ALBERTA SILVICULTURE GUIDE:
Boreal Mixedwood and Lower Foothills Natural Subregions.
Version II

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DISCLAIMER

The Mixedwood Project Team (MPT) of the Forest Growth Organization of Western Canada (FGrOW) commissioned revisions of the Mixedwood Silviculture Guide. The intent was to revise the original mixedwood Silviculture Guide for the Province of Alberta developed by the Mixedwood Management Association by replacing the electronic processes with text and flowcharts, thereby making the Guide more approachable and user-friendly. The conclusions and recommendations contained within this revised Guide are those of the consultants, and have neither been accepted nor rejected by the FGrOW members. The target audience for the Guide is the silviculture practitioner with approximately five years of post-university experience. This means that considerable experience with local conditions and silviculture systems must be used to develop reasonable assessments, interpretations, and plans.

FGrOW, its members, and the consultants that developed this Guide take no responsibility for any adverse outcomes due to the application of the information and direction provided by the Guide. The Silviculture Guide provides direction to the practitioner but is not meant to diagnose or assess conditions, make interpretations, provide treatments, or predict outcomes. Its sole intention is to provide information that the practitioner may find useful in silviculture management. The practitioner is solely responsible for the use, interpretation, and application of any information or data generated from or with assistance of the Guide.

ACKNOWLEDGEMENTS

The original guide was the product of creative and enduring efforts of many contributors over a number of years. The Steering Committee for the guide acknowledged the contribution of John Beckingham of Geographic Dynamics Corp. who envisioned a mixedwood silviculture guide for Alberta and developed a conceptual framework for it. Gitte Grover, formerly of Alberta-Pacific Forest Industries Ltd, and chair of the Mixedwood Management Association provided a thorough and detailed edit of the entire guide. Dr. Phil Comeau (Univeristy of Alberta), Dr. Vic Lieffers (University of Alberta), Dr. Richard Kabzems (British Columbia Ministry of Forests and Range) and Mr. Bill Towill (Ontario Ministry of Natural Resources) provided an academic review of the structure and content of the Guide. Their contributions strengthened the science of the Guide and provided an impetus to make the book-keeping approach which underpinned the Guide more transparent.

Funding for the original guide was primarily provided through the Forest Resource Improvement Association of Alberta as an 'Open Funds' project.

The revised version of the Guide was produced collaboratively by Milo Mihajlovich (Mihajlovich Enterprises Ltd.) and Kevin Kemball (Millennium EMS Solutions Ltd.).

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1 INTRODUCTION

The ***Alberta Silviculture Guide: Boreal Mixedwood and Lower Foothills Natural Subregions. Version II*** brings together our understanding of silviculture systems, practices, and planning with forest ecology in a practical guide that integrates this knowledge and understanding into a series of site and objective based flowcharts that can be used to facilitate developing silvicultural prescriptions for establishing and managing forest stands of mixed aspen and spruce composition (mixedwoods). The current version of the Guide integrates flowcharts, text, and decision support tools (electronic and conceptual) to assist the forest manager in prescribing an integrated suite of treatments to achieve specific mixedwood silviculture objectives.

The Guide is ***not definitive***, it offers the current "best-fit" combination of treatments to attain specific objectives on specific sites; however, other combinations of treatments may well succeed on the same site type. This is a reflection the stochastic nature of silviculture. Many environmental factors that affect tree establishment and growth are highly variable, meaning that a specific suite of treatments may or may not succeed on the same site type depending on variability of environmental factors. The Guide addresses this by recommending the most robust combination of treatments for each site type. To assist the practitioner in amending or adapting treatment prescriptions to changes in conditions or site variations, a suite of constraints (both abiotic and biotic) is identified and treatment recommendations are based on these constraints. The likelihood of constraints arising on a specific edatopic grid position is provided, thus enabling the practitioner to identify the rationale underpinning the recommended treatment regime for each site type.

Treatment recommendations are based on the most current science and technology.

