulated cells.	N	N		Various values (e.g., [Blank], 0, 110)	
20	Texture2	Texture of the PM2. There are 443 unpopulated cells.	N	N	tblTextureList	[Blank]	Undefined
						C	Clay
						CL	Clay loam
						CS	Coarse sand
						FS	Fine sandy
						FSL	Fine sandy loam
						L	Loam
						LS	Loamy sand
						S	Sand
						SCL	Sandy clay loam

Table 14. Data dictionary table for tblSOIL.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						SIC	Silty clay
						SICL	Silty clay loam
						SIL	Silt loam
						SIS	Silty sand
						SL	Sandy loam
21	PM3	Parent Material 3, which is the parent material third closest, after PM1 and PM2, to the soil surface. There are 481 unpopulated cells.	N	Y	tblParentMaterialList	[Blank]	Undefined
						GL	Glaciofluvial
						L	Lacustrine
						P	Saprolite
22	SurfExp3	Surface expression of the PM3, e.g., hummocky, inclined, etc. There are 481 unpopulated cells.	N	Y	tblSurfaceExpressionList	[Blank]	Undefined
						i	Inclined
23	Depth3	Depth of the PM3, in cm. There are 342 unpopulated cells.	N	N		Various values (e.g., [Blank], 0, 107)	
24	Texture3	Texture of the PM3. There are 481 unpopulated cells.	N	N	tblTextureList	[Blank]	Undefined
						SIC	Silty clay
						SICL	Silty clay loam

2.2.2 tblSOILCOM

The tblSOILCOM data table contains the comments by field crews, for soils of the ecological sample plots (Table 15). This data table has a predefined one-to-many relationship with tblSOIL (Figure 5).

Table 15. Data dictionary table for tblSOILCOM.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 690 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Comments	General comments about soils of the plot	Y	N		Various entries from field datasheets regarding the soil of the plot.	The field is a memo data type.

2.2.3 tblSOILB1

The tblSOILB1 data table contains soil horizon profile data (Table 17). This table is related to tblSOIL through a one-to-many inner join, but can form a direct one-to-many relationship with tblSITE. There are 2,762 records and 21 fields.

Fields 4–6 describe the component of the Canadian System of Soil Classification horizon designations (Soil Classification Working Group 1998). Figure 6 depicts a typical example of the CSSC horizon designations nomenclature and the source data tables and fields in the MSE database.

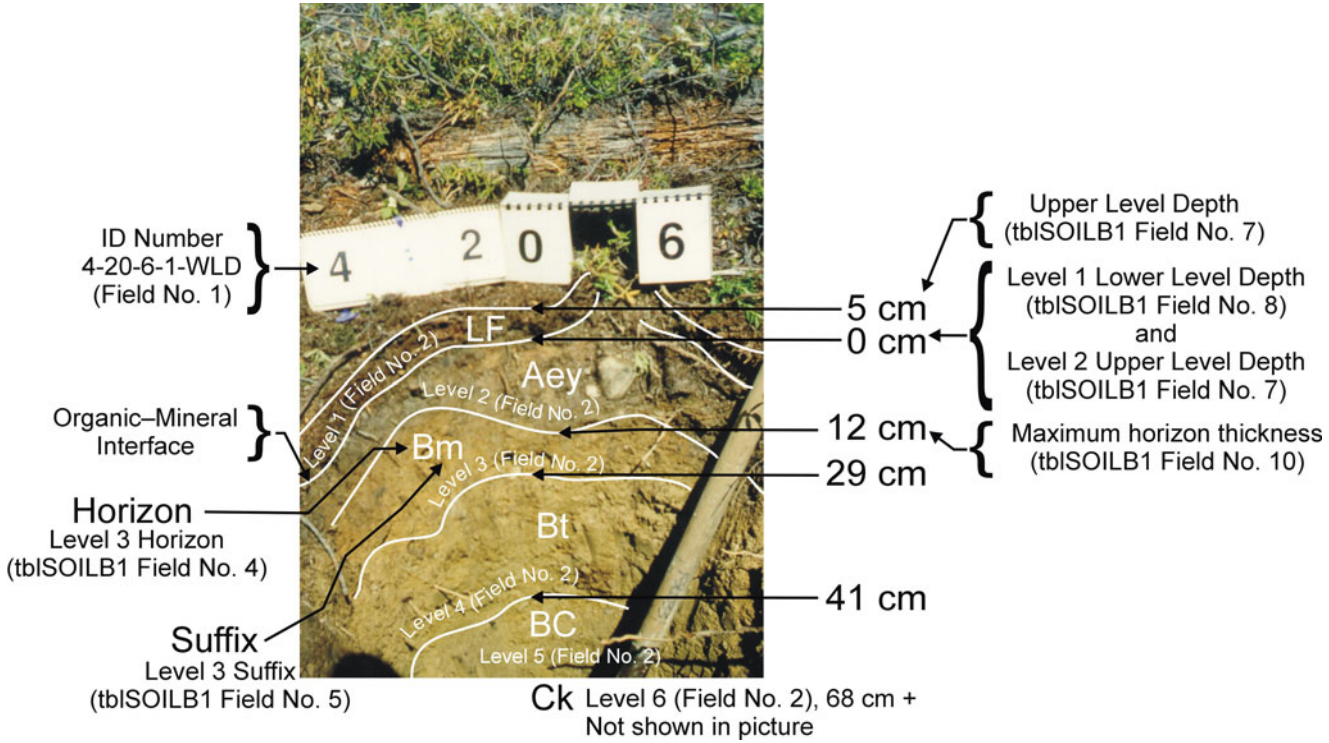

Figure 6. Primary components of soil horizon designation in the Canadian System of Soil Classification: horizon and suffix.

This is the soil pit profile for plot 4-20-6-1-WLD. It is an Upper Foothills, Labrador tea – mesic (d) ecosite, in the 5-year age class. This mineral soil is classified as a Brunisolic Gray Luvisol (BR.GL). Soil profiles for plots can be reconstructed from the Managed Stand Ecosite database. Plot soil property data are accessed through tblSOIL (ID Number, Field No. 1), and soil horizon property data are accessed through tblSOILB1 and tblSOILB2 (ID Number and Level, Fields No. 1 and 2 respectively). Field No. refers to a specific field according to the order of the fields in the soil data tables. Mineral soil horizon boundary measurements start at the organic–mineral interface, and at the soil surface for organic soils

Fields 13 and 14 describe soil horizon texture, determined in the field, for each mineral horizon. Field 13 (Texture) cell values are not required and not are limited to the domain defined by the lookup table, tblTextureList. Both the Field 13 (Texture) and its lookup tblTextureList have more than the basic textures commonly evaluated using texture keys, such as those in the *Ecological Land Survey Site Description Manual* (Alberta Environmental Protection 1994) and the *Field Guide to Ecosites of West-central Alberta* (Beckingham et al. 1996). Field 13 (Texture) field contains both the "basic" texture classes and "finer" texture classes—normally reserved for laboratory particle size analysis methods, such as sedimentation. It is the indiscriminate use of two different taxonomic levels of texture class which causes the problem for analyzing this field. Field 14 (Basic Texture) contains the basic soil textures for horizons. Field 14 (Basic Texture) data were derived by interpretation of values in Field 13 (Texture) and regrouping of classes into the basic texture classes found in the ecosite guides (Beckingham et al. 1996): see Table 16. One exception is the data value "Var" in Field 13 (Texture), which may indicate variable texture. The "Var" texture code originates on the field data sheet of plot 3-3-131-1-WLD. There is no explanation/definition of the textural meaning of "Var", which was recorded by the field crew.

Table 16. Texture and Basic Texture data fields in tblSOILB1, and corresponding lookup tables.

tblSOILB1	tblTextureList	tblSOILB1	tblBasicTextureList
Texture	***Texture***	***Basic Texture***	***Basic Texture***
HC	Heavy clay	HC	heavy clay
SiC	Silty clay	SiC	silty clay
C	Clay	C	clay
FSC		SC	sandy clay
SC	Sandy clay		
SiCL	Silty clay loam	SiCL	silty clay loam
CL	Clay loam	CL	clay loam
FSCL		SCL	sandy clay loam
SCL	Sandy clay loam		
L	Loam	L	loam

Table 16. Texture and Basic Texture data fields in tblSOILB1, and corresponding lookup tables.

tblSOILB1	tblTextureList	tblSOILB1	tblBasicTextureList
Texture	***Texture***	***Basic Texture***	***Basic Texture***
SIL	Silt loam	SiL	silt loam
SI	Silt	Si	silt
SIMS	Silty medium sand	SiS	silty sand
SIS	Silty sand		
FSL	Fine sandy loam	SL	sandy loam
MSL	Medium sandy loam		
SL	Sandy loam		
VFSL	Very fine sandy loam		
LCS	Loamy coarse sand	LS	loamy sand
LFS	Loamy fine sand		
LMS	Loamy medium sand		
LS	Loamy sand		
CS	Coarse sand	S	sand
FS	Fine sand		
MS	Medium sand		
S	Sand		
VAR		Var	Undefined

Table 17. Data dictionary table for tblSOILB1.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 2,762 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Level	Horizon level, starting at the ground surface. ID Number and Level together make the unique record identifier in this table.	Y	N		Various number values (e.g., 1, 9, etc.)	Level number together with the ID Number, the sequence of horizons in the soil profile of a plot can be reconstructed.
3	Horiz Discont	Discontinuity number applied to each horizon within each new parent material present in the profile beyond the horizons of the topmost parent material. There are 1,980 unpopulated soil horizon records in this field.	N	N		Various values (e.g., [Blank], 2, 7, etc.)	Identifies parent material when lithologic discontinuities occur within original within the soil profile. The uppermost PM is understood to be the first (Soil Classification Working Group 1998); thus, it is understood to hold a value of one.
4	Horiz	Major horizon identifier; designation as per *The Canadian*	Y	N		A	Mineral soil horizon formed by pedogenic processes at or near to the ground surface.

