

GUIDE TO RANGE PLANT COMMUNITY TYPES AND CARRYING CAPACITY FOR THE DRY AND CENTRAL MIXEDWOOD SUBREGIONS IN ALBERTA



Alberta
SUSTAINABLE RESOURCE
DEVELOPMENT

Public Lands
& Forests

**GUIDE TO RANGE PLANT COMMUNITY TYPES AND CARRYING CAPACITY
FOR THE DRY AND CENTRAL MIXEDWOOD SUBREGIONS IN ALBERTA**

6th approximation

**(Please note this edition is a revision of the 5th approximation of the Range Plant
Community Types and Carrying Capacity for the Dry and Central Mixedwood Pub. No.
T/074)**

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**ALBERTA SUSTAINABLE
RESOURCE DEVELOPMENT
Public Lands and Forests Division**

FORWARD

In January, 1999 the Rangeland Health Assessment Project was initiated. Its purpose was to coordinate the development of rangeland health assessment methods and ecological site descriptions for both forested and grassland dominated rangelands in the province and transfer the new technology (awareness, information and tools) to livestock producers, staff and other stakeholders. This document "Range plant communities and carrying capacity for the Dry and Central Mixedwood subregions of Alberta, Sixth Approximation" is an effort to organize existing range plant community information for the Boreal Mixedwood subregions into an ecological framework, with the ultimate goal of developing ecological site descriptions as outlined in the Alberta Rangeland Health Task Group, Terms of Reference (1999). This guide encompasses the work of Karen Sundquist (who worked on previous approximations) and Dave Downing who developed the classification for the deciduous communities in the Eastern ecodistricts of the Dry Mixedwood (Downing and Karpuk 1992) and developed a forage gap analysis for the Mixedwood subregions (Downing 2000). It also tries to incorporate the work done by Beckingham and Archibald (1996) on the forested ecosites of the Boreal Mixedwood and work done by Thompson and Hansen (2004) on the lotic and lentic communities of the Mixedwood subregions. As we collect new research information, the sixth approximation will evolve into a range ecological site field guide. The sixth approximation has updated successional sequences of tame pastures in both the Dry and Central areas of the Mixedwood region. This approximation has new information about 4 cutblock community types in the Central Mixedwood area [see section CME p.232].

One major outcome of the project will be to produce ecological base information which will be used to develop management tools for northern livestock producers, resource managers and other stakeholders of Alberta's Boreal forest. This new knowledge will aide in the sustainable grazing of forested plant communities, and maintain the good health and proper functioning of these ecosystems.

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ABSTRACT

The Dry and Central Mixedwood subregions cover nearly 40% of the province and are dominated by aspen, jack pine on coarse textured soils and black spruce, willows and sedges in the poorly drained areas. The vegetative communities in these subregions are important because they provide summer range for livestock, prime habitat for many species of wildlife, productive watersheds, recreational areas and timber harvesting. Despite the importance of these vegetation types there is little information on their ecology. The lack of information makes it very difficult to develop sustainable management prescriptions for multiple use. As a result guides like this and "Ecosites of Northern Alberta" (Beckingham and Archibald 1996) are being developed to provide a framework that will easily group the vegetative community types. It is hoped these classification systems can be used by field staff to assess the ecology of the sites and develop management prescriptions on lands within each region.

This guide represents the analysis of 949 grass, shrubland, conifer and deciduous plots described in the Dry and Central Mixedwood subregions. These types are split into:

Dry Mixedwood subregion

A. Native grasslands and shrubland	33 types
B. Tame forage communities	13 types
C. Deciduous community types	22 types
D. Mixedwood and Conifer community types	15 types

Central Mixedwood subregion

A. Native grassland and shrubland	19 types
B. Tame forage communities	7 types
C. Deciduous community types	19 types
D. Mixedwood and Conifer community types	12 types
E. Forest Cutblock community types	4 types

INTRODUCTION

The province of Alberta is covered by a broad spectrum of vegetation regions from prairie in the South, to alpine vegetation in the mountains and dense forests in the Central and Northern parts of the province. These broad vegetation regions have been classified into 6 regions and 20 subregions (Dept. of Environmental Protection 1994). Within each subregion, there are groups of plant communities which exist under similar, localized, environmental conditions and can be further influenced by human impacts. Sustainable management of these subregions requires an understanding of the ecology of the site as well as the ability to recognize the vegetative communities that have similar productivity and response to disturbance.

Vegetative communities in the province of Alberta are highly regarded by most resource managers for their ability to provide a wide variety of benefits. They are a classic example of multiple use land, providing summer range for livestock, prime habitat for many species of wildlife, productive watersheds and recreational areas. Despite the importance of these vegetation types there is little information on their ecology. The lack of information makes it very difficult to develop sustainable management prescriptions for multiple use.

The purpose of this guide was to develop a framework that would easily group the plant community types utilized by livestock in the Dry and Central Mixedwood subregions of the province and provide ecologically sustainable stocking rate information. Plant communities are grouped into a hierarchical system based on ecology. These groupings include successional communities which occur under natural succession or disturbance such as fire, timber or grazing operations. All of the known relationships among communities are described within this guide in table format and/or schematically. Additionally, each known plant community is described in detail.

It is hoped this classification system can be used by field staff to assess the ecology and sustainable stocking rate of sites in order to develop management prescriptions on lands within each subregion. This guide supplements the work done by Beckingham and Archibald (1996) on the forested community types in the Boreal Mixedwood of northern Alberta. Their guide is a good description of the forested community types found within the subregions, but it does not include forage production values or grazing management information. It also does not provide a description of the native grassland and shrubland communities which are utilized extensively by livestock in these subregions.

CLIMATE AND MODAL PLANT COMMUNITIES

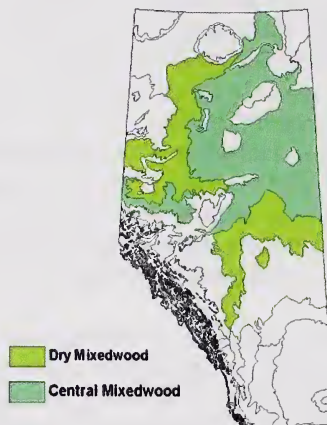
Dry Mixedwood subregion

The **Dry Mixedwood (DM)** subregion represents a transition between the Central and Peace River Parklands and the Central Mixedwood subregions. This subregion occurs in three areas of the province (Map 1). One section is located between the Central Parkland and the Central Mixedwood subregions in the southern portion of the boreal forest and includes the Onion Lake, Athabasca, Westlock plains and Whitefish and Frog Uplands **ecodistricts** (Strong

and Thompson 1995). A second area is located immediately east of Edmonton in the Cooking Lake upland ecodistrict. The third and largest area parallels the Peace River in northwestern Alberta from Grande Prairie to Fort Vermillion and includes the Debolt, Dunvegan, Falher, Smoky, Grimshaw, Manning, High Level and Boyer plains ecodistricts.

Mean summer temperature is 13.8°C and winter temperatures average -10.5 °C, which is somewhat warmer than the Central Mixedwood subregion and somewhat cooler than the Parkland subregion. Mean annual precipitation is 380 mm, which is drier than the Central Mixedwood, but wetter than the Parkland subregion.

The **modal plant community** in this subregion is dominated by aspen, with a variable understory dominated by rose, pea-vine, beaked hazelnut, saskatoon and marsh reed grass. Jack pine stands are found on well drained, coarse-textured parent materials and poorly drained sites are dominated by black spruce, willows and sedge species.



Map 1. Location of Dry and Central Mixedwood Subregions in Alberta.

Central Mixedwood subregion

The **Central Mixedwood (CM)** subregion is the largest in the province covering over 210,000 km² or nearly 32% of the province (Strong and Leggat 1992)(Map 1). Mean annual summer temperature is 13.5 °C and winter temperature averages -13 °C. Annual precipitation averages 397 mm which is wetter than the Dry Mixedwood.

The modal plant communities are vegetated by aspen and balsam poplar with understories composed of a variety of herbs and deciduous shrubs. White spruce and balsam fir are the climatic climax species but are not well represented because of the frequent occurrence of fire. On dry, well drained, coarse-textured soils jack pine dominates and the poorly drained sites are dominated by black spruce, willows and sedge species. These communities are very similar to the Dry Mixedwood subregion, but drier conditions of the Dry Mixedwood favours formation of a number of native grassland communities which are not found in the Central Mixedwood.

APPROACH AND METHODS OF CLASSIFICATION

Approach: Ecological classification hierarchy and terminology

The system of classification in this guide was initially based on the community type approach of Mueggler (1988). Mueggler's system was chosen over the habitat type approach (Daubenmire 1952) or ecosystem association approach (Corns and Annas 1986) because it could classify plant communities regardless of their successional status. However, as the philosophy of rangeland health and proper functioning condition of a site evolved, it became apparent (through data analysis) that there was a need to also organize the various plant communities based on their response to disturbance (i.e. disturbance vs. natural succession) within an area under similar environmental influences.

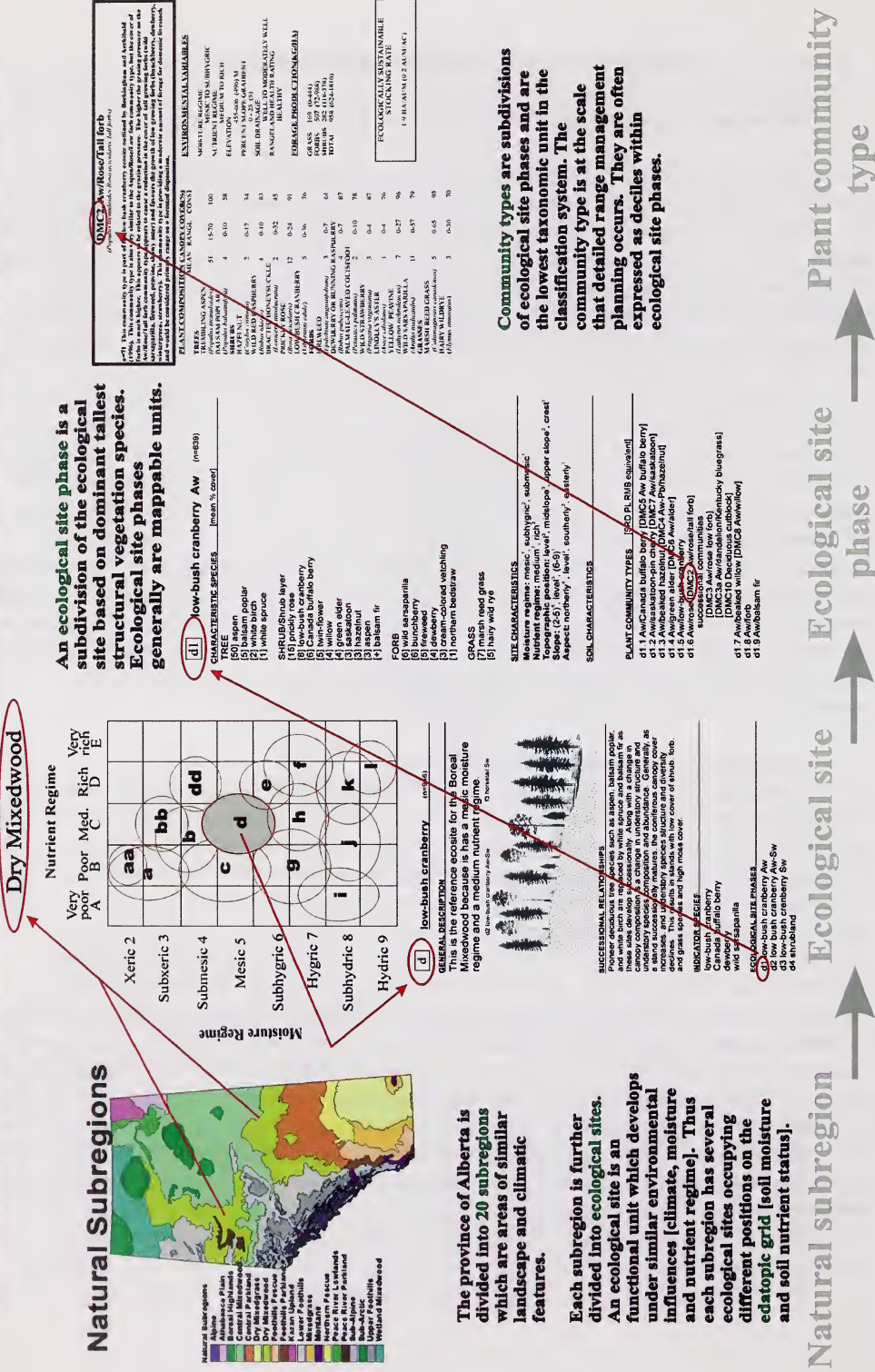
It was determined that the ecosystem classification system developed by Corns and Annas (1986) and Beckingham et al. (1996) could accommodate this additional requirement. Thus, the new system developed for rangelands is a combination of Mueggler (1988) and Beckingham et al. (1996). Consequently, this guide adopts a similar ecological unit classification hierarchy (**ecosite, ecosite phase, plant community**). In an effort to first, link the hierarchical system with the historic rangeland system, and second, to create a provincially standardized rangeland approach, slightly different classification terminology was developed. The new terms **ecological site** and **ecological site phase** (replacing Beckingham et al.'s [1996] ecosite and ecosite phase terms respectively), provide subtle distinction to recognize the blending of the old systems and still be recognizable to readers familiar with the original terminology. See Figure 1 for a flow chart of the classification and general presentation of information. See Figure 2 for a representation of the ecosite phases in the Boreal Mixedwood Region.

Methods: Plant community classification

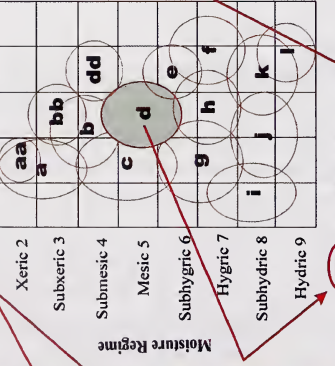
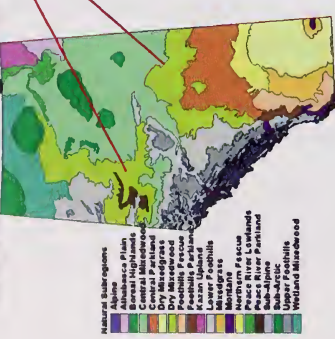
Sampling for this guide occurred within the Dry and Central Mixedwood subregions. This guide outlines the classification of 685 plots described in the Dry Mixedwood and 210 plots described in the Central Mixedwood subregions. The procedure for inventory of plots followed the Range Survey Manual (1992) and uses the MF5 form. A plot consisted of a 10 m x 10 m macroplot and ten randomly selected 1 m x 1 m microplots to record the canopy cover of shrubs and ten nested 20 cm x 50 cm microplots to record the canopy cover of forbs and grass. For a description of the methodology for riparian plots done in the Mixedwood subregions see (Thompson and Hansen 2004). The data for each site was analysed using the multivariate analysis techniques of classification and ordination. Classification is the assignment of samples to classes or groups based on the similarity of species. A polythetic agglomerative approach was used to group the samples. This technique assigns each sample to a cluster which has a single measure. It then agglomerates these clusters into a hierarchy of larger and larger clusters until finally a single cluster contains all the samples (Gauch 1982). Cluster analysis was performed in SAS and Euclidean distance was used as the Cluster Distance Measure and Ward's method was used in the Group Linkage Method. The groupings generated in cluster analysis were overlain on the site ordination to determine final groupings.

Ecological classification of Alberta

An example of the hierarchical system of ecological unit classification for Alberta is outlined below, starting at the large units of natural subregions map and going down to plant community type. [in part, adapted from Beckingham and Archibald 1996]



Natural Subregions



The province of Alberta is divided into 20 subregions which are areas of similar landscape and climatic features.

Each subregion is further divided into ecological sites. An ecological site is an functional unit which develops under similar environmental influences (climate, moisture and nutrient regime). Thus each subregion has several ecological sites occupying different positions on the edatopic grid [soil moisture and soil nutrient status].

Natural subregion

Dry Mixedwood

An ecological site phase is a subdivision of the ecological site based on dominant tallest structural vegetation species. Ecological site phases generally are mappable units.

d1 low-bush cranberry Aw (m2p3)

CHARACTERISTIC SPECIES [mean % cover]

TREE

- (1) balsam poplar
- (2) white birch
- (1) white spruce

SHRUB/SHrub layer

- (1) low-bush cranberry
- (1) Canada buffalo berry
- (1) common dogwood
- (4) willow
- (4) green alder
- (4) black ash
- (3) hazelnut
- (4) balsam fir

GRASS

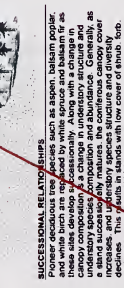
- (6) wild sarapilla
- (6) bunchberry
- (1) northern bewitch
- (3) cream-colored witching

GRASS

- (1) northern meadow grass
- (5) hairy wild rye

d1 low-bush cranberry (m2p3)

GENERAL DESCRIPTION
 This is a species for (N) Dry soil Mixedwood because it has a mesic moisture regime and a medium nutrient regime



SUCCESSIONAL RELATIONSHIPS
 Species such as spruce, balsam poplar and white birch are replaced by white spruce and balsam fir as canopy composition changes in understorey structure and understorey species composition and abundance. Generally, as understorey species composition and abundance increases and secondary species structure and diversity increases, the cover of shrub, fern and grass species and high moss cover.

INDICATOR SPECIES
 low-bush cranberry
 Canada buffalo berry
 wild sarapilla

ECOLOGICAL SITE PHASES
 d1 low-bush cranberry Aw
 d3 low-bush cranberry Sw
 d4 shrubland

Ecological site

Ecological site phase

Plant community type

Community types are subdivisions of ecological site phases and are the lowest taxonomic unit in the classification system. The community type is at the scale that detailed range management planning occurs. They are often expressed as deciles within ecological site phases.

DM23 Aw/Rose/fall forb
 (M2P3) low-bush cranberry (bush canopy) (low forb)

ENVIRONMENTAL VARIABLES

PLANT COMMUNITIES: CANOPY COVER
 (M2P3) low-bush cranberry (bush canopy) (low forb)

SOIL TYPE: M2P3

MOISTURE REGIME: M2P3

NUTRIENT REGIME: M2P3

TREE: (1) balsam poplar, (2) white birch, (1) white spruce

SHRUB/SHrub layer: (1) low-bush cranberry, (1) Canada buffalo berry, (1) common dogwood, (4) willow, (4) green alder, (4) black ash, (3) hazelnut, (4) balsam fir

GRASS: (6) wild sarapilla, (6) bunchberry, (1) northern bewitch, (3) cream-colored witching

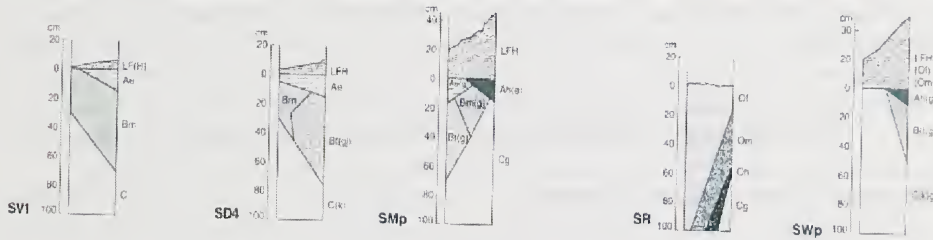
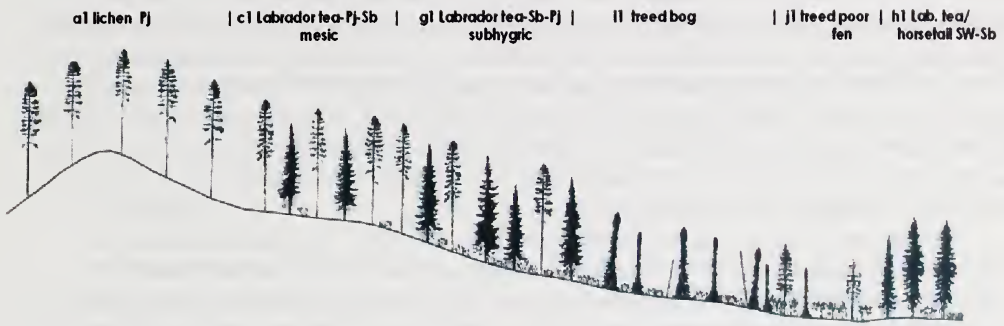
GRASS: (1) northern meadow grass, (5) hairy wild rye

SOIL CHARACTERISTICS: Topographic position: level, multipole, upper slope, crest
 Slope: (2-5) level, (6-8) steep

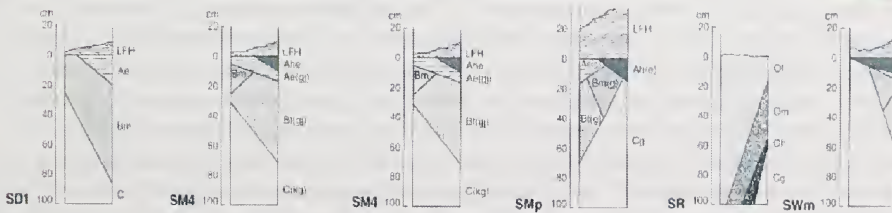
PLANT COMMUNITY TYPES: DM23 Aw/Rose/fall forb, DM33a Aw/strawberry, DM3 Aw/strawberry, DM4 Aw/strawberry, DM5 Aw/strawberry, DM6 Aw/strawberry, DM7 Aw/strawberry, DM8 Aw/strawberry, DM9 Aw/strawberry

ECOLOGICAL SITE PHASES: d1 low-bush cranberry Aw, d3 low-bush cranberry Sw, d4 shrubland

Figure 1. Ecological Classification System for Alberta



b1 blueberry Pj-Aw | d2 lowbush cranberry Aw-Sw | e1 dogwood Pb-Aw | f3 horsetail Sw | k2 shrubby rich fen | f1 marsh



Source: Figure 12 Schematic cross section of the Boreal Mixedwood represented by common ecosite phases and soil types. (Beckingham and Archibald 1996)

Figure 2. Ecosite phases of the Boreal Mixedwood Natural Region.

Ordination was used to find relationships among species, communities and environmental variables. Ordination reduces the dimensionality of the data to 1-3 most important axes to which environmental gradients can be assigned. The ordination technique used in the analysis of the data was DECORANA (Detrended Correspondence Analysis). DECORANA detrends and rescales the axes thereby reducing the arching and compression of axes problems associated with other ordination techniques (Reciprocal averaging, Principle Components Analysis). Once final groupings were determined on the ordination specific environmental variables can be assigned to the variation outlined on the ordination axes.

Plant community type summaries were generated in SAS, by averaging plant species composition, range in composition, and percent constancy of occurrence, among vegetation inventory plots which were part of a community type. Environmental data was subsequently sorted into the same plant community groupings to create the plant community descriptions outlined in this guide. The number of sample plots on which the description was based is also provided (e.g. n=16).

RANGE MANAGEMENT CONCEPTS AND METHODS

Ecologically sustainable stocking rates

Ecologically sustainable stocking rates (ESSR) values are suggested for each plant community. These values reflect the maximum number of livestock (i.e. **animal unit month [AUM]** per area [e.g. ac]) that can be supported by the plant community given inherent biophysical constraints and the ecological goal of sustainable health and proper functioning of the plant community. When the ESSR is multiplied by the area of a plant community polygon the result is termed **ecologically sustainable carrying capacity (ESCC)**, and is expressed as AUMs. Often the ESCC must be adjusted for management factors (e.g. reduced livestock distribution), management goals (e.g. multiple use and values, etc.), drought conditions, and other natural phenomena impacting the site (e.g. forage quality, fire, pests, etc.). This adjusted/reduced value is the **ecologically sustainable grazing capacity (ESGC)**. The ESGC values are not provided in the plant community guide because the necessary adjustments are determined by the rangeland resource manager.

Suggested ESSR values were determined from a combination of clipping studies, long-term rangeland reference area data, estimated production, and historical grazing experience. In order to sustain ecological health and function of the plant community, the ESSR was based on the allocation of up to 25 % of total production for forested plant community types, and up to 50 % of total production for grass and shrub land types within the Dry and Central Mixedwood subregions, and the forage requirements one animal unit (i.e. 455 kg of dry matter per month). The stocking rate ranges provided, are based on total forage production tempered by the forage value of the contributing plant species and the ecological status of the plant community. For example a plant community with high total production but that is mostly composed of unpalatable or unreachable material will have a high end range value based on less than 25% of total production. If this same plant community is of low ecological status, a further reduction is made to the range and the recommended stocking rate to allow for health recovery. The unallocated biomass production (carry over), is needed for the maintenance of ecological

functions (e.g. nutrient cycling, viable diverse plant communities, hydrological function, and soil protection, etc.) and plant community services (forage production, habitat maintenance, etc.). The allocation of biomass production in this manner is well established, and supported, by the scientific community and the percent allocation varies with Natural Subregion (Holechek et al. 1995).

Rangeland Health

Range health is determined by comparing the functioning of ecological processes on an area (e.g. plant community polygon) of rangeland to a standard (i.e. RPC) described within an ecological site description. An ecological site is similar to the concept of **range site**, but a broader list of characteristics are described. An ecological site is defined by the Task Group on Unity and Concepts (1995) as, “*a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation*”. This guide can be used to determine the appropriate **reference range plant community**, within an ecological site, for a rangeland health assessment.

Rangeland health assessments are utilized to make a rapid determination of the ecological health of rangeland. We use range health terminology (healthy, healthy with problems, or unhealthy), to rank the ability of rangeland to perform certain ecological functions. These functions include: net primary production, maintenance of soil/site stability, capture and beneficial release of water, nutrient and energy cycling and plant species functional diversity. For a detailed description on how to assess rangeland health for various plant communities please refer to “*Rangeland Health Assessment for Grassland, Forest and Tame Pasture*” (Adams et al. 2003).

A ecological status score [i.e. the integrity of the plant community composition compared to the reference plant community] has been added to each community type description. These values are based on what is currently known about how a reference plant community (RPC) responds to various kinds and levels of disturbance or successional processes. The values indicate how a particular plant community fits in the state and transition model relative to the RPC. If an experienced observer wishes to estimate the health of a plant community without competing a health form, (e.g. a small riparian area), these values can be used as a guide. Occasionally there are 2 options provided for the ecological status score. This was done for two reasons: 1) to express the range of divergence from the RPC possible for a particular plant community; or 2) to allow for different health forms to be used in communities with variable shrub or tree cover (e.g. on sites with high woody cover and/or an obvious LFH layer use the forest rangeland health form and the corresponding ecological status score; on sites dominated by herbaceous cover and/or an obvious herbaceous litter layer use the native grassland form). [Note: For riparian plant communities the riparian health assessment form should be used.]

Range management objectives tend to favour the later stages of plant succession (late-seral to potential natural community (PNC) or good to excellent range condition) (Adams et al. 2003). Late seral plant communities tend to be superior in the efficient capture of solar energy, in cycling of organic matter and nutrients, in retaining moisture, in supporting wildlife habitat values and in providing the highest potential productivity for the site. In contrast, early seral stages represent plant communities with diminished ecological processes, which are less stable

and more vulnerable to erosion and invasion by weeds and non-native species. They also have diminished resource values for livestock forage production, wildlife habitat and watershed protection (Adams et al. 2003). Healthy rangelands perform important ecological functions and provide a broader suite of goods and services. In most cases these late seral plant communities are used as the RPC, but sometimes management goals influence the choice of RPC (e.g. a cut block to be maintained as untimbered rangeland).

HOW TO USE THE GUIDE

Organization of the guide

This guide is an expansion of the Ecosites of Northern Alberta guide (Beckingham and Archibald 1996). It contains new information and it is recommended that the reader has access to relevant information from both guides. The community types in this guide are closely related to the ecosites and ecosite phases outlined in Ecosites of Northern Alberta (Beckingham and Archibald 1996), and are similarly arranged (e.g. Table 1). Table 1 and Table 6 are a reproduction of Figure 11 in Ecosites of Northern Alberta with community types in this guide further separated into reference range plant communities, successional communities and harvesting and fire communities. The “Successional community types” or “Harvesting and Fire succession” categories outline the successional sequence the community types undergo with heavy grazing pressure, harvesting or fire disturbance.

The majority of ecological site and ecological site phase summary tables as well as the plant community descriptions are recorded in Ecosites of Northern Alberta (Beckingham and Archibald 1996). Any new ecological sites and ecological site phases reported in the fourth approximation are also included in this guide and are summarized before the community type descriptions. The bulk of this guide is community descriptions which include information on the dominant plant species, canopy cover, environmental conditions, response to grazing, forage production and suggested ESSRs. When available, we have included plant community successional information to help us determine rangeland health and the successional relationships on an ecological site.

Generally, in both guides, ecological units within a subregion are classified by their position on the **edatopic grid** [a specific combination of soil moisture and soil nutrient regime] (Figures 3 and 6).

The information in this guide is presented and named by:

1. Subregion/Ecological area
 - a. Dry Mixedwood [DM]
 - b. Central Mixedwood [CM]
2. Dominant cover type
 - a. Native grasslands and Shrublands [A]
 - b. Tame forage communities [B]
 - c. Deciduous forest [C]
 - d. Mixedwood and Conifer forest [D]
 - e. Forest Cutblock communities [E]

NOTE: Each dominant cover type may overlay several ecological sites and ecological site phases. For example DMA community types occur in 8 ecological sites [aa, bb, c, d, dd, f, k, and l].

3. Community types are presented and named by:

- a. Subregion/Ecological area and dominant cover type [e.g. DMA].
- b. Position on the edatopic grid. Generally, communities are named/numbered from low moisture /nutrient status to high moisture/nutrient status. For example, DMA3 is a Plains wormwood/Sedge community on the “aa” xeric/poor ecological site, while DMA7 is a Saskatoon-snowberry/hairy wild rye community type on the “d” mesic medium ecological site.

NOTE: As additional information is collected and new ecological units are identified and described, an attempt is made to fit them into the pre-existing ones. At times the usual conventions of naming and organization have to be compromised to accommodate the new units. Sometimes it was necessary to add an additional letter to an existing name to wedge the new unit into the appropriate place within the pre-existing ones. For example, the extra letter in the new ecological site “dd” and the pre-existing ecological site “d”.

Identifying plant community types

There are two methods to identify plant community types in this guide. The first method uses a key within the dominant cover categories of native grass and shrubland, tame forage, deciduous, or mixedwood and conifer. The second method involves using soil moisture and nutrient information and indicator species to identify plant community types.

Method 1. Use dichotomous key within dominant cover categories

- Step 1. Pick the appropriate subregion [DRY MIXEDWOOD or CENTRAL MIXEDWOOD].
- Step 2. Pick the appropriate category the community type is in within each subregion.
- A. The area does not have an overstory tree canopy and has not been cleared and broken, the community will fall under the NATIVE GRASSLANDS and SHRUBLANDS category.
 - B. The area has been cleared of trees, broken, and seeded down to tame forage species such as timothy or creeping red fescue, the community will be in the TAME GRASS category.
 - C. The DECIDUOUS category includes all plant communities that are dominated, [i.e. $\geq 70\%$ of the overstory], by deciduous tree species. Deciduous cutblocks are included here.
 - D. Communities which have begun to undergo succession from deciduous to conifer overstory may fall into the MIXEDWOOD category. The following is a general rule of thumb. The site is a mixedwood community if the conifer and the deciduous overstories each range between 30 -70% of the total overstory cover. For example a deciduous cover of 40% and a conifer cover of 60% is a mixedwood community. If in doubt, determine if the

understory is responding more to a deciduous or coniferous influence [e.g. loss of production due to conifer shading]. Communities dominated [i.e. $\geq 70\%$ of the overstory] by a conifers are classified in the CONIFER category.

Step 3. Turn to the appropriate section [e.g. DMA] and work through the key provided to determine the closest matching community type for the site you are evaluating. At times, the community in question does not seem to match any of the known / reported types. When this happens, consider the following information in the detailed community type descriptions.

1. In the general description text.
 - a. The number of plots utilized to describe the community [n=number of plots]. The greater the number of plots [i.e. information available], the greater the level of confidence in the clarity and accuracy of the description including the suggested ESSR.
 - b. Information about where the community is found on the landscape, response to disturbance, and natural succession. Use this information together with your field experience to determine the likely hood of a similar situation occurring on the site in question.
2. Under Plant Composition heading.
 - a. The range of a plant species canopy cover. For example, a species with a range of 0-25% may not always be visible on the site, having 0% canopy cover or it may have up to 25% cover.
 - b. The consistency value. This indicates the percentage of the plots that the species was actually present. So if n=16 and consistency was 75%, then the species occurred in 12 of the plots and not in 4 of them.
 - c. Note that tree species in the shrub LAYER are listed in the shrub section.
3. Try to use the other method to see if you can determine the plant community.

Step 4. This step is necessary only if you are completing a rangeland health assessment. In order to determine the health status of the site in question, you must decide the appropriate reference range plant community [RPC] to compare it to. Depending on the type of disturbance [grazing, timber operations, etc.] successional pathways may differ. The RPC would usually be the plant community that is at the start of the pathway. Management goals can influence the choice of RPC. For example, if an aspen-rose community on a “d” ecological site [e.g. DMC2] had undergone timber harvest, had not been seeded with tame forage species and the goal was to maintain it as a native community with out a mature aspen canopy, the appropriate RPC would be DMC10. Alternatively, if the site was to be cultivated, seeded and managed as a tame pasture, the appropriate RPC might be DMB12.

Method 2. Use edatope and indicator species

[see appendix for indicator species list and page 18-19 for plant edatopes.]

- Step 1. Pick the appropriate subregion [DRY MIXEDWOOD or CENTRAL MIXEDWOOD]. [e.g. DM]
- Step 2. Determine the appropriate ecological site based on position on the edatopic grid for the subregion. First decide soil moisture status, then soil nutrient status of the site in question. Use any available soils information to assist [e.g. AGRASID, or PLC]. [e.g. DM - mesic/medium is the “d” low-bush cranberry ecological site or DM-d]
- Step 3. Look up the possible ecological site phases within the selected ecological site on Table 1 or 6. [e.g. DM-d has “d1” low-bush cranberry aspen; “d2” low-bush cranberry aspen spruce; “d3” low-bush cranberry white spruce; and “d4” shrubland.]
- Step 4. Select the appropriate ecological site phase by first determining the dominant overstory [i.e. the highest layer of vegetation which can be either a tree, shrub, or grass species]. [e.g. For a site dominated by aspen (i.e. DM-d1), the appropriate ecological site phase is “d1” low-bush cranberry aspen.]
- Step 5. Select the appropriate community type. Within the selected ecological site phase, use indicator understory species to choose the closest matching community type. This information is shown in table 1 or 6 as part of the community type name [e.g. DMC7 aspen/saskatoon]. It is also detailed in the specific community type descriptions [i.e. species with the highest average canopy cover and consistency]. At times, the community in question does not seem to match any of the known / reported types. When this happens, consider the following information in the detailed community type descriptions.
 1. In the general description text.
 - a. The number of plots utilized to describe the community [n=number of plots]. The greater the number of plots [i.e. information available], the greater the level of confidence in the clarity and accuracy of the description including the suggested ESSR.
 - b. Information about where the community is found on the landscape, response to disturbance, and natural succession. Use this information together with your field experience to determine the likelihood of a similar situation occurring on the site in question.
 2. Under Plant Composition heading.
 - a. The range of a plant species canopy cover. For example, a species with a range of 0-25% may not always be visible on the site, having 0% canopy cover or it may have up to 25% cover.
 - b. The consistency value. This indicates the percentage of the plots that the species was actually present. So if n=16 and consistency was 75%, then the species occurred in 12 of the plots and not in 4 of them.
 - c. Note that tree species in the shrub LAYER are listed in the shrub section.

3. Try to use the other method to see if you can determine the plant community.

Step 6. This step is the same as step 4 in method 1 and is necessary only if you are completing a rangeland health assessment. In order to determine the health status of the site in question, you must decide the appropriate reference range plant community [RPC] to compare it to. Depending on the type of disturbance [grazing, timber operations, etc.] successional pathways may differ. The RPC would usually be the plant community that is at the start of the pathway. Management goals can influence the choice of RPC. For example, if an aspen-rose community on a “d” ecological site [e.g. DMC2] had undergone timber harvest, had not been seeded with tame forage species and the goal was to maintain it as a native community with out a mature aspen canopy, the appropriate RPC would be DMC10. Alternatively, if the site was to be cultivated, seeded and managed as a tame pasture, the appropriate RPC might be DMB12.

DRY MIXEDWOOD SUBREGION

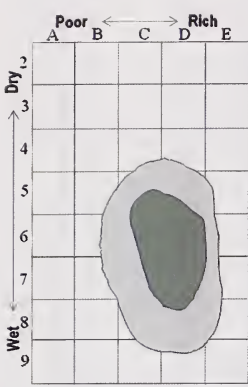
Table 1. Ecological sites, ecological site phases, forested, and range plant community types for the Dry Mixedwood subregion (adapted from Beckingham and Archibald 1996) (see Figure 2 for a diagram outlining the Ecological sites in the landscape of the Boreal Mixedwood subregions).