The Guide is not meant to replace the knowledge and experience of the silviculturist and is designed for a practitioner with approximately five years of experience. It provides direction based largely on the interpretation of current scientific and tacit knowledge about boreal forest ecology and silviculture. The focus is on understanding and working with the natural and dominant ecosystem processes that influence the structure, function, composition, and development of forest stands in the boreal mixedwood ecosystems of Alberta. As much as possible the user is encouraged to develop objectives for a site that are consistent with the inherent natural capability of the site (moisture and nutrient regime) and with the site's current plant community characteristics. Linking a site with the "right" objectives, so the objectives are similar to the natural trajectory of the ecosystem, tends to increase the probability of success. As well it tends to be more cost effective because less intervention is required. It is often more desirable to nudge a stand onto the preferred trajectory rather than exert considerable resources overcoming the site's natural tendency.

As well as ecological conditions, the social, economic, and regulatory environment influences forestry operations. In Alberta, strategic planning and developing strategic level goals and objectives is largely done through the development and implementation of a Detailed Forest Management Plan (DFMP). A fundamental requirement of successful silviculture is to have strategic plans that have explicit

statements of product requirements and of desired future forest conditions at the stand and landscape levels (desired landscape pattern). While each company may have a very different strategic plan, each plan has to be carried out at the stand level. Inevitably, actions at the stand level (what, where, and when) manifest themselves in the availability of fiber, as well as landscape pattern, structure, and availability and diversity of valued ecosystem components such as wildlife habitat. This Guide provides stand level planning tools to assist the practitioner in making decisions, which cumulatively manifest themselves over time, to achieve strategic level economic, social, and environmental goals.

The guide is an integration of text, decision support tools, and flowcharts. Generally, decision processes are supported by flowcharts and text while decision support tools address specific challenges or problems.

Based on an assessment of ecological site conditions, the Guide is capable of assisting the user in predicting the potential success of alternative silviculture regimes to obtain specific forest composition objectives (D=>80% deciduous; DC=deciduous dominated mixedwood; CD=conifer dominated mixedwood; C=>80% conifer) when the stand is 15 years old. Fifteen years was deemed to be a reasonable point in time where a stand has some degree of stability in tree species composition. Each company has different objectives, goals, obligations, and requirements for timber supply as well as for the social and environmental values required from the forest. Each company's business strategy and forest management system is different and, as such, this Guide does not attempt to predict the growth and yield or other ecological attributes of forest stands through to rotation. It does, however, provide guidance to assist the user to develop a reforestation plan and a harvest plan, and to assess the potential utility of the plan to meet tree species composition objectives at 15 years post-harvest. It is beyond the scope of this version of the Guide to provide predictions of forest conditions beyond 15 years. The user must refer to the Detailed Forest Management Plan that applies to their area for specific forest management objectives, strategies, and systems.

This Silviculture Guide allows the user to set objectives that include stands of pure aspen and pure spruce or stands of various admixtures of the species. Mixed species stands are both common and important in the Boreal Mixedwood and Lower Foothills Natural Subregions of Alberta. Some areas of the landscape should be managed to maintain the integrity of mixedwood ecosystems, which (in this context) means maintaining mixtures of species that naturally occur together. Maintaining mixedwood stands as an integral part of the forested landscape is being recognized as a priority across the boreal forest (Greene et al. 2000). There are numerous reasons to manage for mixedwoods, including that (Comeau 1996):

1. mixedwoods occur naturally,
2. they provide a valuable visual resource,
3. mixedwood forests are more diverse and support a greater diversity of other organisms than single species forests,
4. mixedwood stands may suffer reduced impacts from insect and disease problems and reduce risk of loss,

5. broadleaf trees can serve as a valuable nurse crop for conifers,
6. broadleaf trees can improve nutrient availability in mixed stands,
7. mixed stands may provide greater wood yield than pure stands,
8. mixedwood stands may be more readily sustainable than growing single species stands, and
9. regulations may require management of mixed species stands.

This ecologically-based silviculture guide provides information and recommendations to forest managers and others on planning, development, and implementation of ecologically sustainable silviculture practices. It represents a synthesis of current knowledge, research and experience as interpreted by the authors. The Guide is not free of the paradigm created by the current regulatory environment in Alberta.