Table 17. Data dictionary table for tblSOILB1.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		System of Soil Classification handbook.				AB	Transition layer between A-horizon and B-horizon
						AC	Transition layer between A-horizon and C-horizon, occurring in the Regosol Great Group
						B	Mineral soil horizon formed as a result of pedogenic process below the A-horizon.
						BC	Transition layer between B-horizon and C-horizon
						C	Parent material horizon which is relatively unaltered by pedogenic processes, with a few exceptions
						F	Organic horizon composed primarily of partly decomposed leaf and twig litter
						HF	Undefined
						L	Organic horizon composed of mainly undecomposed leaf and twig litter
						LF	Horizon of undifferentiated L and F material.

Table 17. Data dictionary table for tblSOILB1.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						LFH	Undifferentiated L, F, and H material. The 'H' identifies organic material that is decomposed.
						O	Organic horizon (>17% organic carbon) derived from mosses and woody material
						R	Consolidate rock
5	Suffix	Suffix code(s) for horizon characteristics; designations as per The Canadian System of Soil Classification handbook. There are 840 unpopulated cells in this field.	N	N		Various horizon suffix values and combinations (e.g., e, he, h, t, etc.).	
6	Subdiv	Horizon–suffix subdivision: when two or more horizons share the same main horizon designation and suffix code, use subdivision number for differentiation. There are 2,301 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 1, 4, etc.)	

Table 17. Data dictionary table for tblSOILB1.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
7	UpperLevelDepth	Upper boundary of the horizon, which is measured in cm from the organic–mineral interface in mineral soils or from the ground surface for organic soils. There is one unpopulated cell in this field.	N	N		Various values (e.g., [Blank], 0, 180, etc.)	Plot 4-1-132X-1-WLD has no upper horizon level value for the LF (Level 1) horizon. There is no explanation available for this omission.
8	LowerLevelDepth	Lower boundary of the horizon, which is measured in cm from the organic–mineral interface in mineral soils or from the ground surface for organic soils. There are 75 soil horizons that are unpopulated in this field.	N	N		Various values (e.g., [Blank], 0, 205, etc.)	Many of the unpopulated cells are BC- and C-horizons.
9	MinThk	Minimum thickness of the horizon evaluated on the four faces of the soil pit. There are 1,056 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 79, etc.)	

Table 17. Data dictionary table for tblSOILB1.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
10	MaxThk	Maximum Thickness of the horizon evaluated from the four faces of the soil pit. There are 1,057 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 85, etc.)	
11	Horiz Boundary Dist	Thickness of the transition between soil horizons. In each horizon the boundary distinctness refers to the transition with the underlying horizon. There are 605 unpopulated cells in this field.	N	Y	tblHorizDistinctList	[Blank]	Undefined. The unpopulated cells are usually the lowest horizon in the soil profile.
						A	Abrupt
						C	Clear
						D	Diffuse
						G	Gradual
12	Horiz Boundary Form	Shape of the transition between soil horizons. In each horizon the boundary form refers to the transition with the underlying horizon. There are 608 unpopulated cells.			tblHorizBoundList	[Blank]	Undefined
						B	Broken
						I	Irregular
						S	Smooth
						W	Wavy

Table 17. Data dictionary table for tblSOILB1.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
13	Texture	Horizon soil texture as determined in the field.	N	N	tblTextureList	Various values (see Table 16 for list of values in this field)	Table 16 indicates how the "tblTextureList" lookup table can be used to relate a texture name to each of the texture codes in this field.
14	Basic Texture	Basic Horizon textures, conforming to Beckingham et al. (1996, Field Guide to Ecosites of West-central Alberta), including Silty Sand (SiS).	N	Y	tblBasicTextureList	Various values (see Table 16 for list of values in this field)	Table 16 indicates how the "tblBasicTextureList" lookup table can be used to relate a texture name to each of the texture code in this field.
15	CF%total	Total percentage of coarse fragment volume. There are 25 unpopulated cells and 1,241 cells with a value of 0%.	N	N		Various values (e.g., [Blank], 0, 99 etc.)	Coarse fragments are particles >2mm in diameter, in the soil horizon.
16	Gravel%	Percentage of coarse fragment volume that is gravel. There are 311 unpopulated cells and 995 others with a value of 0%.	N	N		Various values (e.g., [Blank], 0, 90 etc.)	Gravel is <7.5 cm in diameter, in the horizon.
17	GravelType	General appearance class of the gravel. There are 1,306 unpopulated cells.	N	Y	tblCFTypeList	[Blank]	Undefined
						5	Undefined
						A	Angular

Table 17. Data dictionary table for tblSOILB1.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						G	Undefined
						R	Rounded
						S	Subrounded/subangular
						T	Thin, flat
18	Cobble%	Percentage of coarse fragment volume that is Cobble. There are 362 unpopulated cells, and 1,268 with a value of 0%.	N	N		Various values (e.g., [Blank], 0, 85 etc.)	Cobble is 7.5 to 25 cm in diameter, in the horizon.
19	CobbleType	General appearance class of Cobble. There are 1,633 unpopulated cells.	N	Y	tblCFTypeList	[Blank, null]	Undefined
						[Blank, zero-length string]	Undefined
						A	Angular
						R	Rounded
						S	Subrounded/subangular
						T	Thin, flat
20	Stone%	Percentage of coarse fragment volume that is stone size. There are 498 unpopulated cells, and 2,092 others with values of 0%.	N	N		Various values (e.g., [Blank], 0, 90 etc.)	A stone is >25 cm in diameter, in the horizon.
21	StoneType	General appearance			tblCFTypeList	[Blank]	Undefined

Table 17. Data dictionary table for tblSOILB1.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		class of the coarse fragments that are stone size. There are 2,584 unpopulated cells.				A	Angular
						R	Rounded
						S	Subrounded/subangular
						T	Thin, flat

2.2.4 tblSOILB2

The tblSOILB2 data table describes supplemental soil horizon information: soil structure, consistency, mottle/gley, and roots (Table 18). This table has a predefined one-to-many relationship with tblSOIL (Figure 5). It also forms a one-to-many relationship with tblSITE, using the ID Number field. There are 2,762 records and 43 fields in this data table.

Fields 3 to 10 pertain to soil structure:

- Fields 3–6 describe the primary soil structure, which is the structure of the larger soil aggregates.
- Fields 7–10 describe the secondary structure, which is the smaller soil aggregates found within the primary structure. For both primary and secondary structures, the description consists of grade, class, kind, and kind modifier.

Fields 11 to 13 describe the soil consistence, the ability of a soil aggregate to resist deformation, at three moisture contents; and plasticity. Fields 15 and 16 describe horizon pH and carbonate content. Fields 17 to 26 describe the dominant soil colour (Colour1), and secondary soil colour (Colour2), if one is present. The dominant and secondary soil colours are described by five fields each: Aspect, Hue Number, Hue Letter, Value, and Chroma.

- "Asp" refers to the colour aspect, which indicates the moisture content and the type of sample. The moisture content is described in terms of wet or dry, and the type refers to inped, exped, or crushed soil aggregate. The lookup table describes the context for interpreting the colour description.
- Hue Number, Hue Letter, Value, and Chroma are from the Munsell soil colour charts (Munsell Color Company, Inc. 1954).

Fields 27–35 describe the mottling/gleying in the soil horizon. The descriptions of mottle aspect, hue number, hue letter, values, and chroma are the same those used for the description of the soil matrix (Colour1 and Colour2). The last eight fields (36-43) describe the two most abundant root sizes, for each horizon, in two categories: Roots1 and Roots2. The most abundant (Roots1) and the second most abundant (Roots2) roots are described with four data fields each: abundance, size, orientation, and distribution.

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 2,762 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Level	Horizon level, starting at the ground surface. ID Number and Level together make the unique record identifier in this table.	Y	N		Various number values (e.g., 1, 9, etc.)	Level number together with the ID Number, the sequence of horizons in the soil profile of a plot can be reconstructed.
3	PrimaryGrade	The distinctness of the aggregate structure. There are 952 unpopulated cells in this field	N	Y	tblSoilGradeList	[Blank]	Undefined
						M	Moderate
						MC	Undefined
						MS	Moderate to strong
						N	Undefined
						S	Strong
						V	Undefined
						VW	Undefined
						W	Weak
						WM	Weak to moderate
						X	

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
4	PrimaryClass	The size range of the aggregate structure. There are 965 unpopulated cells in this field.	N	Y	tblSoilClassList	[Blank]	Undefined
						C	Coarse
						CUC	Undefined
						CV	Undefined
						CVC	Undefined
						F	Fine
						FM	Fine to medium
						G	Undefined
						L	Undefined
						M	Medium
						MC	Medium to coarse
						MVC	Undefined
						PL	Undefined
						S	Undefined
						VC	Very coarse
						VF	Very fine
						VFF	Very fine to fine
5	PrimaryKind	Describes the kind of shape of the aggregate structure. There are 634 unpopulated cells in this field.	N	Y	tblSoilKindList	[Blank]	Undefined
						ABK	Angular blocky
						COL	Columnar
						GR	Granular

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						GRN	Undefined
						M	Undefined
						MA	Massive
						P	Undefined
						PL	Platy
						SBK	Subangular blocky
						SG	Undefined
						SGK	Undefined
						SGR	Single grain
6	PrimaryKind Mod	Describes the structure of aggregates of non-pedological origin. There are 2,657 unpopulated cells in this field.	N	Y	tblSoilKindModList	[Blank]	Undefined
						F	Undefined
						PS	Pseudo-structure
7	SecondaryGrade	The distinctness of the aggregate structure. There are 2,373 unpopulated cells in this field	N	Y	tblSoilGradeList	[Blank]	Undefined
						F	Undefined
						M	Moderate
						MS	Moderate to strong
						S	Strong
						SB	Undefined
						VW	Undefined
						W	Weak