Ecological Site	Ecological Site phase	Forested Plant Community Type	Reference Range Plant Community	Successional Community Types	Harvesting and Fire Succession
aa grassland (xeric/poor)	aa1 plains wormwood		DMA3. Plains wormwood/Sedge		
a lichen (subxeric/poor)	a1 lichen Pj	a1.1 Pj/bearberry/lichen			
		a1.2 Pj/blueberry/lichen			
		a1.3 Pj/green alder/lichen	DMD1 Pj/Alder		
bb grassland (subxeric/medium)	bb1 western porcupine grass		DMA5 Western porcupine grass-Sedge/Fringed sage		
	bb2 northern wheat grass		DMA6 Northern wheat grass- June grass/Fringed sage		
b blueberry (submesic/medium)	b1 blueberry Pj-Aw	b1.1 Pj-Aw/blueberry - bearberry	DMD2 Pj-Aw/Bearberry		
		b1.2 Pj-Aw/blueberry - green alder			
		b1.3 Pj-Aw/blueberry - Labrador tea			
b2 blueberry Aw(Bw)	b2	b2.1 Aw(Bw)/blueberry - bearberry	DMC1. Aw/Dwarf bilberry / Bearberry / Mtn. ricegrass		
		b2.2 Aw(Bw)/blueberry - green alder	DMC1a. Aw/Blueberry		
		b2.3 Aw(Bw)/blueberry - Labrador tea			
b3 blueberry Aw-Sw	b3	b3.1 Aw-Sw/blueberry - bearberry	DMD2a Aw-Sw/Bearberry		
		b3.2 Aw-Sw/blueberry - green alder			
		b3.3 Aw-Sw/blueberry - Labrador tea			
b4 blueberry Sw-Pj	b4	b4.1 Sw-Pj/blueberry - bearberry	DMD3 Sw/Buffaloberry/Bearberry		
		b4.2 Sw-Pj/blueberry - green alder			
c Labrador tea - mesic (mesic/poor)	c1 Labrador tea - mesic Pj-Sb	c1.1 Pj-Sb/Labrador tea/feather moss			
		c1.2 Pj-Sb/green alder/feather moss			
		c1.3 Pj-Sb/feather moss			

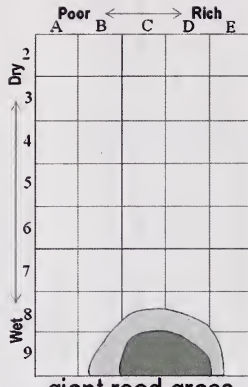
Ecological Site	Ecological Site phase	Forested Plant Community Type	Reference Range Plant Community	Successional Community Types	Harvesting and Fire Succession	
d low-bush cranberry (mesic/medium)	d1 low-bush cranberry Aw	d1.1 Aw/Canada buffalo-berry	DMC5. Aw/Bufaloberry			
		d1.2 Aw/saskatoon-pin cherry	DMC7. Aw/Saskatoon			
		d1.3 Aw/beaked hazelnut	DMC4. Aw-Pb/Hazelnut			
		d1.4 Aw/green alder	DMC6. Aw/Alder			
		d1.5 Aw/low-bush cranberry				
		d1.6 Aw/rose	DMC2. Aw/Rose/Tall forb	DMC3. Aw/Rose/Low forb DMC3a Aw/Dandelion/ Kentucky bluegrass	DMC10. Deciduous cutblocks	
		d1.7 Aw/beaked willow	DMC8a Pb-Aw/Willow			
		d1.8 Aw/forb				
		d1.9 Aw/balsam fir				
	d2 low-bush cranberry Aw-Sw	d2.1 Aw-Sw/Canada buffalo-berry				
		d2.2 Aw-Sw/beaked hazelnut				
		d2.3 Aw-Sw/green alder				
		d2.4 Aw-Sw/low-bush cranberry	DMD10 Sw-Aw/Low bush cranberry			
		d2.5 Aw-Sw/rose	DMD5 Aw-Sw/Rose/Marsh reed grass			
		d2.6 Aw-Sw/forb				
d3 low-bush cranberry Sw	d2.8 Aw-Sw/balsam fir/feather moss					
	d2.9 Aw-Sw/feather moss					
	d3.1 Sw/Canada buffalo-berry					
	d3.2 Sw/green alder	DMD4 Sw/Hazelnut/Moss				
	d3.3 Sw/low-bush cranberry	DMD7 Sw-Pb-Aw/Rose/Twinflower				
d4 shrubland	d3.4 Sw/balsam fir/feather moss					
	d3.5 Sw/feather moss	DMD11 Sw/Moss			DMD12 Sw-Bw / Raspberry	
			DMA7. Saskatoon -Snowberry/ Hairy wild rye	DMA8. Saskatoon / Sweet clover / Smooth bromo		

Ecological Site	Ecological Site phase	Forested Plant Community Type	Reference Range Plant Community	Successional Community Types	Harvesting and Fire Succession	
dd grassland (mesic/rich)	dd1 california oat grass-slender wheat grass		DMA4 Purple oat grass/Sedge - California oat grass DMA4a Veiny meadow rue/Slender wheat grass-Fringed brome			
		e dogwood (subhygric/rich)	e1 dogwood Pb-Aw	e1.1 Pb-Aw/dogwood/fern e1.2 Pb-Aw/bracted honeysuckle/fern e1.3 Pb-Aw/river alder/fern	DMC8, Pb-Aw/Red osier dogwood DMC13 Pb-Aw/Silverberry DMC14 Pb/Snowberry DMC11, Pb/Honeysuckle DMC12 Pb/River alder	DMC18 Pb-Bw/Kentucky bluegrass DMC19 Pb/Smooth brome
e dogwood (subhygric/rich)	e2 dogwood Pb-Sw	e2.1 Pb-Sw/dogwood/fern	DMD13 Sw-Pb/Red osier dogwood			
		e2.2 Pb-Sw/bracted honeysuckle/fern	DMD6 Aw-Pb-Sw/Willow/Willd sarsaparilla			
		e2.3 Pb-Sw/river alder-green alder/fern				
		e2.4 Pb-Sw/balsam fir/fern				
		e2.5 Pb-Sw/fern/feather moss				
	e3 dogwood Sw	e3.1 Sw/dogwood/fern				
		e3.2 Sw/green alder-river alder/fern				
		e3.3 Sw/balsam fir/fern				
		e3.4 Pb-Sw/fern/feather moss				
	e4 dogwood shrubland			DMA17 Red osier dogwood/Marsh reed grass	DMA18 Silverberry/ Smooth brome	
f horsetail (hygric/rich)	f1 horsetail Pb-Aw	f1.1 Pb-Aw/horsetail	DMC9, Pb-Aw/Horsetail			
		f2 horsetail Pb-Sw				
	f3 horsetail Sw	f3.1 Sw-horsetail	DMD14 Sw/Horsetail			
		f3.2 Sw/feather moss				
	f4 horsetail/willow			DMA12, Willow/Horsetail/Marsh reed grass DMA15, Sandbar- Yellow willow DMA16, Bebb willow/M. reed grass		
f5 horsetail Bw			DMA13, River alder/Horsetail			

Ecological Site	Ecological Site phase	Forested Plant Community Type	Reference Range Plant Community	Successional Community Types	Harvesting and Fire Succession
g Labrador tea (subhygric/poor)	g1 Labrador tea - subhygric Sb-Pj g2 saline-alkaline areas	g1.1 Sb-Pj/Labrador tea/feather moss			
		g1.2 Sb-Pj/feather moss			
h Labrador tea / horsetail (hygric/medium)	h1 Labrador tea / horsetail Sw-Sb	h1.1 Sw-Sb/Labrador tea/horsetail	DMA25 Rush DMA27 Three square rush DMA28 Prairie rush DMA29 Nuttall's saltgrass	DMA30 Foxtail barley	
		h1.2 Sw-Sb/Labrador tea/feather moss			
i bog (subhygric/very poor)	i1 treed bog i2 shrubby bog	i1.1 Sb/Lab. tea/cloudberry/peat moss	DMD9 Sb-Lt/Labrador tea/Moss		
		i2.1 Sb/Lab. tea/cloudberry/peat moss			
j poor fen (subhygric/medium)	j1 treed poor fen j2 shrubby poor fen j3 grassland poor fen	j1.1 Sb-Lt/dwarf birch/sedge/peat moss	DMD8 Sb/Willow/Moss		DMC16 Bw/Lab. tea
		j2.1 Sb-Lt/dwarf birch/sedge/peat moss	DMA19 Bog willow		
		j3 grassland poor fen	DMA24 Two stamened sedge		
k rich fen (subhygric/rich)	k1 treed rich fen k2 shrubby rich fen	k1.1 Lt/dwarf birch/sedge/golden moss	DMC15 Pb/Reed grass		DMC12Bw/Raspberry
		k2.1 dwarf birch/sedge/golden moss			
		k2.2 willow/sedge/brown moss	DMA10. Willow/Sedge	DMA14 Willow / Kentucky bluegrass / Dandelion	
l marsh (hygric/rich)	k3 graminoid rich fen l1 marsh	k2.3 willow/marsh reed grass	DMA10a Willow/Marsh reed grass	DMA11 Willow/Marsh reed grass-K. bluegrass	
		k3.1 sedge fen	DMA1. Sedge meadow		
		k3.2 Marsh reed grass fen	DMA2. Marsh reed grass meadow	DMA9 K. bluegrass/Dandelion	
l marsh (hygric/rich)	l1.1 cattail marsh l1.2 reed grass marsh l1.3 bulrush marsh	DMA1a Bulrush-Cattail			
		DMA20 Swamp horsetail			
		DMA21 Tall manna grass DMA22 Common reed grass DMA23 Reed canary grass DMA26 Creeping spike rush			



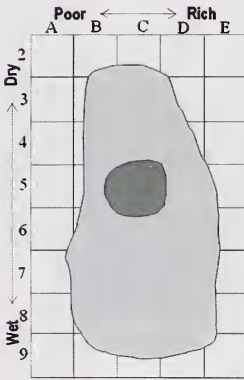
horsetails



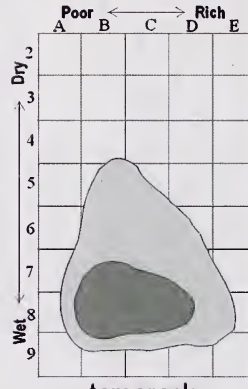
giant reed grass
cattail & bulrush



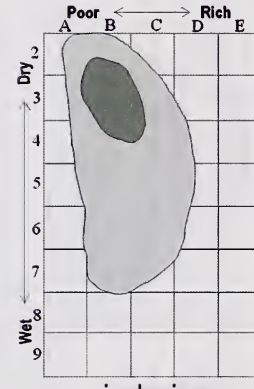
peat moss
(*Sphagnum*)



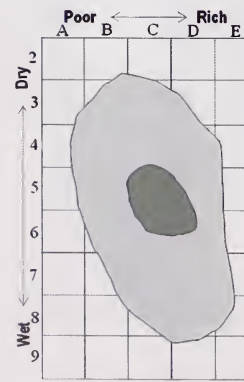
black spruce



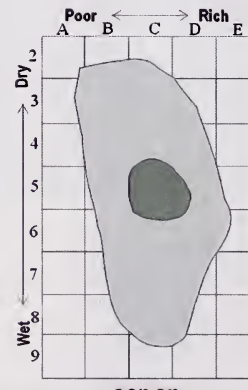
tamarack



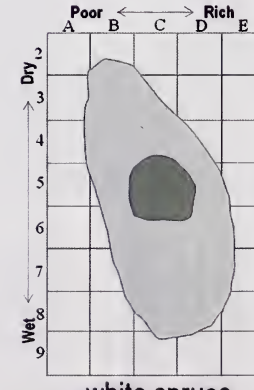
jack pine



balsam poplar
~ river alder



aspen



white spruce
~ green alder

Figure 3A. Selected plant species occurrences relative to moisture and nutrient regimes.

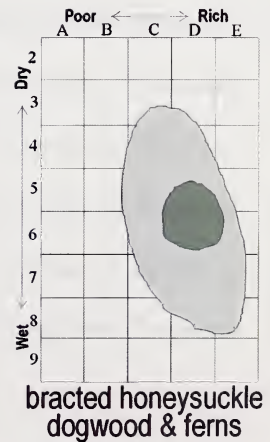
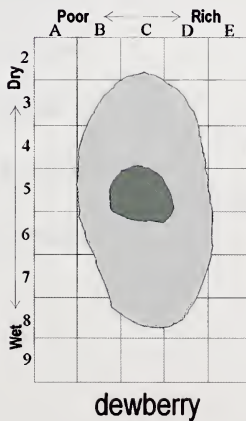
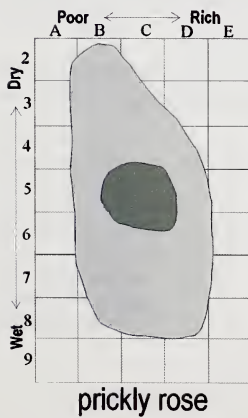
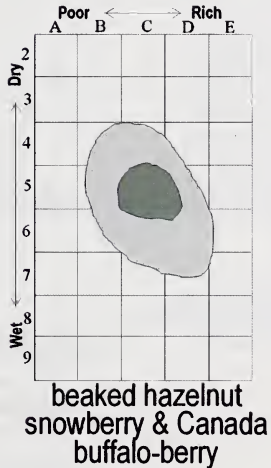
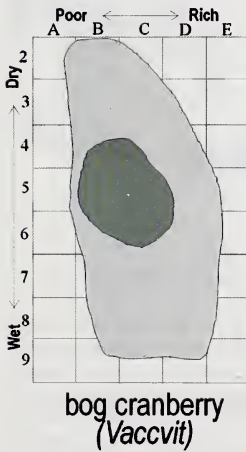
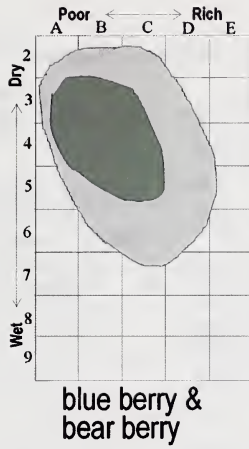
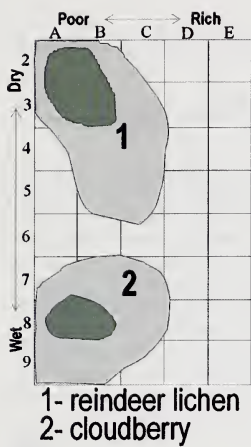


Figure 3B. Selected plant species occurrences relative to moisture and nutrient regimes.

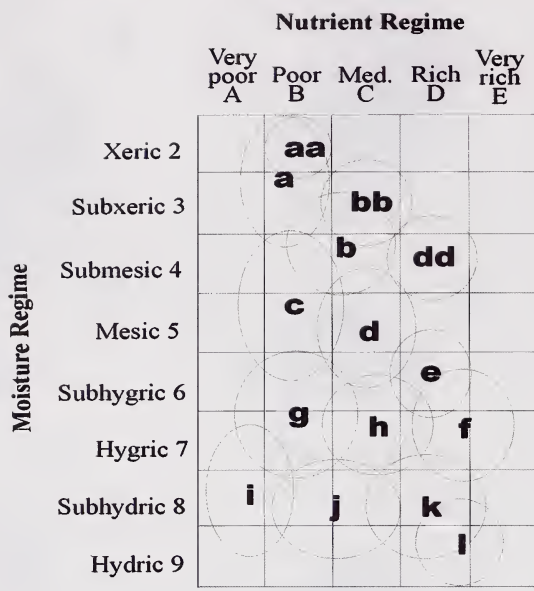


Figure 4. Edatopic grid for the Dry Mixedwood subregion

Ecological sites of the Dry Mixedwood subregion:

- | | |
|--|--|
| aa grassland (xeric/poor) | f horsetail (hygric/rich) |
| a lichen (subxeric/poor) | g Labrador tea-subhygric (subhygric/poor) |
| bb grassland (subxeric/medium) | h Labrador tea/horsetail (hygric/medium) |
| b blueberry (submesic/medium) | i bog (subhygric/very poor) |
| c Labrador tea-mesic (mesic/poor) | j poor fen (subhydric/medium) |
| d low-bush cranberry (mesic/medium) | k rich fen (subhydric/rich) |
| dd grassland (mesic/rich) | l marsh (hydric/rich) |
| e dogwood (subhygric/rich) | |

Ecological Site "aa" fact sheet

aa grass/shrubland (n=2)

GENERAL DESCRIPTION

This ecosite is associated with small grassy openings within Jack pine and aspen forests. This site has dry conditions, with rapidly drained, nutrient poor soils. The parent materials are generally coarse textured eolian, glacialfluvial or fluvial eolian in origin. The high insolation and dry site conditions favour the growth of grassland species. These include Northern ricegrass, slender wheat grass, Sedge, bearberry and plains wormwood. In the moister sites (lower slope positions) aspen and shrubs (saskatoon, rose) are quite common.



SUCCESSIONAL RELATIONSHIPS

Due to the nature of the site grasslands often remain the climax vegetation on these sites. In the moister lower slope positions shrubs often dominate the site with succession to aspen and spruce. On the drier hilltops and midslopes grasslands dominated by plains wormwood and northern ricegrass usually represent the climax vegetation. Heavy grazing pressure on the grasslands can often lead to a degraded site that is dominated by kentucky bluegrass on the moister sites.

INDICATOR SPECIES

Saskatoon
Rose
Snowberry
Beaked hazelnut
Plains wormwood
Bearberry
Strawberry
Sheep fescue
Northern ricegrass
Slender wheat grass
Hairy wild rye

xeric/poor

SITE CHARACTERISTICS

Moisture regime: xeric, subxeric, submesic
Nutrient regime: poor, medium
Topographic position: crest, upper, mid to lower slope
Slope: (0-2%) (5-10%)
Aspect: south, southwest, west

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form: mor
Surface texture: SL,L
Effective texture: SL, S
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: E, GF,FE,F
Soil subgroup: O.EB, E.DYB O.R, E.EB

ECOLOGICAL SITE PHASES

aa1 Plains wormwood (2)

Ecological Site Phase "aa1" fact sheet

aa1 Plains wormwood (n=2)

CHARACTERISTIC SPECIES

Forb

- [8] Scouring rush
- [12] Plains wormwood*
- [1] Low goldenrod
- [1] American vetch
- [1] Yellow beardstongue
- [10] Common yarrow

Grasses

- [18] Sedge species*
- [2] Sheep fescue*
- [2] Creeping red fescue
- [5] Kentucky bluegrass

SITE CHARACTERISTICS

Moisture regime: xeric, subxeric
Nutrient regime: poor,
Topographic position: crest, upper slope, midslope
Slope: 5-10%, 10-20%
Aspect: westerly, southerly

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form: mor
Surface texture: S, SL
Effective texture: S
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: E, GF, FE
Soil subgroup: O.R, O.EB, E.EB

RANGE PLANT COMMUNITY TYPES

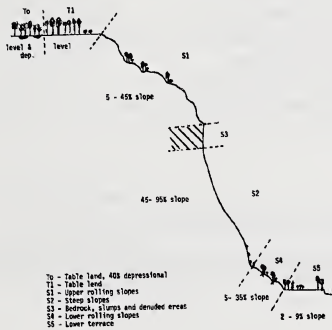
DMA3. Plains wormwood/Sedge

Ecological Site “bb” fact sheet

bb grassland (n=20)

GENERAL DESCRIPTION

This ecosite is associated with the south and west facing slopes along the Peace, Smoky and Wapiti rivers in the Dry Mixedwood subregion of Northwestern Alberta. This site has dry conditions, with rapidly drained, nutrient rich soils. The parent materials are generally glacio lacustrine, morainal, colluvial and fluvial in origin. The high insolation and dry site conditions favour the growth of grassland species. These include Western porcupine grass, Northern wheat grass, Junegrass, Sedge and Fringed sage. In the moister draws aspen and shrubs (snowberry, saskatoon, chokecherry) are quite common.



(Adams 1981)

SUCCESSIONAL RELATIONSHIPS

Due to the nature of the site grasslands often remain the climax vegetation on these sites. In the moister draws and lower slope positions aspen and spruce can succeed onto these grasslands. Frequent fire will often control the succession to trees in the moist areas. Heavy grazing pressure on the grasslands can often lead to a degraded site that is dominated by fringed sage, upland sedges and junegrass.

INDICATOR SPECIES

Western porcupine grass	Green needlegrass
Northern wheat grass	Saskatoon
Junegrass	Snowberry
Upland sedge	
Fringed sage	

subxeric/medium

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic
Nutrient regime: poor, medium, rich
Topographic position: crest, upper slope, midslope
Slope: 27%,45%,90%
Aspect: south, southwest, west

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form: mull
Surface texture: L,CL
Effective texture: C, SCL
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: GF, M, C, F
Soil subgroup: O.BL, R.BL, O.MB, S.GL,CA.DB,O.B,O.EB

ECOLOGICAL SITE PHASES

bb1 Western porcupine grass (7)
bb2 Northern wheat grass (13)

Ecological Site Phase "bb1" fact sheet

bb1 Western porcupine grass (n=7)

CHARACTERISTIC SPECIES

Shrub

- [8] Fringed sage*
- [1] Saskatoon
- [2] Snowberry

Forb

- [1] Little leaved everlasting
- [1] White camas
- [1] Loose flowered milkvetch
- [2] Prairie crocus
- [1] Wild blue flax

Grasses

- [15] Western porcupine grass*
- [15] Sedge species*
- [5] Green needle grass*
- [6] Junegrass*
- [1] Western wheat grass
- [1] Kentucky bluegrass
- [2] Northern wheat grass

SITE CHARACTERISTICS

Moisture regime: subxeric, submesic
Nutrient regime: medium, rich
Topographic position: crest, upper slope, midslope
Slope: 25-35%, 35-72%
Aspect: westerly, southerly

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form: mull
Surface texture: L,CL
Effective texture: C, SCL
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: GF, M, C, F
Soil subgroup: O.BL, R.BL, O.MB, S.GL, CA.DB,O.B,
O.EB

RANGE PLANT COMMUNITY TYPES

DMA5. Western porcupine grass-Sedge/Fringed sage

Ecological Site Phase "bb2" fact sheet

bb2 Northern wheat grass (n=13)

CHARACTERISTIC SPECIES

Shrub

- [6] Fringed sage*
- [6] Saskatoon
- [3] Snowberry
- [3] Rose

Forb

- [1] Little leaved everlasting
- [1] Lindley's aster
- [1] Showy locoweed
- [1] Cut leaved anemone
- [1] Wild blue flax
- [2] Dandelion

Grasses

- [3] Sedge species*
- [2] Green needle grass*
- [5] Junegrass*
- [3] Western wheat grass
- [1] Richardson's needlegrass
- [10] Northern wheat grass*

SITE CHARACTERISTICS

Moisture regime: xeric, subxeric
Nutrient regime: poor, medium
Topographic position: crest, upper slope, midslope
Slope: 10-90%
Aspect: westerly, southerly

SOIL CHARACTERISTICS

Organic thickness: (0-2)
Humus form: mull
Surface texture: L,CL
Effective texture: C, SCL
Depth to Mottles/Gley: none
Drainage: rapid, well
Parent material: GF, M, C, F
Soil subgroup: O.R, O.MB, O.EB, O.B, SZ.GL

RANGE PLANT COMMUNITY TYPES

DMA6. Northern wheat grass-Junegrass/Fringed sage

Ecological Site Phase "d4" fact sheet

d4 Saskatoon-Snowberry (n=11)

CHARACTERISTIC SPECIES

Tree

[4] Aspen

Shrub

[2] Beaked hazelnut

[17] Saskatoon*

[15] Snowberry*

[23] Rose*

Forb

[3] Northern bedstraw

[1] Strawberry

[2] Yellow peavine

[2] Lindley's aster

[2] American vetch

[1] Bearberry

[2] Common yarrow

Grasses

[4] Sedge species*

[1] Northern ricegrass

[3] Smooth brome

[2] Slender wheat grass*

[1] Kentucky bluegrass

[2] Hairy wild rye

SITE CHARACTERISTICS

Moisture regime: submesic, mesic

Nutrient regime: medium

Topographic position: lower slope, midslope

Slope: 0-72%

Aspect: westerly, southerly

SOIL CHARACTERISTICS

Organic thickness: (0-2)

Humus form: mor

Surface texture: L, SL

Effective texture: S, SL

Depth to Mottles/Gley: none

Drainage: rapid, well

Parent material: GF, M, C, F, GL

Soil subgroup: O.R, O.MB, O.EB, DG.SO, BR.GL

RANGE PLANT COMMUNITY TYPES

DMA7. Saskatoon-Snowberry/Hairy wild rye

DMA8. Saskatoon/Sweet clover/Smooth brome

Ecological Site Phase "d1a" fact sheet

d1a Grazed Aw (n=66)

CHARACTERISTIC SPECIES

Tree

- [48] Aspen*
- [1] Balsam poplar

Shrub

- [6] Raspberry
- [1] Low bush cranberry
- [4] Snowberry
- [14] Rose*

Forb

- [2] Northern bedstraw
- [4] Strawberry*
- [4] Yellow peavine
- [4] Bunchberry*
- [3] Lindley's aster
- [3] Wild lily-of-the-valley*
- [3] Dewberry
- [4] Wintergreen*
- [1] Dandelion*
- [1] Clover species*

Grasses

- [2] Marsh reed grass
- [3] Hairy wild rye
- [1] Purple oat grass*
- [2] Slender wheat grass*
- [1] Kentucky bluegrass

SITE CHARACTERISTICS

Moisture regime: mesic
Nutrient regime: medium
Topographic position: mid, lower slope, level
Slope: 0-5%
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (6-15), (0-5)
Humus form: mor, raw moder
Surface texture: SiL, SL, S, L
Effective texture: C, SiC, CL, SCL, SiCL
Depth to Mottles/Gley: none, (0-25)
Drainage: well, mod. well, imperfect
Parent material: GF, M, GL
Soil subgroup: O.GL, GR.GL, GL.GL

RANGE PLANT COMMUNITY TYPES

DMC3. Aw/Rose/Low forb
DMC3a. Aw-Pb/Dandelion/Kentucky bluegrass

Ecological Site Phase "d1b" fact sheet

d1b Harvested Aw (n=4)

CHARACTERISTIC SPECIES

Tree

- [20] Aspen
- [1] Balsam poplar

Shrub

- [5] Raspberry
- [2] Saskatoon
- [3] Snowberry
- [19] Rose
- [2] Low bush cranberry

Forb

- [4] Northern bedstraw
- [21] Strawberry
- [1] Yellow peavine
- [4] Lindley's aster
- [1] American vetch
- [4] Fireweed
- [1] Bunchberry

Grasses

- [17] Marsh reed grass
- [2] Northern ricegrass
- [1] Hairy wild rye
- [1] Slender wheat grass
- [2] Timothy

SITE CHARACTERISTICS

Moisture regime: mesic
Nutrient regime: medium
Topographic position: mid, lower slope, level
Slope: 0-5%
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (6-15), (0-5)
Humus form: mor, raw moder
Surface texture: SiL, SL, S, L
Effective texture: C, SiC, CL, SCL, SiCL
Depth to Mottles/Gley: none, (0-25)
Drainage: well, mod. well, imperfect
Parent material: GF, M, GL
Soil subgroup: O.GL, GR.GL, GL.GL

RANGE PLANT COMMUNITY TYPES

DMC10. Deciduous cutblocks

Ecological Site “dd” fact sheet

dd grassland (n=6)

GENERAL DESCRIPTION

This ecosite is associated with the remnant prairies located throughout the Peace River district of Alberta. This site is associated with the dark colored solonchic and chernozem soils of the region. The parent materials are generally fine textured, slightly saline, fluvial, lacustrine or lacustrine-till in origin. The hard impermeable B horizon and slightly saline conditions tend to favour the growth of grassland species. These include Western porcupine grass, slender wheat grass, sedge, California oat grass and fringed sage. Trees appear to be gradually moving into the old prairie remnants where the unfavorable characteristics of the solonchic soils have been improved from many of the agricultural practices in the area.



SUCCESSIONAL RELATIONSHIPS

Due to the nature of the site grasslands often remain the climax vegetation on these sites. However, industrial activities have greatly modified the original vegetation cover. Heavy grazing pressure on the remnant grasslands can often lead to a degraded site that is dominated by purple oat grass, sedge, Kentucky bluegrass, dandelion and smooth brome.

INDICATOR SPECIES

Saskatoon
California oat grass
Rose
Sedge species
Snowberry
Kentucky bluegrass
Strawberry
Slender wheat grass
Veiny meadow rue
Western porcupine grass
Dandelion
Purple oat grass
Common yarrow

mesic/rich

SITE CHARACTERISTICS

Moisture regime: mesic, submesic
Nutrient regime: medium, rich
Topographic position: level, lower slope
Slope: (0-5%)
Aspect: south, southwest, west

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form: mull
Surface texture: L, SiCL
Effective texture: C, CL
Depth to Mottles/Gley: none
Drainage: well, mod. well
Parent material: L
Soil subgroup: DB.SO, BL.SO, DB.SS, BL.SS, O.DB, R.DB

ECOLOGICAL SITE PHASES

ddl california oat grass-slender wheat grass

Ecological Site Phase "dd1" fact sheet

dd1 california oat grass-slender wheat grass (n=6)

CHARACTERISTIC SPECIES

Shrub

- [1] Saskatoon
- [8] Snowberry*
- [4] Rose

Forb

- [2] Northern bedstraw
- [9] Strawberry
- [5] Common yarrow
- [1] Three flowered avens
- [5] Dandelion
- [10] Veiny meadow rue*
- [4] American vetch

Grasses

- [6] California oat grass*
- [7] Western porcupine grass*
- [9] Sedge species*
- [14] Slender wheat grass*
- [8] Kentucky bluegrass
- [3] Junegrass
- [17] Purple oat grass*

SITE CHARACTERISTICS

Moisture regime: mesic, submesic
Nutrient regime: medium, rich
Topographic position: level, lower slope
Slope: (0-5%)
Aspect: south, southwest, west

SOIL CHARACTERISTICS

Organic thickness: (0-5)
Humus form: mull
Surface texture: L, SiCL
Effective texture: C, CL
Depth to Mottles/Gley: none
Drainage: well, mod. well
Parent material: L
Soil subgroup: DB.SO, BL.SO, DB.SS, BL.SS

RANGE PLANT COMMUNITY TYPES

DMA4. Purple oat grass-California oat grass-Sedge
DMA4a. Veiny meadow rue/Slender wheat grass-Fringed brome

Ecological Site Phase "e4" fact sheet

e4 dogwood shrubland (n=10)

CHARACTERISTIC SPECIES

Trees

- [1] Balsam poplar

Shrub

- [25] Red osier dogwood
- [5] Snowberry*
- [9] Rose
- [32] Silverberry

Forb

- [2] Horsetail
- [3] Strawberry
- [1] Common yarrow
- [3] Veiny meadow rue*
- [2] American vetch

Grasses

- [3] Smooth brome
- [3] Marsh reed grass
- [1] Sedge species*
- [2] Kentucky bluegrass

SITE CHARACTERISTICS

Moisture regime: mesic, subhygric
Nutrient regime: rich
Topographic position: level, lower slope
Slope: (0-5%)
Aspect: variable

SOIL CHARACTERISTICS

Organic thickness: (6-15)
Humus form: mor
Surface texture: SiL, Si, SiC, CL
Effective texture: SiC, C,
Depth to Mottles/Gley: (0-25)
Drainage: imperfect, poor, mod. well, well
Parent material: F, GL, M
Soil subgroup: O.LG, O.G, CU.R, GLCU.R

RANGE PLANT COMMUNITY TYPES

DMA17. Red osier dogwood/Marsh reed grass
DMA18. Silverberry/Smooth brome

Ecological Site Phase "f4" fact sheet

f4 horsetail/ Willow (n=39)

CHARACTERISTIC SPECIES

Shrub

- [65] Willow*
- [1] Bracted honeysuckle
- [10] Rose

Forb

- [18] Horsetail*
- [9] Arrow leaved coltsfoot
- [8] Lindley's aster
- [8] Bishop's cap
- [5] Strawberry
- [4] Veiny meadow rue
- [4] Dewberry
- [2] Fireweed

Grasses

- [23] Marsh reed grass*
- [1] Hair-like sedge
- [2] Slender wheat grass

SITE CHARACTERISTICS

Moisture regime: subhygric, hygric, mesic
Nutrient regime: rich, medium
Topographic position: level, lower slope, toe
Slope: level (2-5%)
Aspect: level, northerly

SOIL CHARACTERISTICS

Organic thickness: (6-15)
Humus form: mor
Surface texture: SiL, Si, SiC, CL
Effective texture: SiC, C,
Depth to Mottles/Gley: (0-25)
Drainage: imperfect, poor, mod. well, well
Parent material: F, GL, M
Soil subgroup: O.LG, O.G, CU.R, GLCU.R

RANGE PLANT COMMUNITY TYPES

DMA12. Willow/Horsetail/Marsh reed grass
DMA15. Sandbar willow
DMA16. Bebb willow/Marsh reed grass

Ecological Site Phase "f5" fact sheet

f5 horsetail/ Bw (n=6)

CHARACTERISTIC SPECIES

Tree

- [25] Paper birch*
- [5] Larch
- [3] White spruce

Shrub

- [8] Bracted honeysuckle
- [45] River alder*
- [3] Willow

Forb

- [27] Horsetail*
- [6] Dewberry
- [5] Bishop's cap
- [3] Twinflower
- [2] Sweet scented bedstraw
- [1] Purple-stemmed aster
- [1] American vetch

Grasses

- [9] Marsh reed grass*
- [2] Sedge species

SITE CHARACTERISTICS

Moisture regime: subhygric, hygric, mesic
Nutrient regime: rich, medium
Topographic position: level, lower slope, toe
Slope: level (2-5%)
Aspect: level, northerly

SOIL CHARACTERISTICS

Organic thickness: (6-15)
Humus form: mor
Surface texture: SiL, Si, SiC, CL
Effective texture: SiC, C,
Depth to Mottles/Gley: (0-25)
Drainage: imperfect, poor, mod. well, well
Parent material: F, GL, M
Soil subgroup: O.LG, O.G, CU.R, GLCU.R

RANGE PLANT COMMUNITY TYPES

DMA13. River alder/Horsetail

Ecological Site Phase "g2" fact sheet

g2 saline (n=11)

CHARACTERISTIC SPECIES

Shrub

[1] Sandbar willow

Forb

[1] Sea side arrowgrass

[1] Sea side buttercup

[1] Horsetail

Grasses

[12] Rush species

[20] Three square rush

[30] Prairie bulrush

[30] Nuttall's saltgrass

[25] Foxtail barley

SITE CHARACTERISTICS

Moisture regime: subhydric, hygric, hydric

Nutrient regime: medium, poor

Topographic position: level, lower slope, toe

Slope: level (2-5%)

Aspect: level, northerly

SOIL CHARACTERISTICS

Organic thickness: >80

Humus form:

Surface texture: fibric, mesic

Effective texture: fibric, mesic, humic

Depth to Mottles/Gley: (0-25)

Drainage: imperfect, poor, very poor

Parent material: O, M

Soil subgroup: TY.M, R.G, TY.F, THU.M, R.HG, ME.OC

RANGE PLANT COMMUNITY TYPES

DMA25. Rush meadow

DMA27. Three square rush

DMA28. Prairie bulrush

DMA29. Nuttall's saltgrass

DMA30. Foxtail barley

Ecological Site Phase "j3" fact sheet

j3 grassland poor fen (n=5)

CHARACTERISTIC SPECIES

Shrub

- [6] Bog willow
- [1] Bog birch

Forb

- [7] Buckbean
- [5] Marsh cinquefoil
- [3] Marsh marigold

Grasses

- [82] Two stamened sedge
- [1] Water sedge

SITE CHARACTERISTICS

Moisture regime: subhydric, hygric, hydric
Nutrient regime: medium, poor
Topographic position: level, lower slope, toe
Slope: level (2-5%)
Aspect: level, northerly

SOIL CHARACTERISTICS

Organic thickness: >80
Humus form:
Surface texture: fibric, mesic
Effective texture: fibric, mesic, humic
Depth to Mottles/Gley: (0-25)
Drainage: imperfect, poor, very poor
Parent material: O, M
Soil subgroup: TY.M, R.G, TY.F, THU.M, R.HG, ME.OC

RANGE PLANT COMMUNITY TYPES

DMA24. Two stamened sedge

Ecological Site Phase "k2a" fact sheet

k2a grazed Willow (n=13)

CHARACTERISTIC SPECIES

Tree

[1] Balsam poplar

Shrub

[1] Rose

[14] Willow*

Forb

[22] Dandelion*

[1] Clover*

[2] Mint

[1] Plantain

Grasses

[16] Kentucky bluegrass*

[12] Marsh reed grass

[1] Foxtail barley

[1] Sedge species

SITE CHARACTERISTICS

Moisture regime: hydric, subhydric, hygric

Nutrient regime: rich, medium, very rich

Topographic position: level, depression

Slope: level, (2-5%)

Aspect: level

SOIL CHARACTERISTICS

Organic thickness: >80, (6-15)

Humus form: peatymor

Surface texture: fibric, C, mesic, SiL, humic

Effective texture: mesic, C,hC,fibric,SiC, humic

Depth to Mottles/Gley: (0-25)

Drainage: very poor, poor

Parent material: O, GL, L

Soil subgroup: R.G, R.HG, TY.F, O.F

RANGE PLANT COMMUNITY TYPES

DMA11. Willow/Marsh reed grass-Kentucky bluegrass

DMA14. Willow/Kentucky bluegrass/Dandelion

Ecological Site Phase "k3a" fact sheet

k3a grazed meadow (n=2)

CHARACTERISTIC SPECIES

Forb

- [60] Dandelion*
- [14] Strawberry*
- [12] Yellow peavine
- [11] Common yarrow
- [7] Horsetail
- [3] Smooth aster
- [3] American vetch

Grasses

- [18] Kentucky bluegrass*
- [16] Rough hairgrass
- [5] Slender wheat grass
- [4] Fringed brome
- [2] Sedge species

SITE CHARACTERISTICS

Moisture regime: hydric, subhydric, hygric
Nutrient regime: rich, medium, very rich
Topographic position: level, depression
Slope: level, (2-5%)
Aspect: level

SOIL CHARACTERISTICS

Organic thickness: >80, (6-15)
Humus form: peatymor
Surface texture: fibric, C, mesic, SiL, humic
Effective texture: mesic, C,hC,fibric,SiC, humic
Depth to Mottles/Gley: (0-25)
Drainage: very poor, poor
Parent material: O, GL, L
Soil subgroup: R.G, R.HG, TY.F, O.F

RANGE PLANT COMMUNITY TYPES

DMA9. Kentucky bluegrass-Rough hairgrass

DRY MIXEDWOOD SUBREGION GRASSLAND AND SHRUBLAND COMMUNITY TYPES



Photo 1. The Western porcupine grass-Sedge/Fringed sage community is found throughout the Dry Mixedwood subregion on the south-facing slopes of the Smoky, Wapiti and Peace Rivers. This community provides early spring forage for both wildlife and cattle.



Photo 2. This picture represents the transition from sedge-marsh reed grass meadows to willow sedge dominated community types in the Dry Mixedwood subregion. These community types provide a large amount of forage, but the moist conditions limit their use by livestock.

NATIVE GRASS AND SHRUBLAND COMMUNITIES

The Dry Mixedwood subregion represents the transition between the Boreal forest and Parkland subregions. Aspen Parkland-like vegetation can develop where site conditions or drought conditions occur in combination with the driest climatic conditions (Strong 1992). The Grande Prairie area is an example where a number of these conditions occur. It is within this area that a number of native upland grassland community types have been described. On steep, south-facing slopes of the Smoky, Wapiti and Peace Rivers with subxeric moisture regimes and medium nutrient regimes the Western porcupine grass-Sedge/Fringed sage and Northern wheat grass/Fringed sage community types are common (Figure 1). The Purple oat grass-Sedge-California oat grass community type is found on more upland sites with mesic moisture and medium nutrient regimes. Wilkinson and Johnston (1983) felt these grasslands to be the climax community type on Solonetzic soils. Indeed, Adams (1981) found the Western porcupine grass-Sedge dominated community on the Peace River slopes to be associated with Dark Gray Solods and Solonetzic Gray Luvisols. These grasslands provide important forage locally for both wildlife and domestic livestock. The grasslands of the south-facing river slopes are important spring forage sources because of early spring green-up.

On coarse textured, sandy soil, with submesic moisture and poor nutrient regimes which lack tree cover are found the Plains wormwood/Sedge and Saskatoon/Bearberry/Northern ricegrass community types. These community types are usually found in association with Jack pine dominated community types.

Wet freshwater (subhydric/rich) sites are associated with sedge, bulrush, cattail, creeping spike rush, swamp horsetail, common reed grass, tall manna grass and marsh reed grass dominated meadows. Sedge, bulrush, cattail, creeping spike rush, common reed grass, tall manna grass and swamp horsetail species are usually associated with the areas of free standing water and reed grass species tend to dominate the drier edges. Flat leaved willow and basket willow will invade into these meadows to form the Willow/Sedge and Willow/Marsh reed grass community types. Rich, subhygric upland sites with better drainage are often dominated by Scouler's willow, Bebb's willow or red osier dogwood. These sites will often become dominated by trees in the absence of disturbance.

Boggy and acidic sites are often dominated by two stamened sedge and bog willow and will undergo succession to black spruce and larch in the absence of disturbance. A number of saline and alkaline sites were described in the Dry Mixedwood subregion. These sites are dominated by rush species, prairie bulrush, Nuttall's salt meadow grass, foxtail barley or three square rush. These saline communities are more common in the eastern part of the subregion.

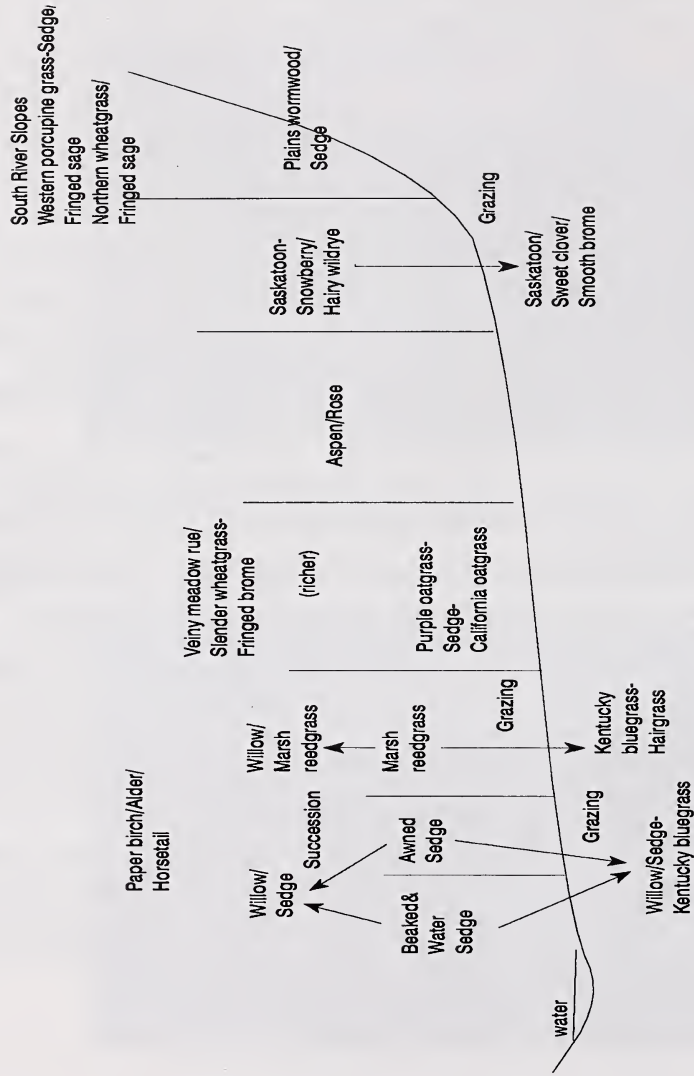


Figure 5. Overview of native grass and shrubland complex in the Dry Mixedwood subregion.