The interpretations within the guide must be used in association with the skill, experience, and professional judgment of the practitioner to develop responsible and sustainable silviculture management plans. Silviculturists may use an adaptive management approach to refine their use of the Guide as results of applying our reforestation and harvest plans are evaluated.

Silviculture is the art and science of managing forests for specific objectives outlined by a landowner (Baker 1934, Smith 1962, Smith et al. 1997, Graham and Jain 1998); therefore, it must consider economic, social, regulatory, environmental and biological factors and impacts. Forestry is a business; therefore, economic return must be a primary consideration in all decisions. This can be accomplished by ensuring that expenditures provide an adequate return at an acceptable level of risk.

Silvicultural practices manipulate forest vegetation through prescriptions to fulfill various objectives such as sustaining wildlife habitat, maintaining hydrological processes, restoring ecosystems, conserving biodiversity, and producing wood products (Graham and Jain 1998). Silviculture practices are described in detail by a silvicultural system, which outlines a plan of treatments over the life of a stand for the purpose of fulfilling a set of values or interests for a particular landowner (Graham and Jain 1998). It ensures that future yields of goods and other values are conserved, while harvesting or utilizing currently available goods (Smith 1962, Smith et al. 1997). Therefore, silvicultural systems need to be placed within the context of the ecological and environmental characteristics of the ecosystem being managed. For boreal forests, a key component of silvicultural systems is the development and implementation of treatments that maintain an assortment of forest structures, compositions, and conditions.

Silviculture systems depend upon silviculture planning, which integrates silviculture activities at all management levels—Strategic, Tactical and Operational. Planning incorporates specific issues by developing approaches to deal with site quality, stand composition and density, stand structure, wood quality, relative market value, harvesting and treatment regime, growth and yield, landscape pattern, and net present value. The idea is to produce a planning system that ties harvest and regeneration systems to the desired end product while considering net present value (costs and return) and the desired future forest condition at the stand and landscape levels.

The ***Alberta Silviculture Guide: Boreal Mixedwood and Lower Foothills Natural Subregions. Version II*** brings together understanding of silviculture systems, practices, and planning with forest ecology in a practical guide that integrates this knowledge and understanding into a decision–making process. The results of this process applied to many stands over time will culminate in the achievement of strategic level objectives. Regardless of strategic intentions and management level plans, what occurs on the ground at the stand level dictates future forest conditions at both the stand and landscape levels. This Guide provides support to practitioners in making effective stand level decisions to facilitate the achievement of forest management planning goals.

1.1 COMPONENTS AND STRUCTURE OF THE SILVICULTURE GUIDE

The Silviculture Guide is a hybrid decision support system that consists of tools and processes that allow the user to develop objectives, evaluate ecological site conditions, evaluate abiotic and biotic constraints, and develop an encompassing reforestation plan.

The Guide has the following components:

1. Written Sections that provide background to assist the user to understand the concepts and processes
2. Time units that describe the temporal framework for the Guide including the timing of assessments and treatments
3. Processes and Tools
    a. Process: A structured series of steps assisting decision making, generally presented as a flowchart.
    b. Tool: An interactive table, chart, or calculator providing decision support and or organizing information.
4. Fact sheets describing the tools.
5. Edatopes (either stand-alone or composited based on limiting factors) are used as a framework for ecological interpretation

The temporal framework of the guide provides a timeframe within which evaluations, assessments, and treatments are applied. The Processes components of the Guide walk the user through a series of questions and answers that collect information and document decisions to develop a record of ecological site conditions, site objectives and limitations, and the series of treatments selected to achieve the site objectives. The Fact Sheets component of the Guide provides a Fact Sheet for each of the Processes and Tools with a description about how to use the Tool or Process. The Edatope component of the Guide provides a series of edatopes (moisture and nutrient grid) with various types of information presented to assist with decisions and interpretations while working through the Tools and Processes. Each of these components will be described briefly below.

1.1.1 WRITTEN SECTIONS OF THE SILVICULTURE GUIDE

This component of the Silviculture Guide provides written text that explains many of the concepts to assist the user in understanding some of the ecology and reasoning behind the decision-making process. Table 1.1 lists each section of the Guide.

Table 1.1 Names of the written sections of the Silviculture Guide.