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						WM	Weak to moderate
8	SecondaryClass	The size range of the aggregate structure. There are 2,374 unpopulated cells in this field.	N	Y	tblSoilClassList	[Blank]	Undefined
						C	Coarse
						F	Fine
						FM	Fine to moderate
						M	Moderate
						MC	Moderate to coarse
						VC	Very coarse
						VF	Very fine
						VFF	Very fine to fine
9	SecondaryKind	Describes the kind of shape of the aggregate structure. There are 2,284 unpopulated cells in this field.	N	Y	tblSoilKindList	[Blank]	Undefined
						ABK	Angular blocky
						GR	Undefined
						MA	Massive
						PL	Platy
						SBK	Subangular blocky
						SG	Undefined
						SGR	Single Grain
						SMK	Undefined
10	SecondaryKi	Describes the structure of	N	Y	tblSoilKindModList	[Blank]	Undefined

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
	ndMod	aggregates of non-pedological origin. There are 2,694 unpopulated cells in this field.				PS	Pseudo-structure
11	Dry	Dry refers to soil consistency or resistance to deformation and rupture (soil strength) for dry soils. There are 2,688 unpopulated cells in this field.	N	Y	tblDrySoilList	[Blank]	Undefined
						1	Loose
						2	Soft
						3	Slightly hard
						4	Hard
12	Moist	Moist refers to soil consistency or resistance to deformation and rupture (soil strength) for moist soil. There are 795 unpopulated cells in this field.	N	Y	tblMoistSoilList	[Blank]	Undefined
						1	Loose
						2	Very friable
						3	Friable
						4	Firm
						5	Very firm
						6	Extremely firm
13	Wet	Wet refers to soil consistency or resistance to deformation and rupture (soil strength) for wet soil. There are 2,652 unpopulated cells in this field.	N	Y	tblWetSoilList	[Blank]	Undefined
						1	Nonsticky
						2	Slightly sticky
						3	Sticky
						4	Very sticky
14	Plas	Plasticity, which is the	N	Y	tblPlasticList	[Blank]	Undefined

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		degree to which the moistened soil can change shape under force and then retains the new form when the force is removed. There are 1,181 unpopulated cells in this field.				1	Nonplastic
						2	Slightly plastic
						3	Plastic
						4	Very plastic
15	pH	Field pH of the soil horizon, measured using the Hellige-Truog method (Phenol red indicator) for mineral soils, and pHast indicator strips for organic soils. Cell values are not required for this field, and there are 40 unpopulated cells.	N	N		Various values (e.g., [Blank], 4.0, 8.2, etc.)	
16	Effer	Effer refers to effervescence of the soil horizon, evaluated by assessing the reaction of soil calcium carbonate content and 10% HCl. Cell values are required, yet there are 3 unpopulated cells in this field.	Y	Y	tblEffervescenceList	[Blank]	Undefined
						M	Moderate
						S	Strong
						VW	Very weak
						W	Weak
						X	None
17	Colour1 Asp	Primary colour aspect. Colour aspect indicates the moisture content and	N	Y	tblColourAspectList	[Blank]	Undefined
						1	Matrix moist

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		the type of sample. There are 96 unpopulated cells in this field.				2	Matrix dry
						3	Exped moist
						4	Exped dry
						9	Natural wet/reduced
						10	Natural wet/oxidized
18	Colour1 Hue Number	Primary hue number from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 46 unpopulated cells in this field.	N	N		Various values (e.g. [Blank], 0.5, 10, etc.)	Hue numbers are limited to Munsell colour chart values.
19	Colour1 Hue Letter	Primary hue letter from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 27 unpopulated cells.	N	Y	tblHueLetterList	[Blank]	Undefined
						B	Blue (gley chart)
						BG	Blue–green (gley chart)
						G	Green (gley chart)
						GY	Green–yellow
						N	Green–Grey (gley chart)
						Y	Yellow
						YR	Yellow-red

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
20	Colour1 Value	Primary colour value from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 26 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 8, etc.)	Colour values are limited to Munsell colour chart values.
21	Colour1 Chroma	Primary colour chroma from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 49 unpopulated cells.	N	N		Various values (e.g., [Blank], 0, 8, etc.)	Colour chroma numbers are limited to Munsell colour chart values.
22	Colour2 Asp	Secondary colour aspect. Colour aspect indicates the moisture content and the type of sample. There are 2,457 unpopulated cells in this field.	N	Y	tblColourAspectList	[Blank]	Undefined
						1	Matrix moist
						2	Matrix dry
						5	Inped moist
						9	Natural wet/reduced
						10	Natural wet/oxidized
23	Colour2 Hue Number	Secondary hue number from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 2,480 unpopulated cells in this field.	N	N		Various values (e.g. [Blank], 2.5, 10, etc.)	Hue numbers are limited to Munsell colour chart values.
24	Colour2 Hue	Secondary hue letter from	N	Y	tblHueLetterList	[Blank, null]	Undefined

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
	Letter	the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 2,471 unpopulated cells.				[Blank, zero length string]	Undefined
						B	Blue (gley chart)
						BG	Blue–green (gley chart)
						GY	Green–yellow
						N	Green–Grey (gley chart)
						PB	Purple–blue (gley chart)
						Y	Yellow
						YR	Yellow-red
25	Colour2 Value	Secondary colour value from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 2,469 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 8, etc.)	Colour values are limited to Munsell colour chart values.
26	Colour2 Chroma	Secondary colour chroma from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 2,513 unpopulated cells.	N	N		Various values (e.g., [Blank], 0, 8, etc.)	Colour chroma numbers are limited to Munsell colour chart values.
27	Mottle Abn	Abundance of mottles in the soil horizon. Cell values are required, yet there are 406 unpopulated	Y	Y	tblMottleAbnList	[Blank]	Undefined
						C	Common
						F	Few

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		cells.				M	Many
						X	None
28	Mottle Size	Size of the mottles in the soil horizon. There are 2,263 unpopulated cells in this field.	N	Y	tblMottleSizeList	[Blank]	
						C	Coarse
						F	Fine
						M	Medium
29	Mottle Cont	Contrast of the mottle and soil matrix. There are 2,262 unpopulated cells in this field.	N	Y	tblMottleContrastList	[Blank]	Undefined
						D	Distinct
						F	Faint
						P	Prominent
30	Mottle Asp	Mottle aspect indicates the moisture content and the type of sample. There are 2,275 unpopulated cells in this field.	N	Y	tblColourAspectList	[Blank]	Undefined
						1	Matrix moist
						2	Matrix dry
						10	Natural wet/oxidized
31	Mottle Hue Number	Secondary hue number from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 2,256 unpopulated cells in this field.	N	N		Various values (e.g. [Blank], 2.5, 10, etc.)	Colour chroma numbers are limited to Munsell colour chart values.
32	Mottle Hue Letter	Secondary hue letter from the Munsell soil colour charts (Munsell Color	N	Y	tblHueLetterList	[Blank]	Undefined
						Y	Yellow

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		Company, Inc. 1954). There are 2,256 unpopulated cells in this field.				YR	Yellow–red
33	Mottle Value	Secondary colour value from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 2,469 unpopulated cells.	N	N		Various values (e.g., [Blank], 3, 6, etc.)	Colour chroma numbers are limited to Munsell colour chart values.
34	Mottle Chroma	Secondary colour chroma from the Munsell soil colour charts (Munsell Color Company, Inc. 1954). There are 2,513 unpopulated cells.	N	N		Various values (e.g., [Blank], 2, 8, etc.)	Colour chroma numbers are limited to Munsell colour chart values.
35	Mottle Bnd Dist	Distinctness of the mottle boundary: sharp, clear, or diffuse. There are 2,274 unpopulated cells.	N	Y	tblMottleBoundList	[Blank]	Undefined
						C	Clear
						D	Distinct
						S	Sharp
36	Roots1 Abn	Abundance of roots in the soil horizon. There are 278 unpopulated cells in this field.	N	Y	tblRootAbundList	[Blank]	Undefined
						A	Abundant
						F	Few
						P	Plentiful
						V	Very few

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						X	None
37	Roots1 Size	Size of the roots in the soil horizon. There are 626 unpopulated cells in this field.	N	Y	tblRootSizeList	[Blank]	Undefined
						C	Coarse
						F	Fine
						M	Medium
						V	Very fine
						X	Undefined
38	Roots1 Ori	Orientation of the roots in the soil horizon. There are 626 unpopulated cells in this field.	N	Y	tblRootOrientList	[Blank]	Undefined
						H	Horizontal
						V	Vertical
						O	Oblique
						R	Random (no dominant plane)
						X	Undefined
39	Roots1 Distrib	Root distribution in the soil horizon. There are 628 unpopulated cells in this field.	N	Y	tblRootDistribList	[Blank]	Undefined
						EX	Exped
						MX	Matrix
						X	Undefined
40	Roots2 Abn	Abundance of roots in the soil horizon. There are 1,038 unpopulated cells in this field.	N	Y	tblRootAbundList	[Blank]	Undefined
						A	Abundant
						F	Few
						P	Plentiful

Table 18. Data dictionary table for tblSOILB2.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						V	Very few
						X	None
41	Roots2 Size	Size of the roots in the soil horizon. There are 1,474 unpopulated cells in this field.	N	Y	tblRootSizeList	[Blank]	Undefined
						C	Coarse
						F	Fine
						M	Medium
						V	Very fine
42	Roots2 Ori	Orientation of the roots in the soil horizon. There are 1,479 unpopulated cells in this field.	N	Y	tblRootOrientList	[Blank]	Undefined
						A	Undefined
						H	Horizontal
						O	Oblique
						R	Random (no dominant plane)
						V	Vertical
43	Roots2 Distrib	Root distribution in the soil horizon. There are 1,477 unpopulated cells in this field.	N	Y	tblRootDistribList	[Blank]	Undefined
						EX	Exped
						MA	Undefined
						MX	Matrix

2.2.5 tblPHMETER

The soil tblPHMETER data table describes the 10 cm and 30 cm laboratory-determined soil pHs for 483 plots, and the 10 cm and 30 cm field-determined soil pHs for 76 plots (Table 19). The data in this table doesn't follow the methods prescribed in the soil sampling protocol (see Section 1.2.3.4, p. 5). Sample depths for pHs were not dependent upon effective rooting zone depth, instead a constant depth for sample was applied: 5–10 cm and 25–30 cm. Laboratory pHs were measured on dried soil samples using an electronic pH meter. Field pHs were measured using Hellige-Truog (mineral) or colour pHast indicator strips (organic).