Table 2. Production values and recommended ecologically sustainable stocking rates for grass and shrubland communities, and ecological site phases described in the Dry Mixedwood subregion.*

Ecological site	Community number	Community type	Productivity (kg/ha)			Stocking rate	
			Grass	Forb	Shrub Total	ha/AUM (AUM/ac)	Recommended
aa xeric/poor	Ecological site phase	aa1 plains wormwood					4.05 (0.1)
	DMA3	Plains wormwood/Sedge	652	525	86	1263	4.05 (0.1)
		bb1 Western porcupine grass					1.01 (0.4)
bb subxeric/medium	Ecological site phase	Western porcupine grass-Sedge/Fringed sage	989	254	5	1055	1.35 - 0.58 (0.3 - 0.7)
	DMA 5						1.01 (0.4)
	Ecological site phase	bb2 Northern wheat grass					1.35 (0.3)
d mesic/medium	DMA 6	Northern wheat grass-June grass /Fringed sage	600	183	309	1146	2.02 - 1.01 (0.2 - 0.4)
	Ecological site phase	d4 shrubland				1089	2.7 (0.15)
	DMA 7	Saskatoon-Snowberry/Hairy wild rye	344	189	144	677	4.05 - 1.35 (0.1 - 0.3)
dd mesic/rich	DMA 8	Rose-Snowberry/ Smooth brome	-	-	-	1500	8.09 - 2.02 (0.05 - 0.2)
	Ecological site phase	dd 1 California oat grass				1778	0.4 (1.0)
	DMA 4	Purple oat grass-Sedge-California oat grass	-	-	-	2500	0.58 - 0.31 (0.7 - 1.3)

Table 2. Production values and recommended ecologically sustainable stocking rates for grass and shrubland communities, and ecological site phases described in the Dry Mixedwood subregion.*

Ecological site	Community number	Community type	Productivity (kg/ha)			Stocking rate ha/AUM (AUM/ac)		
			Grass	Forb	Shrub	Total	Range	Recommended
	DMA 4a	Veiny meadow rue/Slender wheat grass-Fringed brome	989	254	5	1055	0.58 - 0.31 (0.7 - 1.3)	0.4 (1.0)
e subhygric/ rich	Ecological site phase	e4 dogwood shrubland				1500		1.01 (0.4)
	DMA 17	Red osier dogwood/Marsh reed grass	-	-	-	1500	2.02 - 0.4 (0.2 - 1.0)	0.81 (0.5)
	DMA 18	Silverberry/Smooth brome	-	-	-	1500	2.02 - 0.67 (0.2 - 0.6)	1.35 (0.3)
f hygric/ rich	Ecological site phase	f4 horsetail/Willow				1451		2.02 (0.2)
	DMA 12	Willow/Horsetail/Marsh reed grass	580	1272	-	1852	40.47-1.35 (0.01 - 0.3)	2.02 (0.2)
	DMA 15	Sandarbar-Yellow willow	-	-	-	1000	-	40.47 (0.01)
	DMA 16	Bebb willow	-	-	-	1500	40.47 - 0.4 (0.01 - 1.0)	0.81 (0.5)
	Ecological site phase	f5 horsetail						8.09 (0.05)
	DMA 13	River alder/Horsetail	102	330	104	536	40.47-8.09 (0.01-0.05)	8.09 (0.05)
g subhygric/ poor	Ecological site phase	g2 saline-alkaline areas				1320		40.47 (0.01)
	DMA 25	Rush	-	-	-	1200	-	40.47 (0.01)
	DMA 27	Three square rush	-	-	-	1200	-	40.47 (0.01)
	DMA 28	Prairie Rush	-	-	-	1200	-	40.47 (0.01)

Table 2. Production values and recommended ecologically sustainable stocking rates for grass and shrubland communities, and ecological site phases described in the Dry Mixedwood subregion.*

Ecological site	Community number	Community type	Productivity (kg/ha)			Stocking rate ha/AUM (AUM/ac)		
			Grass	Forb	Shrub	Total	Range	Recommended
	DMA 29	Nuttall's salt meadow grass	-	-	-	1500	-	4.05 (0.10)
	DMA 30	Foxtail barley	-	-	-	1500	-	40.47 (0.01)
j subhydryc/medium	Ecological site phase	j2 shrubby poor fen						40.47 (0.01)
	DMA 19	Bog willow	-	-	-	1500	-	40.47 (0.01)
	Ecological site phase	j3 grassland poor fen						40.47 (0.01)
	DMA 24	Two stamened sedge	-	-	-	1500	-	40.47 (0.01)
k subhydryc/rich	Ecological site phase	k2 shrubby rich fen				1285		0.81 (0.5)
	DMA 10	Willow/Sedge	673	470	11	1169	40.47 - 0.4 (0.01 - 1.0)	0.81 (0.5)
	DMA 10a	Willow/Marsh reed grass	1325	75	1400	1400	40.47 - 0.4 (0.01 - 1.0)	0.81 (0.5)
	Ecological site phase	k2 grazed willow				2418		1.16 (0.35)
	DMA 11	Willow/Marsh reed grass-Kentucky bluegrass	1861	621	5	2487	2.02 - 0.51 (0.2 - 0.8)	1.01 (0.4)
	DMA 14	Willow/Kentucky bluegrass/Dandelion	1100	1250	2350	2350	40.47-0.67 (0.01-0.6)	1.35 (0.3)
	Ecological site phase	k3 graminoid rich fen				2992		0.45 (0.88)
	DMA 1	Sedge meadow	3673	73	40	3746	2.02 - 0.31 (0.2 - 1.3)	0.54 (0.75)

Table 2. Production values and recommended ecologically sustainable stocking rates for grass and shrubland communities, and ecological site phases described in the Dry Mixedwood subregion.*

Ecological site	Community number	Community type	Productivity (kg/ha)			Stocking rate ha/AUM (AUM/ac)		
			Grass	Forb	Shrub	Total	Range	Recommended
DMA 2		Marsh reed grass meadow	1427	812	-	2237	0.81 - 0.34 (0.5 - 1.2)	0.4 (1.0)
Ecological site phase		k3 grazed meadow				3064		0.81 (0.5)
DMA 9		Kentucky bluegrass / Dandelion	1382	1682		3064	1.35 - 0.4 (0.3 - 1.0)	0.81 (0.5)
I hydric/rich								
Ecological site phase		I1 Marsh				2250		40.47 (0.01)
DMA 1a		Bulrush-Cattail	4300			4300	-	40.47 (0.01)
DMA 20		Swamp horsetail	-	-	-	2000	-	40.47 (0.01)
DMA 21		Tall manna grass	2000			2000	-	0.54 (0.75)
DMA 22		Common reed grass	-	-	-	2000	-	40.47 (0.01)
DMA 23		Reed canary grass	-	-	-	2000	-	0.81 (0.5)
DMA 26		Creeping spike rush	-	-	-	1200	-	40.47 (0.01)

* Forage production values and stocking rates in italics are an estimate.

Key to Grass and Shrublands

1. Shrub dominated site, by willow, bog birch, silverberry, river alder or dogwood..... 2
 Grass or grass-likes dominated (<20% cover from shrubs) or if shrub-dominated by upland species
 like hazelnut, saskatoon, or rose..... 12
2. Red osier dogwood or river alder dominated sites..... 3
 Willow or silverberry dominated community types, sedge, marsh reed grass, horsetail
 dominate the herbaceous layer 4
3. Red osier dogwood dominated community.....**Red osier dogwood/Marsh reed grass (DMA17)**
 River alder dominated community.....**River alder/Horsetail (DMA13)**
4. Heavily grazed community types dominated by grazing resistant species in the herbaceous
 layer.....**Willow/Kentucky bluegrass/Dandelion (DMA14)**
 Lightly or moderately grazed sites with the herbaceous layer dominated by native species..... 5
5. Horsetail dominates the herbaceous layer.....**Willow/Horsetail/Marsh reed grass (DMA12)**
 Sedges or marsh reed grass dominate the herbaceous layer..... 6
6. Wetland sedge species dominate the herbaceous layer.....**Willow/Sedge (DMA10)**
 Upland sites dominated by willow or silverberry or boggy sites and riparian areas dominated by yellow
 willow, sandbar willow or bog willow..... 7
7. Sites dominated by marsh reed grass in the herbaceous layer..... 8
 Willow or silverberry dominated uplands, willow dominated riparian areas, or boggy areas..... 9
8. Marsh reed grass dominates the herbaceous layer.....**Willow/Marsh reed grass (DMA10a)**
 Kentucky bluegrass dominant or co-dominant in the herbaceous layer.....
**Willow/Marsh reed grass-Kentucky bluegrass (DMA11)**
9. Riparian areas dominated by sandbar and yellow willow.....**Sandbar-Yellow willow (DMA15)**
 Upland sites dominated by Bebb willow, silverberry or boggy sites dominated by bog willow..... 10
10. Boggy sites dominated by Bog willow.....**Bog willow (DMA19)**
 Upland sites dominated by Bebb willow or silverberry..... 11
11. Bebb willow dominated.....**Bebb willow/Marsh reed grass (DMA16)**
 Silverberry dominated.....**Silverberry/Smooth brome (DMA18)**
12. Lowland sites, includes saline sites..... 13
 Upland sites or south facing slopes 27
13. Sites dominated by invasive species.....**Kentucky bluegrass/Dandelion (DMA9)**
 Sites dominated by native species..... 14
14. Saline sites dominated by salt tolerant species (e.g. three square rush, foxtail barley,
 Nuttall's salt meadow grass, baltic rush)..... 15
 Non-saline sites dominated by other wetland species (e.g. cattails, sedges, reed grasses)..... 19
15. Salt tolerant bulrush (*Scirpus* species) dominated sites..... 16
 Nuttall's salt meadow grass, foxtail barley, or rush dominated..... 17
16. Prairie bulrush dominated.....**Prairie bulrush (DMA28)**
 Three square rush dominated.....**Three square rush (DMA27)**
17. Nuttall's salt meadow grass dominated.....**Nuttall's salt meadow grass (DMA29)**
 Foxtail barley or baltic rush dominated..... 18
18. Site dominated by foxtail barley.....**Foxtail barley (DMA30)**
 Baltic rush dominated meadow.....**Rush meadow (DMA25)**
19. Wet sites, dominated by sedge and marsh, narrow or northern reed grass..... 20
 Very wet sites with standing water; cattails, bulrush, swamp horsetail, tall manna grass,
 common reed grass, reed canary grass, or creeping spike rush present..... 22
20. Drier sites dominated by marsh reed grass.....**Marsh reed grass meadow (DMA2)**
 Wet sites dominated by wetland sedge species..... 21

21.	Boggy sites; poor to medium nutrient levels; dominated by two stamened sedge.....	Two stamened sedge (DMA24)	
	Fresh water sites; rich in nutrients; dominated by beaked, water, or awned sedge...	Sedge meadows (DMA1)	
22.	Common great bulrush or cattail dominated sites.....	Bulrush-Cattail (DMA1a)	
	Drier sites, edge communities near free standing water.....		23
23.	Common reed grass or reed canary grass dominated.....		24
	Tall manna grass, Creeping spike rush or swamp horsetail dominated.....		25
24.	Common reed grass (<i>Phragmites</i>) dominated.....	Common reed grass (DMA22)	
	Reed canary grass dominated.....	Reed canary grass (DMA23)	
25.	Swamp horsetail dominated.....	Swamp horsetail (DMA20)	
	Tall manna grass or creeping spike rush dominated.....		26
26.	Tall manna grass dominated.....	Tall manna grass (DMA21)	
	Creeping spike rush dominated.....	Creeping spike rush (DMA26)	
27.	South facing (river) slopes.....		28
	Open meadows and grasslands, or upland shrublands situated among forested stands.....		29
28.	Moderate slopes; the dominate grass is western porcupine grass.....	Western porcupine grass-Sedge/Fringed sage (DMA5)	
	Very steep slopes or grazing modified communities; western porcupine grass is absent/replaced by northern wheat grass.....	Northern wheat grass-Junegrass/Fringed sage (DMA6)	
29.	Mesic sites with medium to rich nutrient soils; white spruce may be present.....		30
	Upland sandy sites with poorer nutrient status; grasslands interspersed among jack pine or aspen.....		31
30.	Mesic medium sites dominated by purple oat grass, sedge, and California oat grass.....	Purple oat grass-Sedge-California oat grass (DMA4)	
	Richer sites, veiny meadow rue, slender wheat grass, and fringed brome dominate.....	Veiny meadow rue/Slender wheat grass-Fringed brome (DMA4a)	
31.	Very dry south facing hilltops dominated by Plains wormwood and upland sedge species, generally lacking shrub cover.....	Plains wormwood/Sedge (DMA3)	
	Moister sites dominated by other species.....		32
32.	Sites dominated by native herbaceous species and saskatoon and/or snowberry.....	Saskatoon-Snowberry/Hairy wild rye (DMA7)	
	Sites dominated by grazing resistant or invasive herbaceous species.....	Rose-Snowberry/Smooth brome (DMA8)	

DMA1. Sedge meadows

(*Carex aquatilis*, *C. rostrata*, *C. atherodes*)

n=41 This wetland community type is found near fresh water and can be dominated by water sedge, beaked sedge or awned sedge. The sedge meadow is a poorly drained community. As one moves to the drier edges marsh reed grass becomes predominant. Willows will invade into both the sedge and marsh reed grass dominated meadows. The sedge meadow community is very productive, but the high water table, particularly in the spring when the sedge species are most palatable, restricts livestock movement. One study done in the Yukon found that crude protein on these meadows declined from a high of 10% in May to less than 5% in September (Bailey et al. 1992).

Beaked sedge found in abundance in this community is usually associated with nitrogen rich conditions and moving water (Brierly et al. 1985). Water sedge is often found in abundance in this community type and is associated with calcium rich stagnant water (MacKinnon et al. 1992).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. (<i>Salix spp.</i>)	2	0-30	44
FORBS			
MARSH WILLOWHERB (<i>Epilobium palustris</i>)	1	0-3	2
DOCK (<i>Rumex acetosa</i>)	1	0-2	12
SKULL CAP (<i>Scutellaria galericulata</i>)	1	0-1	44
MINT (<i>Mentha arvensis</i>)	1	0-4	22
GRASSES			
BEAKED SEDGE (<i>Carex rostrata</i>)	23	0-85	56
AWNED SEDGE (<i>Carex atherodes</i>)	35	0-97	65
WATER SEDGE (<i>Carex aquatilis</i>)	21	0-90	51
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	3	0-11	17

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC-HYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION: 586(579-600) M

SOIL DRAINAGE (MEAN):
POORLY TO VERY POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

GRASS	3673(1054-5028)
FORB	73(0-80)
SHRUB	40(0-120)
TOTAL	3746(1254-5028)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.54 ha/AUM (2.02-0.31)
0.75 AUM/ac (0.2-1.3)

DMA1a. Bulrush-Cattail
(Scirpus acutus-Typha latifolia)

n=18 This wetland community type is associated with standing water. This community is an emergent community found in standing water of ponds and sloughs. As one moves away from the water to the drier edges the sedge meadow communities are found. On the drier edges the marsh reed grass community is found and willow are associated in the transition from the slough margin and the forest.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
ARUM-LEAVED ARROW HEAD <i>(Sagittaria cuneata)</i>	1	0-3	17
NARROW LEAVED BURREED <i>(Sparganium eurycarpium)</i>	9	0-80	11
BULB BEARING WATER HEMLOCK <i>(Cicuta bulbifera)</i>	1	0-3	11
GRASSES			
COMMON GREAT BULRUSH <i>(Scirpus validus)</i>	6	0-60	11
GREAT BULRUSH <i>(Scirpus acutus)</i>	29	0-90	44
CATTAIL <i>(Typha latifolia)</i>	27	0-97	50
CREEPING SPIKE RUSH <i>(Eleocharis palustris)</i>	3	0-4	22
SPANGLETOP <i>(Scholochloa festucacae)</i>	5	0-97	5

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC-HYGRIC

NUTRIENT REGIME (MEAN)
RICH

ELEVATION:
606 M

SOIL DRAINAGE (MEAN):
VERY POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

GRASS	4300
TOTAL	4300

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE</p> <p>Generally Non Use</p> <p>40.47 ha/AUM</p> <p>0.01 AUM/ac</p>

DMA2. Marsh reed grass meadow
(Calamagrostis canadensis, C. inexpansa, C. stricta)

n=12 This community is found on the edges of sedge meadows and moist draws where the water table is lower and can be dominated by either species of reed grass. The lower water table makes this community accessible for most of the grazing season. Willow will invade onto these sites to form the Willow/Marsh reed grass community type. Increased grazing pressure on these sites will cause marsh reed grass to decline and there will be an invasion of Kentucky bluegrass and dandelion. These sites are highly productive.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. <i>(Salix spp.)</i>	1	0-10	50
FORBS			
MINT			
<i>(Mentha arvensis)</i>	2	0-20	40
STINGING NETTLE			
<i>(Urtica dioica)</i>	3	0-10	33
GRASSES			
MARSH REED GRASS			
<i>(Calamagrostis canadensis)</i>	42	0-97	67
BALTIC RUSH			
<i>(Juncus balticus)</i>	1	0-10	25
NORTHERN REED GRASS			
<i>(Calamagrostis inexpansa)</i>	10	0-90	17
WATER SEDGE			
<i>(Carex aquatilis)</i>	1	0-3	33
NARROW REED GRASS			
<i>(Calamagrostis stricta)</i>	15	0-70	25

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC-HYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
603(600-606)M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

Grass	1427(1254-1600)
Forb	812(450-1174)
Total	2237(2050-2424)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 0.4 ha/AUM (0.81-0.34)
 1.0 AUM/ac (0.5-1.2)

DMA3. Plains wormwood/Sedge
(*Artemisia campestris/Carex spp.*)

n=2 This community type is found on coarse textured, sandy soils. It is generally found on hilltops and south-facing slopes in openings among Jack pine on the uplands and black spruce in the lowlands. This community type was also described on similar site conditions in the Central Mixedwood subregion. This community has low forage production and fragile nature.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
SCOURING RUSH (<i>Equisetum hyemale</i>)	8	0-16	50
PLAINS WORMWOOD (<i>Artemisia campestris</i>)	12	8-15	100
LOW GOLDENROD (<i>Solidago missouriensis</i>)	1	0-2	50
AMERICAN VETCH (<i>Vicia americana</i>)	1	0-2	50
YELLOW BEARDSTONGUE (<i>Penstemon confertus</i>)	1	0-1	50
GRASSES			
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	5	0-9	50
CREEPING RED FESCUE (<i>Festuca rubra</i>)	2	0-4	50
SEDGE (<i>Carex spp</i>)	18	1-34	100
SHEEP FESCUE (<i>Festuca saximontana</i>)	2	1-3	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
XERIC-SUBXERIC

NUTRIENT REGIME (MEAN):
SUBMESOTROPHIC

ELEVATION:
467(325-606) M

SOIL DRAINAGE:
RAPIDLY TO WELL

SLOPE(RANGE): 16(10-22)

ASPECT: SOUTH TO WESTERLY

ECOLOGICAL STATUS SCORE: 24-16

FORAGE PRODUCTION (KG/HA)

GRASS	652
FORB	525
SHRUB	86
TOTAL	1263

ECOLOGICALLY SUSTAINABLE STOCKING RATE
Generally Non Use
4.05 ha/AUM (40.47-4.05)
0.1 AUM/ac (0.01-0.1)

DMA4. Purple oat grass-Sedge-California oat grass (*Schizachne purpurascens*-*Carex* spp.-*Danthonia californica*)

n=4 This community appears to be characteristic of dry grassy meadows on dark coloured Solonetzic soils and gentle to level areas throughout the Dry Mixedwood subregion. Wilkinson and Johnson (1982), found there was a close correlation between large tracts of prairie vegetation and the distribution of solonetzic soils in the Peace River district of Alberta. They specifically described Western porcupine grass-Sedge/Fringed sage community on steep south-facing slopes and a Sedge-California oat grass-Western porcupine grass on more gentle slopes. They felt the solonetzic soils supported grasslands and not forests because of their unfavourable ratios of Ca and Na, hard, columnar B-horizon, and relatively impermeable clay pan close to the surface. This community type appears to more similar to their Sedge-California oat grass-Western porcupine grass community type. It is likely the heavy grazing pressure of the described sites favours the growth of purple oat grass over Western porcupine grass on these sites. Many of the sites described were old homestead sites.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	3	0-10	20
SNOWBERRY (<i>Symphoricarpos occidentalis</i>)	12	0-36	75
SASKATOON (<i>Amelanchier alnifolia</i>)	1	0-3	50
FORBS			
STRAWBERRY (<i>Fragaria virginiana</i>)	14	1-29	100
MEADOW RUE (<i>Thalictrum venulosum</i>)	4	1-8	
100DANDELION (<i>Taraxacum officinale</i>)	8	0-20	100
YARROW (<i>Achillea millefolium</i>)	6	0-12	75
AMERICAN VETCH (<i>Vicia americana</i>)	5	0-9	75
GRASSES			
PURPLE OAT GRASS (<i>Schizachne purpurascens</i>)	25	12-34	100
SLENDER WHEAT GRASS (<i>Agropyron trachycaulum</i>)	12	6-18	100
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	12	1-40	100
PRAIRIE SEDGE (<i>Carex prairea</i>)	9	0-15	75
JUNEGRASS (<i>Koeleria macrantha</i>)	4	0-6	75

CALIFORNIA OAT GRASS
(*Danthonia californica*) 9 0-28 50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN): MESIC

NUTRIENT REGIME (MEAN): MEDIUM

ELEVATION: 576-606(584) M

SOIL DRAINAGE (MEAN): WELL

SLOPE % (RANGE): 2(0-5)

ASPECT: SOUTH TO WEST

ECOLOGICAL STATUS SCORE: 16

FORAGE PRODUCTION (KG/HA)

GRASS	1463 (626-2578)
FORB	818(500-1192)
SHRUB	227(0-606)
TOTAL	2508(1600-3316)

ECOLOGICALLY SUSTAINABLE STOCKING RATE 0.4 ha/AUM (0.58-0.31) 1.0 AUM/ac (0.7-1.3)
--

DMA4a. Veiny meadow rue/Slender wheat grass-Fringed brome
(Thalictrum venulosum/Agropyron trachycaulum-Bromus ciliatus)

n=2 This community appears to be characteristic of dry grassy meadows on dark colored Chernozemic soils and gentle to level areas throughout the Dry Mixedwood subregion. This community type is likely associated with the large tracts of prairie vegetation described by Wilkinson and Johnson (1982) in the Peace River district of Alberta. They specifically described Western porcupine grass-Sedge/Fringed sage community on steep south-facing slopes and a Sedge-California oat grass-Western porcupine grass on more gentle slopes. They felt these grasslands were associated with the distribution of solonetzic soils in the Peace River area. This community type appears to be richer than the Sedge-California oat grass-Western porcupine grass community described by Wilkinson and Johnson. The soils on this community are described as Chernozemic and the parent material is fluvial in origin. These sites are very productive.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	1	0-1	50
FORBS			
STRAWBERRY <i>(Fragaria virginiana)</i>	1	0-1	50
MEADOW RUE <i>(Thalictrum venulosum)</i>	23	15-30	100
FIREWEED <i>(Epilobium angustifolium)</i>	2	1-2	100
YARROW <i>(Achillea millefolium)</i>	1	0-2	50
TALL LUNGWORT <i>(Mertensia paniculata)</i>	9	2-15	100
GRASSES			
FRINGED BROME <i>(Bromus ciliatus)</i>	15	10-20	100
SLENDER WHEAT GRASS <i>(Agropyron trachycaulum)</i>	18	15-20	100
WHITE SCALED SEDGE <i>(Carex xerantica)</i>	10	9-10	100
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	1	0-2	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN): MESIC
 NUTRIENT REGIME (MEAN): MEDIUM-RICH
 ELEVATION: 472-587(530) M
 SOIL DRAINAGE (MEAN): MODERATELY WELL
 SLOPE: LEVEL
 ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION (KG/HA)

TOTAL 2500 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE 0.4 ha/AUM (0.58-0.31) 1.0 AUM/ac (0.7-1.3)
--

DMA5. Western porcupine grass-Sedge/Fringed sage (*Stipa curtisetata*-*Carex spp./Artemisia frigida*)

n=7 This community type is found on steep, south-facing slopes along the banks of the Peace, Smoky and Wapiti rivers throughout the Dry Mixedwood subregion. Wilkinson and Johnson (1982), found there was a close correlation between large tracts of prairie vegetation and the distribution of solonchic soils in the Peace River district of Alberta. They specifically described Western porcupine grass-Sedge/Fringed sage community on steep south-facing slopes and a Sedge-California oat grass-Western porcupine grass on more gentle slopes. They felt the solonchic soils supported grasslands and not forests because of their unfavourable ratios of Ca and Na, hard, columnar B-horizon, and relatively impermeable clay pan close to the surface. Adams (1981), found this community type as being a major source of spring forage for livestock in the Peace River area. He found that with increased grazing pressure sedge, Junegrass, northern and western wheat grass would increase as western porcupine grass declines. Often this community type is on steep slopes and is difficult for domestic livestock to access.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
FRINGED SAGE			
(<i>Artemisia frigida</i>)	8	0-30	86
SASKATOON			
(<i>Amelanchier alnifolia</i>)	1	0-2	71
SNWBERRY			
(<i>Symphoricarpos occidentalis</i>)	2	0-8	57
FORBS			
LITTLE LEAVED EVERLASTING			
(<i>Antennaria parviflora</i>)	1	0-3	43
BASTARD'S TOADFLAX			
(<i>Commandra umbellata</i>)	1	0-2	71
PRAIRIE CROCUS			
(<i>Anemone patens</i>)	2	0-12	43
PRICKLY PEAR CACTUS			
(<i>Opuntia fragilis</i>)	1	0-2	29
GRASSES			
WESTERN PORCUPINE GRASS			
(<i>Stipa curtisetata</i>)	15	5-46	100
BLUNT SEDGE			
(<i>Carex obtusata</i>)	15	0-33	75
GREEN NEEDLEGRASS			
(<i>Stipa viridula</i>)	5	0-17	43
JUNEGRASS			
(<i>Koeleria macrantha</i>)	6	0-12	86
WESTERN WHEAT GRASS			
(<i>Agropyron smithii</i>)	1	0-5	43

KENTUCKY BLUEGRASS			
(<i>Poa pratensis</i>)	1	0-8	14
NORTHERN WHEAT GRASS			
(<i>Agropyron dasystachyum</i>)	2	0-6	29

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):	SUBXERIC-SUBMESIC
NUTRIENT REGIME (MEAN):	POOR-MEDIUM
ELEVATION:	442-606(503) M
SOIL DRAINAGE (MEAN):	VERY RAPIDLY
SLOPE:	35-82(59)%
ASPECT:	SOUTH AND WEST

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION(KG/HA)

GRASS	989(700-945)
FORB	254(0-531)
SHRUB	5(0-20)
TOTAL	1055(752-1476)

ECOLOGICALLY SUSTAINABLE STOCKING RATE 1.01 ha/AUM (1.35-0.58) 0.4 AUM/ac (0.3-0.7)

DMA6. Northern wheat grass-Junegrass/Fringed sage
(Agropyron dasystachyum-Koeleria macrantha/Artemisia frigida)

n=13 This community type is found on steep, south-facing slopes along the banks of the Peace, Smoky and Wapiti rivers throughout the Dry Mixedwood subregion. Adams (1981), felt this community type would form when the Western porcupine grass community was heavily to moderately grazed, but a number of plots were described in an area that had little grazing pressure. This community was located on a much steeper slope (76% vs 35%) than the previously described Western porcupine grass community type. It is likely that the drier site conditions and shallower and poorer nutrient soils favour the growth of northern wheat grass over Western porcupine grass. This community type is located on steep slopes that can be difficult for livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
FRINGED SAGE			
<i>(Artemisia frigida)</i>	6	0-20	80
SASKATOON			
<i>(Amelanchier alnifolia)</i>	6	0-15	95
ROSE			
<i>(Rosa acicularis)</i>	3	0-15	62
SNOWBERRY			
<i>(Symphoricarpos occidentalis)</i>	3	0-10	69
FORBS			
WILD BLUE FLAX			
<i>(Linum lewesii)</i>	1	0-4	23
LINDLEY'S ASTER			
<i>(Aster ciliolatus)</i>	1	0-3	46
SHOWY LOCOWEED			
<i>(Oxytropis splendens)</i>	1	0-2	39
DANDELION			
<i>(Taraxacum officinale)</i>	1	0-2	62
GRASSES			
NORTHERN WHEAT GRASS			
<i>(Agropyron dasystachyum)</i>	10	0-17	75
SEDGE SPP.			
<i>(Carex spp.)</i>	3	0-7	63
RICHARDSON NEEDLEGRASS			
<i>(Stipa richardsonii)</i>	1	0-4	15
JUNEGRASS			
<i>(Koeleria macrantha)</i>	5	0-20	77
SLENDER WHEAT GRASS			
<i>(Agropyron trachycaulum)</i>	3	0-30	46

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN): XERIC-SUBXERIC
 NUTRIENT REGIME (MEAN): POOR
 ELEVATION: 345-606 M
 SOIL DRAINAGE (MEAN): VERY RAPIDLY
 SLOPE: 68(10-90%)
 ASPECT: SOUTH AND WEST
 ECOLOGICAL STATUS SCORE: 24-16

FORAGE PRODUCTION (KG/HA)

GRASS 600(500-798)
 FORB 183(50-400)
 SHRUB 309(220-450)
 TOTAL 1146(1000-1350)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 1.35 ha/AUM (2.02-1.01)
 0.3 AUM/ac (0.2-0.4)

DMA7. Saskatoon-Snowberry/Hairy wild rye
(Amelanchier alnifolia -Symphoricarpos occidentalis/Elymus innovatus)

n=9 This community represents small shrubby openings within aspen forests on southwest facing slopes and level areas. These sites have well developed Luvisolic soils with colluvial, glacialfluvial and glacial lacustrine parent materials. It is likely these shrubby openings are drier than the surrounding forest, which favours the growth of shrubs over trees. Forage productivity on these sites is only moderate averaging only 677 kg/ha. These sites are also heavily utilized by wildlife. As a result caution should be used when managing these sites for domestic livestock grazing in order to prevent over-utilization.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
BLUEBERRY <i>(Vaccinium myrtilloides)</i>	1	0-5	22
CHOCKECHERRY <i>(Prunus virginiana)</i>	12	0-45	78
SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	10	1-30	100
SASKATOON <i>(Amelanchier alnifolia)</i>	15	6-65	100
PRICKLY ROSE <i>(Rosa acicularis)</i>	13	5-27	100
FORBS			
BEARBERRY <i>(Arctostaphylos uva-ursi)</i>	5	0-36	22
STRAWBERRY <i>(Fragaria virginiana)</i>	1	0-7	67
YELLOW PEAVINE <i>(Lathyrus ochroleucus)</i>	1	0-2	78
LINDLEY'S ASTER <i>(Aster ciliolatus)</i>	2	0-5	67
GRASSES			
NORTHERN RICEGRASS <i>(Oryzopsis pungens)</i>	2	0-12	22
SLENDER WHEAT GRASS <i>(Agropyron trachycaulum)</i>	3	0-5	56
BLUNT SEDGE <i>(Carex obtusata)</i>	1	0-9	22
HAIRY WILD RYE <i>(Elymus innovatus)</i>	2	0-10	78
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	1	0-7	11

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
 MESIC-SUBMESIC
 NUTRIENT REGIME (MEAN):
 POOR
 ELEVATION:
 343-606(460) M
 SOIL DRAINAGE (MEAN):
 VERY RAPIDLY TO WELL
 SLOPE (RANGE):
 17(0-72)
 ASPECT:
 VARIABLE
 ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION(KG/HA)

GRASS	344(124-564)
FORB	189(82-296)
SHRUB	144(104-184)
TOTAL	677(524-830)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.02 ha/AUM (4.05-1.35)
0.2 AUM/ac (0.1-0.3)

DMA8. Rose-Snowberry/Smooth brome
(Rosa acicularis-Symphoricarpos occidentalis/Bromus inermis)

n=2 This community type appears to represent the Saskatoon-Snowberry/Hairy wild rye community type which has undergone disturbance by livestock. Sweet clover and smooth brome are both invasive species often originating from roadsides or settlements. Sweet clover is well adapted to growing on roadsides and in waste places. Sweet clover and brome can be very productive but must be used before they become over mature.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN <i>(Populus tremuloides)</i>	5	4-5	100
SHRUBS			
SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	20	14-25	100
PRICKLY ROSE <i>(Rosa acicularis)</i>	37	11-62	100
SASKATOON <i>(Amelanchier alnifolia)</i>	7	1-13	100
FORBS			
STRAWBERRY <i>(Fragaria virginiana)</i>	1	1-2	100
CREAM COLORED VETCHLING(PEAVINE) <i>(Lathyrus ochroleucus)</i>	2	1-3	100
NORTHERN BEDSTRAW <i>(Galium boreale)</i>	5	1-8	100
SWEET CLOVER <i>(Melilotus officinalis)</i>	8	0-16	50
GRASSES			
SMOOTH BROME <i>(Bromus inermis)</i>	7	0-13	50
ROSS'S SEDGE <i>(Carex rossii)</i>	6	4-7	100
TIMOTHY <i>(Phleum pratense)</i>	5	0-6	50
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	1	0-1	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBMESIC-MESIC

NUTRIENT REGIME (MEAN):
POOR-MEDIUM

ELEVATION:
455 M

SOIL DRAINAGE (MEAN):
WELL TO MODERATELY WELL

SLOPE (RANGE):
4(3-5)

ASPECT:
SOUTHERLY

ECOLOGICAL STATUS SCORE: 8

FORAGE PRODUCTION(KG/HA)

TOTAL 1500*ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE 4.05 ha/AUM (8.09-2.02) 0.1 AUM/ac (0.05-0.2)</p>

DMA9. Kentucky bluegrass/Dandelion

(*Poa pratensis*/*Taraxacum officinale*)

n=2 This community type represents a Marsh reed grass meadow that has undergone heavy prolonged grazing pressure and is now dominated by Kentucky bluegrass, rough hairgrass and dandelion. This community is a fairly productive community type and the species are generally palatable to livestock when grazed in the vegetative state, but the extremely heavy grazing pressure which is needed to displace the native grass species indicates that there are livestock distribution problems that should be addressed.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
AMERICAN VETCH (<i>Vicia americana</i>)	3	3-4	100
DANDELION (<i>Taraxacum officinale</i>)	30	0-60	50
YELLOW PEAVINE (<i>Lathyrus ochroleucus</i>)	6	0-12	50
WILD STRAWBERRY (<i>Fragaria virginiana</i>)	7	0-14	50
YARROW (<i>Achillea millefolium</i>)	6	0-11	50
HORSETAIL (<i>Equisetum arvense</i>)	4	0-7	50
GRASSES			
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	58	18-97	100
ROUGH HAIRGRASS (<i>Agrostis scabra</i>)	8	0-15	50
SLENDER WHEAT GRASS (<i>Agropyron trachycaulum</i>)	3	0-5	50
FRINGED BROME (<i>Bromus ciliatus</i>)	2	0-4	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):

HYGRIC-SUBHYGRIC

NUTRIENT REGIME (MEAN):

RICH

ELEVATION:

697 M

SOIL DRAINAGE (MEAN):

IMPERFECTLY

ECOLOGICAL STATUS SCORE: 0 or modified

FORAGE PRODUCTION(KG/HA)

GRASS	1382
FORB	1682
TOTAL	3064

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.81 ha/AUM (1.35-0.4)
0.5 AUM/ac (0.3-1.0)

DMA10. Willow/Sedge
(*Salix spp./Carex spp.*)

n=27 This community type is found along the edges of sedge meadows and in moist depressions. Generally flat leaved willow and basket willow become established at the edges of the sedge meadows due to the shorter duration of standing water. Increased flooding and prolonged water logging may result in the disappearance of willow and a transition to a water sedge meadow.

These sites are fairly productive but difficult to graze due to the moist ground conditions and heavy shrub cover which reduces access and mobility within the area.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
BEBB WILLOW (<i>Salix bebbiana</i>)	5	0-65	47
FLAT LEAVED WILLOW (<i>Salix planifolia</i>)	11	0-90	52
BASKET WILLOW (<i>Salix petiolaris</i>)	7	0-60	37
FORBS			
MINT			
(<i>Mentha arvensis</i>)	1	0-5	44
SKULLCAP			
(<i>Scutellaria galericulata</i>)	1	0-10	52
STRAWBERRY			
(<i>Fragaria virginiana</i>)	2	0-18	29
DANDELION			
(<i>Taraxacum officinale</i>)	3	0-22	30
ARROWED LEAVED COLTSFOOT			
(<i>Petasites sagittatus</i>)	2	0-30	41
GRASSES			
AWNED SEDGE			
(<i>Carex atherodes</i>)	12	0-70	59
MARSH REED GRASS			
(<i>Calamagrostis canadensis</i>)	2	0-11	48
BEAKED SEDGE			
(<i>Carex rostrata</i>)	11	1-42	70
WATER SEDGE			
(<i>Carex aquatilis</i>)	9	0-80	63

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
576-606(588) M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

GRASS	673(344-1002)
FORB	470(52-888)
SHRUB	11(0-22)
TOTAL	1169(448-1890)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.81 ha/AUM (40.47-0.4)
0.5 AUM/ac (0.01-1.0)

DMA10a. Willow/Marsh reed grass
(*Salix spp./Calamagrostis canadensis*)

n=18 This community type is found along the edges of sedge and marsh reed grass meadows and in moist depressions. Predominantly flat leaved willow becomes established at the edges of these meadows due to the shorter duration of standing water. Increased flooding and prolonged water logging may result in the disappearance of willow and a transition to a marsh reed grass and water sedge meadow. These sites are fairly productive but difficult to graze due to the moist ground conditions and heavy shrub cover which reduces access and mobility within the area.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
BEBB WILLOW (<i>Salix bebbiana</i>)	3	0-20	44
FLAT LEAVED WILLOW (<i>Salix planifolia</i>)	26	0-70	75
BASKET WILLOW (<i>Salix petiolaris</i>)	3	0-20	38
FORBS			
SKULLCAP (<i>Scutellaria galericulata</i>)	1	0-10	38
MARSH HEMP NETTLE (<i>Stachys palustris</i>)	2	0-10	38
STRAWBERRY (<i>Fragaria virginiana</i>)	7	0-80	31
STINGING NETTLE (<i>Urtica dioica</i>)	1	0-5	56
HORSETAIL (<i>Equisetum arvense</i>)	1	0-10	43
GRASSES			
AWNED SEDGE (<i>Carex atherodes</i>)	2	0-20	44
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	22	0-70	94
BEAKED SEDGE (<i>Carex rostrata</i>)	2	0-10	38
FOWL BLUEGRASS (<i>Poa palustris</i>)	2	0-10	38

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
606 M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

GRASS	1325(900-1750)
FORB	75(50-200)
TOTAL	1400(950-1850)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.81 ha/AUM (40.47-0.4)
0.5 AUM/ac (0.01-1.0)

DMA11. Willow/Marsh reed grass-Kentucky bluegrass
(Salix spp./Calamagrostis canadensis-Poa pratensis)

n=6 This community type is very similar to the Willow/ Marsh reed grass community type, but has been heavily grazed favouring the growth of Kentucky bluegrass and dandelion. Continued heavy grazing pressure will eventually lead to a understory community that is similar to the Willow/ Kentucky bluegrass/dandelion dominated community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. <i>(Salix spp.)</i>	17	10-35	100
SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	1	0-1	17
FORBS			
MINT <i>(Mentha arvensis)</i>	2	0-6	83
DANDELION <i>(Taraxacum officinale)</i>	15	1-41	100
BUSHY CINQUEFOIL <i>(Potentilla paradoxa)</i>	1	0-2	67
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	15	3-42	100
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	17	4-32	100
BALTIC RUSH <i>(Juncus balticus)</i>	2	0-9	17
FOXTAIL BARLEY <i>(Hordeum jubatum)</i>	1	0-3	83

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
600-606 M

SOIL DRAINAGE (MEAN):
IMPERFECTLY

ECOLOGICAL STATUS SCORE: 16-8

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

GRASS	1861(1800-1922)
FORB	621(176-2450)
SHRUB	5(0-28)
TOTAL	2487(1800-4250)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 1.01 ha/AUM (2.02-0.5)
 0.4 AUM/ac (0.2-0.8)

DMA12. Willow/Horsetail/Marsh reed grass
(Salix spp./Equisetum arvensis/Calamagrostis canadensis)

n=12 This community type appears to be transitional between the horsetail (hygric/rich) and shrubby rich fen (subhydryc/rich) ecosites described by Beckingham and Archibald (1996). It has plant species characteristic of both ecosites. This community type is also similar to the Willow-Alder/Fern community described on moist, nutrient rich seepage areas in the Lower Foothills subregion (Lane et al. 2000). This community type is very productive, but the high shrub cover and slope conditions make it difficult to graze. Horsetail the principal forage species is generally unpalatable to domestic livestock and can be poisonous to livestock in large amounts (Lodge et al. 1968).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SCOULER'S WILLOW <i>(Salix scouleriana)</i>	53	0-90	92
WILLOW SPP. <i>(Salix spp.)</i>	5	0-65	8
BRACTED HONEYSUCKLE <i>(Lonicera involucrata)</i>	2	0-10	67
RED OSIER DOGWOOD <i>(Cornus stolonifera)</i>	5	0-30	83
FORBS			
STINGING NETTLE <i>(Urtica dioica)</i>	9	0-60	58
COMMON HORSETAIL <i>(Equisetum arvensis)</i>	15	1-60	100
LARGE LEAVED YELLOW AVENS <i>(Geum macrophyllum)</i>	1	0-3	58
DEWBERRY <i>(Rubus pubescens)</i>	2	0-10	67
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	22	0-97	75

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
PERMESOTROPHIC

ELEVATION:
667 M

SOIL DRAINAGE (MEAN):
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

GRASS	580
FORB	1272
TOTAL	1852

ECOLOGICALLY SUSTAINABLE STOCKING RATE	
2.02 ha/AUM (40.47-1.35)	
0.2 AUM/ac (0.01-0.3)	

DMA13. River alder/Horsetail
(*Alnus tenuifolia/Equisetum arvensis*)

n=6 This community represents lowland sites surrounding open water or nutrient rich river flood plains This community is part of the red osier dogwood ecological site. Succession in the absence of disturbance will likely be to balsam poplar and eventually white spruce. The high shrub cover limits access to livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
PAPER BIRCH (<i>Betula papyrifera</i>)	4	0-25	33
LARCH (<i>Larix laricina</i>)	1	0-5	17
SHRUBS			
WILLOW SPP. (<i>Salix spp.</i>)	2	1-3	100
RIVER ALDER (<i>Alnus tenuifolia</i>)	43	10-90	100
BRACED HONEYSUCKLE (<i>Lonicera involucrata</i>)	2	0-7	33
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	1	0-3	50
FORBS			
DEWBERRY (<i>Rubus pubescens</i>)	8	0-30	67
BISHOP'S CAP (<i>Mitella nuda</i>)	2	0-5	50
HORSETAIL (<i>Equisetum arvensis</i>)	6	0-27	67
HEMP NETTLE (<i>Galeopsis tetrahit</i>)	9	0-50	33
GRASSES			
SEDGE (<i>Carex spp.</i>)	2	0-3	50
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	5	0-10	83
NODDING WOOD REED (<i>Cinna latifolia</i>)	3	0-20	33
SMOOTH BROME (<i>Bromus inermis</i>)	8	0-50	17

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
HYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
606 M

SOIL DRAINAGE (MEAN):
IMPERFECTLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

GRASS	102
FORB	330
SHRUB	104
TOTAL	536

ECOLOGICALLY SUSTAINABLE STOCKING RATE
8.09 ha/AUM (40.47-8.09)
0.05 AUM/ac (0.01-0.05)

DMA14. Willow/Kentucky bluegrass/Dandelion
(Salix spp./Poa pratensis/Taraxacum officinale)

n=7 This community type is very similar to the Willow/ Marsh reed grass community type, but has been heavily grazed favouring the growth of Kentucky bluegrass and dandelion. Continued heavy grazing pressure eventually leads to a understory community that is dominated by Kentucky bluegrass and dandelion.