Section 1	Introduction
Section 2	**Silviculture Strategies**
Section 3	**Making Pre-treatment Silviculture Prescriptions**
Section 4	**Plant Community Management**
Section 5	**Quantifying Plant Community Interactions**
Section 6	**Evaluating Information in Silviculture Decision-Making**
Section 7	**Site Adjustment Treatments**
Section 8	**Propagules Introduction**
Section 9	**Winter Injury and Temporary Saturation of the Rooting Zone**
Section 10	**Abiotic Factors and Their Influence on Forest Ecosystem Establishment**
Appendix 1	**Case Study**
Appendix 2	**Edatopes**
Appendix 3	**Prescription Support Flowcharts**

1.1.2 TEMPORAL FRAMEWORK OF THE SILVICULTURE GUIDE

The ***Alberta Silviculture Guide: Boreal Mixedwood and Lower Foothills Natural Subregions. Version II*** assists the practitioner develop a reforestation plan that will result in a stand having a specific compositional objective (D, DC, CD, or C) at 15 years of age. The temporal interval ranges from pre-harvest assessment through treatments at age 10 – 12 (Performance phase).

T1 REMOTE ASSESSMENT

The remote assessment is done before any fieldwork is conducted. The objective is to collect information about the ecological characteristics of the site using various reference sources: remote sensing images such as aerial photographs and high-resolution multi-spectral images, existing ecosite classifications, Alberta Forest Vegetation Inventory (AVI), soils and terrain maps, and Wet Area Mapping (WAM). This information can be used to pre-stratify before a pre-harvest ecological site assessment or as a foundation to continue to the next timeframe in the Silviculture Guide until a site visit can be planned. The intensity of remote assessment and field assessment will vary depending on the type of site, the objectives for the site, and the experience of the practitioner in that specific area.

Aerial photograph interpretation, in conjunction with forest inventory information and soil survey information, is one method of carrying out a general level of ecological classification. It should be used to complement field level investigations not replace them. The results of this type of classification can be applied to many forest management practices. This type of ecological classification can also be used

to identify areas that may require more detailed field surveying, thus balancing the required resolution of ecological classification with time/cost effectiveness.

If an ecosite map is not available for your area or you require additional information about specific ecological site characteristics, the *Ecological classification using resource maps and aerial photographs, Saskatchewan boreal mixedwoods* (Beckingham and Futoransky 1996) report can provide guidance. See Section 10 (Abiotic Factors and Their Influence on Forest Ecosystem Establishment) of this Guide to better understand the abiotic factors that contribute to the ecological conditions at a particular site. Please review Section 6 of this Guide (Evaluating information in silviculture decision-making (method and error)) for direction on stratification of a site and some of the sources of error in site assessment and Reforestation and Harvest Plan development. See Section 5 of this guide (Quantifying Plant Community Interactions) for guidance about interpreting remote assessment information.

T2 PRE-HARVEST ASSESSMENT AND PLAN DEVELOPMENT

Pre-harvest assessment is completed prior to the development of the reforestation prescription. Pre-harvest assessment requires the stratification of the site into homogeneous ecological units (see Section 6) and the collection of ecological data for each treatment unit. Section 10 of this guide provides a brief interpretation about relevance of the abiotic components of a site. See Section 5 of this guide (Quantifying Plant Community Interactions) for guidance about interpreting pre-harvest assessment information. Once Pre-harvest assessment data is collected and moisture and nutrient regime are known, the process of developing a silviculture prescription is begun.

Section 3 – Making Pre-treatment Silviculture Prescriptions leads the user through a decision-making process that results in silviculture prescription.

T3 HARVEST

Harvest is generally planned around seasonality of transportation and spatial harvest sequence developed in the DFMP. Silviculturists should endeavor to ensure that harvesting operations staff are aware of the potential impact of harvesting activities on silvicultural success. In particular, harvesting practices can substantially reduce aspen reforestation success by negatively impacting suckers or by reducing soil porosity (commonly referred to as compaction). Harvesting practices that damage soil or stimulate reedgrass rhizome reproduction can considerably increase the cost of coniferous reforestation efforts. In effect, these practices increase the risk of conifer reforestation failure thereby requiring additional silvicultural effort to mitigate said risk.