Table 19. Data dictionary table for tblPHMETER.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 483 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	10cm pH (meter)	pH of soil sample from 5–10 cm depth. There are no unpopulated cells in this field.	N	N		Various pH values (e.g., 3.7, 8.0, etc.)	
3	30cm pH (meter)	pH of soil sample from 25–30 cm depth. There is one unpopulated cell in this field. There is one cell value that is unpopulated	N	N		Various pH values (e.g., [Blank], 4.2, 8.3, etc.)	The one unpopulated cell is belongs to plot 2-11-56-1-WLD
4	10cm Field pH	pH of soil sample from 5–10 cm depth. There are 407 unpopulated cells.	N	N		Various pH values (e.g., [Blank], 4.1, 7.8, etc.)	

Table 19. Data dictionary table for tblPHMETER.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
5	30cm Field pH	pH of soil sample from 25–30 cm depth. There are 408 unpopulated cells in this field.	N	N		Various pH values (e.g., [Blank], 4.3, 7.8, etc.)	The one extra unpopulated cell, relative to unpopulated cells of the 10 cm Field pH fields, is due to plot 2-11-56-1-WLD, also missing in the 30 cm pH (meter) field.

2.2.6 tblC&N

The tblC&N data table contains soil total Carbon (C; % by mass) and Total Kjeldahl Nitrogen (TKN; % by mass) laboratory results for selected ecosites[3] (Table 20). The soil samples for total C and TKN were taken from the Lower Foothills and Upper Foothills d and f ecosites. These natural subregions and ecosites were selected for preliminary analysis of total C and TKN because they had the largest sample sizes and most complete chronosequences. This table has a one-to-one predefined relationship with tblSITE (Figure 3). There are 95 records and three fields in this table.

Table 20. Data dictionary table for tblC&N.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 95 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-22-26-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Total Carbon (%)	Total Carbon[3] g/100g of soil for 5–10 cm depth.	Y	N		Various values (e.g., 0.169, 7.875, etc.)	The percentage values are for total carbon were assessed using the CR-12 Carbon System 781-600 (Leco Corporation 1987).
3	Nitrogen (%)	TKN[3] (Total Kjeldahl Nitrogen) g/100g of soil for5–10 cm depth.	Y	N		Various values (e.g., 0.02024445, 0.51928065, etc.)	The percentage total nitrogen, by mass, was assessed using the Kjeldahl digestion method (Kalra and Maynard 1991).

[3] Soil chemical testing for C and N was desired by industry partners, despite the circumspection about results prior to testing. The concern was that soil samples were stored at room temperature in field moist state for a considerable amount of time – possibly as long as three years.

2.3 Representative Photograph and Slide Images

2.3.1 tblIMAGEFIELDS

The tblIMAGEFIELDS data table contains the filenames of scanned images of selected photographs and slides taken at the time a plot was sampled, for most plots (Table 21). In general, there are three plot images, based on three site attribute subjects: stand (overstory) vegetation, plot (understory) vegetation, and the plot soil-pit profile. This table has a predefined one-to-many relationship with tblSITE. The following list of plots (identified by ID Number) have more than one photo record in one or more of the image fields: 1-24-71-1-WLD, 2-12-4-1-WLD, 2-13-30-3-WLD, 2-7-593A-1-WLD, 3-3-13-1-WLD, 3-3-140-1-WLD, 3-3-35-1-WLD, 4-1-14X-1-WLD, 4-1-668-1-WLD, 4-1-727A-1-WLD, 4-1-72W-1-WLD, 4-1-884A-1-WLD, and 4-1-886A-1-WLD. The additional images for the listed plots are generally a result of image size manipulation (e.g., cropped) or image attribute changes (e.g., resolution, contrast, brightness, etc.) after the original image was scanned.

Table 21. Data dictionary table for tblIMAGEFIELDS.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 171 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Site	Image file names for the photographs or slides of the understory plant community of the ecological plot. There are 77 unpopulated cells.	N	N		Various values (e.g., [Blank], LF b 20 yr 2-13-30-3 300dpi site.JPG, LF f 20 yr VH-210-45-1 300dpi site.JPG, etc.)	

Table 21. Data dictionary table for tblIMAGEFIELDS.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
3	Soil	Image file names for the photographs or slides of the soil profile within the ecological plot. There are 108 unpopulated cells.	N	N		Various values (e.g., [Blank], LF b 20 yr 2-13-30-3 300dpi site.JPG, LF f 20 yr VH-210-45-1 300dpi site.JPG, etc.)	
4	Stand	Image file names for the photographs or slides of the plant community of the ecological plot. There are 15 unpopulated cells.	N	N		Various values (e.g., [Blank], LF b 20 yr 2-13-30-3 300dpi stand.JPG, LF f 10 yr w4-40-140-1 slide 300dpi.JPG, etc.)	

2.4 Plant Community Structure & Composition Data

2.4.1 tblVEG

The tblVEG data table contains the plant community composition and structure data for all 485 ecological sample plots (Table 22). All plants species in a plot were recorded by stratum: main canopy, understory canopy, tall shrubs, low shrubs, forbs, grass, and moss/lichen. This table has 16,256 records in four fields, and has a predefined one-to-many relationship with tblSITE (Figure 3).

During data collection plant species were assigned 7-letter codes, composed of the first four letters of the genus name, and the first three letters of the specific epithet. In general this is a very convenient system, although code replication may occur: e.g., *Galium trifidum* and *Galium triflorum*.

Another problem was the range of different reference materials that were used by field crews for plant identification. As a result the scientific names used in the 7-letter species codes were not consistent:

For example,

- Johnson et al. (1995) recognizes one-sided wintergreen as *Pyrola secunda*, which is also known as *Orthilia secunda*.
- Mackinnon et al. (1992) recognizes one-sided winter green as *Orthilia secunda*, which was formerly *Pyrola secunda*.

In the example above, one-sided winter green was coded in tblVEG as both Pyrosec and Orthsec, which suggests that a standard code list was not referenced for recording species that occurred on sample plots. To mitigate the latter problem of multiple names for one plant species, each species in tblVEG coding system was standardized to the *Alberta Plant and Fungi — Master Species List and Species Group Checklist* (Alberta Environmental Protection 1993). The new standardized species codes are stored in the tblVEG field called Std Spp Code (Field 5). Interpretation of original species codes from the field data, and conversion to the standardized species codes was performed using an update field in the lookup table tblVegSppCodeList[4]. Where there was uncertainty about the correct interpretation of a species code in the Field 2 (Spp Code), the value of "unknown" was assigned to the Field 5 (Std Spp Code). Where there was no possibility of interpreting the original species code value from the Field 2 (Spp Code), the unaltered species code values was transferred to the Field 5 (Std Spp Code).

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[4] tblVegSppCodeList lookup table is included in the database, but not described in this document. The tblVegSppCodeList provides a summary of the relationship between Spp Code and Std Spp Code fields, as well as family and species common names, scientific names for family and species including authorities, and other information about individual plant species in tblVEG, derived from cited reference material.

A printable report (>50 pages) is available in the MSE database. The report was prepared as reference to plant species names (including both species codes, and scientific and vernacular plant names) in tblVEG.

Upon completion of laboratory identification of specimens and interpretation spp codes (Spp Code), more than 97% of the records (15,787 of 16,256 records) had a valid standardized species code (Std Spp Code).

Table 22. Data dictionary table for tblVEG.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 16,256 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Spp Code	Plant species abbreviation code (genus 4 letters + species 3 letters, where the last three letters were "spp" if specific epithet was unknown) and labels for unidentified plants.	Y	N		Various values based on plant species code convention, and labels for unidentified plants (e.g., abiebal, mitenud, etc.).	There are 630 unique entries in this field.
3	Strata	Vegetation strata for the plant species	Y	Y	tblVegStrataList[4]	1	Main Canopy: Dominant (tallest) trees.
						2	Understory Canopy: Tree or shrub species taller than 5m but not dominant.
						3	Tall Shrub: Tree or shrub species between 2.5 and 5m tall.
						4	Low Shrub: Tree or shrub species less than 2.5 m tall.

Table 22. Data dictionary table for tblVEG.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						5	Forbs or herbaceous species
						6	Graminoids
						7	Moss/Lichen
						8	Ericaceous
4	% Cover	Percent ground cover for the plant species. Plant species cover and total plant cover in a plot may add up to more than 100% cover, as a result of the percent cover estimation for multiple strata.	Y	N		Various values between 0.5 to 90% (e.g., 0, 90, etc.).	The percent cover is a visual estimation of the percentage of the ground area covered by a vertical projection of plant species onto the ground surface (Alberta Environmental Protection 1994; p. 75). In some cases 0.5 indicates the presents of a plant, and not necessary the actual percent cover.
5	Std Spp Code	Seven letter (genus 4 letters + specific epithet 3 letters) species codes based on the standardized code list from Alberta Environmental Protection's (1993), *Alberta plants and fungi - master species list and species group checklists*, when possible.	N	Y	tblVegSppCodeList[4]	Various values based on standardized species codes to *Alberta plants and fungi - master species list and species group checklists*, when possible, and labels for unidentified plants (e.g., abiebal, mitenud, etc.).	After standardization of species codes there are 587 unique entries in this field.

2.5 Forest Mensuration Data

2.5.1 tblCRUISE

The tblCRUISE data table contains individual tree measurements from 469 of the total 485 plots (Table 23). This table contains 5,580 individual tree records, which can be identified by the combined use of ID Number and Tree No fields. Alternately, a single field called Plot–Tree ID (Field 3) was developed as a unique identifier for each tree. The Plot–Tree ID provides a unique integer for each tree record in tblCRUISE, and therefore makes it possible to enforce the integrity of a predefined one-to-one relationship between tree records of tblCRUISE and tblSI (See Section 2.5.2, p. 105).