PLANT COMPOSITION CANOPY COVER(%)

ENVIRONMENTAL VARIABLES

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. <i>(Salix spp.)</i>	8	0-20	85
SCOULER'S WILLOW <i>(Salix scouleriana)</i>	9	0-50	29
FLAT LEAVED WILLOW <i>(Salix planifolia)</i>	11	0-40	29
FORBS			
MINT <i>(Mentha arvensis)</i>	2	0-10	57
DANDELION <i>(Taraxacum officinale)</i>	32	0-80	71
PLANTAIN <i>(Plantago major)</i>	1	0-5	21
STRAWBERRY <i>(Fragaria virginiana)</i>	2	0-10	57
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	5	0-10	86
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	10	0-40	43
FOWL BLUEGRASS <i>(Poa palustris)</i>	4	0-10	71
SMOOTH BROME <i>(Bromus inermis)</i>	4	0-30	14

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
600-606 M

SOIL DRAINAGE (MEAN):
IMPERFECTLY

ECOLOGICAL STATUS SCORE: 8

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

GRASS	1100(700-1500)
FORB	1250(750-1750)
TOTAL	2350(2250-2450)

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE 1.35 ha/AUM (40.47-0.67) 0.3 AUM/ac (0.01-0.6)</p>
--

DMA15. Sandbar willow-Yellow willow
(Salix exigua-Salix lutea)

n=14 This community type occurs on moist alluvial deposits which are adjacent to streams and rivers. This community can persist for some time if the site is subject to frequent flooding. However in the absence of disturbance it will eventually undergo succession to a spruce dominated community type. Thompson and Hansen (2002) described this community in the grassland natural region of Southern Alberta. They found that this community type disappeared as one moved north into the Parkland and it was replaced by basket willow and flat leaved willow dominated community types. Typically there is little understory vegetation found in this community type and it should be rated as non-use for livestock.

PLANT COMPOSITION CANOPY COVER (%)

MEAN RANGE CONST.

TREES

BALSAM POPLAR

(Populus balsamifera) 1 0-3 42

SHRUBS

SANDBAR WILLOW

(Salix exigua) 32 0-60 86

YELLOW WILLOW

(Salix lutea) 11 0-40 86

SHINING WILLOW

(Salix lucida) 2 0-30 29

FORBS

HORSETAIL

(Equisetum arvense) 12 0-90 64

SILVERWEED

(Potentilla anserina) 2 0-10 43

PLANTAIN

(Plantago major) 2 0-20 29

GRASSES

SMALL FRUITED BULRUSH

(Scirpus microcarpus) 2 0-10 43

KENTUCKY BLUEGRASS

(Poa pratensis) 2 0-3 50

SMOOTH BROME

(Bromus inermis) 9 0-90 57

ENVIRONMENTAL VARIABLES

MOISTURE REGIME: HYGRIC

NUTRIENT REGIME: RICH

ELEVATION: 600 M

SOIL DRAINAGE: IMPERFECTLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

TOTAL 1000*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 Generally Non Use
 40.47 ha/AUM
 0.01 AUM/ac

DMA16: Bebb willow/Marsh reed grass
(Salix bebbiana/Calamagrostis canadensis)

n=13 This community type is found along the drier edges of marsh reed grass meadows and in moist depressions and represents the transition between the flat leaved willow and basket willow dominated shrublands and the upland forest. Bebb willow is an upland species that prefers well drained sites. This species of willow is often found in the understory of aspen and balsam poplar dominated community types. Increased flooding and prolonged water logging may result in the disappearance of Bebb willow and favour the growth of flat leaved willow. In contrast the continued drying of the site will favour the growth of balsam poplar. These sites are fairly productive but difficult to graze due to the moist ground conditions and heavy shrub cover which reduces access and mobility within the area.

PLANT COMPOSITION **CANOPY COVER (%)**

MEAN RANGE CONST.

TREES

BALSAM POPLAR
(Populus balsamifera) 2 0-10 23

SHRUBS

BEBB WILLOW
(Salix bebbiana) 23 1-90 100

SNOWBERRY
(Symphoricarpos occidentalis) 1 0-10 31

RASPBERRY
(Rubus idaeus) 2 0-10 46

ROSE
(Rosa acicularis) 10 0-80 54

FORBS

HORSETAIL
(Equisetum arvense) 4 0-20 69

DANDELION
(Taraxacum officinale) 1 0-3 46

STRAWBERRY
(Fragaria virginiana) 3 0-30 62

CANADA GOLDENROD
(Solidago canadensis) 2 0-20 39

GRASSES

KENTUCKY BLUE GRASS
(Poa pratensis) 2 0-10 31

SMOOTH BROME
(Bromus inermis) 1 0-10 23

SEDGE
(Carex spp.) 10 1-40 100

MARSH REED GRASS
(Calamagrostis canadensis) 12 0-60 62

ENVIRONMENTAL VARIABLES

MOISTURE REGIME: SUBHYGRIC-HYGRIC

NUTRIENT REGIME: RICH

ELEVATION(MEAN): 600 M

SOIL DRAINAGE: MOD. WELL

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 1500*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 0.81 ha/AUM (40.47-0.4)
 0.5 AUM/ac (0.01-1.0)

DMA17: Red osier dogwood/Marsh reed grass
(Cornus stolonifera/Calamagrostis canadensis)

n=8 This community type was described on alluvial terraces, streambanks, abandoned channels on river floodplains and moist areas around springs and seeps. This community is much richer and has higher moisture levels than the adjacent upland aspen dominated forest, but it is much drier than the willow dominated shrublands in lower slope positions. In the absence of disturbance this community type will likely succeed to a balsam poplar and eventually white spruce dominated community type.

Livestock generally do not prefer this community type because of the dense nature of the understory, but heavy grazing pressure can reduce the understory cover and allow Kentucky bluegrass, timothy and smooth brome to invade.

PLANT COMPOSITION CANOPY COVER (%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR <i>(Populus balsamifera)</i>	1	0-3	50
SHRUBS			
RED OSIER DOGWOOD <i>(Cornus stolonifera)</i>	50	20-90	100
ROSE <i>(Rosa acicularis)</i>	3	0-10	75
SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	5	0-20	50
RASPBERRY <i>(Rubus idaeus)</i>	5	0-30	50
FORBS			
VEINY MEADOW RUE <i>(Thalictrum venulosum)</i>	6	0-30	63
HORSETAIL <i>(Equisetum arvense)</i>	4	0-20	50
AMERICAN VETCH <i>(Vicia americana)</i>	3	0-20	63
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	7	0-20	88
FOWL BLUEGRASS <i>(Poa palustris)</i>	1	0-3	75

ENVIRONMENTAL VARIABLES

MOISTURE REGIME: SUBHYGRIC

NUTRIENT REGIME: RICH

ELEVATION(MEAN): 600 M

SOIL DRAINAGE: MOD. WELL

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 1500*ESTIMATED

ECOLOGICALLY SUSTAINABLE STOCKING RATE 0.81 ha/AUM (2.02-0.4) 0.5 AUM/ac (0.2-1.0)
--

DMA18: Silverberry/Smooth brome
(*Elaeagnus commutata/Bromus inermis*)

n=2 This community type has similar moisture and nutrient conditions to the previously described red osier dogwood dominated community type. Silverberry prefers moist, well drained seepage areas where overland flow provides additional moisture. This species can be found adjacent to streams and rivers, or seepage areas and snow accumulation areas adjacent to aspen stands. Thompson and Hansen (2002) found that these silverberry shrublands are often associated with disturbance in the grassland natural region of southern Alberta. Indeed, smooth brome is dominant in the understory of this community and it has likely invaded off the road allowance adjacent to this site. This community type is very productive because of the favourable moisture conditions, but as succession occurs to an aspen forest many of the palatable grass and forbs are often lost. This community will likely succeed to an Pb/Snowberry/Smooth brome dominated community type.

PLANT COMPOSITION CANOPY COVER (%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR			
(<i>Populus balsamifera</i>)	2	0-3	50
SHRUBS			
PRAIRIE ROSE			
(<i>Rosa arkansana</i>)	15	10-20	100
SNOWBERRY			
(<i>Symphoricarpos occidentalis</i>)	5	1-10	100
SILVERBERRY			
(<i>Elaeagnus commutata</i>)	65	50-80	100
FORBS			
STINGING NETTLE			
(<i>Urtica dioica</i>)	2	1-3	100
STRAWBERRY			
(<i>Fragaria virginiana</i>)	5	0-10	50
YARROW			
(<i>Achillea millefolium</i>)	2	0-3	50
GRASSES			
KENTUCKY BLUE GRASS			
(<i>Poa pratensis</i>)	5	0-10	50
SMOOTH BROME			
(<i>Bromus inermis</i>)	12	3-20	100
QUACKGRASS			
(<i>Agropyron repens.</i>)	2	1-3	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME: SUBHYGRIC-MESIC
 NUTRIENT REGIME: RICH
 ELEVATION(MEAN): 600 M
 SOIL DRAINAGE: WELL
 ECOLOGICAL STATUS SCORE: 8-0

FORAGE PRODUCTION (KG/HA)

TOTAL 1500*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 1.35 ha/AUM (2.02-0.67)
 0.3 AUM/ac (0.2-0.6)

DMA19: Bog willow
(*Salix pedicellaris*)

n=4 This community type was described on floating fens in the northern part of the Dry Mixedwood subregion near Gunn and Tulliby lake. Bog willow tends to prefer growing in swamps and fens throughout the Boreal forest of Northern Alberta (Johnson et al. 1995). The slight acidity on these sites limits productivity and these site are difficult to graze due to the moist ground conditions and heavy shrub cover which reduces access and mobility within the area.

PLANT COMPOSITION CANOPY COVER (%)

	MEAN	RANGE	CONST.
TREES			
PAPER BIRCH (<i>Betula papyrifera</i>)	1	0-1	50
SHRUBS			
BOG WILLOW (<i>Salix pedicellaris</i>)	70	50-90	100
FORBS			
MARSH CINQUEFOIL (<i>Potentilla palustre</i>)	9	1-20	100
SKULLCAP (<i>Scutellaria galericulata</i>)	1	0-3	50
GRASSES			
TWO STAMENED SEDGE (<i>Carex diandra</i>)	8	0-20	75
WATER SEDGE (<i>Carex aquatilis</i>)	15	0-40	75
NARROW REED GRASS (<i>Calamagrostis stricta</i>)	13	0-50	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME: SUBHYDRIC
 NUTRIENT REGIME: MEDIUM
 ELEVATION(MEAN): 600M
 SOIL DRAINAGE: IMPERFECTLY
 ECOLOGICAL STATUS SCORE: 24
 HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 1500*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 Generally Non Use
 40.47 ha/AUM
 0.01 AUM/ac

DMA20. Swamp horsetail
(Equisetum fluviatile)

n=3 This wetland community type is found near fresh water and is often associated with shallow water around lake shores or saturated wet spots in old river channels and sloughs. This community is often only found in small isolated spots or in narrow bands around the edge of lakes. As these areas dry, swamp horsetail is often replaced by sedge species. Swamp horsetail is generally unpalatable to livestock and the areas it grows in are often to wet for livestock to access.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
SWAMP HORSETAIL <i>(Equisetum fluviatile)</i>	77	50-90	100
MARSH WILLOW HERB <i>(Epilobium leptophyllum)</i>	13	0-40	33
SKULL CAP <i>(Scutellaria galericulata)</i>	3	0-10	33
SMALL BEDSTRAW <i>(Galium trifidum)</i>	7	0-20	33
GRASSES			
BEAKED SEDGE <i>(Carex rostrata)</i>	3	0-10	33
WATER SEDGE <i>(Carex aquatilis)</i>	8	0-20	66
CATTAIL <i>(Typha latifolia)</i>	1	0-1	33

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC-HYGRIC
NUTRIENT REGIME (MEAN):
RICH
ELEVATION:
586(579-600) M
SOIL DRAINAGE (MEAN):
POORLY TO VERY POORLY
ECOLOGICAL STATUS SCORE: 24
HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 2000*ESTIMATE

<p align="center">ECOLOGICALLY SUSTAINABLE STOCKING RATE Generally Non Use 40.47 ha/AUM 0.01 AUM/ac</p>

DMA21. Tall manna grass
(*Glyceria grandis*)

n=3 This wetland community type is associated with the edge of the standing water of ponds, sloughs and slow meandering streams. As one moves away from the water to the drier edges the sedge meadow communities are found. This community is often only found in small isolated spots or in narrow bands around the edge of lakes. As these areas dry, tall manna grass is often replaced by sedge species. Tall manna grass is palatable to livestock, however, the areas it grows in are often to wet for livestock to access.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
SWAMP HORSETAIL (<i>Equisetum fluviatile</i>)	3	0-10	33
MARSH WILLOWHERB (<i>Epilobium leptophyllum</i>)	1	0-3	33
SMALL BEDSTRAW (<i>Galium trifidum</i>)	1	0-3	33
GRASSES			
TALL MANNA GRASS (<i>Glyceria grandis</i>)	92	80-97	100
AWNED SEDGE (<i>Carex atherodes</i>)	3	3-4	100
CATTAIL (<i>Typha latifolia</i>)	1	0-1	66

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC-HYGRIC

NUTRIENT REGIME (MEAN)
PERMESOTROPHIC

ELEVATION:
606 M

SOIL DRAINAGE (MEAN):
VERY POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

GRASS 2000
TOTAL 2000*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.54 ha/AUM
0.75 AUM/ac

DMA22. Common reed grass
(Phragmites australis)

n=3 This community is found on the edges of shallow lakes and sloughs where the water table is near the surface for most of the growing season. Common reed grass is common throughout the Boreal forest and this species is very important in binding the soil on river banks. The high sugar content of this plant makes it very palatable to livestock, but the moist ground conditions limits livestock use of these areas.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. <i>(Salix spp.)</i>	2	0-5	33
FORBS			
MINT <i>(Mentha arvensis)</i>	1	0-1	66
SKULLCAP <i>(Scutellaria galericulata)</i>	1	0-1	66
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	1	0-3	33
COMMON REED GRASS <i>(Phragmites australis)</i>	58	13-80	100
AWNED SEDGE <i>(Carex atherodes)</i>	2	0-5	66
CREEPING SPIKE RUSH <i>(Eleocharis palustris)</i>	3	0-10	33

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC

NUTRIENT REGIME (MEAN):
PERMESOTROPHIC

ELEVATION:
603(600-606)M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

TOTAL 2000*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
Generally Non Use
40.47 ha/AUM
0.01 AUM/ac

DMA23. Reed canary grass
(*Phalaris arundinacea.*)

n=1 This community type is found along the edges of lakes, rivers, streams and pond margins. The European variety of this species has been widely distributed as a forage and often escapes from pastures and invades into the riparian and wetland areas, displacing more desirable species (Thompson and Hansen 2002). Once this species has invaded riparian areas it often forms monospecific stands because of its heavy sod forming habit (Thompson and Hansen 2002). Reed canary grass is moderately palatable to livestock and when it is grazed heavily the site often becomes invaded by thistle, dandelion and Kentucky bluegrass.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
CANADA THISTLE (<i>Cirsium arvense</i>)	20	-	100
WATER SMARTWEED (<i>Polygonum amphibium</i>)	10	-	100
SOW THISTLE (<i>Sonchus spp.</i>)	3	-	100
MARSH HEDGE-NETTLE (<i>Stachys palustris</i>)	3	-	100
GRASSES			
REDTOP (<i>Agrostis stolonifera</i>)	10	-	100
REED CANARY GRASS (<i>Phalaris arundinacea</i>)	50	-	100
SLENDER WHEAT GRASS (<i>Agropyron trachycaulum</i>)	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC

NUTRIENT REGIME (MEAN):
PERMESOTROPHIC

ELEVATION:
600 M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 2000*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.81 ha/AUM
0.5 AUM/ac

DMA24. Two stamened sedge
(*Carex diandra*)

n=5 This community type was described in boggy areas adjacent to black spruce and larch dominated community types. Two stamened sedge tends to be found in the wetter areas where there is a floating mat of peat. As these areas dry out two stamened sedge will be replaced by willow, black spruce and larch species. Two stamened sedge is generally unpalatable to livestock and the areas it grows in are often too wet for livestock to access.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
BOG WILLOW (<i>Salix pedicellaris</i>)	6	0-30	40
BOG BIRCH (<i>Betula glandulosa</i>)	1	0-3	40
FORBS			
BUCK-BEAN (<i>Menyanthes trifoliata</i>)	7	0-20	60
MARSH CINQUEFOIL (<i>Potentilla palustris</i>)	5	0-10	60
MARSH MARIGOLD (<i>Caltha palustris</i>)	3	0-10	40
GRASSES			
TWO STAMENED SEDGE (<i>Carex diandra</i>)	82	60-90	100
WATER SEDGE (<i>Carex aquatilis</i>)	1	0-3	40

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC

NUTRIENT REGIME (MEAN):
MESOTROPHIC

ELEVATION:
576-606(584) M

SOIL DRAINAGE (MEAN):
WELL

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 1500*ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE Generally Non Use 40.47 ha/AUM 0.01 AUM/ac</p>
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DMA25. Rush meadow

(*Juncus balticus*, *J. nodosus*)

n=2 This community type was described on slightly saline sandy lakeshores. As the lake recedes rush species will invade into the sand of the lakeshore. Bailey et al. (1992) described rush dominated meadows in a saline sequence in the Yukon and Thompson and Hansen (2002) felt that rush dominated meadows were indicative of heavy grazing pressure in Southern Alberta. Rush species are generally unpalatable to livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR (<i>Populus balsamifera</i>)	1	0-1	50
FORBS			
PRICKLY SOW THISTLE (<i>Sonchus asper</i>)	2	0-3	50
GRASSES			
BALTIC RUSH (<i>Juncus balticus</i>)	40	1-80	100
KNOTTED RUSH (<i>Juncus nodosus</i>)	40	0-80	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
SUBMESOTROPHIC

ELEVATION:
600 M

SOIL DRAINAGE (MEAN):
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 1200*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
Generally Non Use
40.47 ha/AUM
0.01 AUM/ac

DMA26. Creeping spike rush
(Eleocharis palustris)

n=2 Thompson and Hansen (2002) described this type on somewhat alkaline sites in narrow bands along streams, rivers, lake margins and reservoirs. These sites are subject to yearly flooding. Typically these sites are almost pure stands of creeping spike rush. Creeping spike rush is generally unpalatable to livestock and the wet conditions limit livestock use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
MARSH RAGWORT <i>(Senecio congestus)</i>	2	1-3	100
SEASIDE BUTTERCUP <i>(Ranunculus cymbalaria)</i>	10	0-20	50
MARSH WILLOW HERB <i>(Epilobium palustre)</i>	5	0-10	50
COMMON BURREED <i>(Sparganium eurycarpum)</i>	5	0-10	50
GRASSES			
CREEPING SPIKE RUSH <i>(Eleocharis palustris)</i>	60	50-70	100
COMMON BULRUSH <i>(Scirpus acutus)</i>	5	0-10	50
FOXTAIL BARLEY <i>(Hordeum jubatum)</i>	2	0-3	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC

NUTRIENT REGIME (MEAN):
PERMESOTROPHIC

ELEVATION:
600 M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

TOTAL 1200*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
Generally Non Use
40.47 ha/AUM
0.01 AUM/ac

DMA27. Three square rush
(Scirpus pungens)

n=3 This community is an edge community forming dense stands along the edges of smaller streams, marshes and ponds. Three square rush is also tolerant of alkaline (pH 8.5) and saline soils (Thompson and Hansen 2002) and can be found adjacent to saline areas in conjunction with prairie bulrush in the southern part of the region. The palatability of this species is low to moderate. Consequently, three square rush communities are seldom grazed by livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SANDBAR WILLOW <i>(Salix exigua)</i>	1	0-1	33
FORBS			
SLENDER ARROW-GRASS <i>(Triglochin palustris)</i>	4	0-10	66
SEASIDE BUTTERCUP <i>(Ranunculus cymbalaria)</i>	2	0-3	66
HORSETAIL <i>(Equisetum arvense)</i>	3	0-10	33
GRASSES			
THREE SQUARE RUSH <i>(Scirpus pungens)</i>	60	50-70	100
FOXTAIL BARLEY <i>(Hordeum jubatum)</i>	4	0-10	66
NUTTALL'S SALTGRASS <i>(Puccinellia nuttalliana)</i>	2	0-3	66
ROUGH HAIRGRASS <i>(Agrostis scabra)</i>	2	0-3	66

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
SUBMESOTROPHIC

ELEVATION:
606 M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 1200*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
Generally Non Use
40.47 ha/AUM
0.01 AUM/ac

DMA28. Prairie bulrush
(*Scirpus paludosus*)

n=2 This community type is often associated with alkaline and saline areas in semi-permanently flooded shallow edges of marshes and ponds (Thompson and Hansen 2002). Three square rush is often associated with the drier edges of this community type. The palatability of this species is low to moderate. Consequently, prairie bulrush communities are seldom grazed by livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
GRASSES			
PRAIRIE BULRUSH (<i>Scirpus paludosus</i>)	98	-	100
FOXTAIL BARLEY (<i>Hordeum jubatum</i>)	1	-	100
NUTTALL'S SALTGRASS (<i>Puccinellia nuttalliana</i>)	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
SUBMESOTROPHIC

ELEVATION:
600 M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

TOTAL 1200*ESTIMATE

<p align="center">ECOLOGICALLY SUSTAINABLE STOCKING RATE Generally Non Use 40.47 ha/AUM 0.01 AUM/ac</p>

DMA29. Nuttall's saltgrass

(*Puccinellia nuttalliana*)

n=2 This community is characteristic of saline and alkaline alluvial deposits adjacent to ponds, lake margins or seepage areas. This community type is fairly productive and heavy grazing will often lead to a community type dominated by foxtail barley.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
GRASSES			
NUTTALL'S SALTGRASS (<i>Puccinellia nuttalliana</i>)	97	97-98	100
PRAIRIE BULRUSH (<i>Scirpus paludosus</i>)	2	0-3	50
FOXTAIL BARLEY (<i>Hordeum jubatum</i>)	1	0-1	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
SUBMESOTROPHIC

ELEVATION:
600 M

SOIL DRAINAGE (MEAN):
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

TOTAL 1500*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
4.05 ha/AUM
0.10 AUM/ac

DMA30. Foxtail barley

(*Hordeum jubatum*)

n=2 This community represents a disturbance community. It can result from heavy grazing of tame pastures or native meadows in slightly saline areas. This community can also form on the edges of receding lake shores. As the lake dries foxtail barley will invade onto the drier edges. Foxtail barley is generally unpalatable to livestock and the seeds can get stuck in the animals mouth causing sores. Despite the high productivity of these sites they are often never used by livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
SEASIDE BUTTERCUP (<i>Ranunculus cymbalaria</i>)	2	0-3	50
DANDELION (<i>Taraxacum officinale</i>)	1	0-1	50
SEA SIDE ARROW-GRASS (<i>Triglochin maritima</i>)	1	0-1	50
GRASSES			
FOXTAIL BARLEY (<i>Hordeum jubatum</i>)	80	80-81	100
NUTTALL'S SALTGRASS (<i>Puccinellia nuttalliana</i>)	1	1-2	100
CREEPING SPIKE RUSH (<i>Eleocharis palustris</i>)	5	0-10	50
THREE SQUARE RUSH (<i>Scirpus pungens</i>)	2	0-3	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
SUBMESOTROPHIC

ELEVATION:
600M

SOIL DRAINAGE (MEAN):
IMPERFECTLY

ECOLOGICAL STATUS SCORE: 8

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

TOTAL 1500*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE Generally Non Use 40.47 ha/AUM 0.01 AUM/ac
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DRY MIXEDWOOD SUBREGION

TAME FORAGE COMMUNITIES



Photo 3. Typical Range improvement clearing in the Dry Mixedwood subregion.

TAME FORAGE COMMUNITIES

(Cleared areas that have been broken and seeded to tame forage)

Throughout the Dry mixedwood subregion there are sites that have been deforested, broken, and seeded to tame forage. Usually these areas are mesic and moderately well to well drained with good nutrient levels. Because most of these tame forage stands are established on similar sites, the most influential factors affecting plant species composition are stand establishment and grazing regime.

Stand establishment is important because it determines what the initial plant species composition is going to be. Seed bed preparation and the type of seed sown are the two most important factors influencing stand establishment. Seed bed preparation is important because it helps to determine how well the sown seed germinates and establishes. If the seed bed is not well prepared, the tame forage species may have reduced seedling vigour and/or density allowing native or weedy species to become a dominant component of the plant community.

After the stand is established, the grazing regime applied to the stand will influence the plant species composition. Generally, a light to moderate level of grazing allows the stand to maintain itself while sustained heavy grazing causes the stand to degrade. Damage to a stand due to overgrazing occurs more readily while the stand is establishing than it does when the stand is established. This is because the forage plants in an establishing stand have not had time to develop energy reserves or substantial root systems and are therefore more susceptible to grazing induced stress.

Figure 6 is a successional diagram for tame pastures in the Dry Mixedwood subregion. Tame pasture communities are organized horizontally by moisture gradient [e.g. dry (submesic) to moist (subhygric)] and vertically by successional factors like the grazing disturbance gradient [e.g. moderate or very heavily grazed] or stand establishment. A light to moderate grazing regime will normally maintain a forage stand similar to what was seeded on the site. These stands are generally the most productive and provide the best grazing opportunities for livestock. In figure 6, these plant communities are indicated by the **bolded** boxes and represent various seed mixes sown on submesic to subhygric sites (not just those species in the plant community name) They are considered to be in the healthy category for range health.

The plant communities represented by the boxes **above** the bolded boxes may be the result of a number of different factors. For example, when the site is under-grazed, the stand becomes dominated by species that are the most competitive in the absence of grazing disturbance. In this case, trees and shrubs growth is unchecked and they can out-compete seeded plants for light and other resources. Poor forage establishment is another factor that can result in stands that are dominated by native or weedy species. Although shrubs and trees can occur on all tame pasture community types, the extent to which invasion occurs is influenced by site preparation, forage establishment, moisture conditions, age of stand and grazing history.

Plant community changes which occur under heavy grazing are dependent on the grazing history (level of use, season of use and duration of the grazing regime). Overgrazed community types [plant communities at **bottom** of Figure 6] develop over a long period of repeated overgrazing. If weedy species such as tall buttercup or Canada thistle, become established on overgrazed sites, they can quickly become a dominant species.

Figure 6. Successional sequences of tame pasture communities on 3 moisture regimes in the Dry Mixedwood subregion.

	SUBMESIC SITES	MESIC SITES	SUBHYGRIC SITES	SUCCESSION FACTORS
SUCCESSIONAL CHANGES				
tree species become dominant	Aw-Pb / Rose / H. wild rye DMB23	Aw / Rose / Strawberry DMB21		↑
some woody regrowth and native herbaceous species	Rose / Dandelion / H. wild rye DMB22	Rose / C. red fescue- Sedge DMB20	Willow / Timothy DMB24	↑
reversion to native plants				poor stand establishment or under-grazing
dominated by the tall, productive species originally seeded [i.e. desirable species]	Wheat grass / Creeping red fescue DMB19	Brome / Timothy DMB12	R. canary grass- Meadow foxtail- Timothy-Brome DMB16	light to moderately grazed
decline in desirable species with some grazing induced species present		Brome - Timothy - C. red fescue DMB13	Brome -C. red fescue- K. bluegrass / Dandelion DMB17	moderately to heavily grazed ↓
dominated by grazing induced species with some weedy species		C. red fescue - K. bluegrass / Dandelion DMB14		heavily grazed ↓
dominated by grazing induced and/or weedy species	Strawberry- Dandelion/Weeds DMB15	Strawberry- Dandelion/Weeds DMB15	Foxtail barley/Weeds DMB18	very heavily grazed

Table 3. Production and Stocking rate of Tame forage communities in the Dry Mixedwood subregion.

Ecological site	Community number	Community type	Prod. (kg/ha)	Stocking rate	
				ha/AUM	AUM/ac
	Total	Range	Recommended		
b submesic/medium					
Submesic					
DMB19	Wheat grass -Creeping red fescue	1000	0.51 - 0.4	[0.8 - 1.0]	0.51 [0.8]
DMB22	Rose/Dandelion/ Hairy wild rye	1000	4.05 - 0.51	[0.1 - 0.3]	2.02 [0.2]
DMB23	Aw-Pb/Rose/Hairy wild rye	1000	4.05 - 0.51	[0.1 - 0.3]	2.02 [0.2]
d mesic/medium					
Mesic					
DMB12	Brome-Timothy	3884	0.4 - 0.31	[1.0 -1.3]	0.4 [1.0]
DMB13	Creeping red fescue-Brome-Timothy	2120	0.58 - 0.4	[0.7 - 1.0]	0.51 [0.8]
DMB14	Creeping red fescue-Kentucky bluegrass	2120	1.35 - 0.4	[0.3 -1.0]	0.67 [0.6]
DMB15	Strawberry-Dandelion-Weeds	1500	40.47 - 1.35	[0.01-0.3]	2.02 [0.2]
DMB20	Rose/Creeping red fescue-Sedge	2000	1.35 - 0.51	[0.3 - 0.8]	0.81 [0.5]
DMB21	Aw/Rose/Strawberry	2060	4.05 - 0.51	[0.1 - 0.3]	2.02 [0.2]
e subhygric/rich					
Subhygric					
DMB16	Reed canary grass-Meadow foxtail-Smooth brome-Timothy	2995	0.4 - 0.27	[1.0- 1.5]	0.34 [1.2]
DMB17	Brome-K. bluegrass-C. red fescue/Dandelion	2500	0.51 - 0.34	[0.8 - 1.2]	0.4 [1.0]
DMB18	Foxtail barley/Weeds	1500	4.05 - 1.35	[0.1 - 0.3]	0.34 [0.2]
DMB24	Willow/Timothy	2500	1.35 - 0.81	[0.3 - 0.5]	1.01 [0.4]

Key to Tame Grass Plant Communities - Dry Mixedwood Subregion

1. Tame forage stand dominated by tall productive species, grazing has not caused an increase of grazing resistant or weedy species 2
Tame forage stand modified by overgrazing with grazing resistant species at least co-dominant in the plant community; or the site has aspen or shrub invasion 4
2. Subhygric sites dominated by productive, moisture loving tame forage species seeded on the site [e.g. reed canary grass, meadow foxtail or timothy].....
.....**Reed Canary Grass-Meadow Foxtail-Smooth brome-Timothy (DMB16)**
Mesic or submesic sites dominated by productive tame forage species suited to normal or dry moisture conditions [e.g. smooth brome, meadow brome, timothy, wheat grass, etc.] 3
3. Submesic sites with wheat grass and creeping red fescue.....
.....**Crested wheat grass-Creeping Red Fescue (DMB19)**
Mesic sites dominated by other tall, productive tame forage species [e.g. smooth brome, meadow brome, timothy, etc.].....**Brome / Timothy (DMB12)**
4. Tame pasture invaded by aspen, balsam poplar or shrub species..... 9
Species composition modified by moderate to heavy grazing..... 5
5. Pasture moderately to heavily grazed; tall, productive and grazing resistant species co-dominate the site.....**Creeping Red Fescue - Brome-Timothy (DMB13)**
Pasture heavily to very heavily grazed; grazing resistant and/or weedy species dominate the site .. 6
6. Pasture heavily grazed; grazing resistant forage species dominate the site; dandelion, strawberry are common 7
Pasture very heavily grazed; weedy invaders dominate the site..... 8
7. Subhygric sites; dominated by grazing resistant species.....
.....**Brome-Creeping Red Fescue- Kentucky Bluegrass-Dandelion (DMB17)**
Mesic sites; dominated by grazing resistant species.....
.....**Creeping Red Fescue-Kentucky Bluegrass-Clover / Dandelion (DMB14)**
8. Mesic or submesic sites dominated by strawberry, dandelion, Canada thistle and other weedy species.....**Strawberry / Dandelion / Weeds (DMB15)**
Subhygric sites dominated by foxtail barley, Canada thistle or other weedy spp.....
.....**Foxtail barley / Weeds (DMB18)**
9. Old tame pastures with Aspen and Balsam Poplar invasion..... 10
Newer tame pastures with shrub invasion, little tree growth..... 11
10. Mesic sites with strawberry **Aw/Rose/Strawberry (DMB21)**
Submesic sites with hairy wild rye.....**Aw-Pb/Rose/Hairy wild rye (DMB23)**
11. Submesic sites dominated by hairy wild rye and rose.....
.....**Rose/Dandelion/Hairy wild rye (DMB22)**
Mesic to subhygric sites..... 12
12. Mesic sites with marsh reed grass and sedge.....
.....**Rose/Creeping red fescue-Sedge (DMB20)**
Subhygric sites with willow invading..... **Willow/Timothy (DMB24)**

DMB12. Brome-Timothy

(*Bromus inermis*, *B. biebersteinii*-*Phleum pratense*)

n=9 This community type represents healthy condition tame pasture on mesic sites that were seeded with a timothy, smooth brome, meadow brome, creeping red fescue, alfalfa, clover mixture. Timothy establishes much quicker than creeping red fescue or smooth brome on pastures that have been recently seeded. Eventually creeping red fescue and smooth brome will outcompete timothy and this community will likely become dominated by creeping red fescue and smooth brome. Heavy to moderate grazing pressure will cause the tall growing grass species (Brome, timothy) to decline and allows low growing Kentucky bluegrass and dandelion to increase to form communities DMB13 and DMB14. Continued heavy grazing pressure will eventually lead to a community dominated by dandelion and weeds (DMB15). Light or no grazing or poor seed establishment will allow native trees, shrubs, forbs and grass to invade onto these sites to form communities DMB20 and 21.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	1	0-4	22
FORBS			
CLOVER (<i>Trifolium spp.</i>)	4	0-30	44
DANDELION (<i>Taraxacum officinale</i>)	10	0-45	67
WILD STRAWBERRY (<i>Fragaria virginiana</i>)	15	0-47	78
GRASSES			
CREEPING RED FESCUE (<i>Festuca rubra</i>)	7	0-35	78
TIMOTHY (<i>Phleum pratense</i>)	8	0-60	46
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	1	0-3	33
SMOOTH BROME (<i>Bromus inermis</i>)	49	25-77	100
MEADOW BROME (<i>Bromus biebersteinii</i>)	10	0-56	44

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
MESIC-SUBHYGRIC

NUTRIENT REGIME (MEAN):
MEDIUM-RICH

ELEVATION:
457-606 (587)M

SOIL DRAINAGE (MEAN):
WELL TO MODERATELY WELL

DESIRABLE SPECIES SHIFT SCORE: 8

FORAGE PRODUCTION (KG/HA)

TOTAL 3884

ECOLOGICAL SUSTAINABLE STOCKING RATE 0.4 ha/AUM (0.4-0.31) 1.0 AUM/ac (1.0-1.3)

DMB13. Creeping red fescue- Brome-Timothy
(Festuca-rubra-Bromus spp.-Phleum pratense)

n=12 This community type develops on mesic sites that were seeded to a mixture of brome, timothy or other productive species with some grazing resistant species like creeping red fescue, A history of moderate to heavy grazing pressure results in a decline in the proportions of tall, productive species and an increase in the grazing resistant species. Heavy continuous grazing will allow Kentucky bluegrass and dandelion to invade into the stand to form a Kentucky bluegrass or Quackgrass/Dandelion dominated community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN <i>(Populus tremuloides)</i>	2	0-10	33
SHRUBS			
ROSE <i>(Rosa acicularis)</i>	2	0-5	75
FORBS			
CLOVER <i>(Trifolium spp.)</i>	19	0-72	83
DANDELION <i>(Taraxacum officinale)</i>	10	0-31	83
STRAWBERRY <i>(Fragaria virginiana)</i>	8	0-35	50
GRASSES			
CREEPING RED FESCUE <i>(Festuca rubra)</i>	41	9-78	100
TIMOTHY <i>(Phleum pratense)</i>	9	0-25	83
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	5	0-23	67
SMOOTH BROME <i>(Bromus inermis)</i>	15	0-75	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
MESIC

NUTRIENT REGIME (MEAN):
MEDIUM

ELEVATION:
609M

SOIL DRAINAGE (MEAN):
WELL

DESIRABLE SPECIES SHIFT SCORE: 4

FORAGE PRODUCTION(KG/HA)

TOTAL 2120

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 0.51 ha/AUM (0.58-0.4)
 0.8 AUM/ac (0.7-1.0)