T4 POST-HARVEST ASSESSMENT (AFTER HARVEST AND BEFORE TREATMENT)

The Post-harvest Assessment is done after the stand has been harvested and before any treatments have been applied. The post-harvest assessment serves four purposes:

1. It confirms presence of plant species likely to compete with crop species.
2. It links seasonal and longer-term climatic variation to vegetation predictions.
3. It confirms the presence of slash levels and water table rebound issues.
4. Finally, it ensures harvesting operations have not negatively impacted deciduous regeneration potential or coniferous reforestation opportunities.

See Section 5 of this guide (Quantifying Plant Community Interactions) for guidance about post- harvest assessment and interpreting the information.

T5 TREATMENT

After post-harvest assessment, any adjustments to the treatment plan identified in the post-harvest assessment are made as required. The silvicultural prescription must be adjusted to reflect these changes; this provides more assurance of success and provides a more sound basis for monitoring.

T6 ESTABLISHMENT (TREATMENT TO 4 YEARS OLD)

At the Establishment time in the Silviculture Guide time frame herbaceous species can exert considerable competitive pressure on the crop. The nature and magnitude of competition is dependent on ecological site conditions and the tree species composition objectives for the site. Plant community assessments during the establishment phase are critical to success. During this stage of plant community development, herbaceous competition develops more quickly than larger woody species. Therefore, herbaceous species exert the greatest competitive constraint on crop tree species (Bell *et al*. 2000, Wagner 2000). The type, rate, and timing of herbicide application during the establishment stage exerts an enormous influence on the dynamic interaction of competing herbaceous, woody, and both deciduous and conifer crop species. The practitioner has an opportunity to strongly influence stand composition depending on the tree species present and the timing and extent of vegetation management treatment.

Section 5 of the Guide provides detailed guidance on assessing and managing reforestation in this most dynamic phase of plant community establishment and development. See Section 5.6 (Establishment Phase (T6) Assessments), Section 5.7 (Thresholds), and Section 5.8 (Interpreting Establishment (T6) Assessments) for a discussion about competitive interactions, understanding and setting thresholds, and interpreting establishment assessments during the Establishment Phase of the Silviculture Guide time frame.

The Establishment Phase flowchart provides guidance for setting competition treatment thresholds, assessing vegetation, and prescribing treatments in the Establishment Phase (Years 1 - 4) of plant community assembly. The process recommends user pre-determined competition threshold values and a light- based competition index (Comeau Competition Index Tool) to assist the practitioner in deciding

whether white spruce seedlings are under sufficient competition to require treatment. Guidance is also provided in understanding the role of aspen facilitation in white spruce establishment. Further guidance is provided on the impact on aspen as crop species of using vegetation management treatments to attain mixedwood silvicultural outcomes. Please see Sections 5.6,54.7, and 5.8 for discussion about T6 assessments, thresholds and assessment interpretation.

T7 COMPOSITION (5 TO 7 YEARS OLD) TO T8 PERFORMANCE (8 TO 12 YEARS OLD)

Development of the plant community begins to stabilize in the Composition phase (5 to 7 years old) of development. At this phase vegetation management treatments focus on shifting composition toward management objectives (D, DC, CD, C). Therefore, community assessments need to determine if interactions between crop species (i.e. spruce and aspen) are competitive, facilitative, or both. In the Composition phase, woody species competition may contribute substantially to overall competition burden while herbaceous competition (particularly from reedgrass) continues to limit crop tree growth; this means that woody and herbaceous competition must be addressed. Please see Section 5.9 (Composition (T7) and Performance (T8) Assessments) for a description of the role of vegetation assessment, interpretation, and treatment.

The Composition Phase process uses pre-determined competition threshold values and suggests practitioners use a light- based competition index to assist the practitioner in deciding whether white spruce seedlings under competition require treatment to reduce competition. Should the practitioner decide to treat competing vegetation the process offers guidance (based on composition objective and the facilitative value of aspen) in selecting treatment extent and timing.