The selection criterion for individual trees changed between 1998 and 1999–2000 (See Section 1.2.3.6, p. 6, for more details). Sample trees for tblCRUISE were selected based on two sampling protocols:

- In 1998, trees with breast height (1.3 m) diameter s ≥9.0 cm were selected for this table, except for site index trees; and
- In 1999–2000, trees ≥2.70 m tall were selected for this table, except for site index trees.

There are 16 fields in this data table. The first six fields identify plot, individual trees on a plot, and basic tree information such as species, dbh, and crown class. Fields 7 and 8 describe the dominant and secondary tree health and stature, such as dying, conks, burls, frost, >20% lean, good condition, or dead. Fields 9 to 11 describe the tree age in reference to breast height, stump height, and total ages. The latter age is an estimated value. Field 12 defines the total height of the sample tree, and fields 13 and 14 are used for the calculation of growth-intercept, a measure of site productivity. During data collection, growth-intercept year was measured by counting the 3rd, 4th, or 5th year whorls above the first whorl above breast height (1.3 m). Each whorl was counted as one year of growth[5].

[5] The original description of this field in the database stated, "each whorl = 1 year of growth". This assumption is not necessarily true, and can have a detrimental impact on the interpretation of the data. Use of this assumption in growth-intercept site-quality evaluation would cause a severe underestimation of site productivity when two or more whorls are formed in one year.

Table 23. Data dictionary table for tblCRUISE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 5,580 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Tree No	Tree number assigned to individual trees on each plot. This field is indexed, but by itself it is not a unique identifier for individual trees in this table.	Y	N		Various values (e.g., 1, 999, etc.)	
3	Plot–Tree ID	Indexed, and unique, plot identifier for each of the 5,580 individual sample trees. This is the primary key field for the one-to-one relationship between tblCRUISE and tblSI.	Y	N		Various values (e.g., 1, 5580, etc.)	
4	Species	Tree species of the sample tree record.	Y	Y	tblTreeSppList	AW	Trembling aspen
						BW	White birch
						FA	Subalpine fir
						FB	Balsam fir
						LT	Tamarack

Table 23. Data dictionary table for tblCRUISE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						PB	Balsam poplar
						PL	Lodgepole pine
						SB	Black spruce
						SE	Engelmann spruce
						SW	White spruce
						SX	Hybrid spruce
						UK	Unknown
5	DBH	Outside bark diameter in cm, at breast height (i.e., 1.3 m above the point of germination). There are 969 unpopulated values in this field.	N	N		Various values (e.g., [Blank], 0.1, 56.5, etc.)	
6	Crown Class	Tree crown class describing an individual tree's position in the tree canopy.	Y	Y	tblCrownClassList	[Blank]	Undefined
						C	Codominant
						D	Dominant
						I	Intermediate
						S	Suppressed
7	Condition	Primary tree condition values are required. Although mandatory there are two plot records without a condition code:	Y	Y	tblTreeCondList	[Blank]	Undefined
						04	dying
						06	broken stem (below 10cm top DIB)

Table 23. Data dictionary table for tblCRUISE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		Plot–Tree ID 2149 and 2151.				07	broken top (above 10 top DIB)
						08	conks, blind conks
						09	stem insects
						10	stem diseases
						11	foliar insects
						12	foliar diseases
						13	burls, galls
						14	open scars
						15	closed scars
						16	dead top, dieback
						18	crook, sweep
						19	>20% lean
						20	forked tree (above breast height)
						21	forked tree (below breast height)
						22	limby
						23	good condition
						24	Dead
8	Condition2	Secondary tree condition values are not required. There are 5,393	N	Y	tblTreeCondList	[Blank]	Undefined
						04	dying

Table 23. Data dictionary table for tblCRUISE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		unpopulated cell values in this field.				06	broken stem (below 10cm top DIB)
						09	stem insects
						10	stem diseases
						11	foliar insects
						12	foliar diseases
						13	burls, galls
						14	open scars
						15	closed scars
						16	dead top, dieback
						18	crook, sweep
						19	>20% lean
						20	forked tree (above breast height)
						21	forked tree (below breast height)
						24	dead

Table 23. Data dictionary table for tblCRUISE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
9	DBH Age	Tree age in years, at breast height (1.3 m from the point of germination), without age correction. Breast height age was determined either by increment core extraction or by tree cookie. There are 5,070 unpopulated cells	N	N		Various values (e.g., [Blank], 1, 183, etc.)	
10	Stump Age	Tree age in years, at stump height (0.30 m above the ground), without age correction. Stump height age was determined either by increment core extraction or by tree cookie. There are 5,247 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 58, etc.)	
11	Total Age	Estimated tree age in years, based on whorl count. There are 3,336 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 130, etc.)	
12	TopHeight	Total tree height in metres. There are 109 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0.02, 32, etc.)	

Table 23. Data dictionary table for tblCRUISE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
13	Ht Live Crown	Height to live crown is the distance from the base of the tree to the base of the live crown, in metres. There are 4,665 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 0, 12.3, etc.)	
14	GI Year	Growth-intercept Year[5] is the count of the number of whorls after the first whorl above breast height. There are 5,075 unpopulated cells in this field.	N	Y	tblGIYearList	[Blank]	Undefined
						3	Third year growth intercept
						4	Fourth year growth intercept
						5	Fifth year growth intercept
15	GI	The distance in cm between the first whorl ≥ 1.3 m above the point of germination and the third, fourth, or fifth whorl as indicated by the GI Year field. There are 5,075 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 19, 330, etc.)	
16	Stem Condition	Description of stem conditions. This is a comment field. There are 5,486 unpopulated cells in this field.	N	N		00	
						10	
						14	
						18	
						99	

Table 23. Data dictionary table for tblCRUISE.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						Browsed	
						Leader.Damage	
						RCW	
						WGR	

2.5.2 tblSI

The forest inventory and site-index determination sections of the sampling protocol (see Sections 1.2.3.6 and 1.2.3.7) indicated that the four tallest, or site-index, trees were labelled with specific tree numbers (Tree No field). Tree No 1 should be the tallest tree with the largest diameter in the inventory plot. The revised 1999–2000 sampling protocol required that the three additional site-index trees outside of the inventory plot, but within the ecological plot, be labelled with tree numbers 1, 97, 98 and 99.

Site index number labelling specified in the site index determination portion of the sampling protocol and subsequent revisions does not appear to represent all of the tallest trees with the largest diameter, even after further clarification was made in the 1999 protocol revisions. There are site-index trees with tree numbers 97, 98, and 99; but there are also cases where site-index trees were labelled #997, #998, and #999; and other cases where the tallest trees with the largest diameter are do not have the designated tree numbers 97, 98, and 99. For example, in plot 2-6-2-1-WLD establish in 1999 the four tallest crop trees with the largest diameter are lodgepole pines labelled #1[6], #51, #58, and #41. In fact there is no tree number 97 in plot 2-6-2-1-WLD.

In addition to the difficulty of selecting site-index trees in tblCRUISE based on the Tree No field, a subset of trees in tblCRUISE contains remnant trees—mature trees from the forest stand that were not harvested—in addition to the younger and smaller trees regenerating in the ecological sample plot.

The result of the difficulty of identifying site-index trees from tblCRUISE was the creation of tblSI (Table 24). In tblSI site-index trees are defined from tblCRUISE as the first four of the tallest trees for each species, on each plot, after the removal of remnant trees. The remnant trees were defined as those trees with top heights ≥2 standard deviations from the mean of the tree species, for each ecosite-age class; or the upper portion of a bimodal distribution, which occurs on 4-7-157-1-WLD plot. The tblSI data table, in conjunction with tblCRUISE, is used to identify site-index trees and their measurements. Site-index trees are captured from tblCRUISE using an enforced one-to-one inner-join relationship of records with tblSI (Figure 3).

[6] In plot 2-6-2-1-WLD tree number 1 is appropriately label as one of the four tallest trees with the largest diameter, and the sampling protocol suggests that it was within the inventory plot.

Table 24. Data dictionary table for tblSI.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	Plot–Tree ID	Indexed and unique plot identifier for each of the 2,397 individual sample trees, and is the primary key field for the one-to-one relationship to tblCRUISE.	Y	N		Various values (e.g., 1, 5580, etc.)	
2	ID Number	Plot identifier for each of the 2,397 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
3	Tree No	Tree number assigned to individual trees on each plot. This field is indexed, but it is not a unique identifier across sites.	Y	N		Various values (e.g., 1, 999, etc.)	

2.5.3 tblREGEN

The tblREGEN data table is related to tblCRUISE. The trees that did not meet the either the top height or diameter at breast height criterion of tblCRUISE were tallied in tblREGEN (Table 25). In the 1998 sampling protocol, trees <9.0 cm in diameter 1.3 m from the point of germination were tallied in tblREGEN (see Section 1.2.3.6). In the 1999–2000 sampling protocol trees, were tallied in different height classes, when the top height was <2.70 m. In addition to changing the sample tree selection criteria the height class into which selected sample tree were tallied differed between 1998 and 1999–2000 (Table 26).

The difficulty in using the data in tblREGEN is a result of a dynamic tree sampling protocol (sample tree selection criteria and height classes) between 1998 and 1999–2000 (see Section 1.2.3.6). To compile tree density information tblREGEN and tblCRUISE were combined in a table called tblTREEDENSITY (see Section 2.5.4, p. 112).

There are two plots missing from tblREGEN for undetermined reasons: 4-7-134-1-WLD and VH-210-45-1-WLD.