DMB14. Creeping red fescue-Kentucky bluegrass/Dandelion

(*Festuca rubra*-*Poa pratensis*/ *Taraxacum officinale*)

n=31 This community is representative of heavily grazed mesic sites and is dominated by grazing resistant species like Kentucky bluegrass, creeping red fescue or quackgrass. Heavy grazing tends to favour the growth of these low-growing or rhizomatous species and that of weedy or disturbance induced species such as dandelion. These sites have poor health ratings and lower production than community types dominated by species like timothy and brome.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
RASPBERRY. (<i>Rubus idaeus.</i>)	1	0-30	25
FORBS			
CLOVER (<i>Trifolium spp.</i>)	13	0-45	100
DANDELION (<i>Taraxacum officinale</i>)	21	0-42	91
STRAWBERRY (<i>Fragaria virginiana</i>)	2	0-4	72
GRASSES			
CREEPING RED FESCUE (<i>Festuca rubra</i>)	15	0-75	40
TIMOTHY (<i>Phleum pratense</i>)	3	0-13	53
SMOOTH BROME (<i>Bromus inermis</i>)	2	0-3	25
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	15	0-36	78
QUACKGRASS (<i>Agropyron repens</i>)	5	0-45	20

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
MESIC

NUTRIENT REGIME (MEAN):
MEDIUM

ELEVATION:
576-701(658)M

SOIL DRAINAGE (MEAN):
WELL

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION (KG/HA)

TOTAL 2120

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.67 ha/AUM (1.35-0.4)
0.6 AUM/ac (0.3-1.0)

DMB15. Strawberry-Dandelion-Weeds
(Fragaria virginiana-Taraxacum officinale-Cirsium arvensis)

n=6 This community represents extremely heavily grazed mesic pasture sites. Generally, all that is left growing on these areas is dandelion. There also tends to be a lot of bare soil, which provides a place for noxious weeds (Canada thistle) to become established.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
STRAWBERRY <i>(Fragaria virginiana)</i>	2	0-8	50
CLOVER <i>(Trifolium spp.)</i>	1	0-6	50
DANDELION <i>(Taraxacum officinale)</i>	44	19-75	100
CANADA THISTLE <i>(Cirsium arvense)</i>	5	0-29	33
GRASSES			
TIMOTHY <i>(Phleum pratense)</i>	2	0-7	67
CREEPING RED FESCUE <i>(Festuca rubra)</i>	1	0-1	67
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	17	3-74	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
MESIC

NUTRIENT REGIME (MEAN):
MEDIUM

ELEVATION:
455M

SOIL DRAINAGE (MEAN):
WELL

PLANT COMPOSITION: TAME OR MODIFIED TAME

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION (KG/HA)

TOTAL 1500

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 2.02 ha/AUM (40.47-1.35)
 0.2 AUM/ac (0.01-0.3)

DMB16. Reed canary grass-Meadow foxtail-Smooth brome-Timothy
(Phalaris arundinacea-Alopecurus pratensis-Bromus inermis-Phleum pratense)

n=2 This community type represents seeded areas on moist (subhygric) rich sites. Reed canary grass and meadow foxtail establish quickly in wet places that have been disturbed and will dominate very wet sites. Care should be taken when seeding reed canary grass. It appears that the commercial cultivars can be very invasive (Invasive plants of natural habitats 1992). In areas that have supported reed canary grass monocultures for extended periods many have seed banks devoid of other species. Meadow foxtail also seems particularly prone to increasing on moister grazed sites as it starts growth and heads out early. Meadow foxtail becomes unpalatable and is avoided by livestock if it is not grazed early enough in the spring.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
AMERICAN VETCH <i>(Vicia americana)</i>	1	0-1	50
DANDELION <i>(Taraxacum officinale)</i>	3	2-3	100
STRAWBERRY <i>(Fragaria virginiana)</i>	13	0-26	50
CLOVER <i>(Trifolium spp.)</i>	15	6-25	100
GRASSES			
REED CANARY GRASS <i>(Phalaris arundinacea)</i>	28	0-55	50
TIMOTHY <i>(Phleum pratense)</i>	5	2-7	100
SMOOTH BROME <i>(Bromus inermis)</i>	21	0-41	50
CREEPING RED FESCUE <i>(Festuca rubra)</i>	6	1-11	100
MEADOW FOXTAIL <i>(Alopecurus pratensis)</i>	11	0-22	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
579-606M

SOIL DRAINAGE (MEAN):
WELL

DESIRABLE SPECIES SHIFT SCORE: 8

FORAGE PRODUCTION(KG/HA)

TOTAL 2995

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.34 ha/AUM (0.4-0.27)
1.2 AUM/ac (1.0-1.5)

DMB17. Brome-Creeping red fescue-Kentucky bluegrass/Dandelion
(Bromus spp.-Festuca rubra-Poa pratensis/Taraxacum officinale)

n=3 This community represents moderately grazed subhygric sites. Heavy continuous grazing will allow Kentucky bluegrass and dandelion to invade into the stand to form a Kentucky bluegrass or Quackgrass/Dandelion dominated community type. Continued heavy grazing pressure may eventually lead to site dominated by foxtail barley.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
CLOVER <i>(Trifolium spp.)</i>	19	6-31	100
DANDELION <i>(Taraxacum officinale)</i>	29	15-38	100
HORSETAIL <i>(Equisetum arvense)</i>	4	2-6	100
STRAWBERRY <i>(Fragaria virginiana)</i>	2	1-2	100
GRASSES			
CREEPING RED FESCUE <i>(Festuca rubra)</i>	62	40-80	100
MEADOW BROME <i>(Bromus biebersteinii)</i>	21	17-23	100
SEDGE <i>(Carex spp.)</i>	16	1-45	100
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	5	1-10	100
TIMOTHY <i>(Phleum pratense)</i>	3	2-4	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
PERMESOTROPHIC

ELEVATION:
667M

SOIL DRAINAGE (MEAN):
MODERATELY WELL

DESIRABLE SPECIES SHIFT SCORE: 4

FORAGE PRODUCTION(KG/HA)

TOTAL 2500

ECOLOGICALLY SUSTAINABLE STOCKING RATE 0.4 ha/AUM (0.51-0.34) 1.0 AUM/ac (0.8-1.2)
--

DMB18. Foxtail barley/Weeds
(*Hordeum jubatum/Cirsium arvensis*)

n=1 This community type develops on heavily grazed subhygric moist sites. This community was found in depressional areas and on river flood plains. Foxtail barley is also well adapted to growing on saline soils (Bailey et al. 1992). It is likely that the soils of this site are slightly saline. This community type would be considered non-use because the principle forage species foxtail barley is generally unpalatable to livestock. Foxtail barley can also cause injury to livestock. The sharp seeds and awns may work their way into tongues, gums, eyes, noses or skins of animals.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
ALFALFA (<i>Medicago falcata.</i>)	11	-	100
DANDELION (<i>Taraxacum officinale</i>)	1	-	100
SWEET CLOVER (<i>Melilotus officinalis</i>)	4	-	100
CLOVER (<i>Trifolium spp.</i>)	5	-	100
GRASSES			
FOXTAIL BARLEY (<i>Hordeum jubatum</i>)	69	-	100
SMOOTH BROME (<i>Bromus inermis</i>)	1	-	100
TIMOTHY (<i>Phleum pratense</i>)	18	-	100
FOWL BLUEGRASS (<i>Poa palustris</i>)	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC
NUTRIENT REGIME (MEAN):
RICH
ELEVATION:
457-606(597)M
SOIL DRAINAGE (MEAN): WELL
PLANT COMPOSITION: TAME OR MODIFIED TAME
DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION(KG/HA)

TOTAL 1500

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.34 ha/AUM (4.05-1.35)
0.2 AUM/ac (0.1-0.3)

DMB19. Wheat grass-Creeping red fescue-Timothy
(Agropyron pectiniforme-Festuca rubra-Phleum pratense)

n=1 This community type occurs on cleared pastures that were seeded on submesic (dry) sites in the eastern part of the subregion near St. Paul. These sites occur on very stoney well drained soils and it was thought crested wheat grass would grow well in these site conditions. These pastures were seeded in the late 1980's with a mixture of pubescent wheat grass, timothy, creeping red fescue, alfalfa, crested wheat grass and sweet clover. Crested wheat grass and creeping red fescue were found to dominate the dry hilltops and timothy was found on the moist lowland sites. There was little evidence of pubescent wheat grass, alfalfa or sweet clover surviving from the original mix. These pastures often undergo succession to a shrub dominated community (DMB11) and then a deciduous dominated community type (DMB9).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	1	-	100
FORBS			
CLOVER <i>(Trifolium spp.)</i>	1	-	100
DANDELION <i>(Taraxacum officinale)</i>	29	-	100
BEARBERRY <i>(Arctostaphylos uva-ursi)</i>	1	-	100
GRASSES			
CREEPING RED FESCUE <i>(Festuca rubra)</i>	7	-	100
CRESTED WHEAT GRASS <i>(Agropyron pectiniforme)</i>	11	-	100
TIMOTHY <i>(Phleum pratense)</i>	5	-	100
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	3	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBMESIC

NUTRIENT REGIME (MEAN):
MESOTROPHIC

ELEVATION:
579M

SOIL DRAINAGE (MEAN):
WELL

DESIRABLE SPECIES SHIFT SCORE: 8

FORAGE PRODUCTION(KG/HA)

TOTAL 1000

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 0.51 ha/AUM (0.51-0.4)
 0.8 AUM/ac (0.8-1.0)

DMB20. Rose/Creeping red fescue-Sedge

(Rosa acicularis/Festuca rubra-Carex spp.)

n=5 As seeded pastures undergo succession back to a deciduous dominated forest they are often invaded by rose and willow before the trees become dominant. This community represents an early successional community of DMB21. Burning, cultivation and spraying with herbicide are all options that can be considered in order to control shrub regrowth. On mesic sites marsh reed grass tends to be the native grass that invades. In contrast hairy wild rye will invade on drier sites.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN			
<i>(Populus tremuloides)</i>	6	0-15	40
SHRUBS			
PRICKLY ROSE			
<i>(Rosa acicularis)</i>	12	1-25	100
FORBS			
CLOVER			
<i>(Trifolium spp.)</i>	7	0-14	80
DANDELION			
<i>(Taraxacum officinale)</i>	2	1-7	100
WILD STAWBERRY			
<i>(Fragaria virginiana)</i>	8	1-23	100
GRASSES			
CREEPING RED FESCUE			
<i>(Festuca rubra)</i>	19	0-64	80
TIMOTHY			
<i>(Phleum pratense)</i>	4	0-12	60
KENTUCKY BLUEGRASS			
<i>(Poa pratensis)</i>	2	0-7	60
HAIRY WILD RYE			
<i>(Elymus innovatus)</i>	1	0-3	40
MARSH REED GRASS			
<i>(Calamagrostis canadensis)</i>	3	0-13	20
SEDGE			
<i>(Carex spp.)</i>	7	0-24	80

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):

MESIC

NUTRIENT REGIME (MEAN):

MEDIUM

ELEVATION:

603(600-606)M

SOIL DRAINAGE (MEAN): WELL

PLANT COMPOSITION: TAME OR MODIFIED TAME

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION(KG/HA)

TOTAL 2000

ECOLOGICALLY SUSTAINABLE STOCKING RATE

0.81 ha/AUM (1.35-0.51)

0.5 AUM/ac (0.3-0.8)

DMB21. Aw/Rose/Strawberry
(Populus tremuloides/Rosa acicularis/Fragaria virginiana)

n=5 This community type occurs in mesic cultivated pastures that are being invaded by aspen. No grazing pressure or only light grazing pressure allows aspen to recolonize these cultivated pastures. Burning, cultivation and spraying with herbicide are all options that can be considered in order to control aspen regrowth.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN <i>(Populus tremuloides)</i>	14	8-20	100
BALSAM POPLAR <i>(Populus balsamifera)</i>	1	0-1	40
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	3	1-4	100
WILLOW <i>(Salix bebbiana)</i>	1	0-4	20
SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	1	0-2	60
FORBS			
CLOVER <i>(Trifolium spp.)</i>	2	0-5	60
DANDELION <i>(Taraxacum officinale)</i>	15	0-40	80
WILD STAWBERRY <i>(Fragaria virginiana)</i>	5	2-12	100
GRASSES			
CREEPING RED FESCUE <i>(Festuca rubra)</i>	2	0-5	40
TIMOTHY <i>(Phleum pratense)</i>	1	0-4	20
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	5	0-8	60
HAIRY WILD RYE <i>(Elymus innovatus)</i>	6	1-15	100
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	1	0-4	40

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
MESIC

NUTRIENT REGIME (MEAN):
MESOTROPHIC

ELEVATION:
600M

SOIL DRAINAGE (MEAN): WELL

PLANT COMPOSITION: TAME OR MODIFIED TAME

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION(KG/HA)

TOTAL 2060

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 2.02 ha/AUM (4.05-0.51)
 0.2 AUM/ac (0.1-0.3)

DMB22. Rose/Dandelion/Hairy wild rye
(Rosa acicularis/Taraxacum officinale/Elymus innovatus)

n=1 This community represents early invasion of shrubs onto drier (submesic) sites on pastures in the St. Paul area of the subregion. As seeded pastures undergo succession back to a deciduous dominated forest they are often invaded by rose and willow before the trees become dominant. This community represents an early successional community of DMB23. Burning, cultivation and spraying with herbicide are all options that can be considered in order to control shrub regrowth.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN			
<i>(Populus tremuloides)</i>	1	-	100
BALSAM POPLAR			
<i>(Populus balsamifera)</i>	1	-	100
SHRUBS			
PRICKLY ROSE			
<i>(Rosa acicularis)</i>	6	-	100
WILLOW			
<i>(Salix bebbiana)</i>	4	-	100
SNOWBERRY			
<i>(Symphoricarpos occidentalis)</i>	2	-	100
FORBS			
CLOVER			
<i>(Trifolium spp.)</i>	3	-	100
DANDELION			
<i>(Taraxacum officinale)</i>	22	-	100
WILD STAWBERRY			
<i>(Fragaria virginiana)</i>	3	-	100
GRASSES			
CREEPING RED FESCUE			
<i>(Festuca rubra)</i>	8	-	100
TIMOTHY			
<i>(Phleum pratense)</i>	1	-	100
KENTUCKY BLUEGRASS			
<i>(Poa pratensis)</i>	4	-	100
HAIRY WILD RYE			
<i>(Elymus innovatus)</i>	4	-	100
CRESTED WHEAT GRASS			
<i>(Agropyron pectiniforme)</i>	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
 SUBMESIC

NUTRIENT REGIME (MEAN):
 MEDIUM

ELEVATION:
 600M

SOIL DRAINAGE (MEAN): WELL

PLANT COMPOSITION: TAME OR MODIFIED TAME

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION(KG/HA)

TOTAL 1000

ECOLOGICALLY SUSTAINABLE STOCKING RATE 2.02 ha/AUM (4.05-0.51) 0.2 AUM/ac (0.1-0.3)

DMB23. Aw-Pb/Rose/Hairy wild rye
(Populus tremuloides-P. balsamifera/Rosa acicularis/Elymus innovatus)

n=1 This community represents old pastures on dry sandy sites that were cleared of trees and aerial seeded with brome, timothy, crested wheat grass and creeping red fescue in the 1980's near St. Paul. In the absence of disturbance these sites have been slowly encroached by trees and the understory has been invaded by hairy wild rye. These sites are moderately productive and are easily accessible to livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN			
<i>(Populus tremuloides)</i>	15	-	100
BALSAM POPLAR			
<i>(Populus balsamifera)</i>	35	-	100
SHRUBS			
PRICKLY ROSE			
<i>(Rosa acicularis)</i>	6	-	100
WILLOW			
<i>(Salix bebbiana)</i>	1	-	100
SNOWBERRY			
<i>(Symphoricarpos occidentalis)</i>	1	-	100
FORBS			
CLOVER			
<i>(Trifolium spp.)</i>	1	-	100
DANDELION			
<i>(Taraxacum officinale)</i>	4	-	100
WILD STAWBERRY			
<i>(Fragaria virginiana)</i>	1	-	100
GRASSES			
CREEPING RED FESCUE			
<i>(Festuca rubra)</i>	9	-	100
SLENDER WHEAT GRASS			
<i>(Agropyron trachycaulum)</i>	1	-	100
KENTUCKY BLUEGRASS			
<i>(Poa pratensis)</i>	1	-	100
HAIRY WILD RYE			
<i>(Elymus innovatus)</i>	24	-	100
CRESTED WHEAT GRASS			
<i>(Agropyron pectiniforme)</i>	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBMESIC

NUTRIENT REGIME (MEAN):
MEDIUM

ELEVATION:
600M

SOIL DRAINAGE (MEAN): WELL

PLANT COMPOSITION: TAME OR MODIFIED TAME

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION(KG/HA)

TOTAL 1000

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE 2.02 ha/AUM (4.05-0.51) 0.2 AUM/ac (0.1-0.3)</p>
--

DMB24. Willow/Timothy
(*Salix spp./Phleum pratense*)

n=2 This community represents invasion of shrubs and trees onto tame pasture on moister sites. Willow favours growing on these moist, richer sites and will often invade off the edges of the pasture. Burning, cultivation and spraying with herbicide are all options that can be considered in order to control shrub regrowth.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW			
(<i>Salix bebbiana</i>)	19	8-30	100
FORBS			
CLOVER			
(<i>Trifolium spp.</i>)	3	2-3	100
DANDELION			
(<i>Taraxacum officinale</i>)	27	4-49	100
WILD STAWBERRY			
(<i>Fragaria virginiana</i>)	6	0-12	100
HORSETAIL			
(<i>Equisetum arvense</i>)	1	0-2	50
GRASSES			
TIMOTHY			
(<i>Phleum pratense</i>)	45	43-46	100
SEDGE			
(<i>Carex spp.</i>)	5	0-9	50
KENTUCKY BLUEGRASS			
(<i>Poa pratensis</i>)	1	0-1	50
SMOOTH BROME			
(<i>Bromus inermis</i>)	2	0-3	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):

SUBHYGRIC

NUTRIENT REGIME (MEAN):

PERMESOTROPHIC

ELEVATION:

600M

SOIL DRAINAGE (MEAN):

WELL

DESIRABLE SPECIES SHIFT SCORE: 8

FORAGE PRODUCTION(KG/HA)

TOTAL 2500

<p align="center">ECOLOGICALLY SUSTAINABLE STOCKING RATE 1.01 ha/AUM (1.35-0.81) 0.4 AUM/ac (0.3-0.5)</p>

DRY MIXEDWOOD SUBREGION
DECIDUOUS FOREST COMMUNITY TYPES



Photo 4. Aw/Rose/Tall forb community type in the Dry Mixedwood subregion



Photo 5. Aw/Hazelnut community is very common in the eastern ecodistricts of the Dry Mixedwood subregion.

DECIDUOUS FOREST COMMUNITIES

All of the deciduous stands sampled in the Dry Mixedwood subregion were dominated by aspen and balsam poplar and had a significant rose understory. In both Brierley et al. (1985) and Beckingham's (1993) deciduous classifications in the same subregion rose was the dominant or codominant understory shrub species in nearly every aspen-dominated community type. In Beckingham's classification rose was present in 205 of the 209 aspen-dominated stands. Rose is well adapted to a wide variety of site conditions with a moderate supply of nutrients. The moisture regime can vary from submesic to subhygric and the sites can be well to imperfectly drained.

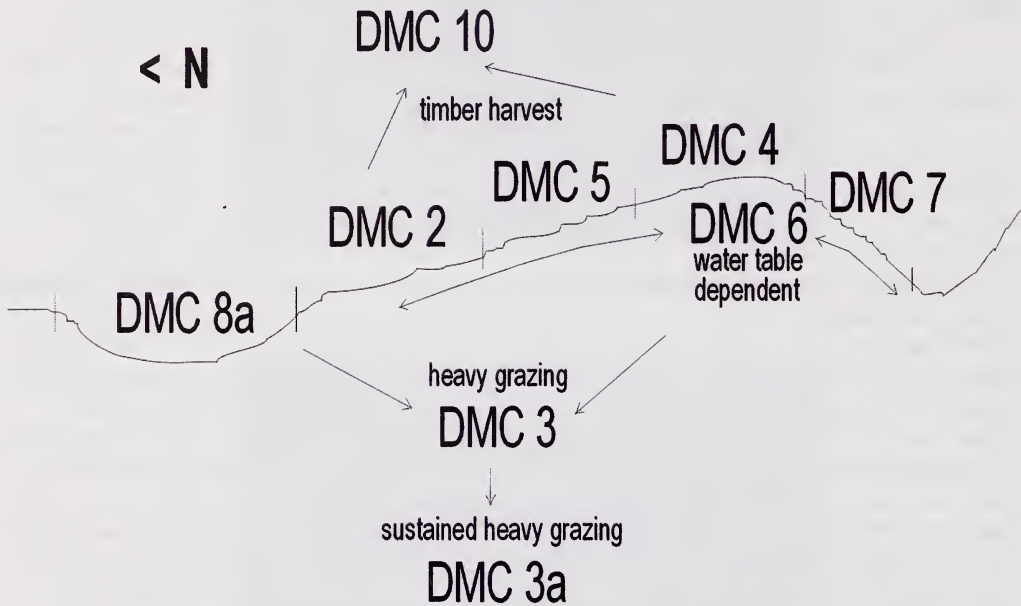
It appears the secondary forb and shrub species in association with rose characterize the ecological conditions of aspen forest types in the Dry Mixedwood subregion. Indeed, many of the deciduous types in Beckingham's classification were based on the secondary shrub species.

In the Dry Mixedwood 22 deciduous community types were described. The Aw/Blueberry type is found on well-drained, sandy sites in association with jack pine stands and the Aw/Dwarf bilberry/Bearberry/Mountain ricegrass community is found on slightly moister sites with loamy sand textures. The Aspen/Alder type is found on moist, moderately drained sites at higher elevations and the Aspen/Rose(Aw/Rose/Tall forb, Aw/Rose/Low forb, Aw/Rose-Hazelnut, Aw/Buffaloberry-Rose and Aw/Saskatoon-Rose) site types are moderately well-drained, with mesic moisture and mesotrophic nutrient regimes. Beckingham (1993), felt the Aspen/Buffaloberry type occurred on somewhat nutrient-poor soils. The Aspen/Rose/Tall and Low forb community types occupy similar site conditions. The difference between these two types may be related to grazing pressure. The Aspen/Rose/Low forb type has a low total cover of forbs (48%), whereas the Aspen/Rose/Tall forb type has a high total cover of forbs (81%). The increased grazing pressure in the Aspen/Rose/Low forb type may have caused a reduction in forb cover. The Aspen/Hazelnut type is found on mesic, well-drained sites and appears to be the reference deciduous type for this subregion, particularly in the more eastern ecodistricts. The hazelnut-dominated community types were very common within the eastern ecodistricts in the southern part of the subregion (St. Paul, Bonnyville, Smoky Lake). The presence of hazelnut appears to be indicative of warmer sites (Beckingham 1993) and have some fire history (Downing and Karpuk 1992).

A number of balsam poplar-dominated community types were described in the western and eastern ecodistricts. These communities are typical of forests situated along the flood plains of rivers and seepage areas in lower slope positions. The Balsam poplar-Aspen/Horsetail and Balsam poplar-Aspen/Willow type are found on moist poorly drained sites adjacent to some willow shrublands.

The position sequence of the dominant community types in the d.l. ecological site phase is shown in figure 7.

Ecological site phase: d.1 low bush cranberry - Aw



NOTE: DMC 5 may not be present in eastern areas of the Dry Mixedwood subregion.

Figure 7. Overview of deciduous communities in the Dry Mixedwood subregion.

Table 4. Production values and recommended ecologically sustainable stocking rates for the deciduous communities and ecological site phases described in the Dry Mixedwood subregion.*

Ecological site medium	Community number	Community type	Productivity (kg/ha)			Stocking rate ha/AUM(AUM/ac)			
			Grass	Forb	Shrub		Total	Range	Recommended
b submesic/ medium	Ecological site phase	b2 blueberry Aw(Bw)							2.7 (0.15)
	DMC1	Aw/Dwarf bilberry/ Bearberry/Mtn. ricegrass	339	263	145	728	4.05 - 2.02 (0.1 - 0.2)		2.7 (0.15)
	DMC1a	Aw/Blueberry	1005	169	173	1312	4.05 - 2.02 (0.1 - 0.2)		2.7 (0.15)
	Ecological site phase	d1 low bush cranberry Aw							2.53(0.16)
d mesic/ medium	DMC2	Aw/Rose/Tall forb	169	507	282	958	4.05 - 1.35 (0.1 - 0.3)		2.02 (0.2)
	DMC4	Aw-Pb/Hazelnut	77	457	441	995	4.05 - 1.62 (0.1 - 0.25)		2.7 (0.15)
	DMC5	Aw/Buffaloberr	19	658	219	897	4.05 - 2.02 (0.1 - 0.2)		2.7 (0.15)
	DMC6	Aw/Alder	170	356	556	1082	4.05 - 2.02 (0.1 - 0.2)		2.7 (0.15)
	DMC7	Aw/Saskatoon	153	419	524	1096	4.05 - 1.35 (0.1 - 0.3)		2.02 (0.2)
	DMC8a	Pb-Aw/Willow	155	520	130	885	4.05 - 2.02 (0.1 - 0.2)		2.7 (0.15)
	Ecological site phase	d1 grazed Aw							3.4 (0.12)
	DMC3	Aw/Rose/Low forb	285	339	300	937	4.05 - 2.02 (0.1 - 0.2)		2.7 (0.15)
Ecological site phase	DMC3a	Aw-Pb/Dandelion/K. bluegrass	681	380	117	1178	4.05 - 2.02 (0.1 - 0.2)		4.05 (0.1)
	DMC10	d1 harvested Aw Deciduous cutblocks	626	580	810	2013	4.05 - 1.35 (0.1 - 0.3)		2.0 (0.2) 2.02 (0.2)

Table 4. Production values and recommended ecologically sustainable stocking rates for the deciduous communities and ecological site phases described in the Dry Mixedwood subregion.*

e	subhygric/ rich	Ecological site phase	e1 dogwood Aw-Pb	13	213	713	950	4.05 - 1.35 (0.1 - 0.3)	2.5 (0.16)
		DMC8	Pb-Aw/Red osier dogwood						2.02 (0.2)
		DMC11	Pb/Honeysuckle	324	687	200	1211	4.05 - 1.35 (0.1 - 0.3)	1.62 (0.25)
		DMC12	Pb/River alder	245	544	397	1187	4.05 - 2.02 (0.1 - 0.2)	4.05 (0.1)
		DMC13	Pb-Aw/Silverberry	200	300	600	1100	4.05 - 1.01 (0.1 - 0.4)	2.02 (0.2)
		DMC14	Pb/Snowberry	18	230	896	1204	4.05 - 2.02 (0.1 - 0.2)	2.7 (0.15)
		Ecological site phase	e1a grazed dogwood Aw-Pb						4.05 (0.1)
		DMC18	Pb-Bw/Kentucky bluegrass	700	300	150	1150	4.05 - 2.02 (0.1 - 0.2)	4.05 (0.1)
		DMC19	Pb/Smooth brome	900	300	50	1250	4.05 - 2.02 (0.1 - 0.2)	4.05 (0.1)
f	hygric/ rich	Ecological site phase	f1 horsetail Pb-Aw						4.05 (0.1)
		DMC9	Pb-Aw/Horsetail	188	544	302	1034	4.05 - 2.02 (0.1 - 0.2)	4.05 (0.1)
j	subhydric/ medium	Ecological site phase	j1 treed poor fen						4.05 (0.1)
		DMC16	Bw/Labrador tea	150	250	350	750	-	40.47 (0.01)
k	subhydric/ rich	Ecological site phase	k1 treed rich fen						0.81 (0.5)
		DMC15	Pb/Reed grass	2000	100	50	2150	0.81 - 0.40 (0.5 - 1.0)	0.81 (0.5)
		Ecological site phase	k1a disturbed treed rich fen						4.05 (0.1)
		DMC17	Bw/Raspberry	300	300	400	1000	-	40.47 (0.01)

* Forage production values and stocking rates in italics are an estimate.

Key to Deciduous Community Types - Dry Mixedwood

1. Sites where plant community succession is in the early stages (i.e. recently reset by logging or fire).....**DMC10 Deciduous cutblocks and unseeded clearings**
Mid to late successional plant communities..... 2
2. Tree canopy dominated by Aspen..... 3
Tree canopy dominated by Balsam poplar and paper birch 11
3. Dry sites with sandy soil texture, blueberry and bearberry dominate understory..... 4
Sites with mesic or better moisture, blueberry or bearberry may be present but do not dominate the understory 5
4. Sandy sites dominated by blueberry.....**DMC1a Aw/Blueberry**
Loamy sand sites dominated by dwarf bilberry, bearberry and Mtn. ricegrass.....
.....**DMC1 Aw/D.bilberry/Bearberry/Mtn. ricegrass**
5. Heavily grazed sites dominated by dandelion, Kentucky bluegrass or clover.....
.....**DMC3a Aw/Dandelion/Kentucky bluegrass**
Moderately or lightly grazed sites dominated by shrubs..... 6
6. Beaked hazelnut dominates the understory.....**DMC4 Aw-Pb/Hazelnut**
Sites dominated by other shrubs..... 7
7. Alder dominates the understory.....**DMC6 Aw/Alder**
Sites dominated by other shrubs 8
8. Slope communities dominated by saskatoon.....**DMC7 Aw/Saskatoon**
Sites dominated by other shrubs..... 9
9. Buffaloberry dominates the understory.....**DMC5 Aw/Buffaloberry**
Rose and forb dominated understory..... 10
10. Tall forb dominated (fireweed, showy aster, peavine, wild sarsaparilla)....**DMC2 Aw/Rose/Tall forb**
Low forb dominated (bunchberry, twinflower, strawberry, wintergreen)...**DMC3 Aw/Rose/Low forb**
11. Heavily grazed birch or balsam poplar dominated sites..... 12
Moderately or lightly grazed birch or balsam poplar dominated sites..... 13
12. Smooth brome dominates understory.....**DMC19 Pb/Smooth brome**
Kentucky bluegrass and dandelion dominated.....**DMC18 Pb-Bw/K. bluegrass**
13. Paper birch dominated..... 14
Balsam poplar dominated..... 15
14. Boggy area that has recently burned.....**DMC16 Bw/Labrador tea**
Wet sites with recent beaver activity.....**DMC17 Bw/Raspberry**
15. Very wet site, grass meadows invaded by balsam poplar.....**DMC15 Pb/Reed grass**
Upland sites dominated by shrubs or horsetail 16
16. Riverine forests dominated by dogwood in understory....**DMC8 Pb-Aw/Red osier dogwood**
Sites dominated by other shrubs or horsetail in the understory..... 17
17. Willow dominates the understory..... **DMC8a Pb-Aw/Willow**
Sites dominated by other shrubs or horsetail in the understory..... 18
18. Riverine forest dominated by river alder.....**DMC12 Pb/River alder**
Sites dominated by other shrubs or horsetail in the understory..... 19
19. Very moist sites dominated by horsetail in the understory.....**DMC9 Pb-Aw/Horsetail**
Understory dominated by shrubs..... 20
20. Honeysuckle present as a co-dominant shrub on rich seepage sites....**DMC11 Pb/Honeysuckle**
Snowberry or silverberry are dominant in the understory..... 21
21. Snowberry dominates the understory.....**DMC14 Pb/Snowberry**
Silverberry dominates the understory.....**DMC13 Pb-Aw/Silverberry**

DMC1. Aw/Dwarf bilberry/Bearberry/Mountain ricegrass
(Populus tremuloides/Vaccinium caespitosum/Arctostaphylos uva-ursi/Oryzopsis asperifolia)

n=26 This community type is found on dry, well-drained, loamy-sand sites and is part of the blueberry ecosite outlined by Beckingham and Archibald (1996). The canopy cover of aspen is open allowing for easy access by livestock, but the dry site conditions and poorer nutrient status limit the amount of regrowth after grazing. If this community type is managed for one rotation a year, it can contribute significantly to the overall carrying capacity of a lease.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN <i>(Populus tremuloides)</i>	43	20-75	100
WHITE SPRUCE <i>(Picea glauca)</i>	2	0-15	42
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	8	0-21	92
SASKATOON <i>(Amelanchier alnifolia)</i>	4	0-22	77
BLUEBERRY <i>(Vaccinium myrtillus)</i>	2	0-13	50
DWARF BILBERRY <i>(Vaccinium caespitosum)</i>	4	0-9	81
FORBS			
BEARBERRY <i>(Arctostaphylos uva-ursi)</i>	7	0-36	75
TWINFLOWER <i>(Linnaea borealis)</i>	8	0-22	88
LINDLEY'S ASTER <i>(Aster ciliolatus)</i>	2	0-6	89
WILD LILY OF THE VALLEY <i>(Maianthemum canadense)</i>	5	2-9	100
YELLOW PEAVINE <i>(Lathyrus ochroleucus)</i>	7	3-31	100
STRAWBERRY <i>(Fragaria virginiana)</i>	5	0-12	96
GRASSES			
MOUNTAIN RICE GRASS <i>(Oryzopsis asperifolia)</i>	7	0-22	81
HAIRY WILD RYE <i>(Elymus innovatus)</i>	7	0-16	96
PURPLE OAT GRASS <i>(Schizachne purpurascens)</i>	3	0-10	81

NORTHERN RICEGRASS
(Oryzopsis pungens)

1 0-10 35

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
POOR

ELEVATION:
455 M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS 339(166-442)
 FORBS 263(64-610)
 SHRUBS 145(56-266)
 TOTAL 728(230-1284)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 2.7 ha/AUM (4.05-2.02)
 0.15 AUM/ac (0.1-0.2)

DMC1a. Aw/Blueberry
(*Populus tremuloides/Vaccinium myrtillus*)

n=1 This community type is found on dry, well-drained, sandy sites interspersed with stands of jack pine and is part of the blueberry ecosite outlined by Beckingham and Archibald (1996). The canopy cover of aspen is open allowing for easy access by livestock, but the dry site conditions and poorer nutrient status limit the amount of regrowth after grazing. If this community type is managed for one rotation a year, it can contribute significantly to the overall carrying capacity of a lease.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	35	-	100
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	2	-	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	2	-	100
BLUEBERRY (<i>Vaccinium myrtillus</i>)	40	-	100
FORBS			
BEARBERRY (<i>Arctostaphylos uva-ursi</i>)	20	-	100
TWINFLOWER (<i>Linnaea borealis</i>)	5	-	100
STRAWBERRY (<i>Fragaria virginiana</i>)	5	-	100
WILD LILY OF THE VALLEY (<i>Maianthemum canadense</i>)	15	-	100
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	7	-	100
GRASSES			
HAIRY WILD RYE (<i>Elymus innovatus</i>)	5	-	100
NORTHERN RICEGRASS (<i>Oryzopsis pungens</i>)	4	-	100
LICHEN			
REINDEER LICHEN (<i>Cladina mitis</i>)	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC-SUBXERIC
NUTRIENT REGIME:
POOR
ELEVATION:
455 M
SOIL DRAINAGE:
WELL
ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 750*ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE 2.7 ha/AUM (4.05-2.02) 0.15 AUM/ac (0.1-0.2)</p>
--

DMC2. Aw/Rose/Tall forb
(*Populus tremuloides/Rosa acicularis/Tall forbs*)

n=71 This community type is part of the low bush cranberry ecosite outlined by Beckingham and Archibald (1996). This community type is also very similar to the Aspen/Rose/Low forb community type, but the cover of forbs is much higher. This appears to be related to the grazing pressure. The higher the grazing pressure on the Aw/Rose/Tall forb community type appears to cause a reduction in the cover of tall growing forbs (wild sarsaparilla, fireweed, peavine, showy aster) and favours the growth of low growing forbs (bunchberry, dewberry, wintergreen, strawberry). This community type is providing a moderate amount of forage for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	51	15-70	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	4	0-10	58
SHRUBS			
HAZELNUT (<i>Corylus cornuta</i>)	2	0-12	34
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	4	0-10	83
BRACED HONEYSUCKLE (<i>Lonicera involucrata</i>)	2	0-32	45
PRICKLY ROSE (<i>Rosa acicularis</i>)	12	0-24	91
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	5	0-36	76
FORBS			
FIREWEED (<i>Epilobium angustifolium</i>)	3	0-7	61
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	4	0-7	87
PALMATE-LEAVED COLTSFOOT (<i>Petasites palmatus</i>)	2	0-10	78
WILD STRAWBERRY (<i>Fragaria virginiana</i>)	3	0-4	87
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	1	0-4	76
YELLOW PEAVINE (<i>Lathyrus ochroleucus</i>)	7	0-27	96
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	11	0-57	79

GRASSES

MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	5	0-65	93
HAIRY WILD RYE (<i>Elymus innovatus</i>)	3	0-30	70

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO SUBHYGRIC

NUTRIENT REGIME:
MEDIUM TO RICH

ELEVATION:
455-606(496) M

PERCENT SLOPE GRADIENT:
0 - 25(5)

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS	169(0-444)
FORBS	507(72-988)
SHRUBS	282(118-378)
TOTAL	958(624-1810)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.02 ha/AUM (4.05-1.35)
0.2 AUM/ac (0.1-0.3)

DMC3. Aw/Rose/Low forb
(*Populus tremuloides/Rosa acicularis/Low forbs*)

n=60 This community type is part of the low bush cranberry ecosite described by Beckingham and Archibald (1996) and is very similar to the Aw/Rose/Tall forb community type previously described. The difference in the community types appears to be related to the grazing pressure. The higher the grazing pressure on the Aw/Rose/Tall forb community type appears to cause a reduction in the cover of tall growing forbs (wild sarsaparilla, fireweed, peavine, showy aster) and favours the growth of low growing forbs (bunchberry, dewberry, wintergreen, strawberry). This community type is providing a moderate amount of forage for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	46	15-85	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	3	0-15	33
SHRUBS			
WILLOW SPP. (<i>Salix spp.</i>)	2	0-20	36
SASKATOON (<i>Amelanchier alnifolia</i>)	1	0-11	48
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	5	0-20	93
SNOWBERRY (<i>Symphoricarpos occidentalis</i>)	4	0-38	85
PRICKLY ROSE (<i>Rosa acicularis</i>)	13	1-55	100
FORBS			
FIREWEED (<i>Epilobium angustifolium</i>)	1	0-11	42
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	3	0-30	78
PALMATE-LEAVED COLTSFOOT (<i>Petasites palmatus</i>)	1	0-30	53
WILD STRAWBERRY (<i>Fragaria virginiana</i>)	3	0-12	92
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	2	0-12	82
BUNCHBERRY (<i>Cornus canadensis</i>)	5	0-22	83
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	1	0-9	38
WINTERGREEN (<i>Pyrola asarifolia</i>)	3	0-20	85

GRASSES

MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	2	0-20	77
SLENDER WHEAT GRASS (<i>Agropyron trachycaulum</i>)	2	0-40	33
HAIRY WILD RYE (<i>Elymus innovatus</i>)	3	0-22	73

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

MESIC TO SUBHYGRIC

NUTRIENT REGIME:

MEDIUM TO RICH

ELEVATION: 455-697(524) M

PERCENT SLOPE GRADIENT: 0 - 5

SOIL DRAINAGE:

WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 12

FORAGE PRODUCTION(KG/HA)

GRASS	285(12-996)
FORBS	339(90-842)
SHRUBS	300(0-896)
TOTAL	937(414-2074)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.7 ha/AUM (4.05-2.02)
0.15 AUM/ac (0.1-0.2)

DMC3a. Aw-Pb/Dandelion/Kentucky bluegrass
(*Populus tremuloides*-*P. balsamifera*/*Taraxacum officinale*/*Poa pratensis*)

n=6 This community represents the Aw or Pb/Rose/Tall forb community that has received prolonged heavy grazing. This community type often occurs in relatively small isolated patches created by intensive grazing adjacent to water, salt or temporary holding areas. The species richness and diversity of native shrubs, forbs, and grass is reduced and replaced by grazing resistant clover, dandelion and Kentucky bluegrass.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	36	20-50	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	32	20-40	100
SHRUBS			
WILLOW SPP. (<i>Salix spp.</i>)	2	1-3	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	4	0-10	80
SNOWBERRY (<i>Symphoricarpos occidentalis</i>)	7	0-20	80
PRICKLY ROSE (<i>Rosa acicularis</i>)	15	3-30	100
FORBS			
CLOVER (<i>Trifolium spp.</i>)	10	0-20	80
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	2	0-10	83
DANDELION (<i>Taraxacum officinale</i>)	4	1-10	100
WILD STRAWBERRY (<i>Fragaria virginiana</i>)	3	1-3	100
SHOWY ASTER (<i>Aster conspicuus</i>)	4	3-10	100
BUNCHBERRY (<i>Cornus canadensis</i>)	1	0-1	50
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	1	0-1	20
WINTERGREEN (<i>Pyrola asarifolia</i>)	2	0-10	33

GRASSES

MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	1	0-3	67
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	4	0-10	83
HAIRY WILD RYE (<i>Elymus innovatus</i>)	2	0-10	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

MESIC TO SUBHYGRIC

NUTRIENT REGIME:

MESOTROPHIC TO PERMESOTROPHIC

ELEVATION:

455-697(524) M

PERCENT SLOPE GRADIENT:

0 - 5

SOIL DRAINAGE:

WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 6-0

FORAGE PRODUCTION(KG/HA)

TOTAL 1178*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE 4.05 ha/AUM (4.05-2.02) 0.1 AUM/ac (0.1-0.2)

DMC4. Aw-Pb/Hazelnut
(*Populus tremuloides*-*P. balsamifera*/*Corylus cornuta*)

n=45 Beaked hazelnut is a common component of many of the deciduous stands in both the western and eastern ecodistricts of the Dry Mixedwood subregion. The presence of hazelnut appears to be indicative of warmer sites and have some fire history (Downing and Karpuk 1992). This community tends to occur on moderately to well drained, fine-textured and gently sloping till deposits. The total forage productivity of this community type is only moderate, but the majority of the production is coming from hazelnut, which is largely unpalatable to livestock at proper stocking levels. The high cover of hazelnut also restricts access to livestock, limiting the forage availability.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	38	3-75	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	5	0-60	38
PAPER BIRCH (<i>Betula papyrifera</i>)	2	0-70	4
SHRUBS			
HAZELNUT (<i>Corylus cornuta</i>)	39	12-70	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	9	0-25	82
SNOWBERRY (<i>Symphoricarpos occidentalis, albus</i>)	4	4-10	100
SASKATOON (<i>Amelanchier alnifolia</i>)	4	0-18	89
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	3	0-16	71
FORBS			
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	2	0-7	80
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	4	0-5	87
PEAVINE (<i>Lathyrus ochroleucus</i>)	5	1-10	100
AMERICAN VETCH (<i>Vicia americana</i>)	1	0-2	67
BUNCHBERRY (<i>Cornus canadensis</i>)	6	0-8	84
WILD SANSAPARILLA (<i>Aralia nudicaulis</i>)	11	0-25	93

GRASSES

MARSH REED GRASS
(*Calamagrostis canadensis*) 4 0-10 87

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO SUBHYGRIC
NUTRIENT REGIME:
MEDIUM TO RICH
ELEVATION:
455 M
PERCENT SLOPE GRADIENT:
0-15 %
SOIL DRAINAGE:
WELL TO MODERATELY WELL
ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS 77(2-200)
FORBS 457(398-520)
SHRUBS 441(348-522)
TOTAL 995(830-1180)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.7 ha/AUM (4.05-1.62)
0.15 AUM/ac (0.1-0.25)

DMC5. Aw/Buffaloberry
(*Populus tremuloides/ Shepherdia canadensis*)

n=5 This community type was found on mesic sites at higher elevations in the Saddle and Birch hills. Beckingham (1993) felt the Aw/Buffaloberry type was slightly drier and had a slightly poorer nutrient regime than the model Aw/Rose community types. This type is providing a moderate amount of forage for domestic livestock, but the drier site conditions and poorer nutrient status will limit regrowth after grazing. Buffaloberry the predominant shrub species in this community type, is generally unpalatable to livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	52	30-85	100
SHRUBS			
BUFFALOBERRY (<i>Shepherdia canadensis</i>)	25	11-38	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	3	0-8	60
BRACTED HONEYSUCKLE (<i>Lonicera involucrata</i>)	1	0-2	20
PRICKLY ROSE (<i>Rosa acicularis</i>)	8	2-17	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	3	0-14	40
FORBS			
BUNCHBERRY (<i>Cornus canadensis</i>)	8	0-21	80
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	2	0-9	60
YELLOW PEAVINE (<i>Lathyrus ochroleucus</i>)	8	1-18	100
TWINFLOWER (<i>Linnaea borealis</i>)	3	0-8	60
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	2	1-7	80
HAIRY WILD RYE (<i>Elymus innovatus</i>)	5	1-15	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
455-758(556) M

PERCENT SLOPE GRADIENT:
0-15

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS 112
FORBS 304
SHRUBS 346
TOTAL 713

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.7 ha/AUM (4.05-2.02)
0.15 AUM/ac (0.1-0.2)

DMC6. Aw/Alder
(*Populus tremuloides/Alnus crispa*)

n=7 This community type was described at a higher elevation (600 m) in the Dry Mixedwood subregion. Brierly et al. (1985) and Beckingham (1993) both described aspen-alder communities at higher elevations (>600m). It appears that the presence of alder may indicate a transition from the Dry Mixedwood into the Lower Foothills subregion.