In the Performance phase, community composition and trajectory are clearly evident. Treatments can reinforce an existing trajectory or somewhat alter a compositional objective but they are not able to produce the massive alterations in the assembly of the plant community induced by treatments in the Establishment (T6) phase. Please see Sections 5.9, 5.10, and 5.11 for a discussion about Post Establishment assessments and their interpretation. Section 5.7 provides a general discussion about thresholds and their application.

In the Performance phase, emphasis on woody competition suggests use of a woody species interaction tool (Lorimer's Competition Index Tool) to quantify plant community status versus silvicultural objective. Please see the Fact Sheet for a description of the use the Lorimer's Competition Index Tool.

T9 OBJECTIVE (15 YEARS OLD)

The objective phase in the Silviculture Guide defines the target interval for species composition. Fifteen years was deemed to be a reasonable point in time where a stand has some degree of stability in tree species composition and it aligns with the final regulatory assessment of regeneration in Alberta. There are four stand composition objective classes (Table 1.2). Based on an assessment of ecological site conditions, the Guide can assist the user in predicting the potential success of alternative silviculture regimes to obtain specific forest composition objectives when the stand is 15 years old. Objectives are

set in the Pre-harvest Process (Pre-harvest Plan Development). See Section 4 for a description of the process of setting objectives. At approximately 15 years, post-treatment the composition of the stand must be assessed and the results documented. This will allow comparison of the actual outcome with the predicted outcome so an adaptive management strategy can be applied to improve the linkage between ecological site conditions, composition at 15 years, treatment regime, and risk assessment.

Table 1.2 Tree species composition objective at 15 years old.

Objective Code	Objective Name	Composition Description
D	Deciduous	> 80% deciduous trees
DC	Deciduous dominated mixedwood	Deciduous trees < 80% and > 50%
CD	Conifer dominated mixedwood	Conifer trees < 80% and > 50%
C	Conifer	> 80% Conifer trees

1.1.3 TOOLS AND PROCESSES

The ***Alberta Silviculture Guide: Boreal Mixedwood and Lower Foothills Natural Subregions. Version II*** consists of 5 tools and three types of process flowcharts. The process flowcharts guide the practitioner in making decisions related to the assessment of biotic and abiotic conditions, interpretation of the assessment information, and in the development of prescriptions for treatments and management interventions to address diagnosed constraints to tree establishment and growth. Each process is supported by a separate chapter of the Guide. In turn, the chapters supporting the process flowcharts are linked to sections of the Guide which summarize and interpret the current (2017) state of the knowledge of mixedwood reforestation. The process contains references or/and hot links to the knowledge summaries as does the verbiage supporting the process flowcharts.

The tools are stand-alone electronic tools that assist the practitioner in assessing and interpreting key factors that determine or limit mixedwood reforestation. There is a fact sheet included with each silviculture tool that explains how to use the tool (Table 1.3).

Table 1.3 Fact sheets that describe how to use the silviculture Guide processes and tools.

Fact Sheet 01	**Comeau Competition Index Tool**
Fact Sheet 02	**Deciduous Propagule Potential Tool**
Fact Sheet 03	**Light Threshold Tool**
Fact Sheet 04	**Lorimer's Competition Index Tool**
Fact Sheet 05	**Stocking / Density Calculator Tool**

1.1.4 EDATOPES USED AS A FRAMEWORK FOR ECOLOGICAL INTERPRETATION

Many of the decisions the user is asked to make while navigating through the Alberta Silviculture Guide processes and tools are supported with additional information to improve comprehension and understanding of the topic. An edatope is used to display information about the distribution of various plant species and their characteristics and site limitations related to moisture and nutrient regime. An edatope is a soil moisture/nutrient grid that displays the potential ranges of combinations of moisture regime and nutrient regime (Beckingham and Archibald, 1996). Each location on the edatope defines a

specific combination of soil moisture and nutrient conditions. Figure 1.1 depicts an edatope with the location of ecosites from the central mixedwood region of northern Alberta.

The edatope presented in Figure 1.2 is modified to better adapt it to being a decision support tool for silvicultural decisions. The modified edatope groups edatopes that are silviculturally similar; that is, the suite of silviculture interventions commonly used on the edatopes that are grouped is essentially the same. Thus, while there are subtle differences between the component edatopic grid positions from a silvicultural perspective they pose the same overarching constraints and are addressed using the same array of treatment interventions.