Table 25. Data dictionary table for tblREGEN.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 1,563 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Meas Year	The year that the plots were sampled. This field only differs from the Year	Y	Y	tblYearList	00	2000
						98	1998

Table 25. Data dictionary table for tblREGEN.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
		field—i.e., the year the plot was established—in tblSITE for plot 4-20-11-1-WLD. Apparently this plot was tallied for tblREGEN in 2000, but all of the other data for this plot was collected in 1999.				99	1999
3	Species	Tree species of the measured tree.	Y	Y	tblTreeSppList	AW	trembling aspen
						BW	White birch
						FA	Subalpine fir
						FB	Balsam fir
						LT	Tamarack
						PB	balsam poplar
						PL	lodgepole pine
						SB	black spruce
						SE	Engelmann spruce
						SW	white spruce
						SX	hybrid spruce
						UK	unknown
4	Live/Dead	Indicates whether or not the tallied trees in the record are live or dead.	Y	Y	tblTreeLiveDeadList	dead	
						live	

Table 25. Data dictionary table for tblREGEN.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
5	Plot Size	Size of the plot tallied.	Y	N		0.01 or 0.005	Despite the sampling protocol indicating a standard forest inventory (tally) plot size of 0.010 ha, the plot size of 2-11-21-2-WLD was listed as 0.005 ha.
6	0-13	Zero to 1.3 m height class, used in 1998. There are 1,312 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 252, etc.)	
7	13-30	Height class 1.3 to 3.0 m, used in 1998. There are 1,435 unpopulated.	N	N		Various values (e.g., [Blank], 1, 90, etc.)	
8	31-50	Height class 3.1 to 5.0 m, used in 1998. There are 1,494 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 51, etc.)	
9	51-7	Height class 5.1 to 7.0 m, used in 1998. There are 1,520 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 54, etc.)	
10	7 +	Height class 7 m and greater, used in 1998. There are 1,538 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 30, etc.)	
11	0-30	Zero to 30 cm height class, used in 1999 and 2000. There are 948 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 588, etc.)	

Table 25. Data dictionary table for tblREGEN.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
12	31-60	Height class 31 to 60 cm, used in 1999 and 2000. There are 804 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 157, etc.)	
13	61-90	Height class 61 to 90 cm, used in 1999 and 2000. There are 836 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 200, etc.)	
14	91-120	Height class 91 to 120 cm, used in 1999 and 2000. There are 976 unpopulated cells.	N	N		Various values (e.g., [Blank], 1, 158, etc.)	
15	121-150	Height class 121 to 150 cm, used in 1999 and 2000. There are 1,042 unpopulated cells.	N	N		Various values (e.g. [Blank], 1, 129, etc.)	
16	151-180	Height class 151 to 180 cm, used in 1999 and 2000. There are 1,147 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 1, 86, etc.)	
17	181-210	Height class 181 to 210 cm, used in 1999 and 2000. There are 1,189 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 1, 58, etc.)	

Table 25. Data dictionary table for tblREGEN.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
18	211-240	Height class 211 to 240 cm, used in 1999 and 2000. There are 1,323 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 1, 38, etc.)	
19	241-270	Height class 241 to 270 cm, used in 1999 and 2000. There are 1,292 unpopulated cells in this field.	N	N		Various values (e.g., [Blank], 1, 39, etc.)	

Table 26. Height tally classes for tblREGEN.

Height Class Tally Sampling Protocols	
1998 (m)	1999–2000 (m)
0.0–1.3	0.00–0.30
1.3–3.0	0.31–0.60
3.1–5.0	0.61–0.90
5.1–7.0	0.91–1.20
7.0 +	1.21–1.50
	1.51–1.80
	1.81–2.10
	2.11–2.40
	2.41–2.70

2.5.4 tblTREEDENSITY

The tblTREEDENSITY data table is derived from both tblREGEN and tblCRUISE (Table 27). It is an attempt to utilize the density tally data that was incompatible because of the change in sampling protocol between 1998 and 1999–2000. The tallies of tblREGEN were reorganized into common height classes, and the frequency of tree species frequency in tblCRUISE was added. In theory, the change in sample tree selection criteria from 1998 to 1999–2000 does not have an influence the tblTREEDENSITY table, since trees not meeting the selection criteria for tblREGEN were measured in tblCRUISE, and visa versa; however, it is unclear if some trees were double-counted. In some cases it appears that site index trees were measured in tblCRUISE even if the trees met the size criteria for tblREGEN, and not tblCRUISE. The tblTREEDENSITY table has 1,590 records and seven fields.

Table 27. Data dictionary table for tblTREEDENSITY.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
1	ID Number	Plot identifier for each of the 1,590 records in this table.	Y	Y	tblSITE	Various values (e.g., 1-16-209-1-WLD, 1-16-210-1-WLD, etc.)	Derived from the concatenation of administrative location (e.g. Working circle, Compartment, Block, etc.), company name, and plot number for each plot.
2	Plot Size	Size of the plot tallied.	Y	N		0.01 or 0.005	Despite the sampling protocol indicating a standard forest inventory (tally) plot size of 0.010 ha, the plot size of 2-11-21-2-WLD was listed as 0.005 ha.
3	Species	Tree species of the measured tree.	Y	Y	tblTreeSppList	AW	Trembling aspen
						BW	White birch
						FA	Subalpine fir
						FB	Balsam fir

Table 27. Data dictionary table for tblTREEDENSITY.

Field No.	Field Name	Field Description	Values Required (Y/N)	Limited Value Domain (Y/N)	Value Domain Lookup Table	Field Values	Field Value Description
						LT	Tamarack
						PB	Balsam poplar
						PL	Lodgepole pine
						SB	Black spruce
						SE	Engelmann spruce
						SW	White spruce
						UK	Unknown
4	Live/Dead	Indicates whether or not the tallied trees in the record were alive or dead.	Y	Y	tblTreeLiveDeadList	dead	
						live	
5	Total Frequency	Tally of all of the trees.	N	N		Various values (e.g., 1, 738, etc.)	
6	Below bh	Tally of tree heights <1.3 m from the point of germination.	N	N		Various values (e.g., 0, 634, etc.)	
7	Equal to Above bh	Tally of tree heights ≥1.3 from the point of germination.	N	N		Various values (e.g., 0, 334, etc.)	

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Appendices

A–1 Lookup Tables

The lookup tables in the MSE database are in alphabetical order. Only **tblVegSppCodeList** is not included in the Appendix. A printable multi-page *tblVegSppCodeList* report is available in the database file.

A–1.1 tblAgeClassList

Age Class Number	1998	1999	2000	Age Range	Seral Stage Name	Seral Stage Code	Field Guide Age Class	Chronologic Order
5	1991-1995	1992-1996	1993-1997	3-7	pioneer	P	5	1
10	1986-1990	1987-1991	1988-1992	8-12	early	E	10	2
20	1976-1980	1977-1981	1978-1982	18-22	very young	VY	20–35	3
30	1966-1970	1967-1971	1968-1972	28-32	young	Y	20–35	4
40	1956-1960	1957-1961	1958-1962	38-42	young–mid seral	YM	35+	5

A–1.2 tblAVIDensityList

AVI Density Code	AVI Density
A	6-30%
B	31-50%
C	51-75%
D	76-100%
N	0-6%

A–1.3 tblBasicTextureList

Basic Texture Abbreviation	Basic Texture	Coarseness Group	Order
	(blank) not applicable; usually water & LFH	—	0
HC	heavy clay	fine	1
SiC	silty clay	fine	2
C	Clay	fine	3
SC	sandy clay	fine	4
SiCL	silty clay loam	medium	5
CL	clay loam	medium	6
SCL	sandy clay loam	medium	7
L	Loam	medium	8
SiL	silt loam	medium	9
Si	Silt	medium	10
SiS	silty sand	coarse	11
SL	sandy loam	coarse	12
LS	loamy sand	coarse	13
S	Sand	coarse	14
Var	variable (?)	—	15

A–1.4 tblCFTypeList

CF Type Code	Coarse Fragment Type
A	Angular
R	Rounded
S	Subrounded/subangular
T	Thin, flat

A–1.5 tblColourAspectList

Aspect Code	Colour Aspect	Colour Aspect Description
	MINERAL SOILS	
1	Matrix moist	Colour of main soil constituent—structureless or weakly structured soils
2	Matrix dry	Colour of main soil constituent—structureless or weakly structured soils
3	Exped moist	Colour of moderately durable ped surfaces
4	Exped dry	Colour of moderately durable ped surfaces
5	Inped moist	Colour of moderately durable ped interior
6	Inped dry	Colour of moderately durable ped interior
7	Crushed moist	Colour of crushed and mixed soil material
8	Crushed dry	Colour of crushed and mixed soil material
	ORGANIC SOILS	
9	Natural wet/reduced	Colour of freshly dug and unaltered wet material
10	Natural wet/oxidized	Colour of the unaltered wet material
11	Pressed wet/reduced	Colour of freshly dug wet material after removal of free water, by squeezing
12	Pressed wet/oxidized	Colour of the wet material after removal of free water, by squeezing
13	Rubbed wet/oxidized	Colour of the wet material after rubbing (10 times), squeezing into clod, and breaking to expose interior
14	Rubbed dry	Colour of air-dried material after rubbing (10 times), squeezing into clod, and breaking to expose interior
	(blank) Not applicable	

A–1.6 tblCompanyList

Code	Company Name
ALC	Ainsworth Lumber Co. (Grande Prairie)
ANC	Alberta Newsprint Company (Whitecourt)
BRL	Blue Ridge Lumber (West Fraser Timber)
MWI	Millar Western Industries (Whitecourt)
SFP	Sunpine Forest Products (Sundre/Rocky Mtn House)
SLP	Slave Lake Pulp (West Fraser Timber)
WDV	Weyerhaeuser Drayton Valley
WED	Weyerhaeuser Edson
WGC	Weyerhaeuser Grande Cache
WGP	Weyerhaeuser Grande Prairie
WLD	Weldwood (Hinton)

A–1.7 tblCrownClassList

CC Code	Crown Class
D	Dominant
C	Codominant
I	Intermediate
S	Suppressed
O	Open grown

A–1.8 tblDrainageList

Drainage Code	Soil Drainage	Soil Drainage Code	Drainage Class Description
1	Very Rapidly	VR	Soil moisture content seldom exceeds field capacity in any horizon except immediately after water additions.
2	Rapidly	R	Soil moisture content seldom exceeds field capacity in any horizon except immediately after water additions.
3	Well	W	Soil moisture content does not normally exceed field capacity in any horizon (except possibly the C) for a significant period of the year.
4	Moderately Well	MW	Soil moisture in excess of field capacity remains in subsurface horizons for a small but significant period of the year.
5	Imperfectly	I	Soil moisture in excess of field capacity remains in subsurface horizons for moderately long periods during the year.
6	Poorly	P	Soil moisture in excess of field capacity remains in all horizons for a large part of the year.
7	Very Poorly	VP	Free water remains at or within 30 cm of the surface most of the year.