This community type is providing a moderate amount of forage for domestic livestock, but the high cover of alder will limit access.

PLANT COMPOSITION CANOPY COVER(%)
MEAN RANGE CONST.

TREES

BALSAM POPLAR (<i>Populus balsamifera</i>)	5	1-10	100
TREMBLING ASPEN (<i>Populus tremuloides</i>)	45	25-60	100

SHRUBS

PRICKLY ROSE (<i>Rosa acicularis</i>)	7	5-12	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	2	0-5	67
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	5	2-12	100
GREEN ALDER (<i>Alnus crispa</i>)	31	18-82	100

FORBS

CREAM-COLOURED VETCHLING (<i>Lathyrus ochroleucus</i>)	4	0-6	83
BUNCHBERRY (<i>Cornus canadensis</i>)	12	0-30	83
STRAWBERRY (<i>Fragaria virginiana</i>)	2	1-3	100
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	20	5-40	100

GRASSES

MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	21	0-65	83
SLENDER WHEAT GRASS (<i>Agropyron trachycaulum</i>)	2	0-5	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

MESIC

NUTRIENT REGIME:

MEDIUM

ELEVATION:

600 M

PERCENT SLOPE GRADIENT:

5 %

SOIL DRAINAGE:

WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS	170
FORBS	356
SHRUBS	556
TOTAL	1082

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.7 ha/AUM (4.05-2.02)
0.15 AUM/ac (0.1-0.2)

DMC7. Aw/Saskatoon
(*Populus tremuloides/ Amelanchier alnifolia*)

n=9 This community type is found on mesic, well drained south facing slopes that overlook rivers and creeks. Generally, hazelnut, chokecherry, saskatoon and snowberry are indicative of the Dry Mixedwood subregion and are usually found associated with each other. When saskatoon predominates it usually occurs on south and west facing slopes. Saskatoon provides important browse for wild ungulates. Livestock also find saskatoon palatable and in areas where there is extensive cattle grazing this species can be heavily browsed.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	55	35-70	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	4	0-20	44
SHRUBS			
SASKATOON (<i>Amelanchier alnifolia</i>)	21	15-30	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	12	1-31	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	5	0-17	67
SNOWBERRY (<i>Symphoricarpos occidentalis</i>)	5	0-12	89
CHOKECHERRY (<i>Prunus virginiana</i>)	7	0-30	67
FORBS			
YELLOW PEAVINE (<i>Lathyrus ochroleucus</i>)	2	0-10	78
STRAWBERRY (<i>Fragaria virginiana</i>)	1	0-10	78
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	2	0-10	67
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	6	0-20	89
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	3	1-10	78

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC
NUTRIENT REGIME:
MEDIUM
ELEVATION:
455-630 M
PERCENT SLOPE GRADIENT:
4(3-5%)
ASPECT:
SOUTHERLY-WESTERLY
SOIL DRAINAGE:
WELL
ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS 153(42-264)
FORBS 419(250-587)
SHRUBS 524(514-534)
TOTAL 1096(826-1365)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.02 ha/AUM (4.05-1.35)
0.2 AUM/ac (0.1-0.3)

DMC8. Pb-Aw/Red osier dogwood
(Populus balsamifera-P. tremuloides/Cornus stolonifera)

n=51 This community type is typical of river floodplains throughout the Dry Mixedwood subregion. This community type tends to have a subhygric moisture and rich nutrient regime. Beckingham and Archibald (1996) found this community type on mid to lower slope topographic positions or near water courses where they receive nutrient-rich seepage or flood waters for a portion of the growing season. This community type is one of the most productive in the Dry Mixedwood subregion, but the high cover of shrubs limits access to livestock.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

TREES

BALSAM POPLAR <i>(Populus balsamifera)</i>	37	0-80	84
TREMBLING ASPEN <i>(Populus tremuloides)</i>	20	0-60	69
PAPER BIRCH <i>(Betula papyrifera)</i>	4	0-50	41

SHRUBS

RED OSIER DOGWOOD <i>(Cornus stolonifera)</i>	23	8-70	100
WILD RED RASPBERRY <i>(Rubus idaeus)</i>	4	0-18	60
PRICKLY ROSE <i>(Rosa acicularis)</i>	9	0-18	78
LOW BUSH CRANBERRY <i>(Viburnum edule)</i>	7	0-30	78

FORBS

HORSETAIL <i>(Equisetum arvense)</i>	4	0-10	73
WILD SARSAPARILLA <i>(Aralia nudicaulis)</i>	7	0-40	80
PEAVINE <i>(Lathyrus ochroleucus)</i>	1	0-4	57
FIREWEED <i>(Epilobium angustifolium)</i>	3	0-20	61

GRASSES

MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	4	0-50	75
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ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

SUBHYGRIC

NUTRIENT REGIME:

RICH

ELEVATION:

455-606 M

SOIL DRAINAGE:

MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS 13(0-50)
 FORBS 213(150-250)
 SHRUBS 713(400-900)
 TREE 13(0-50)
 TOTAL 950(600-1150)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 2.02 ha/AUM (4.05-1.35)
 0.2 AUM/ac (0.1-0.3)

DMC8a. Pb-Aw/Willow
(*Populus balsamifera*-*P. tremuloides*/*Salix spp.*)

n=6 This community type is typical of aspen forests adjacent to sloughs and wet meadows. The edges of the sedge meadows tend to be willow dominated. This community type represents the transition from the meadow edge into the aspen and balsam poplar dominated forest. This community type is relatively moist and nutrient rich, but the high cover of willow limits the light reaching the forest floor inhibiting the growth of understory shrub, forbs and grass. As a result there is little forage for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR (<i>Populus balsamifera</i>)	25	0-60	83
TREMBLING ASPEN (<i>Populus tremuloides</i>)	16	0-50	67
PAPER BIRCH (<i>Betula papyrifera</i>)	7	0-20	50
SHRUBS			
WILLOW SPP. (<i>Salix spp.</i>)	27	20-35	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	8	0-20	83
PRICKLY ROSE (<i>Rosa acicularis</i>)	3	1-10	100
BRACKETED HONEYSUCKLE (<i>Lonicera involcrata</i>)	2	0-3	83
FORBS			
STRAWBERRY (<i>Fragaria virginiana</i>)	3	1-5	100
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	1	0-5	33
TALL LUNGWORT (<i>Mertensia paniculata</i>)	4	1-20	100
DEWBERRY (<i>Rubus pubescens</i>)	2	1-4	100
HORSETAIL (<i>Equisetum arvense</i>)	3	0-10	83
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	5	1-20	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC
NUTRIENT REGIME:
RICH
ELEVATION:
455-606 M
SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS 130(0-260)
FORBS 525(350-700)
SHRUBS 155(50-260)
TREE 75(0-150)
TOTAL 885(660-1110)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.7 ha/AUM (4.05-2.02)
0.15 AUM/ac (0.1-0.2)

DMC9. Pb-Aw/Horsetail

(*Populus balsamifera*-*Populus tremuloides*/*Equisetum arvense*)

n=5 This community occupies lowland sites adjacent to black spruce and willow lowlands. It is very moist and nutrient-rich. Horsetail types in the other subregions also tend to be moister and richer than the model Aw/Rose types. Past overgrazing pressure appears to have been heavy at one of the sites has resulted in an alteration of understory species composition and productivity. Overuse appears to lower species diversity and allows horsetail to increase in cover.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN			
(<i>Populus tremuloides</i>)	25	0-85	60
BALSAM POPLAR			
(<i>Populus balsamifera</i>)	41	0-75	80
SHRUBS			
PRICKLY ROSE			
(<i>Rosa acicularis</i>)	3	1-10	100
HONEYSUCKLE			
(<i>Lonicera involucrata</i>)	3	0-16	60
RED OSIER DOGWOOD			
(<i>Cornus stolonifera</i>)	3	0-8	60
FORBS			
HORSETAIL			
(<i>Equisetum arvense</i>)	30	5-60	100
BUNCHBERRY			
(<i>Cornus canadensis</i>)	1	0-6	40
TALL LUNGWORT			
(<i>Mertensia paniculata</i>)	3	0-7	60
DEWBERRY			
(<i>Rubus pubescens</i>)	1	0-5	80
VEINY MEADOW RUE			
(<i>Thalictrum venulosum</i>)	1	0-4	20
BISHOP'S CAP			
(<i>Mitella nuda</i>)	1	0-3	40
STRAWBERRY			
(<i>Fragaria virginiana</i>)	1	0-2	60
GRASSES			
MARSH REED GRASS			
(<i>Calamagrostis canadensis</i>)	2	0-5	80

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

HYGRIC

NUTRIENT REGIME:

RICH

ELEVATION:

590-667 M

SOIL DRAINAGE:

IMPERFECTLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS 188(104-272)
 FORBS 544(450-638)
 SHRUBS 302(0-604)
 TOTAL 1034(910-1158)

ECOLOGICALLY SUSTAINABLE STOCKING RATE 4.05 ha/AUM (4.05-2.02) 0.1 AUM/ac (0.1-0.2)

DMC10. Deciduous cutblocks and unseeded clearings (*Populus tremuloides*)

n=4 This community type represents deciduous cutblocks and clearings that have not been seeded to tame forage species. [Note: it is also the "best fit" for recently burnt areas that remain undescribed in the guide to date.] Marsh reed grass and strawberry initially dominated these areas. As succession occurs an understory of aspen and rose predominate. As the tree cover increases the understory species structure and diversity declines. Initially these clearings are very productive for domestic livestock until the trees grow back and limit accessibility. Care should be taken when grazing these cutblocks that the trees are not damaged and there is sufficient regrowth to regenerate the cutblock.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

UNDERSTORY TREES

BALSAM POPLAR (<i>Populus balsamifera</i>)	T	0-1	25
ASPEN (<i>Populus tremuloides</i>)	19	11-28	100

SHRUBS

PRICKLY ROSE (<i>Rosa acicularis</i>)	18	9-22	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	2	0-4	75
SNOWBERRY OR BUCKBRUSH (<i>Symphoricarpos occidentalis</i>)	3	0-11	75
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	5	0-16	50

FORBS

WILD STRAWBERRY (<i>Fragaria virginiana</i>)	22	8-38	100
PALMATE-LEAVED COLTSFOOT (<i>Petasites palmatus</i>)	2	0-6	25
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	2	0-8	50
NORTHERN BEDSTRAW (<i>Galium boreale</i>)	4	0-14	75
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	4	0-12	75

GRASSES

MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	17	0-45	75
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ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

MESIC

NUTRIENT REGIME:

MESOTROPHIC

ELEVATION:

455-727(636) M

PERCENT SLOPE GRADIENT:

LEVEL

SOIL DRAINAGE:

WELL

ECOLOGICAL STATUS SCORE: 18-0

FORAGE PRODUCTION(KG/HA)

GRASS	623
FORBS	580
SHRUBS	810
TOTAL	2013

ECOLOGICALLY SUSTAINABLE STOCKING RATE

2.02 ha/AUM (4.05-1.35)

0.2 AUM/ac (0.1-0.3)

DMC11. Pb/Honeysuckle
(*Populus balsamifera/Lonicera involucrata*)

n=8 This community type occupies mid to lower slope positions which receive nutrient rich seepage from upslope. It has similar moisture and nutrient regimes to the red osier dogwood dominated sites, but it has a very low cover of red osier dogwood which distinguishes this community type from the red osier dogwood dominated communities. The lack of red osier dogwood cover may be indicative of increased grazing pressure or this community may represent the transition to the Lower Foothills subregion. Indeed Lane et al. (2000) described an Aw/Honeysuckle in the Lower Foothills subregion and red osier dogwood was not as common in this subregion. This community type has a very diverse shrub and forb layer, but the high cover of shrubs often restricts access to livestock, limiting forage availability.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR (<i>Populus balsamifera</i>)	53	20-70	100
ASPEN (<i>Populus tremuloides</i>)	8	0-20	75
SHRUBS			
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	4	0-20	63
PRICKLY ROSE (<i>Rosa acicularis</i>)	11	0-20	88
BRACTED HONEYSUCKLE (<i>Lonicera involucrata</i>)	9	3-10	100
RASPBERRY (<i>Rubus idaeus</i>)	11	3-40	100
FORBS			
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	3	0-10	88
BUNCHBERRY (<i>Cornus canadensis</i>)	4	0-20	88
WILD STRAWBERRY (<i>Fragaria virginiana</i>)	3	0-10	88
SHOWY ASTER (<i>Aster conspicuus</i>)	3	1-10	100
TALL LUNGWORT (<i>Mertensia paniculata</i>)	2	0-5	88
YELLOW PEAVINE (<i>Lathyrus ochroleucus</i>)	1	0-3	88
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	2	1-3	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC
NUTRIENT REGIME:
RICH
ELEVATION:
590--648(630) M
PERCENT SLOPE GRADIENT:
0
SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS 105
FORBS 450
SHRUBS 604
TOTAL 1191

ECOLOGICALLY SUSTAINABLE STOCKING RATE
1.62 ha/AUM (4.05-1.35)
0.25 AUM/ac (0.1-0.3)

DMC12. Pb/River alder
(*Populus balsamifera*/*Alnus tenuifolia*)

n=2 This community is found on lower slopes along natural drainages or areas with high water tables. River alder persists on moist sites and is replaced by green alder on drier upper slope positions. This community is similar to the Pb-Aw/River alder community described by Beckingham and Archibald (1996) in the Boreal Mixedwood of Northern Alberta and is part of the dogwood ecosite. Production of this community type is very high because of the high moisture and nutrient conditions, however a large component of the total forage production is coming from alder which is generally unpalatable to livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR (<i>Populus balsamifera</i>)	50	50-60	100
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	5	1-10	100
RIVER ALDER (<i>Alnus tenuifolia</i>)	55	50-60	100
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	12	3-20	100
FORBS			
HORSETAIL (<i>Equisetum arvense</i>)	5	1-10	100
DANDELION (<i>Taraxacum officinale</i>)	2	1-3	100
STAR FLOWERED SOLOMON SEAL (<i>Smilacina stellata</i>)	1	1-2	100
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	1	0-1	50
HAIRY WILD RYE (<i>Elymus innovatus</i>)	1	0-1	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
556-646(587) M

PERCENT SLOPE GRADIENT:
1-5(3)%

SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 1187 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
4.05 ha/AUM (4.05-2.02)
0.1 AUM/ac (0.1-0.2)

DMC13. Pb-Aw/Silverberry
(Populus balsamifera-P. tremuloides/Elaeagnus commutata)

n=3 This community is scattered throughout the Dry Mixedwood subregion. It appears to represent the invasion of aspen and balsam poplar onto silverberry shrublands. Silverberry thickets can occur on alluvial floodplain terraces, in V-shaped ravines and swale-like depressions where overland flows provide additional moisture (Thompson and Hansen 2002). The open nature and high productivity on these silverberry dominated communities make them attractive to livestock grazing. The understory of these communities are often dominated by Kentucky bluegrass, smooth brome and dandelion. Thompson and Hansen (2002) felt that silverberry dominated communities represented a grazing disclimax of red osier dogwood communities in Southern Alberta.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN <i>(Populus tremuloides)</i>	17	0-50	33
BALSAM POPLAR <i>(Populus balsamifera)</i>	31	3-50	100
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	11	3-20	100
YELLOW WILLOW <i>(Salix lutea)</i>	4	1-10	100
SILVERBERRY <i>(Elaeagnus commutata)</i>	23	20-30	100
FORBS			
DANDELION <i>(Taraxacum officinale)</i>	2	1-3	100
SHOWY ASTER <i>(Aster conspicuus)</i>	1	1-3	100
HORSETAIL <i>(Equisetum arvense)</i>	4	0-10	66
STRAWBERRY <i>(Fragaria virginiana)</i>	4	0-10	66
YELLOW PEAVINE <i>(Lathyrus ochroleucus)</i>	1	1-2	100
GRASSES			
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	5	1-10	100
SMOOTH BROME <i>(Bromus inermis)</i>	4	0-10	66

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
570-690(630) M

SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 12

FORAGE PRODUCTION(KG/HA)

TOTAL 1100 *ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE 2.02 ha/AUM (4.05-1.01) 0.2 AUM/ac (0.1-0.4)</p>
--

DMC14. Pb/Snowberry
(*Populus balsamifera/Symphoricarpos occidentalis*)

n=3 This community type occupies small seepage areas on slopes above creeks and rivers in the Dry Mixedwood subregion. Snowberry prefers well drained habitats and has been found to quite common on forested slopes and river flood plains throughout the Boreal forest (Lane et al. 2000). The presence of balsam poplar indicates that the moisture content is sufficient to support its growth in this community. This community type is usually found in only small isolated spots.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	5	0-11	66
BALSAM POPLAR (<i>Populus balsamifera</i>)	36	3-80	100
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	17	10-20	100
SNOWBERRY (<i>Symphoricarpos occidentalis</i>)	22	6-20	100
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	5	1-10	100
FORBS			
BUNCHBERRY (<i>Cornus canadensis</i>)	3	0-6	66
STRAWBERRY (<i>Fragaria virginiana</i>)	2	1-3	100
NORTHERN BEDSTRAW (<i>Galium boreale</i>) 1	1-2	100	
DANDELION (<i>Taraxacum officinale</i>)	2	0-3	66
YELLOW PEAVINE (<i>Lathyrus ochroleucus</i>)	6	3-15	100
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>) 1	0-1		66
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	3	0-10	33

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
556-709(624) M

SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 12

FORAGE PRODUCTION(KG/HA)

TOTAL 1204 *ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE 2.02 ha/AUM (4.05-1.35) 0.2 AUM/ac (0.1-0.3)</p>
--

DMC15. Pb/Reed grass
(Populus balsamifera/Calamagrostis stricta)

n=2 This community type is not common in the Dry Mixedwood subregion. It appears to represent the invasion of balsam poplar onto reed grass and reed canary grass dominated meadows. As sloughs and small lakes dry up the edge communities become drier which favours the growth of trees and shrubs. If drying continues this community will likely succeed to a Pb/Red osier dogwood dominated community type. However, if flooding increases balsam poplar will likely decline. This community type is very productive for domestic livestock and the open nature of the understory also allows for good access.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR			
<i>(Populus balsamifera)</i>	40	20-60	100
SHRUBS			
RED OSIER DOGWOOD			
<i>(Cornus stolonifera)</i>	2	1-3	100
FORBS			
THISTLE			
<i>(Cirsium arvense)</i>	3	3-4	100
HORSETAIL			
<i>(Equisetum arvense)</i>	3	3-4	100
SOW THISTLE			
<i>(Sonchus arvensis)</i>	7	3-10	100
DANDELION			
<i>(Taraxacum officinale)</i>	2	0-3	50
GRASSES			
NARROW REED GRASS			
<i>(Calamagrostis stricta)</i>	10	0-20	50
REED CANARY GRASS			
<i>(Phalaris arundinacea)</i>	5	0-10	50
WATER SEDGE			
<i>(Carex aquatilis)</i>	5	0-10	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC TO SUBHYDRIC

NUTRIENT REGIME:
RICH

ELEVATION:
556-693(617) M

SOIL DRAINAGE:
MODERATELY WELL TO IMPERFECTLY

ECOLOGICAL STATUS SCORE: 12

FORAGE PRODUCTION(KG/HA)

TOTAL 2150 *ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE</p> <p>0.81 ha/AUM (0.81-0.4)</p> <p>0.5 AUM/ac (0.5-1.0)</p>

DMC16. Bw/Labrador tea
(Betula papyrifera/Ledum groenlandicum)

n=1 This community type represents a treed poor fen ecosite that was recently burned in Elk Island National Park. The poor fen ecosite is intermediate in nutrient regime between the bog and the rich fen ecosites (Beckingham and Archibald 1996). The presence of Labrador tea and short sedge is indicative of the acidic soil conditions. Treed poor fens are often dominated by black spruce in the Boreal Mixedwood (Beckingham and Archibald 1996), however the frequent fire regime in the park has burned the black spruce canopy and the site has become dominated by paper birch a early successional species in these boggy areas. These boggy community types are often too wet for domestic livestock and the species growing in them are often unpalatable.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

TREES

PAPER BIRCH

(Betula papyrifera) 40 - 100

ASPEN

(Populus tremuloides) 1 - 100

SHRUBS

LABRADOR TEA

(Ledum groenlandicum) 40 - 100

CURRANT

(Ribes triste) 30 - 100

RASPBERRY

(Rubus idaeus) 3 - 100

BLUEBERRY

(Vaccinium myrtilloides) 20 - 100

FORBS

FIREWEED

(Epilobium angustifolium) 1 - 100

SKULL CAP

(Scutellaria galericulata) 1 - 100

GRASSES

MARSH REED GRASS

(Calamagrostis canadensis) 3 - 100

SHORT SEDGE

(Carex curta) 3 - 100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

SUBHYDRIC

NUTRIENT REGIME:

POOR

ELEVATION:

625 M

SOIL DRAINAGE:

POORLY

ECOLOGICAL STATUS SCORE: 18

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

TOTAL 750 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 40.47 ha/AUM
 0.01 AUM/ac

DMC17. Bw/Raspberry
(*Betula papyrifera/Rubus idaeus*)

n=2 This community type was described adjacent to old beaver dams. Cutting of the adjacent tree canopy and the increased moisture around the dam favours the growth of paper birch and raspberry. Both species are early successional and will rapidly dominate a site after disturbance. As the site dries and undergoes succession it will likely succeed to willow and eventually balsam poplar and white spruce. This community occupies small areas adjacent to the ponds and sloughs and is generally too wet for livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
PAPER BIRCH (<i>Betula papyrifera</i>)	85	80-90	100
ASPEN (<i>Populus tremuloides</i>)	1	0-1	50
SHRUBS			
ROSE (<i>Rosa acicularis</i>)	1	0-1	50
SCOULER'S WILLOW (<i>Salix scouleriana</i>)	5	0-10	50
RASPBERRY (<i>Rubus idaeus</i>)	10	10-11	100
FORBS			
FIREWEED (<i>Epilobium angustifolium</i>)	1	0-1	50
BUNCHBERRY (<i>Cornus cornuta</i>)	2	0-3	50
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	15	1-30	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYDRIC

NUTRIENT REGIME:
RICH

ELEVATION:
625 M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 1000 *ESTIMATE

<p style="text-align: center;">ECOLOGICALLY SUSTAINABLE STOCKING RATE 40.47 ha/AUM 0.01 AUM/ac</p>
--

DMC18. Pb-Bw/Kentucky bluegrass
(*Populus balsamifera*-*Betula papyrifera*/*Poa pratensis*)

n=5 This community represents a Pb or Bw/Red osier dogwood community that has received prolonged heavy grazing. This community type often occurs in relatively small isolated patches created by intensive grazing adjacent to water, salt or temporary holding areas. The species richness and diversity of native shrubs, forbs, and grass is reduced and replaced by grazing resistant species like clover, dandelion and Kentucky bluegrass.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	4	0-10	80
BALSAM POPLAR (<i>Populus balsamifera</i>)	54	30-80	100
PAPER BIRCH (<i>Betula papyrifera</i>)	8	0-40	60
SHRUBS			
WILLOW SPP. (<i>Salix spp.</i>)	3	3-4	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	4	0-10	80
SNOWBERRY (<i>Symphoricarpos occidentalis</i>)	3	1-10	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	6	3-10	100
FORBS			
FIREWEED (<i>Epilobium angustifolium</i>)	1	0-1	60
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	4	0-20	80
CLOVER (<i>Trifolium spp.</i>)	2	0-10	60
WILD STRAWBERRY (<i>Fragaria virginiana</i>)	3	1-3	100
SHOWY ASTER (<i>Aster conspicuus</i>)	2	1-3	100
Horsetail (<i>Equisetum arvense</i>)	2	1-3	100
DANDELION (<i>Taraxacum officinale</i>)	4	1-10	100

GRASSES

MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	1	0-3	80
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	9	1-20	100
QUACKGRASS (<i>Agropyron repens</i>)	1	0-3	60

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC
NUTRIENT REGIME:
RICH
ELEVATION:
455-697(524) M
PERCENT SLOPE GRADIENT:
0 - 5
SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 6-0

FORAGE PRODUCTION(KG/HA)

TOTAL 1150 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
4.05 ha/AUM (4.05-2.02)
0.1 AUM/ac (0.1-0.2)

DMC19. Pb/Smooth brome
(*Populus balsamifera/Bromus inermis*)

n=2 This community type is similar to the previously described red osier dogwood and balsam poplar dominated community types, but has a high cover of smooth brome in the understory. Smooth brome is an introduced grass that can increase with increased grazing pressure, but invade into ungrazed areas. The invasion of non-native invaders onto the site makes this community moderately productive for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR			
(<i>Populus balsamifera</i>)	70	60-80	100
SHRUBS			
WILLOW SPP.			
(<i>Salix spp.</i>)	67	3-10	100
WILD RED RASPBERRY			
(<i>Rubus idaeus</i>)	10	0-20	50
SNOWBERRY			
(<i>Symphoricarpos occidentalis</i>)	7	3-10	100
RED OSIER DOGWOOD			
(<i>Cornus stolonifera</i>)	10	1-20	100
FORBS			
CLOVER			
(<i>Trifolium spp.</i>)	1	0-1	50
HORSETAIL			
(<i>Equisetum arvense</i>)	5	1-10	100
DANDELION			
(<i>Taraxacum officinale</i>)	2	1-3	100
STAR FLOWERED SOLOMON SEAL			
(<i>Smilacina stellata</i>)	7	3-10	100
SHOWY ASTER			
(<i>Aster conspicuus</i>)	2	1-3	100
RICHARDSON GERANIUM			
(<i>Geranium richardsonii</i>)	10	0-20	50
HEMP-NETTLE			
(<i>Galeopsis tetrahit</i>)	5	0-10	50
GRASSES			
SMOOTH BROME			
(<i>Bromus inermis</i>)	10	1-20	100
KENTUCKY BLUEGRASS			
(<i>Poa pratensis</i>)	5	0-10	50
QUACKGRASS			
(<i>Agropyron repens</i>)	2	0-3	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC
NUTRIENT REGIME:
RICH
ELEVATION:
455-697(524) M
PERCENT SLOPE GRADIENT:
0 - 5
SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 6-0

FORAGE PRODUCTION(KG/HA)

TOTAL 1250 *ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
4.05 ha/AUM (4.05-2.02)
0.1 AUM/ac (0.1-0.2)

DRY MIXEDWOOD SUBREGION
CONIFEROUS AND MIXEDWOOD FOREST
COMMUNITIES



Photo 6. Pj/Bearberry community type in the Dry Mixedwood subregion

CONIFEROUS AND MIXEDWOOD FORESTS

Communities which have begun to undergo succession from deciduous to conifer overstory may fall into the MIXEDWOOD category. The following is a general rule of thumb. The site is a mixedwood community if the conifer and the deciduous overstories each range between 30 -70% of the total overstory cover. For example a deciduous cover of 40% and a conifer cover of 60% is a mixedwood community. If in doubt, determine if the understory is responding more to a deciduous or coniferous influence [e.g. loss of production due to conifer shading]. Communities dominated [i.e. $\geq 70\%$ of the overstory] by a conifers are classified in the CONIFER category .

The mixedwood and coniferous community types described in this guide represent seven ecological sites (ecosites) as described by Beckingham and Archibald (1996). On sites with subxeric moisture and poor nutrient regimes, coarse textured, sandy soils open stands of jack pine generally dominate (Pj/Alder, Pj/Bearberry). These community types commonly have a carpet of lichens covering the forest floor and a thin organic layer typically less than 5 cm thick (Beckingham and Archibald 1996).

On slightly moister sites with submesic moisture and medium nutrient regimes aspen grows in conjunction with jack pine to form the Pj-Aw/Bearberry community type. On slightly moister sites Aw-Sw/Bearberry and Sw/Buffaloberry/Bearberry communities are found. The soils of these community types continue to be coarse-textured but the moisture and nutrient conditions are more favourable to the growth of aspen and spruce.

The mesic/medium sites are generally dominated by white spruce (Sw/Moss) and mixedwood communities of aspen and spruce (Aw-Sw/Rose/Marsh reed grass, Aw-Pb-Sw/Willow/Wild sarsparilla, Sw-Pb-Aw/Rose/Twinflower, Sw-Aw/Low bush cranberry). These communities represent the reference ecological site for the Boreal Mixedwood subregion (Beckingham and Archibald 1996). Generally, these sites have moderately fine to fine-textured till or glaciolacustrine parent materials. Pioneer deciduous species (aspen, balsam poplar and birch) are replaced with white spruce and balsam fir as these sites develop successionaly. With succession shade tolerant plants take over the herbaceous layer as conifers dominate the canopy. These shade tolerant species are unproductive and often unpalatable for domestic livestock. Forage productivity declines from 2.3 ha/AUM in a deciduous community to 2.3-8.6 ha/AUM in a mixedwood community to less than 10 ha/AUM in a conifer community.

Black spruce and larch communities generally dominate on wetter sites with subhygric to subhydric moisture regimes and poor to medium nutrient regimes to form the Sb/Willow/Moss and Sb-Lt/Labrador tea/Moss community types. Larch is more tolerant of excessive moisture and is indicative of an enriched nutrient status, while black spruce is typical in areas of stagnating ground water with poor nutrient status (Hay et al. 1985). Generally, these community types are considered non-use for domestic livestock. In contrast on the richer sites red osier dogwood and horsetail dominate the understory to form the Sw/Horsetail and Sw-Pb/Red osier dogwood dominated communities.

Beckingham and Archibald (1996), provide a good description on how the conifer and mixedwood community types are arranged in the landscape.

Table 5. Production (kg/ha) and grazing capacity (ha/AUM) for ecological site phase, conifer and mixedwood communities of the Dry Mixedwood subregion.*

Ecological site	Community number	Community type	Grass	Forb	Shrub	Total	Productivity (kg/ha)	Sustainable Stocking rate ha/AUM (Aum/ac)	Recommended
a suberic/poor	Ecological site phase	a lichen							
	DMD1	Pj/Alder	160	175	191	526	40.47 - 40.47 (0.01 - 0.01)	40.47 (0.01)	
b submesic/medium	Ecological site phase	b1 blueberry Pj-Aw							
	DMD2	Pj-Aw/Bearberry	141	325	110	577	8.09 - 4.05 (0.05 - 0.1)	8.09(0.05)	
	Ecological site phase	b3 blueberry Aw-Sw							
	DMD2a	Aw-Sw/Bearberry	100	50	500	650	40.47 - 8.09 (0.01 - 0.05)	8.09(0.05)	
d mesic/medium	Ecological site phase	b4 blueberry Sw							
	DMD3	Sw/Bufaloberry/Bearberry	18	238	848	1104	40.47 - 8.09 (0.01 - 0.05)	40.47 (0.01)	
	Ecological site phase	d2 low-bush cranberry Aw-Sw							
	DMD5	Aw-Sw/Rose/Marsh reed grass	468	534	440	1442	4.05 - 2.02 (0.1 - 0.2)	4.05 (0.1)	
	DMD10	Sw-Aw/Low bush cranberry	400	250	500	1150	4.05 - 2.02 (0.1 - 0.2)	4.05 (0.1)	
	Ecological site phase	d3 grazed low-bush cranberry							
DMD12	Sw-Bw/Raspberry	400	250	200	850	40.47 - 40.47 (0.01 - 0.01)	40.47 (0.01)		
Ecological site phase	d3 low-bush cranberry Sw								
								40.47 (0.01)	

Ecological site	Community number	Community type	Productivity (kg/ha)			Sustainable Stocking rate ha/AUM (Aum/ac)		
			Grass	Forb	Shrub	Total	Range	Recommended
	DMD4	Sw/Beaked hazelnut/Moss	0	132	74	206	40.47 - 40.47 (0.01 - 0.01)	40.47 (0.01)
	DMD7	Sw-Pb-Aw/Rose/Twinflower	16	112	108	236	40.47 - 40.47 (0.01 - 0.01)	40.47 (0.01)
	DMD11	Sw/Moss	<i>10</i>	<i>100</i>	<i>100</i>	<i>210</i>	<i>40.47 - 40.47 (0.01 - 0.01)</i>	<i>40.47 (0.01)</i>
e	subhygric/ rich	Ecological site phase e2 dogwood Pb-Sw						<i>13.5 (0.03)</i>
	DMD6	Aw-Pb-Sw/Willow/Wild sarsaparilla	20	400	56	476	40.47 - 40.47 (0.01 - 0.01)	40.47 (0.01)
	DMD13	Sw-Pb/Red osier dogwood	20	350	250	620	8.09 - 2.02 (0.05 - 0.2)	8.09(0.05)
f	hygric/ rich	Ecological site phase f2 horsetail Sw						
	DMD14	Sw/Horsetail	10	300	250	560	40.47 - 40.47 (0.01 - 0.01)	40.47 (0.01)
i	subhygric/ very poor	Ecological site phase i1 treed bog						
	DMD9	Sb-Lt/Labrador tea/Moss	10	40	50	100	40.47 - 40.47 (0.01 - 0.01)	40.47 (0.01)
j	subhygric/ medium	Ecological site phase j1 treed poor fen						
	DMD8	Sb/Willow/Moss	401	89	242	732	40.47 - 40.47 (0.01 - 0.01)	40.47 (0.01)

* Forage production values and stocking rates in italics are an estimate.

Key to Conifer and Mixedwood* Types - Dry Mixedwood

1. Wet, boggy sites dominated by black spruce..... 2
 Moist, mesic or dry sandy sites dominated by white spruce, aspen, balsam poplar
 or jack pine..... 3
2. Richer nutrient sites with willow and sedge
 dominating understory.....**Sb/Willow/Moss (DMD8)**
 Poorer sites with Labrador tea and larch present.....**Sb-Lt/Labrador Tea/Moss (DMD9)**
3. Dry, sandy sites dominated by jack pine..... 4
 Mesic or subhygric sites dominated by spruce, aspen, balsam poplar..... 5
4. Bearberry dominates, alder low in cover or absent.....**Pj-Aw/Bearberry (DMD2)**
 Alder dominates understory.....**Pj/Alder (DMD1)**
5. White spruce dominated (i.e. $\geq 70\%$ spruce overstory cover, or deciduous species absent or
 their cover is $< 30\%$) or the understory is strongly influenced by conifer shading..... 6
 Mixedwood types, dominated by a mixture of deciduous and conifer trees; and a
 structurally diverse understory present 10
6. Poorer nutrient sites, buffaloberry, bearberry dominate understory.....
**Sw/Buffaloberry/Bearberry (DMD3)**
 Mesic sites; hazelnut, moss, low bush cranberry or raspberry predominant or present..... 7
7. Hazelnut dominates the understory.....**Sw/Hazelnut/Moss (DMD4)**
 Mesic sites with low bush cranberry, moss or raspberry..... 8
8. Moss dominates understory, little shrub cover.....**Sw/Moss (DMD11)**
 Raspberry or low bush cranberry predominant or present in the understory..... 9
9. Raspberry dominates understory; recently disturbed sites.....**Sw-Bw/Raspberry (DMD12)**
 Low bush cranberry predominant or present in the understory.....
**Sw-Aw/Low bush cranberry (DMD10)**
10. Dry and mesic sites dominated by aspen and spruce..... 11
 Balsam poplar present, moister, richer sites..... 12
11. Typical mesic site, with rose and marsh reed grass.....
**Aw-Sw/Rose/Marsh Reed grass (DMD5)**
 Drier sites dominated by bearberry**Aw-Sw/Bearberry (DMD2a)**
12. Twinflower dominates understory, poorer nutrient sites.....
**Sw-Pb-Aw/Rose/Twinflower (DMD7)**
 Willow, wild sarsaparilla, red osier dogwood or horsetail dominate understory..... 13
13. Willow dominated understory.....**Aw-Pb-Sw/Willow/Wild sarsaparilla(DMD6)**
 Red osier dogwood or horsetail dominates understory..... 14
14. Red osier dogwood dominates understory.....**Sw-Pb/Red osier dogwood (DMD13)**
 Horsetail dominates understory.....**Sw/Horsetail (DMD14)**

*Communities which have begun to undergo succession from a deciduous to a conifer overstory may fall into the MIXEDWOOD category. The following is a general rule of thumb. The site is a mixedwood community if the conifer and the deciduous overstories each range between 30 -70% of the total overstory cover. For example a deciduous cover of 40% and a conifer cover of 60% is a mixedwood community. If in doubt, try to determine if the understory is responding more to a deciduous or coniferous influence [e.g. loss of production due to conifer shading].