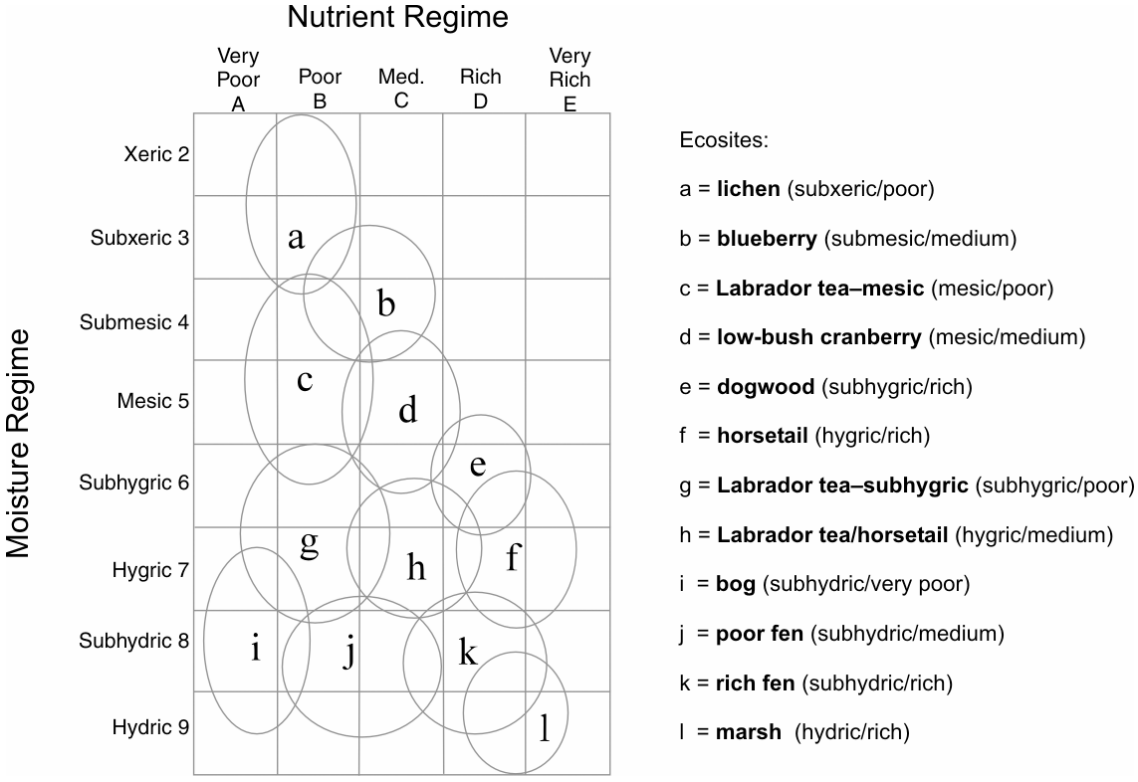

Figure 1.1 Edatope illustrating the moisture and nutrient conditions of ecosites from northern Alberta.