A–1.9 tblDrySoilList

Dry Code	Dry Ped Consistency
1	Loose
2	Soft
3	Slightly hard
4	Hard
5	Very hard
6	Extremely hard
7	Rigid
	(blank) Not applicable

A–1.10 tblEcositeList

Ecosite	Boreal Mixedwood	Lower Foothills	Upper Foothills	Montane	Subalpine
a	lichen	grassland	grassland	grassland	grassland
b	blueberry	bearberry/lichen	bearberry/lichen	bearberry	bearberry/lichen
c	Labrador tea – mesic	hairy wild rye	hairy wild rye	hairy wild rye	hairy wild rye
d	low-bush cranberry	Labrador tea – mesic	Labrador tea – mesic	dogwood	rhododendron – mesic
e	dogwood	low-bush cranberry	tall bilberry/arnica	meadow	meadow
f	horsetail	bracted honeysuckle	bracted honeysuckle	horsetail	rhododendron – subhygric
g	Labrador tea – subhygric	meadow	meadow	fen	horsetail
h	Labrador tea/horsetail	Labrador tea – subhygric	Labrador tea – subhygric	marsh	bog
i	bog	horsetail	Labrador tea/horsetail	—	fen
j	poor fen	Labrador tea/horsetail	horsetail	—	—
k	rich fen	bog	bog	—	—
l	marsh	poor fen	poor fen	—	—
m	—	rich fen	rich fen	—	—
n	—	marsh	—	—	—

A–1.11 tblEffervescenceList

Effer Code	Effervescence	Effervescence Code Description
X	None	No evidence of effervescence
VW	Very weak	Few bubble
W	Weak	Bubbles readily observed
M	Moderate	Low foam
S	Strong	Thick foam

A–1.12 tblEstablishmentList

Establishment Factor Code	Stand Establishment Factor	Establishment Factor Examples
1	Atmospheric	Atmospheric pollution, climate extremes, windthrow
2	Cutting and soil disturbance	Abandoned construction sites, clearcuts, excavation, site preparation
3	Dumping, disposal and spills	Chemical spills, effluent disposal, mine spoils
4	Fire	Intensive fires, light fires, slash burning
5	Plant/animal effects	Beaver tree cutting, disease, domestic grazing
6	Terrain related	Avalanching, eolian, recent deglaciation, rock quarry
7	Vegetation and site improvement-related effects	Fertilization, irrigation, planting
8	Water related	Inundation, temporary seepage, water table control

A–1.13 tblExposureTypeList

Exposure Code	Exposure Type	Exposure Type Description
1	Not applicable	No soil or vegetation evidence of climatic conditions deviating from the typical (zonal) conditions.
2	Wind	Influenced by strong winds, e.g., mountaintops, shores, convergent valleys ("wind-funnelling").
3	Insolation	Influenced by solar radiation.
4	Frost	Areas of cold air accumulation, e.g., depressions and valley bottoms.
5	Cold air drainage	
6	Atmospheric toxicity	Influenced by highly acidic or basic rainfall or chemical fumes.

A–1.14 tblFieldGuideList

FG Abbrev	Field Guide
WC	West-central Alberta
NO	Northern Alberta
SW	Southwestern Alberta

A–1.15 tblFloodHazardList

Flood Hazard Code	Flood Hazard
1	No hazard
2	Rare
3	May be expected
4	Frequent

A–1.16 tblGIYearList

GI Year	Growth Intercept Year
3	Third year growth-intercept
4	Fourth year growth-intercept
5	Fifth year growth-intercept

A–1.17 tblHorizBoundList

Boundary Code	Horizon Boundary Form	Horizon Boundary Form Description
B	Broken	At least one horizon is discontinuous.
I	Irregular	Horizon surface has pockets that are deeper than they are wide.
S	Smooth	Horizon surface is nearly planar.
W	Wavy	Horizon surface has pockets that are wider than they are deep.
	(blank) Not applicable; usually lowest horizon	

A–1.18 tblHorizDistinctList

Distinctness Code	Horizon Boundary Dist	Horizon Boundary Dist Description
A	Abrupt	<2cm transition
C	Clear	2-5cm transition
G	Gradual	5-15cm transition
D	Diffuse	>15cm transition
	(blank) Not applicable; usually lowest horizon	—

A–1.19 tblHueLetterList

Hue Letter	Hue Description
B	Blue (gley chart)
BG	Blue-green (gley chart)
G	Green (gley chart)
GY	Green-yellow (gley chart)
PB	Purple-blue (gley chart)
R	Red
Y	Yellow
YR	Yellow-red
	(blank) Not applicable
N	Green-Grey (gley chart)

A–1.20 tblHumusFormList

AEP Abbrev	Humusform Name	Order	Major Form	Major Order	Humusform Description
.MU	Mull	1	.MU	1	The original 'Mull' has humus incorporated into the A-horizon; F and H horizons are lacking
R.MU	Rhizomull	2	.MU	1	Characterized by a thin litter layer overlying a thick dark-coloured mineral/organic horizon where finely dispersed organic matter, mainly the residue of root systems, is incorporated with the mineral soil
Z.MU	Zoomull	3	.MU	1	Humus form consisting of a porous mass characterized by mechanically inseparable complexes of colloidal organic matter and mineral soil
.MD	Moder	4	.MD	2	Humus at varying degrees of intermixing with mineral soil
ML.MD	Mull-like moder	5	.MD	2	
T.MD	Typical moder	6	.MD	2	
W.MD	Raw moder	7	.MD	2	Humus at the intermediate transition between moder and mor; containing a L, F and thin Hi horizon
.MR	Mor	8	.MR	3	"Raw humus", humus sharply delineated from the mineral soil
F.MR	Fibrimor	9	.MR	3	
HF.MR	Humifibrimor	10	.MR	3	
FH.MR	Fibrihumimor	11	.MR	3	
H.MR	Humimor	12	.MR	3	
P.MR	Peatymor	13	P.MR	4	Humus strongly associated with lowlands - Of, Om, and Oh horizons
FP.MR	Fibric peatymor	14	P.MR	4	
MP.MR	Mesic peatymor	15	P.MR	4	
HP.MR	Humic peatymor	16	P.MR	4	
AN	Anmoor	17	AN	5	

A–1.21 tblMoistSoilList

Moist Code	Moist Soil Consistency
1	Loose
2	Very friable
3	Friable
4	Firm
5	Very firm
6	Extremely firm
	(blank) Not applicable

A–1.22 tblMoistureList

MR Code	Ecological Moisture Regime	Alternate Moisture Regime
1	Very xeric	Very dry
2	Xeric	Dry
3	Subxeric	Moderately dry
4	Submesic	Moderately fresh
5	Mesic	Fresh
6	Subhygric	Moderately moist
7	Hygric	Moist
8	Subhydric	Moderately wet
9	Hydric	Wet

A–1.23 tblMottleAbnList

Mottle Abn Code	Abn Class	Mottle Abundance Code Description
F	Few	<2 % of exposed surface
C	Common	2-20 % of exposed surface
M	Many	>20% of exposed surface
X	None	0 % of exposed surface

A–1.24 tblMottleBoundList

Mottle Bound Code	Mottle Boundary Distinct	Mottle Boundary Distinct Description
S	Sharp	as a knife edge
C	Clear	<2 mm wide
D	Diffuse	>2 mm wide
	(blank) Not applicable	—

A–1.25 tblMottleContrastList

Mottles Cont Code	Mottles Contrast
F	Faint
D	Distinct
P	Prominent
	(blank) Not applicable

A–1.26 tblMottleSizeList

Mottle Size Code	Mottle Size Class	Mottle Size Description
F	Fine	<5 mm
M	Medium	5-15 mm
C	Coarse	>15 mm
	(blank) Not applicable	—

A–1.27 tblNatRegionList

Nat Subregion/ Ecoregion	NS/Ecoregion Name	Definition of area
LF	Lower Foothills	<1100m
UF	Upper Foothills	1100-1400m
MN	Montane	Unique, usually >1400m
SA	Subalpine	>1400m
BM	Boreal Mixedwood	Interior Plains (6 regions)
BH	Boreal Highlands	Hilly/plateaus of N.Alberta Uplands
SB	Subarctic	Higher elevations of N.Alta Uplands
CS	Canadian Shield	Athabasca Plain & Kazan Uplands

A–1.28 tblNutrientList

NR Code	Ecological Nutrient Regime	Alternate Nutrient Regime	Alternate Nutrient Code
1	Very poor	Oligotrophic	A
2	Poor	Submesotrophic	B
3	Medium	Mesotrophic	C
4	Rich	Permesotrophic	D
5	Very rich	Eutrophic	E

A–1.29 tblParentMaterialList

Parent Material Code	Parent Material
A	Anthropogenic
B	Bog
C	Colluvial
E	Eolian
F	Fluvial
FE	Fluviolian
FL	Fluviolacustrine
GF	Glaciofluvial
GL	Glaciolacustrine
H	Marsh
L	Lacustrine
LT	Lacustro-moraine
M	Morainal
N	Fen
O	Undifferentiated Organic
P	Saprolite
R	Rock
S	Swamp
T	Tephra
U	Undifferentiated Mineral
X	Residual

A–1.30 tblPerviousnessList

Perviousness Code	Perviousness	Perviousness Description
1	Rapidly	High capacity to transmit water vertically; soil remains wet for only a few hours. For example, large continuous vertical cracks between soil structures that do not close when wet, or large continuous pores through the soil profile.
2	Moderately	The capacity is to transit water is limited; soil remains wet for a few days.
3	Slowly	Low capacity to transmit water; soil remains wet for weeks.