DMD1. Pj/Alder
(*Pinus banksiana/ Alnus crispa*)

n=2 This community type is found on dry, rapidly drained, sandy soils with a poor nutrient status. Consequently, production is quite low. Cattle will utilize these areas due to the easy access, however overutilization will quickly deplete the area of forage.

PERCENT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
JACK PINE (<i>Pinus banksiana</i>)	43	35-50	100
SHRUBS			
GREEN ALDER (<i>Alnus crispa</i>)	33	30-35	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	9	7-10	100
SASKATOON (<i>Amelanchier alnifolia</i>)	5	1-8	100
FORBS			
TWIN-FLOWER (<i>Linnaea borealis</i>)	6	0-12	50
BEARBERRY (<i>Arctostaphylos uva-ursi</i>)	9	0-18	50
YELLOW PEAVINE (<i>Lathyrus ochroleucus</i>)	4	0-8	50
STRAWBERRY (<i>Fragaria virginiana</i>)	2	1-2	100
GRASSES			
SEDGES (<i>Carex spp.</i>)	6	1-11	100
HAIRY WILD RYE (<i>Elymus innovatus</i>)	3	1-4	100
NORTHERN RICEGRASS (<i>Oryzopsis pungens</i>)	6	1-10	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBXERIC

NUTRIENT REGIME
POOR

ELEVATION:
606 M

SOIL DRAINAGE:
RAPIDLY

PERCENT SLOPE GRADIENT:
2 - 8%

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS	160
FORBS	175
SHRUBS	191
TOTAL	526

ECOLOGICALLY SUSTAINABLE STOCKING RATE
40.47 ha/AUM (40.47-40.47)
0.01 AUM/ac (0.01-0.01)

DMD2. Pj-Aw/Bearberry
(*Pinus banksiana/Arctostaphylos uva-ursi*)

n=4 This community represents a jack pine forest with a secondary canopy of aspen. It is very similar to the Pj/Alder community type, but it is found on slightly moister soils with better nutrient regimes. These conditions favour the growth of aspen. Like the previous community, cattle will utilize these areas due to the easy access, however over-utilization will quickly deplete the forage supply.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
JACK PINE (<i>Pinus banksiana</i>)	45	30-45	100
ASPEN (<i>Populus tremuloides</i>)	13	10-20	100
SHRUBS			
SASKATOON (<i>Amelanchier alnifolia</i>)	9	1-15	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	6	4-8	100
BLUEBERRY (<i>Vaccinium myrtilloides</i>)	7	0-2	75
FORBS			
BEARBERRY (<i>Arctostaphylos uva-ursi</i>)	15	7-64	100
NORTHERN BEDSTRAW (<i>Galium boreale</i>)	2	1-3	100
WILD LILY-OF-THE-VALLEY (<i>Maianthemum canadense</i>)	2	1-5	100
CREAM-COLOURED VETCHLING (<i>Lathyrus ochroleucus</i>)	7	3-7	100
GRASSES			
HAIRY WILD RYE (<i>Elymus innovatus</i>)	10	2-16	100
MOSSES			
MOSS SPP.	2	0-7	25

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
POOR

ELEVATION:
606 M

SOIL DRAINAGE:
RAPIDLY

PERCENT SLOPE GRADIENT:
0 - 5

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS	141
FORBS	325
SHRUBS	110
TOTAL	577

ECOLOGICALLY SUSTAINABLE STOCKING RATE
8.09 ha/AUM (8.09-4.05)
0.05 AUM/ac (0.05-0.1)

DMD2a. Aw-Sw/Bearberry
(Populus tremuloides-Picea glauca/Arctostaphylos uva-ursi)

n=1 This community type was found on a small, sandy hillcrest with a high water table. It is similar to the Sw/Buffaloberry/Bearberry (DMD3) community type, but this community is successional younger. The majority of productivity is from bearberry which is unpalatable to livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	15	-	100
ASPEN <i>(Populus tremuloides)</i>	15	-	100
SHRUBS			
SASKATOON <i>(Amelanchier alnifolia)</i>	1	-	100
PRICKLY ROSE <i>(Rosa acicularis)</i>	2	-	100
BLUEBERRY <i>(Vaccinium myrtilloides)</i>	2	-	100
FORBS			
BEARBERRY <i>(Arctostaphylos uva-ursi)</i>	37	-	100
STRAWBERRY <i>(Fragaria virginiana)</i>	1	-	100
YELLOW PEAVINE <i>(Lathyrus ochroleucus)</i>	4	-	100
WILD-LILY-OF-THE VALLEY <i>(Maianthemum canadense)</i>	3	-	100
GRASSES			
HAIRY WILD RYE <i>(Elymus innovatus)</i>	3	-	100
NORTHERN RICEGRASS <i>(Oryzopsis pungens)</i>	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
POOR

ELEVATION:
606 M

SOIL DRAINAGE:
WELL

PERCENT SLOPE GRADIENT:
0 - 4

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 650*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 8.09 ha/AUM (40.47-8.09)
 0.05 AUM/ac (0.01-0.05)

DMD3. Sw/Buffaloberry/Bearberry
(Picea glauca/ Shepherdia canadensis/Arctostaphylos uva-ursi)

n=1 This community type represents a very open spruce forest. It was found on a small, sandy hillcrest with a high water table. The site may have a high pH and be somewhat nutrient poor as indicated by the abundance of buffaloberry (Beckingham 1993). The majority of productivity is from buffaloberry which is unpalatable to livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	10	-	100
SHRUBS			
BUFFALOBERRY <i>(Shepherdia canadensis)</i>	48	-	100
PRICKLY ROSE <i>(Rosa acicularis)</i>	12	-	100
BLUEBERRY <i>(Vaccinium myrtilloides)</i>	7	-	100
SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	5	-	100
FORBS			
BEARBERRY <i>(Arctostaphylos uva-ursi)</i>	19	-	100
TWINFLOWER <i>(Linnaea borealis)</i>	12	-	100
YELLOW PEAVINE <i>(Lathyrus ochroleucus)</i>	8	-	100
TOADFLAX <i>(Comandra umbellata)</i>	2	-	100
GRASSES			
MOUNTAIN RICEGRASS <i>(Oryzopsis asperifolia)</i>	8	-	100
NORTHERN RICEGRASS <i>(Oryzopsis pungens)</i>	6	-	100
SEDGE <i>(Carex spp.)</i>	5	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
POOR

ELEVATION:
606 M

SOIL DRAINAGE:
WELL

PERCENT SLOPE GRADIENT:
0 - 4

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS	18
FORBS	238
SHRUBS	848
TOTAL	1104

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 40.47 ha/AUM (40.47-8.09)
 0.01 AUM/ac (0.01-0.05)

DMD4. Sw/Beaked hazelnut/Moss
(Picea glauca/Corylus cornuta/ Moss)

n=1 This is a mature white spruce forest which represents the climax or near climax vegetation for the area. The northerly aspect of this community type has probably protected the site from past disturbance by fires and allowed the community to undergo succession. The high canopy of spruce limits the light reaching the forest floor, limiting the growth of grasses and forbs. As a result, the forage productivity of this community type is very low.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	60	-	100
PAPER BIRCH <i>(Betula papyrifera)</i>	5	-	100
SHRUBS			
HAZELNUT <i>(Corylus cornuta)</i>	12	-	100
BOG CRANBERRY <i>(Vaccinium vitis-idaea)</i>	6	-	100
PRICKLY ROSE <i>(Rosa acicularis)</i>	6	-	100
FORBS			
BEARBERRY <i>(Arctostaphylos uva-ursi)</i>	2	-	100
TWINFLOWER <i>(Linnaea borealis)</i>	8	-	100
BASTARD TOADFLAX <i>(Geocaulon lividum)</i>	2	-	100
STRAWBERRY <i>(Fragaria virginiana)</i>	2	-	100
MOSESSES			
MOSS SPP.	73	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
606 M

SOIL DRAINAGE:
WELL

PERCENT SLOPE GRADIENT:
5%

ASPECT:
NORTHERLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS	0
FORBS	132
SHRUBS	74
TOTAL	206

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 40.47 ha/AUM (40.47-40.47)
 0.01 AUM/ac (0.01-0.01)

DMD5. Aw-Sw/Rose/Marsh reed grass

(*Populus tremuloides*-*Picea glauca*/*Rosa acicularis*/*Calamagrostis canadensis*)

n=2 This community represents a highly productive aspen community that is succeeding to white spruce. The presence of tall forbs wild sarsaparilla and fireweed indicate a high nutrient regime and a light grazing regime. At present this community type has a good level of forage for domestic livestock.

ENVIRONMENTAL VARIABLES

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE (<i>Picea glauca</i>)	55	50-60	100
POPULUS TREMULOIDES (<i>Populus tremuloides</i>)	53	35-70	100
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	13	3-23	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	8	0-15	50
BRISTLY BLACK CURRANT (<i>Ribes lacustre</i>)	5	0-10	50
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	8	6-10	100
FORBS			
BUNCHBERRY (<i>Cornus canadensis</i>)	4	0-8	50
FIELD HORSETAIL (<i>Equisetum arvense</i>)	2	0-3	50
TALL LUNGWORT (<i>Mertensia paniculata</i>)	4	1-7	100
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	4	3-4	100
DEWBERRY (<i>Rubus pubescens</i>)	3	0-5	50
FIREWEED (<i>Epilobium angustifolium</i>)	2	1-3	100
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	17	3-30	100

MOISTURE REGIME:
MESIC-SUBHYGRIC

NUTRIENT REGIME:
MEDIUM TO RICH

ELEVATION:
455-600(527) M

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS	468
FORBS	534
SHRUBS	440
TOTAL	1442

ECOLOGICALLY SUSTAINABLE STOCKING RATE
4.05 ha/AUM (4.05-2.02)
0.1 AUM/ac (0.1-0.2)

DMD6. Aw-Pb-Sw/Willow/Wild sarsaparilla

(*Populus tremuloides*-*Populus balsamifera*-*Picea glauca*/*Salix spp.*/*Aralia nudicaulis*)

n=1 This community type has similar moisture and nutrient conditions to the Aw-Pb and Pb/Red osier dogwood-Rose community types, but this community is successionaly more advanced. The abundance of tall shrubs limits the amount of light reaching the forest floor, which limits forage production.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN			
(<i>Populus tremuloides</i>)	35	-	100
WHITE SPRUCE			
(<i>Picea glauca</i>)	15	-	100
PAPER BIRCH			
(<i>Betula papyrifera</i>)	10	-	100
BALSAM POPLAR			
(<i>Populus balsamifera</i>)	25	-	100
SHRUBS			
GREEN ALDER			
(<i>Alnus crispa</i>)	45	-	100
WILLOW			
(<i>Salix spp.</i>)	25	-	100
LOW BUSH CRANBERRY			
(<i>Viburnum edule</i>)	10	-	100
PRICKLY ROSE			
(<i>Rosa acicularis</i>)	10	-	100
FORBS			
WILD SARSAPARILLA			
(<i>Aralia nudicaulis</i>)	13	-	100
BISHOP'S CAP			
(<i>Mitella nuda</i>)	11	-	100
CANADA VIOLET			
(<i>Viola canadensis</i>)	11	-	100
LADY FERN			
(<i>Athyrium filix-femina</i>)	5	-	100
DEWBERRY			
(<i>Rubus pubescens</i>)	4	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
606 M

SOIL DRAINAGE:
MODERATELY WELL

PERCENT SLOPE GRADIENT:
20%

ASPECT:
EAST

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS	20
FORBS	400
SHRUBS	56
TOTAL	476

ECOLOGICALLY SUSTAINABLE STOCKING RATE
40.47 ha/AUM (40.47-40.47)
0.01 AUM/ac (0.01-0.01)

DMD7. Sw-Pb-Aw/Rose/Twinflower

(Picea glauca-Populus balsamifera-Populus tremuloides/ Rosa acicularis/ Linnaea borealis)

n=1 This community is similar to the previous described Aw-Pb-Sw/Willow/Wild sarsaparilla community type but is found on slightly drier sites with a poorer nutrient regime. Succession of this community type will likely be to a White spruce /Moss dominated community type. The thick overstory limits the growth of shrubs, forbs and grass. Consequently, there is little forage for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	35	-	100
TREMBLING ASPEN <i>(Populus tremuloides)</i>	20	-	100
BALSAM POPLAR <i>(Populus balsamifera)</i>	30	-	100
SHRUBS			
SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	13	-	100
PRICKLY ROSE <i>(Rosa acicularis)</i>	18	-	100
BRACED HONEYSUCKLE <i>(Lonicera involcrata)</i>	5	-	100
BUFFALO-BERRY <i>(Shepherdia canadensis)</i>	1	-	100
FORBS			
TWIN-FLOWER <i>(Linnaea borealis)</i>	22	-	100
BUNCHBERRY <i>(Cornus canadensis)</i>	8	-	100
WINTERGREEN <i>(Pyrola asarifolia)</i>	6	-	100
DEWBERRY <i>(Rubus pubescens)</i>	6	-	100
BISHOP'S CAP <i>(Mitella nuda)</i>	3	-	100
MOSSES			
MOSS SPP.	71	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

MESIC TO SUBHYGRIC

NUTRIENT REGIME:

MEDIUM

ELEVATION:

606 M

SOIL DRAINAGE:

WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

GRASS	16
FORBS	112
SHRUBS	108
TOTAL	236

ECOLOGICALLY SUSTAINABLE STOCKING RATE
40.47 ha/AUM (40.47-40.47)
0.01 AUM/ac (0.01-0.01)

DMD8. Sb/Willow/Moss
(Picea mariana/Salix spp./Moss)

n=2 This community type is part of the poor fen ecosite (Beckingham and Archibald 1996) because it has an intermediate nutrient regime between the bog and rich fen ecosites. Drainage on this community type is poor to very poor, but has some movement of water through the site. This community type has a well developed shrub layer and the grass layer consists mainly of marsh reed grass and sedge species. The productivity of this type is moderate, but the high water table limits access to domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BLACK SPRUCE <i>(Picea mariana)</i>	15	14-16	100
SHRUBS			
WILLOW SPP. <i>(Salix spp.)</i>	35	20-50	100
BOG BIRCH <i>(Betula glandulosa)</i>	17	8-25	100
FORBS			
STEMLESS RASPBERRY <i>(Rubus arctica)</i>	4	2-5	100
HORSETAIL <i>(Equisetum arvense)</i>	18	15-20	100
BISHOP'S CAP <i>(Mitella nuda)</i>	6	1-10	100
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	10	9-11	100
HAIR-LIKE SEDGE <i>(Carex capillaris)</i>	8	5-10	100
MOSSES			
MOSS SPP.	99	99-100	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYDRIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
606-697(657) M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 18

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

GRASS	401
FORBS	89
SHRUBS	242
TOTAL	732

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 40.47 ha/AUM (40.47-40.47)
 0.01 AUM/ac (0.01-0.01)

DMD9. Sb-Lt/Labrador tea/Moss
(Picea mariana-Larix laricina/Ledum groenlandicum/Moss)

n=3 This community type is very similar to the previously described community type, but the nutrient status is poorer. This community type appears to be related to the bog ecosite described by Beckingham and Archibald (1996). The bog ecosite commonly has organic soils consisting of slowly decomposing peat moss. This community type is has poor productivity and accessibility.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
LARCH <i>(Larix laricina)</i>	10	1-15	100
BLACK SPRUCE <i>(Picea mariana)</i>	30	10-60	100
SHRUBS			
WILLOW SPP. <i>(Salix spp.)</i>	21	8-35	100
LABRADOR TEA <i>(Ledum groenlandicum)</i>	23	10-35	100
BOG BIRCH <i>(Betula glandulosa)</i>	24	0-39	100
FORBS			
DWARF BRAMBLE <i>(Rubus pedatus)</i>	8	0-25	66
HORSETAIL <i>(Equisetum arvense)</i>	21	0-45	66
DWARF SCOURING RUSH <i>(Equisetum scirpoides)</i>	8	0-25	33
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	3	1-4	100
GOLDEN SEDGE <i>(Carex aurea)</i>	5	0-15	33
BEAKED SEDGE <i>(Carex rostrata)</i>	4	0-7	66
FOWL BLUEGRASS <i>(Poa palustris)</i>	1	0-2	33
MOSSES			
MOSS SPP.	95	10-60	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYDRIC

NUTRIENT REGIME:
VERY POOR

ELEVATION:
576-606 M

SOIL DRAINAGE:
POOR

ECOLOGICAL STATUS SCORE: 18

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

GRASS	10
FORBS	40
SHRUBS	50
TOTAL	100

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 40.47 ha/AUM (40.47-40.47)
 0.01 AUM/ac (0.01-0.01)

DMD10. Sw-Aw/Low bush Cranberry
(Picea glauca-Populus tremuloides/Viburnum edule)

n=5 This community is similar to community DMD5 Aw-Sw, but is successional more advanced. As succession continues in the absence of disturbance on these sites there will be a corresponding drop in forage production. A spruce dominated forest generally produces about 1/3 of an undisturbed deciduous dominated community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	28	20-40	100
POPULUS TREMULOIDES <i>(Populus tremuloides)</i>	14	1-30	100
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	4	3-10	100
WILD RED RASPBERRY <i>(Rubus idaeus)</i>	5	0-10	80
RED OSIER DOGWOOD <i>(Cornus stolonifera)</i>	9	0-30	80
LOW BUSH CRANBERRY <i>(Viburnum edule)</i>	8	1-10	100
FORBS			
BUNCHBERRY <i>(Cornus canadensis)</i>	3	0-10	80
FIELD HORSETAIL <i>(Equisetum arvense)</i>	1	0-3	60
TALL LUNGWORT <i>(Mertensia paniculata)</i>	1	1-3	100
WILD Sarsaparilla <i>(Aralia nudicaulis)</i>	11	0-30	80
DEWBERRY <i>(Rubus pubescens)</i>	2	1-3	100
FIREWEED <i>(Epilobium angustifolium)</i>	2	0-3	80
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	3	0-10	80

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC-SUBHYGRIC

NUTRIENT REGIME:
MEDIUM TO RICH

ELEVATION:
455-600(527) M

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 1150*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 4.05 ha/AUM (4.05-2.02)
 0.1 AUM/ac (0.1-0.2)

DMD11. Sw/Moss
(*Picea glauca*/Moss spp.)

n=1 This community is similar to community DMD10 Sw-Aw, but is successional more advanced. As succession continues in the absence of disturbance on these sites there will be a corresponding drop in forage production. A spruce dominated forest generally produces about 1/3 of an undisturbed deciduous and mixed wood dominated community types.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE (<i>Picea glauca</i>)	60	-	100
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	1	-	100
BRACTED HONEYSUCKLE (<i>Lonicera involcrata</i>)	3	-	100
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	3	-	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	1	-	100
FORBS			
BUNCHBERRY (<i>Cornus canadensis</i>)	1	-	100
FIELD HORSETAIL (<i>Equisetum arvense</i>)	3	-	100
TWINFLOWER (<i>Linnaea borealis</i>)	10	-	100
DEWBERRY (<i>Rubus pubescens</i>)	1	-	100
GRASSES			
PURPLE OAT GRASS (<i>Schizachne purpurascens</i>)	3	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC-SUBHYGRIC

NUTRIENT REGIME:
MEDIUM TO RICH

ELEVATION:
600 M

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 210*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
40.47 ha/AUM (40.47-40.47)
0.01 AUM/ac (0.01-0.01)

DMD12. Sw-Bw/Raspberry
(*Picea glauca*-*Betula papyrifera*/*Rubus idaeus*)

n=1 This community type was described near Astotin Lake in Elk Island National Park. It represents a site that has had historic beaver activity and since has undergone succession to a spruce dominated community. Cutting of the adjacent tree canopy and the increased moisture around the dam favours the growth of paper birch and raspberry. Both species are early successional and will rapidly dominate a site after disturbance. This community occupies small areas adjacent to the ponds and sloughs and therefore will contribute little to the overall carrying capacity of a lease.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE (<i>Picea glauca</i>)	50	-	100
PAPER BIRCH (<i>Betula papyrifera</i>)	20	-	100
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	3	-	100
BRACTED HONEYSUCKLE (<i>Lonicera involucrata</i>)	3	-	100
RASPBERRY (<i>Rubus idaeus</i>)	40	-	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	3	-	100
FORBS			
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	10	-	100
HEMP NETTLE (<i>Galeopsis tetrahit</i>)	10	-	100
FIREWEED (<i>Epilobium angustifolium</i>)	3	-	100
SHOWY ASTER (<i>Aster conspicuus</i>)	1	-	100
GRASSES			
QUACKGRASS (<i>Agropyron repens</i>)	3	-	100
SMOOTH BROME (<i>Bromus inermis</i>)	3	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC-SUBHYGRIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
600 M

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 850*ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE 40.47 ha/AUM (40.47-40.47) 0.01 AUM/ac (0.01-0.01)</p>
--

DMD13. Sw-Pb/Red osier dogwood
(Picea glauca-Populus balsamifera/Cornus stolonifera)

n=6 This community is similar to community DMC8 Pb-Aw/Red osier dogwood, but is successional more advanced. As succession continues in the absence of disturbance on these sites there will be a corresponding drop in forage production. A spruce dominated forest generally produces about 1/3 of an undisturbed deciduous dominated community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	23	1-40	100
BALSAM POPLAR <i>(Populus balsamifera)</i>	30	20-60	100
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	7	3-20	100
RED OSIER DOGWOOD <i>(Cornus stolonifera)</i>	14	3-20	100
RIVER ALDER <i>(Alnus tenuifolia)</i>	11	3-30	100
LOW BUSH CRANBERRY <i>(Viburnum edule)</i>	2	0-10	67
FORBS			
WILD SARSAPARILLA <i>(Aralia nudicaulis)</i>	2	0-10	67
HORSETAIL <i>(Equisetum arvense)</i>	3	1-10	100
STAR FLOWERED SOLOMON SEAL <i>(Smilacina stellata)</i>	1	1-3	100
BUNCHBERRY <i>(Cornus canadensis)</i>	8	0-30	83
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	2	0-3	67
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	3	0-10	83
REDTOP <i>(Agrostis stolonifera)</i>	6	0-20	83

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
600 M

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18-12

FORAGE PRODUCTION(KG/HA)

TOTAL 620*ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE 8.09 ha/AUM (8.09-2.02) 0.05AUM/ac (0.05-0.02)</p>
--

DMD14. Sw/Horsetail
(*Picea glauca/Equisetum arvense*)

n=5 This community type is wet and nutrient rich. These sites are commonly found on fluvial or glaciolacustrine parent materials where flooding or seepage enhances the substrate nutrient supply. With high water tables, wet soil conditions organic matter tends to accumulate which favours the growth of horsetails. Generally horsetails are unpalatable to livestock and the wet ground conditions limit access.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE (<i>Picea glauca</i>)	44	20-60	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	3	0-10	60
PAPER BIRCH (<i>Betula papyrifera</i>)	9	0-40	80
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	3	1-10	100
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	3	0-10	80
BRACKETED HONEYSUCKLE (<i>Lonicera involucrata</i>)	1	0-3	80
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	1	0-3	60
FORBS			
DEWBERRY (<i>Rubus pubescens</i>)	1	1-3	100
HORSETAIL (<i>Equisetum arvense</i>)	32	30-40	100
BISHOP'S CAP (<i>Mitella nuda</i>)	1	0-3	80
BUNCHBERRY (<i>Cornus canadensis</i>)	3	0-10	80
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	1	0-3	60
NODDING WOOD REED (<i>Cinna latifolia</i>)	1	0-3	40

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
HYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
600 M

SOIL DRAINAGE:
POOR TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 560*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE
40.47 ha/AUM (40.47-40.47)
0.01 AUM/ac (0.01-0.01)

CENTRAL MIXEDWOOD SUBREGION

CENTRAL MIXEDWOOD SUBREGION

This subregion is the largest in the province covering over 210,000 km² or nearly 32% of the province (Strong and Leggat 1992)(Map 2). Mean annual summer temperatures average 13.5 °C and winter temperatures average -13 °C, which is somewhat colder than the adjacent Dry Mixedwood subregion. Annual precipitation averages 397 mm of precipitation which is wetter than the Dry Mixedwood.

The modal plant communities are vegetated by aspen and balsam poplar with understories composed of a variety of herbs and deciduous shrubs. White spruce and balsam fir are the climatic climax species but are not well represented because of the frequent occurrence of fire. On dry, well drained, coarse-textured soils jack pine dominates and the poorly drained sites are dominated by black spruce, willows and sedge species. These reference communities are very similar to the Dry Mixedwood subregion, but the drier conditions of the Dry Mixedwood favours the formation of a number of native grassland communities, which are not found in the Central Mixedwood. Table 6 outlines the ecological sites, ecological site phases and reference range plant community types in the Central Mixedwood subregion. There are a number of new ecological sites (ecosites) and ecological site phases (ecosite phases) which are not found in the guide “Ecosites of Northern Alberta” (Beckingham and Archibald 1996) and they are outlined here. The new ecosite includes (aa) grass/shrubland and the new ecosite phases include (aa1) plains wormwood, (d4)shrubland, (e4) shrubland, and (j3) grassland poor fen (Table 6). The “Successional communities” or “Harvesting and Fire succession” categories (Table 1 and 6) outline the successional sequence the community type will undergo with increased grazing pressure or with harvesting or fire disturbance. There are a number of ecological site phase tables which summarize these successional communities. These include (d1a) grazed Aw, (d1c) burned Aw, (d3c) burned Sw, and (k2a) grazed willow.

The 61 range plant communities described in the Central Mixedwood subregion are arranged into 5 categories. These include:

Central Mixedwood subregion

CMA. Native grass and shrubland	19 types
CMB. Tame pastures	7 types
CMC. Deciduous community types	19 types
CMD. Mixedwood and Conifer community types	12 types
CME. Forest Cutblock community types	4 types

The dominant plant species, canopy cover, environmental conditions, forage production and grazing capacity (when available) are outlined for each community type.

Table 6. Ecological sites, ecological site phases and forested and reference range plant communities for the Central Mixedwood subregion (adapted from Beckingham and Archibald 1996) (see Figure 2 for a diagram outlining the Ecological sites in the landscape of the Boreal Mixedwood subregions).

Ecological site	Ecological site Phase	Forested Plant Community Type	Reference Range Plant Community	Successional community type	Harvesting and Fire succession
aa grass shrubland (xeric/poor)	aa1 plains wormwood		CMA5. Plains wormwood/Sheep fescue-Sedge	CMA6 Plains wormwood/ Kentucky bluegrass-Sedge	
a lichen (subxeric/poor)	a1 lichen Pj	a1.1 Pj/bearberry/lichen	CMD2 Pj/Bearberry		
		a1.2 Pj/blueberry/lichen			
		a1.3 Pj/green alder/lichen	CMD1 Pj/Alder		
b blueberry (submesic/medium)	b1 blueberry Pj-Aw	b1.1 Pj-Aw/blueberry - bearberry	CMD3 Aw-Pj/Bearberry /Lichen		
		b1.2 Pj-Aw/blueberry - green alder			
		b1.3 Pj-Aw/blueberry - Labrador tea			
b2 blueberry Aw(Bw)	b2 blueberry Aw(Bw)	b2.1 Aw(Bw)/blueberry - bearberry	CMC5 Aw/Blueberry		
		b2.2 Aw(Bw)/blueberry - green alder			
		b2.3 Aw(Bw)/blueberry - Labrador tea			
b3 blueberry Aw-Sw	b3 blueberry Aw-Sw	b3.1 Aw-Sw/blueberry - bearberry			
		b3.2 Aw-Sw/blueberry - green alder			
		b3.3 Aw-Sw/blueberry - Labrador tea			
b4 blueberry Sw-Pj	b4 blueberry Sw-Pj	b4.1 Sw-Pj/blueberry - bearberry			
		b4.2 Sw-Pj/blueberry - green alder			
		b4.3 Sw-Pj/blueberry - green alder			
c Labrador tea - mesic (mesic/poor)	c1 Labrador tea - mesic Pj-Sb	c1.1 Pj-Sb/Labrador tea/feather moss			
		c1.2 Pj-Sb/green alder/feather moss			
		c1.3 Pj-Sb/feather moss			

Ecological site	Ecological site Phase	Forested Plant Community Type	Reference Range Plant Community	Successional community type	Harvesting and Fire succession	
d low-bush cranberry (mesic/medium)	d1 low-bush cranberry Aw	d1.1 Aw/Canada buffalo-berry	CMC8a Aw/Buffaloberry-Rose			
		d1.2 Aw/saskatoon-pin cherry	CMC9 Aw/Rose-Saskatoon			
		d1.3 Aw/beaked hazelnut	CMC3 Pb-Aw/Beaked hazelnut-Rose		CME3 Beaked hazelnut /Aw/Wild Sarsaparilla	
		d1.4 Aw/green alder	CMC12 Aw/Alder-Willow-Rose			
		d1.5 Aw/low-bush cranberry		CMC10 Aw-Pb/Rose/ Strawberry		
		d1.6 Aw/rose	CMC8 Aw/Rose/Tail forb	CMC6 Aw/Rose/ Twinflower	CME1 Aw/Rose/Marsh Reedgrass/ Fireweed	
		d1.7 Aw/beaked willow	CMC13 Aw/Willow		CME7 Aw/Rose/ Low forb	
		d1.8 Aw/forb			CMC11 Aw/Rose/ Clover	
		d1.9 Aw/balsam fir			CMC16 Aw/ Smooth brome	
	d2 low-bush cranberry Aw-Sw	d2.1 Aw-Sw/Canada buffalo-berry				CMA11 Willow/ Fireweed
		d2.2 Aw-Sw/beaked hazelnut		CMD11 Aw-Sw/Hazelnut		
		d2.3 Aw-Sw/green alder				
		d2.4 Aw-Sw/low-bush cranberry				

Ecological site	Ecological site Phase	Forested Plant Community Type	Reference Range Plant Community	Successional community type	Harvesting and Fire succession		
e dogwood (subhygric/rich)		d2.5 Aw-Sw/rose	CMD7 Aw-Sw/Rose/Low forb				
		d2.6 Aw-Sw/forb					
		d2.8 Aw-Sw/balsam fir/feather moss					
		d2.9 Aw-Sw/feather moss					
	d3 low-bush cranberry Sw	d3.1 Sw/Canada buffalo-berry					
		d3.2 Sw/green alder					
		d3.3 Sw/low-bush cranberry				CMA12 Willow-Spruce/Kentucky bluegrass	
		d3.4 Sw/balsam fir/feather moss		CMD4 Balsam fir-Sw/Moss			
		d3.5 Sw/feather moss		CMD5 Sw/Moss	CMD6 Sw/Creeping red fescue		
	e dogwood (subhygric/rich)	d4 shrubland		CMA19 Snowberry/Horsetail/ Marsh Reedgrass	CMA4 Snowberry/Kentucky bluegrass		
e1.1 Pb-Aw/dogwood/fern			CMD14 Aw-Pb/Red osier dogwood-Rose				
e2 dogwood Pb-Sw		e1 dogwood Pb-Aw	e1.2 Pb-Aw/bracted honeysuckle/fern	CMD1 Pb/Rose-Alder CMD3a Aw-Pb/Honeysuckle CMD17 Aw/Thimbleberry		CME4 Green Alder-Honeysuckle/Aw-Pb	
			e1.3 Pb-Aw/river alder/fern	CMD2 Pb-Aw/River alder			
			e2.1 Pb-Sw/dogwood/fern				
			e2.2 Pb-Sw/bracted honeysuckle/fern				
		e2.3 Pb-Sw/river alder-green alder/fern	e2.4 Pb-Sw/balsam fir/fern				

Ecological site	Ecological site Phase	Forested Plant Community Type	Reference Range Plant Community	Successional community type	Harvesting and Fire succession
		e2.5 Pb-Sw/fern/feather moss			
	e3 dogwood Sw	e3.1 Sw/dogwood/fern			
		e3.2 Sw/green alder-river alder/fern			
		e3.3 Sw/balsam fir/fern			
		e3.4 Pb-Sw/fern/feather moss			
	e4 shrubland		CMA10 Willow-Alder/Marsh reed grass CMA13 Yellow willow CMA14 Scouler willow-Red osier dogwood CMA15 Bebb willow/Marsh reed grass	CMA3 Cow parsnip/ Kentucky bluegrass - Marsh reed grass	
f horsetail (hygric/rich)	f1 horsetail Pb-Aw	f1.1 Pb-Aw/horsetail	CMC15 Aw/Horsetail-Cow parsnip		
	f2 horsetail Pb-Sw	f2.1 Pb-Sw/horsetail			
	f3 horsetail Sw	f3.1 Sw-horsetail f3.2 Sw/feather moss	CMD12 Sw/Horsetail		
g Labrador tea - subhygric (subhygric/poor)	g1 Labrador tea - subhygric Sb-Pj	g1.1 Sb-Pj/Labrador tea/feather moss g1.2 Sb-Pj/feather moss			
h Labrador tea/horsetail (hygric/medium)	h1 Labrador tea/horsetail Sw-Sb	h1.1 Sw-Sb/Labrador tea/horsetail h1.2 Sw-Sb/Labrador tea/feather moss	CMD8 Aw-Sw/Labrador tea/Moss		
i bog (subhygric/very poor)	i1 treed bog i2 shrubby bog	i1.1 Sb/Labrador tea/cloudberry/peat moss i2.1 Sb/Labrador tea/cloudberry/peat moss	CMD9 Sb/Labrador tea/Peat moss		
j poor fen (subhygric/medium)	j1 treed poor fen	j1.1 Sb-Lt/dwarf birch/sedge/peat moss	CMD10 Sb/Bog birch		

Ecological site	Ecological site Phase	Forested Plant Community Type	Reference Range Plant Community	Successional community type	Harvesting and Fire succession	
k rich fen (subhydryc/rich)	j2 shrubby poor fen	j2.1 Sb-Lt/dwarf birch/sedge/peat moss	CMC4 Bw/Willow			
	j3 grass poor fen		CMA18 Short sedge			
	k1 treed rich fen	k1.1 Lt/dwarf birch/sedge/golden moss				
	k2 shrubby rich fen	k2.1 dwarf birch/sedge/golden moss				
		k2.2 willow/sedge/brown moss	CMA7 Willow/Sedge	CMA8 Willow/Sedge-Kentucky bluegrass		
		k2.3 willow/marsh reed grass	CMA9. Willow/Marsh reed grass			
k3 graminoid rich fen		k3.1 sedge fen	CMA1. Sedge meadow			
		k3.2 marsh reed grass fen	CMA2. Marsh reed grass meadow			
		l1.1 cattail marsh				
l marsh (hydryc/rich)		l1.2 reed grass marsh	CMA16 Swamp horsetail CMA17 Tall manna grass			
		l1.3 bulrush marsh				

CENTRAL MIXEDWOOD SUBREGION

GRASSLAND AND SHRUBLAND COMMUNITY TYPES



Photo 7. This picture represents the Plains wormwood/Sheep fescue-Sedge community type. This community type is common on dry sandy hills throughout the Central Mixedwood subregion.

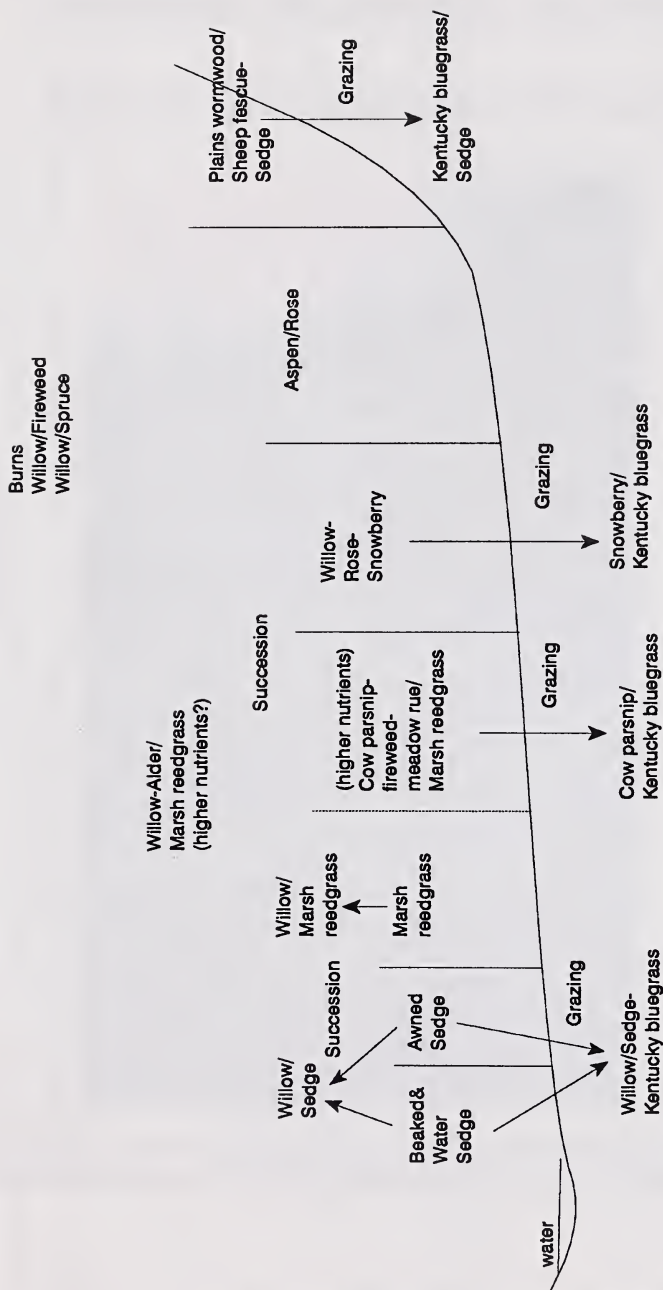


Figure 8. Ecology of the native grass and shrublands of the Central Mixedwood subregion.

NATIVE GRASS AND SHRUBLAND COMMUNITIES

Upland native grasslands are very rare in the Central Mixedwood subregion. The communities that have been described occur on coarse textured, sandy soil, with xeric to subxeric moisture and poor nutrient regimes which lack tree cover. This includes the Plains wormwood/Sheep fescue-Sedge community type. This community type is usually found in association with jack pine dominated community types. Heavy grazing of this community type can lead to a Kentucky bluegrass-Sedge/Plains wormwood dominated type on slightly moister sites. On level, gravelly, well-drained sites adjacent to streams and rivers the Snowberry/Horsetail/Marsh Reedgrass community type is common. This community is extensively grazed by livestock to form the Snowberry/Kentucky bluegrass dominated type (Figure 3).

Wetter (subhydric/rich) sites are associated with sedge, swamp horsetail, tall manna grass and marsh reed grass dominated meadows. Sedge and swamp horsetail species are usually associated with the areas of free standing water, whereas, tall manna grass and marsh reed grass dominate the better drained, drier edges. Willow will invade into these meadows to form the Willow/Sedge and Willow/Marsh reed grass community types. Under grazing pressure these community types tended to be invaded by dandelion, clover and Kentucky bluegrass to form the Willow/Sedge-Kentucky bluegrass community type.

Fire is an important part of the ecology of the Central Mixedwood subregion. There are a number of shrubland community types which have a strong fire origin. These include the Willow-River alder/Marsh reed grass, Willow/Fireweed and Willow-Spruce/ Kentucky bluegrass dominated community types. Other upland shrub communities which are found on nutrient rich, seepage areas include the Scouler and Bebb willow dominated communities.

Table 7. Native grass and shrubland community types of the Central Mixedwood subregion.