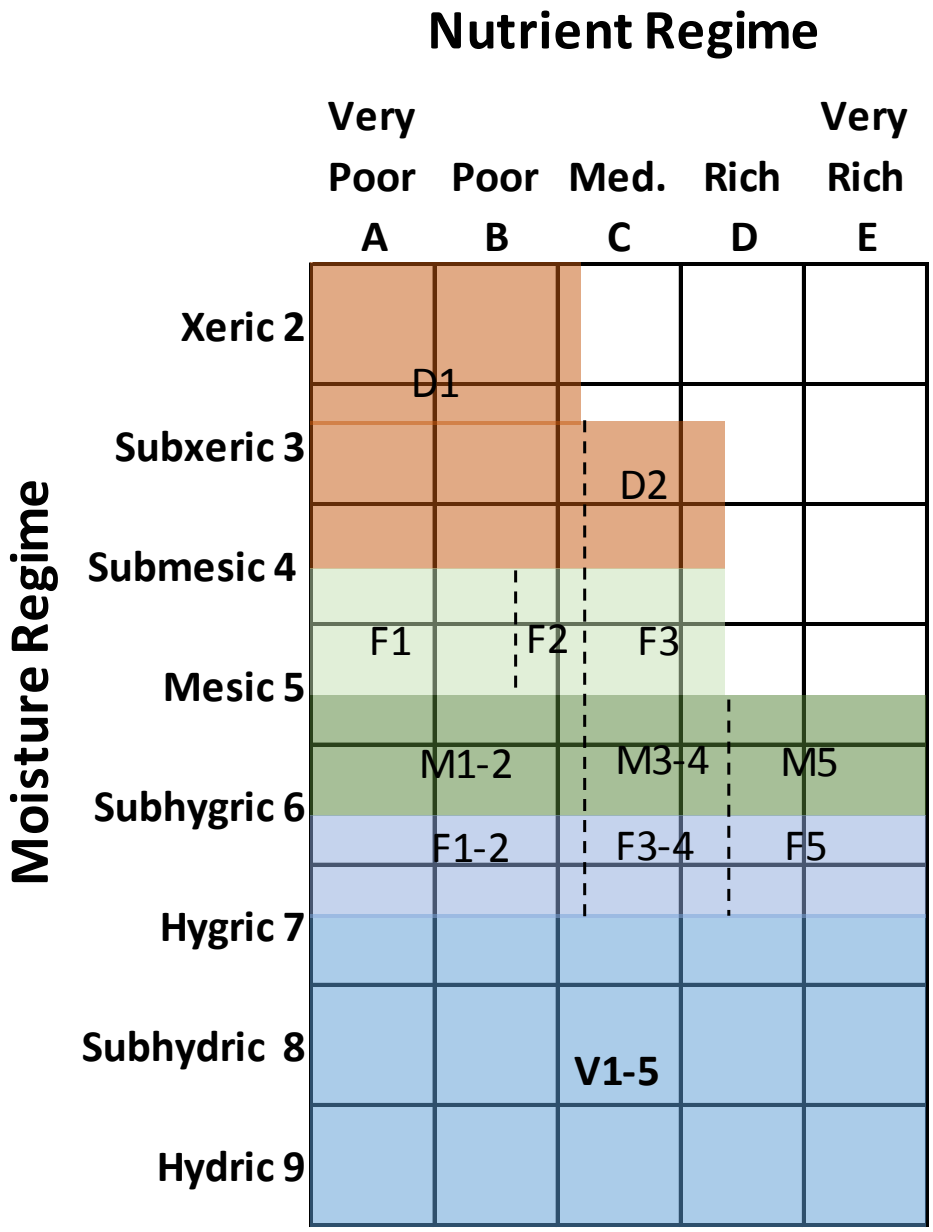

Figure 1.2 Edatope used in the Alberta Silviculture Guide. (D=dry; F=fresh; M=moist; W=wet; V=very wet)

1.2 HOW TO USE THE SILVICULTURE GUIDE

The Guide is a decision support system. Information on how to use the Guide is provided with each component and within the fact sheets. The Guide is not intended to be read like a book. There are several ways to use the Silviculture Guide. Each of the three primary phases of the Guide is essentially a stand-alone decision support system with unique flowcharts, unique guidance text and unique interpretive tools. The overarching aspects of the Guide are:

1. The silvicultural edatope on which the silviculturist is operating, and
2. The compositional objective the silviculturist wishes to achieve. In the Guide, compositional objectives are defined by both “composition” and “aggregation” to better refine the silvicultural focus.

To use the Guide to develop a silvicultural prescription the practitioner should:

5. Review this Introduction Section of the Guide to obtain an overview of the system.
6. Determine the Phase of stand renewal in which the prescription is to be made.
7. Identify the Process Flowchart and Tools that are required to support decisions in that Phase.
8. Conduct a field assessment as appropriate to collect the necessary data to support use of the Process Flowchart identified.
9. Review the Fact Sheets of the Guide that describe how to use the specific Tool or Tools that apply to the Phase of interest.
10. Work through the Process flowchart to develop a prescription.
    a. Access supporting materials and Tools to support your decision-making.