A–1.31 tblPlasticList

Plasticity Code	Plasticity	Plasticity Description
1	Nonplastic	roll 4cm long and 4 mm thick cannot be formed.
2	Slightly plastic	roll 4 cm long and 4 mm thick can be formed, but cannot support its own weight (when dangled from between the thumb and forefinger).
3	Plastic	roll 4 cm long and 2 mm thick can be formed, but cannot support its own weight (when dangled from between the thumb and forefinger).
4	Very plastic	roll 4 cm long and 2 mm thick can be formed, and can support its own weight (when dangled from between the thumb and forefinger).
	(blank) Not applicable	

A–1.32 tblRootAbundList

Root Abund Code	Abundance Class	Very Fine/Fine	Medium	Coarse
X	None	0	0	0
V	Very few	N/A	N/A	N/A
F	Few	<10	<1	<1
P	Plentiful	10-100	1-10	1-5
A	Abundant	>100	>10	>5

A–1.33 tblRootDistribList

Root Distribution Code	Root Distribution	Root Distribution Description
IN	Inped	roots predominantly within ped
EX	Exped	roots predominantly along peds
MX	Matrix	no peds—structureless soils
	(blank) Not applicable	—

A–1.34 tblRootSizeList

Root Size Code	Root Size Class	Root Size Description
V	Very fine	<1 mm
F	Fine	1-2 mm
M	Medium	2-5 mm
C	Coarse	>5mm
	(blank) Not applicable	

A–1.35 tblRootOrientList

Roots Orient Code	Roots Orient Class
V	Vertical
H	Horizontal
O	Oblique
R	Random (no dominant plane)
	(blank) Not applicable

A–1.36 tblSiteMacroList

Site Position Code	Site Position Macro	Site Position Macro Description
1	Apex	upper moist convex surface, such as a mountain-top
2	Face	steep surface, usually with exposed bedrock
3	Upper slope	convex upper portion immediately below the Apex
4	Middle slope	between the Upper slope and Lower slope
5	Lower slope	generally concave slope at the base of a slope
6	Valley floor	generally level to moderate slopes bounded on both sides by mountains or hills
7	Plain	generally level surface
8	Plateau	upheld surface with a level upper surface and bounded by steep sides

A–1.37 tblSiteMesoList

Site Position Code	Site Position Meso
1	Crest
2	Upper slope
3	Middle slope
4	Lower slope
5	Toe
6	Depression
7	Level

A–1.38 tblSitePrepList

Site Prep Code	Site Prep Type
BLST	Blade straight
BRMD	Bracke mound
BRSC	Bracke scalp
C&HM	Caze & Hepner plow
DISK	Breaking disc
DONM	Donaren mound
DRAG	Chain drag (no details)
DRHV	Chain drag heavy
DRLT	Chain drag light
DRSF	Chain drag & shark fin
DTPA	Passive disc trench
DTPO	Power disc trench
EXMD	Excavator mound
HAND	Manual (hand/boot screef)
MART	Martini plow
MCBD	Method cannot be determined
NSP	No site preparation
OARE	Other - area
OLIN	Other - linear
OSPO	Other - spot
RPCS	Ripper plow

A–1.39 tblSiteShapeList

Site Shape Code	Site Surface Shape
1	Straight
2	Concave
3	Convex

A–1.40 tblSoilClassList

Class Code	Soil Class
VF	Very fine
VFF	Very fine to fine
F	Fine
FM	Fine to medium
M	Medium
MC	Medium to coarse
C	Coarse
VC	Very coarse
	(blank) Not applicable

A–1.41 tblSoilGradeList

Grade Code	Soil Grade
W	Weak
WM	Weak to moderate
M	Moderate
MS	Moderate to strong
S	Strong
	(blank) Not applicable

A–1.42 tblSoilKindlist

Kind Code	Soil Kind
ABK	Angular blocky
CDY	Cloddy (ploughed surfaces)
COL	Columnar
GR	Granular
MA	Massive
PL	Platy
PR	Prismatic
SBK	Subangular blocky
SGR	Single grained
	(blank) Not applicable

A–1.43 tblSoilKindModList

KindMod Code	Kind Modifier
PS	Pseudo-structure
	(blank) Not applicable

A–1.44 tblSuccessionList

Successional Code	Successional Status
0	Non vegetated
1	Pioneer seral
2	Young seral
3	Mature seral
4	Old seral
5	Young edaphic climax
6	Mature edaphic climax
7	Young climatic climax
8	Mature climatic climax
9	Disclimax

A–1.45 tblSurfaceExpressionList

Surface Expression Code	Surface Expression
a	Apron
b	Blanket
d	Delta
e	Depressional
f	Fen
h	Hummocky
i	Inclined
k	Subdued
l	Level
m	Rolling
o	Floodplain
p	Pitted
r	Ridged
s	Steep
t	Terraced
u	Undulating
v	Veneer

A–1.46 tblTendingList

Tending Code	Silviculture Treatment
NOTR	No treatment
FPLA	Fill plant
THIN	Thinning
HERB	Herbicide
GIRD	Girdling
PRUN	Pruning
FERT	Fertilize

A–1.47 tblTextureList

Texture Abbreviation	Texture
	(blank) Not applicable; usually water & LFH
C	Clay
CL	Clay loam
CS	Coarse sand
CSL	Coarse sandy loam
F	Fibric (organic)
FS	Fine sand
FSL	Fine sandy loam
G	Gravelly
H	Humic (organic)
HC	Heavy clay
L	Loam
LCS	Loamy coarse sand
LFS	Loamy fine sand
LMS	Loamy medium sand
LS	Loamy sand
LVCS	Loamy very coarse sand
LVFS	Loamy very fine sand
M	Mesic (organic)
MS	Medium sand
MSL	Medium sandy loam
S	Sand
SC	Sandy clay
SCL	Sandy clay loam
SI	Silt
SIC	Silty clay
SICL	Silty clay loam
SICS	Silty coarse sand
SIFS	Silty fine sand

Texture Abbreviation	Texture
SIL	Silt loam
SIMS	Silty medium sand
SIS	Silty sand
SL	Sandy loam
VCS	Very coarse sand
VFS	Very fine sand
VFSL	Very fine sandy loam
VG	Very gravelly

A–1.48 tblTreeCondList

Condition Code	Tree Condition
04	dying
06	broken stem (below 10cm top DIB)
07	broken top (above 10 top DIB)
08	conks, blind conks
09	stem insects
10	stem diseases
11	foliar insects
12	foliar diseases
13	burls, galls
14	open scars
15	closed scars
16	dead top, dieback
17	frost crack, wind shake, spiral grain
18	crook, sweep
19	>20% lean
20	forked tree (above breast height)
21	forked tree (below breast height)
22	limby
23	good condition
24	dead

A–1.49 tblTreeLiveDeadList

Tree condition
live
dead

A–1.50 tblTreeSppList

Tree Species	Tree Name
AW	trembling aspen
BW	white birch
FA	subalpine fir
FB	balsam fir
FD	Douglas fir
FX	hybrid fir
LT	tamarack
PB	balsam poplar
PJ	jack pine
PL	lodgepole pine
PX	hybrid pine
SB	black spruce
SE	Engelmann spruce
SW	white spruce
SX	hybrid spruce
UK	unknown

A–1.51 tblVegStrataList

Strata Code	Strata Type	Alternative Strata Code	Strata Description
1	Main canopy	A1	Dominant (tallest) trees, or the upper portion of height distribution for the tree population.
2	Understory canopy	A2	Tree and (or) shrub species above 5 m in height, not in the Main canopy. Refer to the Alberta Plants and Fungi—Master species List and Species Group Checklists for more information.
3	Tall shrub	B1	Tree and (or) shrub species between 2.5 m and 5 m. Refer to the Alberta Plants and Fungi—Master species List and Species Group Checklists for more information.
4	Low shrub	B2	Tree and (or) shrub species below 2.5 m. Refer to the Alberta Plants and Fungi—Master species List and Species Group Checklists for more information.
5	Forb	C	Herbaceous species. Refer to the Alberta Plants and Fungi—Master species List and Species Group Checklists for more information.
6	Grass	G	Graminoids. Refer to the Alberta Plants and Fungi—Master species List and Species Group Checklists for more information.
7	Moss/lichen	D/L	Moss, liverworts and lichens. Refer to the Alberta Plants and Fungi—Master species List and Species Group Checklists for more information.
8	Ericaceous	NA	Members of the genus Ericaceae.

A–1.52 tblWetSoilList

Wet Code	Wet Soil Consistency
1	Nonsticky
2	Slightly sticky
3	Sticky
4	Very sticky
	(blank) Not applicable

A–1.53 tblYearList

Year	Full Year
98	1998
99	1999
00	2000

A–2 Installation Instructions for CD-ROM

To access the Managed Stand Ecosite (MSE) Microsoft® Access 2000 database on a local hard drive, follow these steps:

1. Insert the MSE CD-ROM into your computer's CD drive.
2. Open your Windows Explorer.
    a. In your Windows Explorer, select the CD drive to view its contents.
    b. Select the folder named "MSE Database".
3. Go to "Edit" on the Windows Explorer menu bar, and select "Copy to folder" from the Edit menu.
4. Select the path on which you want to place the MSE database folder.
5. Click on the "OK" button.

When the download is complete, the entire MSE database can be opened as a regular Microsoft® Access 2000 database. The entire "MSE Database" folder must be transferred from the CD-ROM to the hard drive in order to maintain the relative path of files associated with the database.

NOTE: When the folder is copied from the CD-ROM the database file properties will be "Read-only". To make the database file editable, follow the steps below:

6. In Windows Explorer select the database file that was copied to your computer's hard drive (Steps 1 to 4 above).
7. Go to "File" on the Windows Explorer menu bar and select "Properties".
8. On the file properties window which pops-up uncheck the "Attributes: Read-only" box.
9. Click on the "OK" button.