Ecological site	Community number	Community type	Sustainable Stocking Rate ha/AUM (AUM/ac)	
			Recommended	Range
aa xeric/poor	Ecological site phase aal plains wormwood			
	CMA5	Plains wormwood/Sheep fescue-Sedge	4.05 (0.1)	4.05-1.16 (0.1-0.35)
d mesic/medium	CMA6	Plains wormwood/Kentucky bluegrass-Sedge	8.09 (0.05)	40.47-2.02 (0.01-0.2)
	Ecological site phase d4 shrubland			
	CMA4	Snowberry/Kentucky bluegrass	0.67 (0.6)	2.02-0.4 (0.2-1.0)
	CMA19	Snowberry/Horsetail/Marsh Reedgrass	0.5 (0.8)	2.02-0.4 (0.2-1.0)
e subhygric/rich	Ecological site phase d1 burned aspen			
	CMA11	Willow/Fireweed	4.05 (0.1)	40.47-1.01 (0.01-0.4)
	Ecological site phase d3 burned spruce			
	CMA12	Willow-Spruce/Kentucky bluegrass	40.47 (0.01)	40.47-4.05 (0.01-0.1)
	Ecological site phase e4 shrubland			
j subhygric/medium	CMA3	Cow parsnip/Kentucky bluegrass-Marsh Reed grass	0.54 (0.75)	0.81-0.40 (0.5-1.0)
	CMA10	Willow-River alder/Marsh reed grass	2.02 (0.2)	2.02-1.01 (0.2-0.4)
k subhygric/rich	CMA13	Yellow willow	40.47 (0.01)	40.47-40.47 (0.01-0.01)
	CMA14	Scouler willow-Red osier dogwood	40.47 (0.01)	40.47-2.02 (0.01-0.2)
	CMA15	Bebb willow/Marsh reed grass	0.81 (0.5)	2.02-0.4 (0.2-1.0)
	Ecological site phase j3 grass poor fen			
	CMA18	Short sedge	40.47 (0.01)	40.47-40.47 (0.01-0.01)
l hydric/rich	Ecological site phase k2 shrubby rich fen			
	CMA7	Willow/Sedge	0.81 (0.5)	2.02-0.4 (0.2-1.0)
	CMA9	Willow/Marsh reed grass	0.81 (0.5)	2.02-0.4 (0.2-1.0)
	Ecological site phase k2 grazed shrubland			
l hydric/rich	CMA8	Willow/Sedge-Kentucky bluegrass	1.01 (0.4)	2.02-0.51 (0.2-0.8)
	Ecological site phase k3 graminoid rich fen			
	CMA1	Sedge meadow	0.54 (0.75)	2.02-0.31 (0.2-1.3)
	CMA2	Marsh reed grass meadow	0.4 (1.0)	0.81-0.34 (0.5-1.2)
	Ecological site phase l1 reed grass marsh			
	CMA16	Swamp horsetail	40.47 (0.01)	40.47-40.47 (0.01-0.01)
	CMA17	Tall manna grass	0.54 (0.75)	2.02-0.31 (0.2-1.3)

Key to Central Mixedwood Grass and Shrublands

1. Shrubland dominated by willow, bog birch, alder, understory spruce.....2
Grass-dominated, or if shrub-dominated, upland species like snowberry.....7

SHRUBLANDS

2. Sedge, marsh reed grass dominated understory, wet sites or riparian or seepage areas dominated by yellow, Scouler or Bebb willow.....3a
Communities of fire origin, willow, alder, fireweed, understory spruce dominated5
3. Ungrazed, sedge and marsh reed grass dominated understory.....4
Grazed community type with Kentucky bluegrass... **Willow/Sedge-Kentucky Bluegrass (CMA8)**
- 3a. Riparian areas dominated by yellow willow.....**Yellow willow(CMA13)**
Seepage areas dominated by Bebb or Scouler's willow or edges of lakes and sloughs dominated by Marsh reed grass or sedge in understory.....3b
- 3b. Upland seepage areas dominated by Bebb or Scouler's willow.....4a
Wet lowland sites dominated by Marsh reed grass or sedge species.....4
4. Wetland sedges dominate understory.....**Willow/Sedge (CMA7)**
Marsh reed grass dominates understory.....**Willow/Marsh Reed grass (CMA9)**
- 4a. Bebb willow dominated community.....**Bebb willow/Marsh reed grass(CMA15)**
Scouler's willow dominated community.....**Scouler willow-Red osier dogwood(CMA14)**
5. Willow, alder dominated community.....**Willow-Alder/Marsh Reed grass (CMA10)**
Willow, fireweed and understory spruce dominated communities.....6
6. Willow, fireweed dominated.....**Willow/Fireweed (CMA11)**
Willow, spruce dominated.....**Willow-Spruce/Kentucky Bluegrass (CMA12)**

GRASSLANDS

7. Lowland sites dominated by sedge, marsh reed grass, swamp horsetail or tall manna grass.....7a
Upland sites dominated by snowberry, sage, or cow parsnip.....9
- 7a. Boggy areas dominated by short sedge.....**Short sedge (CMA18)**
Freshwater areas dominated by marsh reed grass, sedge, swamp horsetail or tall manna grass...7b
- 7b. Area dominated by sedge or Marsh reed grass.....8
Area dominated by tall manna grass or swamp horsetail.....7c
- 7c. Swamp horsetail dominated site, very wet.....**Swamp horsetail (CMA16)**
Tall manna grass dominated site.....**Tall manna grass (CMA17)**
8. Wet sites dominated by wetland sedge.....**Sedge Meadow (CMA1)**
Slightly drier sites dominated by marsh reed grass**Marsh Reed grass Meadow (CMA2)**
9. Moist, nutrient rich seepage areas or snowberry dominated areas adjacent to rivers.....10
Dry, sandy sites or south facing slopes dominated by sage or grasses and upland sedge.....11
10. Moist nutrient rich seepage areas dominated by cow parsnip.....**Cow Parsnip/Kentucky Bluegrass-Marsh Reed grass (CMA3)**
Well drained, gravelly sites adjacent to rivers and dominated by snowberry.....12
11. Dry, sandy south facing slopes dominated by plains wormwood, sheep fescue, and sedge.....**Plains Wormwood/Sheep Fescue-Sedge (CMA5)**
Grazed, sandy grasslands dominated by Kentucky bluegrass.....
.....**Plains Wormwood/Kentucky Bluegrass-Sedge (CMA6)**
12. Ungrazed to moderately grazed sites dominated by snowberry and marsh regrass.....
.....**Snowberry/Horsetail/Marsh Reedgrass (CMA19)**
Heavily grazed sites dominated by Kentucky bluegrass and dandelion.....
.....**Snowberry/Kentucky Bluegrass (CMA4)**

CMA1. Sedge meadows
(Carex aquatilis, C. rostrata, C. atherodes)

n=5 This wetland community type is found near fresh water. The sedge meadow is a poorly drained community. As one moves to the drier edges marsh reed grass becomes predominant. Willows will invade into both the sedge and marsh reed grass dominated meadows. The sedge meadow community is very productive, but the high water table, particularly in the spring when the sedge species are most palatable, restricts livestock movement. One study done in the Yukon found that crude protein on these meadows declined from a high of 10% in May to less than 5% in September (Bailey et al. 1992).

Beaked sedge found in abundance in this community is usually associated with nitrogen rich conditions and moving water (Brierly et al. 1985). Water sedge is often found in abundance in this community type and is associated with calcium rich stagnant water (MacKinnon et al. 1992).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
MARSH SKULLCAP <i>(Scutellaria galericulata)</i>	5	0-25	20
NODDING BEGGAR TICKS <i>(Bidens cernua)</i>	3	0-13	20
DANDELION <i>(Taraxacum officinale)</i>	1	0-3	20
GRASSES			
BEAKED SEDGE <i>(Carex rostrata)</i>	48	8-73	100
AWNED SEDGE <i>(Carex atherodes)</i>	13	0-57	40
WATER SEDGE <i>(Carex aquatilis)</i>	3	0-7	100
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	8	0-18	60

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC-HYGRIC

NUTRIENT REGIME (MEAN)
RICH

ELEVATION:
150-606 (485) M

SOIL DRAINAGE (MEAN):
POORLY TO VERY POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA) n=5

GRASS	2209(1498-300)
FORB	161(0-644)
TOTAL	2370(1498-3000)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 GENERALLY NON-USE
 0.54 ha/AUM (2.02 - 0.31)
 0.75 AUM/ac (0.2 - 1.3)

CMA2. Marsh reed grass meadow
(*Calamagrostis canadensis*)

n=6 This community is found on the edges of sedge meadows and moist draws where the water table is lower. The lower water table makes this community accessible for most of the grazing season. Willow will invade onto these sites to form the Willow/Marsh reed grass community type. Increased grazing pressure on these sites will cause marsh reed grass to decline and there will be an invasion of Kentucky bluegrass and dandelion. These sites are highly productive for domestic livestock and should be rated as primary range.

PLANT COMPOSITION **CANOPY COVER(%)**
MEAN RANGE CONST.

TREES			
WHITE BIRCH (<i>Betula papyrifera</i>)	2	0-14	17
SHRUBS			
WILLOW SPP. (<i>Salix spp.</i>)	1	0-2	33
FORBS			
NODDING BEGGARTICKS (<i>Bidens cernua</i>)	1	0-1	17
LEAFY-BRACTED ASTER (<i>Aster sibiricus</i>)	T	0-1	17
DOCK, SORREL (<i>Rumex crispus</i>)	1	0-1	33
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	56	34-83	100
BEAKED SEDGE (<i>Carex rostrata</i>)	4	0-28	17
WATER SEDGE (<i>Carex aquatilis</i>)	4	0-14	33
AWNED SEDGE (<i>Carex atherodes</i>)	11	0-33	67

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
HYGRIC

NUTRIENT REGIME (MEAN):
MEDIUM TO RICH

ELEVATION:
150-758 (320) M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA) n=6

GRASS	2068(1052-5110)
FORB	6(0-18)
SHRUB	42(0-254)
TOTAL	2117(1070-5110)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.4 ha/AUM (0.81 - 0.34)
1.0 AUM/ac (0.5 - 1.2)

CMA3. Cow parsnip/Kentucky bluegrass-Marsh reed grass
(Heracleum lanatum/Poa pratensis-Calamagrostis canadensis)

n=1 This community type is found on fine textured, silty soils adjacent to the Willow river near Wabasca . It represents a Willow/Cow parsnip/Marsh reed grass community that has been cleared and then grazed extensively. The heavy grazing pressure has allowed dandelion and Kentucky bluegrass to invade onto the site. The high nutrient and moisture regime of this community type makes it extremely productive. Once cleared of shrubs it can provide a significant amount of forage for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
GREEN ALDER <i>(Alnus crispa)</i>	1	-	100
PRICKLY ROSE <i>(Rosa acicularis)</i>	8	-	10
FORBS			
COW PARSNIP <i>(Heracleum lanatum)</i>	42	-	100
HORSETAIL <i>(Equisetum arvense)</i>	33	-	100
DANDELION <i>(Taraxacum officinale)</i>	27	-	100
FIREWEED <i>(Epilobium angustifolium)</i>	19	-	100
CREAMY PEAVINE <i>(Lathyrus ochroleucus)</i>	8	-	100
GRASSES			
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	15	-	100
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	10	-	100
FRINGED BROME <i>(Bromus ciliatus)</i>	2	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
606 M

SOIL DRAINAGE (MEAN):
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 16 - 8

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA) n=1

GRASS	200
FORB	1798
SHRUB	470
TOTAL	2468

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 0.54 ha/AUM (0.81 - 0.40)
 0.75 AUM/ac (0.5 - 1.0)

CMA4. Snowberry/Kentucky bluegrass
(Symphoricarpos occidentalis/Poa pratensis)

n=4 This snowberry dominated community type appears to be common on level, well drained, gravelly areas along rivers throughout Northern Alberta. In the absence of disturbance this community type appears to be dominated by snowberry, rose, fireweed, slender wheat grass and marsh reed grass. Heavy grazing pressure causes the native forbs and grasses to decline and allows Kentucky bluegrass, dandelion and clover to increase. Because these clearings are some of the only natural openings throughout the Central Mixedwood they tend to be heavily utilized by livestock. Snowberry which is unpalatable to livestock will remain even under extreme grazing pressure.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	3	0-9	50
BUCKBRUSH			
<i>(Symphoricarpos occidentalis)</i>	19	1-30	100
WILLOW			
<i>(Salix spp.)</i>	5	0-8	75
FORBS			
STRAWBERRY			
<i>(Fragaria virginiana)</i>	1	0-1	75
CLOVER			
<i>(Trifolium repens)</i>	29	0-54	75
DANDELION			
<i>(Taraxacum officinale)</i>	32	5-49	100
YARROW			
<i>(Achillea millefolium)</i>	2	1-4	100
AMERICAN VETCH			
<i>(Vicia americana)</i>	1	0-1	50
GRASSES			
MARSH REED GRASS			
<i>(Calamagrostis canadensis)</i>	7	0-24	50
SLENDER WHEAT GRASS			
<i>(Agropyron trachycaulum)</i>	7	3-13	100
KENTUCKY BLUEGRASS			
<i>(Poa pratensis)</i>	38	16-73	100
PRAIRIE SEDGE			
<i>(Carex prairea)</i>	1	0-1	25

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):

MESIC

NUTRIENT REGIME (MEAN):

MEDIUM TO RICH

ELEVATION:

576-606 (586) M

SOIL DRAINAGE (MEAN):

WELL

ECOLOGICAL STATUS SCORE: 8 - 0

FORAGE PRODUCTION(KG/HA) n=4

GRASS	1337(800-1800)
FORB	1311(200-2390)
SHRUB	141(0-424)
TOTAL	2790(2000-3614)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 0.67 ha/AUM (2.02 - 0.4)
 0.6 AUM/ac (0.2 - 1.0)

CMA5. Plains wormwood/Sheep fescue-Sedge
(Artemisia campestris/Festuca saximontana-Carex spp.)

n=3 This community type is found on coarse textured, sandy soils. It is generally found on hilltops and south-facing slopes in openings among Jack pine on the uplands and black spruce in the lowlands. This community type was also described on similar site conditions in the Dry Mixedwood subregion. This community would be considered either secondary or non-use range for domestic livestock because of the low forage production and fragile nature of the community.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SASKATOON <i>(Amelanchier alnifolia)</i>	3	1-3	100
BLUEBERRY <i>(Vaccinium myrtilloides)</i>	3	0-8	33
FORBS			
SMOOTH SCOURING RUSH <i>(Equisetum laevigatum)</i>	1	0-1	33
PLAINS WORMWOOD <i>(Artemisia campestris)</i>	9	2-13	100
LOW GOLDENROD <i>(Solidago missouriensis)</i>	2	1-3	66
BEARBERRY <i>(Arctostaphylos uva-ursi)</i>	5	0-8	67
GRASSES			
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	3	1-4	100
NORTHERN RICEGRASS <i>(Oryzopsis pungens)</i>	4	0-12	67
SLENDER WHEAT GRASS <i>(Agropyron trachycaulum)</i>	2	1-5	100
SEDGE <i>(Carex spp)</i>	9	7-10	100
SHEEP FESCUE <i>(Festuca saximontana)</i>	8	7-10	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBMESIC-SUBXERIC

NUTRIENT REGIME (MEAN):
MEDIUM

ELEVATION:
576-652 (611) M

SOIL DRAINAGE (MEAN):
RAPIDLY

SLOPE(RANGE):
22(15-30)%

ASPECT:
SOUTH TO WESTERLY

ECOLOGICAL STATUS SCORE: 24

FORAGE PRODUCTION(KG/HA) n=3

GRASS	469(270-612)
FORB	303(200-452)
TOTAL	772(470-978)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 4.05 ha/AUM (4.05 - 1.16)
 0.1 AUM/ac (0.1 - 0.35)

CMA6. Plains wormwood/Kentucky bluegrass-Sedge
(Artemisia campestris/Poa pratensis-Carex spp.)

n=1 This community type is similar to the Plains wormwood/Sheep fescue-Sedge community type, but heavy grazing pressure and a higher nutrient and moisture regime has allowed Kentucky bluegrass to invade onto the site.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SASKATOON <i>(Amelanchier alnifolia)</i>	2	-	100
CHOKECHERRY <i>(Prunus virginiana)</i>	8	-	100
SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	3	-	100
FORBS			
MEADOW PARSNIP <i>(Zizia aptera)</i>	2	-	100
PLAINS WORMWOOD <i>(Artemisia campestris)</i>	4	-	100
LOW GOLDENROD <i>(Solidago missouriensis)</i>	2	-	100
BEARBERRY <i>(Arctostaphylos uva-ursi)</i>	10	-	100
GRASSES			
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	49	-	100
NORTHERN RICEGRASS <i>(Oryzopsis pungens)</i>	4	-	100
SLENDER WHEAT GRASS <i>(Agropyron trachycaulum)</i>	3	-	100
SEDGE <i>(Carex spp)</i>	13	-	100
SHEEP FESCUE <i>(Festuca saximontana)</i>	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBMESIC

NUTRIENT REGIME (MEAN):
MEDIUM

ELEVATION:
606 M

SOIL DRAINAGE (MEAN):
RAPIDLY

SLOPE(RANGE):
15%

ASPECT:
SOUTH TO WESTERLY

ECOLOGICAL STATUS SCORE: 8

FORAGE PRODUCTION(KG/HA) n=1

GRASS	824
FORB	38
TOTAL	862

ECOLOGICALLY SUSTAINABLE STOCKING RATE	
8.09 ha/AUM (40.47 - 2.02)	
0.05 AUM/ac (0.01 - 0.2)	

CMA7. Willow/Sedge
(*Salix spp./Carex spp.*)

n=7 This community type is found along the edges of sedge meadows and in moist depressions. Willow becomes established at the edges of the sedge meadows due to the shorter duration of standing water. Increased flooding and prolonged waterlogging may result in the disappearance of willow and a transition to a water sedge meadow.

These sites are fairly productive but difficult to graze due to the moist ground conditions and heavy shrub cover which reduces access and mobility within the area.

PLANT COMPOSITION CANOPYCOVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. (<i>Salix spp.</i>)	54	26-85	100
FORBS			
MINT (<i>Mentha arvensis</i>)	1	0-1	17
GREEN SOREL (<i>Rumex acetosa</i>)	1	0-1	17
FIREWEED (<i>Epilobium angustifolium</i>)	2	0-10	57
HORSETAIL (<i>Equisetum arvense</i>)	9	0-60	29
GRASSES			
AWNED SEDGE (<i>Carex atherodes</i>)	11	0-31	43
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	10	0-20	71
BEAKED SEDGE (<i>Carex rostrata</i>)	9	0-24	57
WATER SEDGE (<i>Carex aquatilis</i>)	21	0-64	57

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYDRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
150-853 (343) M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24 or 18

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA) n=7

GRASS	1389(0-1734)
FORB	152(70-3518)
SHRUB	71(0-364)
TOTAL	1612(214-4826)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.81 ha/AUM (2.02 - 0.40)
0.5 AUM/ac (0.2 - 1.0)

CMA8. Willow/Sedge-Kentucky bluegrass

(*Salix spp./Carex spp.-Poa pratensis*)

n=4 This community type is very similar to the Willow/Sedge community, but has been heavily grazed favouring the growth of Kentucky bluegrass and dandelion. Continued heavy grazing pressure will eventually lead to a community that is similar to the Kentucky bluegrass/Dandelion dominated community type.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

SHRUBS

WILLOW SPP. (<i>Salix spp.</i>)	25	1-40	100
PRICKLY ROSE (<i>Rosa acicularis</i>)		3 25	0-10

FORBS

STRAWBERRY (<i>Fragaria virginiana</i>)	3	0-11	25
DANDELION (<i>Taraxacum officinale</i>)	5	0-19	25
MINT (<i>Mentha arvensis</i>)	3	0-6	75
CLOVER (<i>Trifolium spp.</i>)	9	0-44	25
ARROW LEAVED COLTSFOOT (<i>Petasites sagittatus</i>)	9	0-15	50

GRASSES

SEDGE (<i>Carex rostrata, aquatilis atherodes.</i>)	40	12-61	100
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	21	7-42	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
576 M

SOIL DRAINAGE (MEAN):
IMPERFECTLY

ECOLOGICAL STATUS SCORE: 16 - 8 or 12 - 6

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA) n=4

GRASS	2121(1566-2478)
FORB	547(492-1204)
TOTAL	2138(2770-2970)

ECOLOGICALLY SUSTAINABLE STOCKING RATE 1.01 ha/AUM (2.02 - 0.51) 0.4 AUM/ac (0.2 - 0.8)

CMA9. Willow/Marsh reed grass
(Salix spp./Calamagrostis canadensis, C. inexpansa)

n=10 The Marsh reed grass community type is found along the edges of sedge meadows and in moist depressions.

Willow will invade onto these sites to form the Willow/Marsh reed grass community type. Increased grazing pressure on these sites will cause marsh reed grass to decline and there will be an invasion of Kentucky bluegrass and dandelion. These sites are highly productive for domestic livestock and should be rated as primary range. Increased flooding and prolonged waterlogging may result in the disappearance of willow and a transition to a water sedge meadow.

These sites are fairly productive but difficult to graze due to the moist ground conditions and heavy shrub cover which reduces access and mobility within the area.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW SPP. <i>(Salix spp.)</i>	48	0-80	80
FLAT LEAVED WILLOW <i>(Salix planifolia)</i>	11	0-60	20
BEBB WILLOW <i>(Salix bebbiana)</i>	2	0-20	10
FORBS			
MINT <i>(Mentha arvensis)</i>	1	0-7	40
DANDELION <i>(Taraxacum officinale)</i>	2	0-13	60
GRASSES			
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	2	0-7	40
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	26	0-47	90
BEAKED SEDGE <i>(Carex rostrata)</i>	4	0-22	50
WATER SEDGE <i>(Carex aquatilis)</i>	6	0-23	30
NORTHERN REED GRASS <i>(Calamagrostis inexpansa)</i>	5	0-50	10

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
333-853 (577) M

SOIL DRAINAGE (MEAN):
POORLY

ECOLOGICAL STATUS SCORE: 24 or 18

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA) n=8

GRASS	951(318-2010)
FORB	219(0-270)
SHRUB	336(0-554)
TOTAL	1353(588-2118)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 0.81 ha/AUM (2.02 - 0.40)
 0.5 AUM/ac (0.2 - 1.0)

CMA10. Willow-River alder/Marsh reed grass
(Salix spp-Alnus tenuifolia/Calamagrostis canadensis)

n=6 This community type represents a tall willow and alder dominated type that is usually represented as an AIA aspen stand on phase III maps. It is typically found in very moist, poorly drained areas. Black spruce communities are usually found associated with this community type on the wetter edges. The understory of this community type is fairly open allowing for easy access by livestock. When this community is situated next to trails or seismic lines it is moderately utilized by livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
FLAT LEAVED WILLOW <i>(Salix planifolia)</i>	6	0-30	33
WILLOW SPP. <i>(Salix spp.)</i>	32	0-65	67
RIVER ALDER <i>(Alnus tenuifolia)</i>	20	0-40	67
GREEN ALDER <i>(Alnus crispa)</i>	9	0-35	33
WILD RED RASPBERRY <i>(Rubus idaeus)</i>	11	0-33	50
BRACTED HONEYSUCKLE <i>(Lonicera involucrata)</i>	4	0-13	50
FORBS			
STRAWBERRY <i>(Fragaria virginiana)</i>	1	0-3	33
SWEET SCENTED BEDSTRAW <i>(Galium triflorum)</i>	3	0-11	67
WILD SARSAPARILLA <i>(Aralia nudicaulis)</i>	4	0-13	33
DEWBERRY <i>(Rubus pubscens)</i>	3	0-11	50
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	40	14-60	100
BEAKED SEDGE <i>(Carex rostrata)</i>	5	0-27	17

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC-HYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
576 M

SOIL DRAINAGE (MEAN):
IMPERFECTLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA) n=4

GRASS	702(118-1102)
FORB	184(18-470)
SHRUB	61(0-132)
TOTAL	947(592-1296)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 2.02 ha/AUM (2.02 - 1.01)
 0.2 AUM/ac (0.2 - 0.4)

CMA11. Willow/Fireweed
(*Salix spp./Epilobium angustifolium*)

n=1 This community type represents a 3 year old burn of a white spruce forest. Fireweed and marsh reed grass early successional species quickly dominate the community after a fire. As this community undergoes succession the herbaceous understory will be suppressed as a result of shading by white spruce. Eliminating the tree canopy cover has increased the forage production of this site from 50-100 kg/ha under a spruce moss forest to over 1700 kg/ha on this community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
ASPEN			
(<i>Populus tremuloides</i>)	1	-	100
WHITE SPRUCE			
(<i>Picea glauca</i>)	10	-	100
SHRUBS			
WILLOW SPP.			
(<i>Salix spp.</i>)	21	-	100
FORBS			
STRAWBERRY			
(<i>Fragaria virginiana</i>)	2	-	100
FIREWEED			
(<i>Epilobium angustifolium</i>)	37	-	100
YARROW			
(<i>Achillea millefolium</i>)	2	-	100
LARGE LEAVED YELLOW AVENS			
(<i>Geum macrophyllum</i>)	2	-	100
GRASSES			
MARSH REED GRASS			
(<i>Calamagrostis canadensis</i>)	19	-	100
HAIR-LIKE SEDGE			
(<i>Carex capillaris</i>)	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC-MESIC

NUTRIENT REGIME (MEAN):
MEDIUM

ELEVATION:
150 M

SOIL DRAINAGE (MEAN):
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=1

GRASS	190
FORB	1322
SHRUB	236
TOTAL	1748

ECOLOGICALLY SUSTAINABLE STOCKING RATE
4.05 ha/AUM (40.47 - 1.01)
0.1 AUM/ac (0.01 - 0.4)

CMA12. Willow-Spruce/Kentucky bluegrass
(Salix spp.-Picea glauca/Poa pratensis)

n=1 This community represents an old spruce community which burned in 1968, succeeded to willow, and is now succeeding back to white spruce. After the fire, the canopy was opened up allowing for good forage productivity. Consequently, cattle grazing was quite heavy allowing Kentucky bluegrass and clover to establish. Thistle is now beginning to invade and will expand to other areas if not controlled. As the spruce continues to mature, the increasing canopy cover will cause a decline in overall production and this site will eventually become non-use for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
LARCH			
<i>(Larix laricina)</i>	8	-	100
WHITE SPRUCE(UNDERSTORY)			
<i>(Picea glauca)</i>	3	-	100
SHRUBS			
WILLOW SPP.			
<i>(Salix spp.)</i>	50	-	100
FORBS			
CLOVER			
<i>(Trifolium sp.)</i>	22	-	100
DANDELION			
<i>(Taraxacum officinale)</i>	14	-	100
MARSH HEDGE NETTLE			
<i>(Stachys palustris)</i>	6	-	100
BISHOP'S CAP			
<i>(Mitella nuda)</i>	6	-	100
CANADA THISTLE			
<i>(Cirsium arvense)</i>	2	-	100
GRASSES			
KENTUCKY BLUEGRASS			
<i>(Poa pratensis)</i>	77	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):

SUBHYGRIC

NUTRIENT REGIME (MEAN):

RICH

ELEVATION:

667 M

SOIL DRAINAGE (MEAN):

MODERATELY WELL TO IMPERFECTLY

ECOLOGICAL STATUS SCORE: 0 or MODIFIED

FORAGE PRODUCTION(KG/HA) n=1

GRASS	1985
FORB	540
SHRUB	0
TOTAL	2524

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 40.47 ha/AUM (40.47 - 4.05)
 0.01 AUM/ac (0.01 - 0.1)

CMA13. Yellow willow (*Salix lutea*)

n=1 This community type occurs on moist alluvial deposits which are adjacent to streams and rivers. This community can persist for some time if the site is subject to frequent flooding. However in the absence of disturbance it will eventually undergo succession to a spruce dominated community type. Thompson and Hansen (2002) described this community in the grassland natural region of Southern Alberta. They found that this community type disappeared as one moved north into the Parkland and it was replaced by basket willow and flat leaved willow dominated community types. Typically there is little understory vegetation found in this community type and it should be rated as non-use for livestock.

PLANT COMPOSITION CANOPY COVER (%)

SHRUBS

	MEAN	RANGE	CONST.
YELLOW WILLOW (<i>Salix lutea</i>)	30	-	100
SHINING WILLOW (<i>Salix lucida</i>)	10	-	100
RIVER ALDER (<i>Alnus tenuifolia</i>)	3	-	100

FORBS

HORSETAIL (<i>Equisetum arvense</i>)	1	-	100
VEINY MEADOW RUE (<i>Thalictrum venulosum</i>)	1	-	100
DANDELION (<i>Taraxacum officinale</i>)	1	-	100

GRAMINOIDS

MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	10	-	100
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	1	-	100
QUACKGRASS (<i>Agropyron repens</i>)	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME: HYGRIC

NUTRIENT REGIME: RICH

ELEVATION:
600 M

SOIL DRAINAGE: IMPERFECTLY

ECOLOGICAL STATUS SCORE: 24 or 18

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 1000*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE GENERALLY NON-USE 40.47 ha/AUM (40.47 - 40.47) 0.01 AUM/ac (0.01 - 0.01)
--

CMA14. Scouler willow-Red osier dogwood
(Salix scouleriana-Cornus stolonifera)

n=1 This community type appears to be transitional between the horsetail (hygric/rich) and shrubby rich fen (subhygric/rich) ecosites described by Beckingham and Archibald (1996). It has plant species characteristic of both ecosites. This community type is also similar to the Willow-Alder/Fern community described on moist, nutrient rich seepage areas in the Lower Foothills subregion (Lane et al. 2000). This community type is very productive, but the high shrub cover and slope conditions make it difficult to graze. Consequently, this community type should be rated as secondary or non-use range.

PLANT COMPOSITION CANOPY COVER(%)
 MEAN RANGE CONST.

SHRUBS			
SCOULER'S WILLOW <i>(Salix scouleriana)</i>	60	-	100
BRACTED HONEYSUCKLE <i>(Lonicera involcrata)</i>	10	-	100
RED OSIER DOGWOOD <i>(Cornus stolonifera)</i>	30	-	100
LOW BUSH CRANBERRY <i>(Viburnum edule)</i>	20	-	100
FORBS			
BUNCHBERRY <i>(Cornus canadensis)</i>	3	-	100
COMMON HORSETAIL <i>(Equisetum arvensis)</i>	1	-	100
FIREWEED <i>(Epilobium angustifolium)</i>	3	-	100
DEWBERRY <i>(Rubus pubescens)</i>	3	-	100
STRAWBERRY <i>(Fragaria virginiana)</i>	3	-	100
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	10	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
 SUBHYGRIC

NUTRIENT REGIME (MEAN):
 RICH

ELEVATION:
 667 M

SOIL DRAINAGE (MEAN):
 MODERATELY WELL

ECOLOGICAL STATUS SCORE: 24 or 18

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION(KG/HA)

TOTAL 1500*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE GENERALLY NON-USE 40.47 ha/AUM (40.47 - 2.02) 0.01 AUM/ac (0.01 - 0.2)
--

CMA15: Bebb willow/Marsh reed grass
(Salix bebbiana/Calamagrostis canadensis)

n=3 This community type is found along the drier edges of marsh reed grass meadows and in moist depressions and represents the transition between the flat leaved willow and basket willow dominated shrublands and the upland forest. Bebb willow is an upland species that prefers well drained sites. This species of willow is often found in the understory of aspen and balsam poplar dominated community types. Increased flooding and prolonged water logging may result in the disappearance of Bebb willow and favour the growth of flat leaved willow. In contrast the continued drying of the site will favour the growth of balsam poplar. These sites are fairly productive but difficult to graze due to the moist ground conditions and heavy shrub cover which reduces access and mobility within the area.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

TREES

BALSAM POPLAR
(Populus balsamifera) 1 0-1 33

SHRUBS

BEBB WILLOW
(Salix bebbiana) 57 50-70 100
 FLAT LEAVED WILLOW
(Salix planifolia) 1 0-3 33
 RED OSIER DOGWOOD
(Cornus stolonifera) 1 0-3 66
 BRACTED HONEYSUCKLE
(Lonicera involucrata) 1 0-3 66

FORBS

HORSETAIL
(Equisetum arvense) 13 0-30 66
 TALL LUNGWORT
(Mertensia paniculata) 1 0-3 100
 SMALL ENCHANTER'S NIGHTSHADE
(Circaea alpina) 13 0-40 33
 SMALL BEDSTRAW
(Galium trifidum) 7 0-20 33

GRASSES

MARSH REED GRASS
(Calamagrostis canadensis) 24 3-40 100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME: SUBHYGRIC-HYGRIC

NUTRIENT REGIME: RICH

ELEVATION (MEAN): 600 M

SOIL DRAINAGE: MOD. WELL

ECOLOGICAL STATUS SCORE: 24 or 18

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 1500*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE 0.81 ha/AUM (2.02 - 0.40) 0.5 AUM/ac (0.2 - 1.0)

CMA16. Swamp horsetail
(Equisetum fluviatile)

n=1 This wetland community type is found near fresh water and is often associated with shallow water around lake shores or saturated wet spots in old river channels and sloughs. This community is often only found in small isolated spots or in narrow bands around the edge of lakes. As these areas dry, swamp horsetail is often replaced by sedge species. Swamp horsetail is generally unpalatable to livestock and the areas it grows in are often to wet for livestock to access. This community type should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
SWAMP HORSETAIL <i>(Equisetum fluviatile)</i>	97	-	100
GRASSES			
BEAKED SEDGE <i>(Carex rostrata)</i>	3	-	100
TALL MANNA GRASS <i>(Glyceria grandis)</i>	1	-	100
SLOUGH GRASS <i>(Beckmannia syzigachne)</i>	1	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):

SUBHYDRIC-HYGRIC

NUTRIENT REGIME (MEAN):

RICH

ELEVATION:

600 M

SOIL DRAINAGE (MEAN):

POORLY TO VERY POORLY

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 2000*ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE GENERALLY NON-USE 40.47 ha/AUM (40.47 - 40.47) 0.01 AUM/ac (0.01 - 0.01)</p>
--

CMA17. Tall manna grass

(*Glyceria grandis*)

n=1 This wetland community type is associated with the edge of the standing water of ponds, sloughs and slow meandering streams. As one moves away from the water to the drier edges the sedge meadow communities are found. This community is often only found in small isolated spots or in narrow bands around the edge of lakes. As these areas dry, tall manna grass is often replaced by sedge species. Tall manna grass is palatable to livestock, however, the areas it grows in are often too wet for livestock to access. This community type should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
MINT			
(<i>Mentha arvensis</i>)	20	-	100
PALE PERSICARIA			
(<i>Polygonum lapthifolium</i>)	3	-	100
CANADA THISTLE			
(<i>Cirsium arvense</i>)	1	-	100
GRASSES			
TALL MANNA GRASS			
(<i>Glyceria grandis</i>)	60	-	100
SLOUGH GRASS			
(<i>Beckmannia syzigachne</i>)	30	-	100
BEBB'S SEDGE			
(<i>Carex bebbii</i>)	10	-	100
CREEPING SPIKE RUSH			
(<i>Eleocharis palustris</i>)	10	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN): SUBHYDRIC-HYGRIC
NUTRIENT REGIME (MEAN): RICH
ELEVATION: 606 M
SOIL DRAINAGE (MEAN): VERY POORLY
ECOLOGICAL STATUS SCORE: 24 or 18
HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

GRASS	2000
TOTAL	2000*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE GENERALLY NON-USE 0.54 ha/AUM (2.02 - 0.31) 0.75 AUM/ac (0.2 - 1.3)

CMA18. Short sedge (*Carex curta*)

n=1 This community type was described in boggy areas adjacent to black spruce and larch dominated community types. Short sedge tends to be found in the wetter areas where there is a floating mat of peat. As these areas dry out short sedge will be replaced by willow, black spruce and larch species. Short sedge is generally unpalatable to livestock and the areas it grows in are often too wet for livestock to access. This community type should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
FLAT LEAVED WILLOW (<i>Salix planifolia</i>)	1	-	100
FORBS			
WATER HEMLOCK (<i>Cicuta maculata</i>)	1	-	100
SKULL CAP (<i>Scutellaria galericulata</i>)	1	-	100
GRASSES			
SHORT SEDGE (<i>Carex curta</i>)	60	-	100
WATER SEDGE (<i>Carex aquatilis</i>)	20	-	100
NORTHERN REED GRASS (<i>Calamagrostis inexpansa</i>) ¹⁰		-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):

SUBHYDRIC

NUTRIENT REGIME (MEAN):

MEDIUM

ELEVATION:

576-606(584) M

SOIL DRAINAGE (MEAN):

WELL

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 1500*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE

GENERALLY NON-USE

40.47 ha/AUM (40.47 - 40.47)

0.01 AUM/ac (0.01 - 0.01)

CMA19. Snowberry/Horsetail/Marsh Reed Grass

(Symphoricarpos occidentalis/Equisetum arvense/Calamagrostis canadensis)

n=1 This snowberry dominated community type appears to be common on level, well drained, gravelly areas along rivers throughout Northern Alberta. In the absence of disturbance this community type is dominated by snowberry, rose, horsetail, fireweed, slender wheatgrass and marsh reedgrass. Heavy grazing pressure causes the native forbs and grasses to decline and allows Kentucky bluegrass, dandelion and clover to increase. Because these clearings are some of the only natural openings throughout the Central Mixedwood they tend to be heavily utilized by livestock. Snowberry which is unpalatable to livestock will remain even under extreme grazing pressure.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
SNOWBERRY			
<i>(Symphoricarpos occidentalis)</i>	13	-	100
BEAKED WILLOW			
<i>(Salix hebbiana)</i>	8	-	100
PRICKLY ROSE			
<i>(Rosa acicularis)</i>	5	-	100
WILD RED RASPBERRY			
<i>(Rubus idaeus)</i>	4	-	100
FORBS			
COMMON HORSETAIL			
<i>(Equisetum arvense)</i>	11	-	100
FIREWEED			
<i>(Epilobium angustifolium)</i>	14	-	100
AMERICAN VETCH			
<i>(Vicia americana)</i>	1	-	100
LINDLEY'S ASTER			
<i>(Aster ciliolatus)</i>	3	-	100
COW PARSNIP			
<i>(Heracleum lanatum)</i>	3	-	100
STRAWBERRY			
<i>(Fragaria virginiana)</i>	1	-	100
GRASSES			
MARSH REED GRASS			
<i>(Calamagrostis canadensis)</i>	24	-	100
AWNED SEDGE			
<i>(Carex atherodes)</i>	3	-	100
SLENDER WHEATGRASS			
<i>(Agropyron trachycaulum)</i>	3	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBHYGRIC - HYGRIC

NUTRIENT REGIME (MEAN):
RICH

ELEVATION:
758 M

SOIL DRAINAGE (MEAN):
WELL

ECOLOGICAL STATUS SCORE: 24

HEALTH FORM: RIPARIAN

FORAGE PRODUCTION (KG/HA)

TOTAL 2250* ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE 0.5 ha/AUM (2.02 - 0.4) 0.81 AUM/ac (0.2 - 1.01)

CENTRAL MIXEDWOOD SUBREGION
TAME FORAGE COMMUNITIES



Photo 8. This range improvement clearing exhibits signs of heavy grazing pressure and is slowly being invaded by tall buttercup.

TAME FORAGE COMMUNITIES

(Cleared areas that have been broken and seeded to tame forage)

Throughout the Central Mixedwood subregion there are sites that have been deforested, broken, and seeded to tame forage. Usually these areas are mesic and moderately well to well drained with good nutrient levels. Because most of these tame forage stands are established on similar sites, the most influential factors affecting plant species composition are stand establishment and grazing regime.

Stand establishment is important because it determines what the initial plant species composition is going to be. Seed bed preparation and the type of seed sown are the two most important factors influencing stand establishment. Seed bed preparation is important because it helps to determine how well the sown seed germinates and establishes. If the seed bed is not well prepared, the tame forage species may have reduced seedling vigour and/or density allowing native or weedy species to become a dominant component of the plant community.

After the stand is established, the grazing regime applied to the stand will influence the plant species composition. Generally, a light to moderate level of grazing allows the stand to maintain itself while sustained heavy grazing causes the stand to degrade. Damage to a stand due to overgrazing occurs more readily while the stand is establishing than it does when the stand is established. This is because the forage plants in an establishing stand have not had time to develop energy reserves or substantial root systems and are therefore more susceptible to grazing induced stress.

Figure 9 is a successional diagram for tame pastures in the Central Mixedwood subregion. Tame pasture communities are organized horizontally by moisture gradient [e.g. dry (submesic) to moist (subhygric)] and vertically by successional factors like the grazing disturbance gradient [e.g. moderate or very heavily grazed] or stand establishment. A light to moderate grazing regime will normally maintain a forage stand similar to what was seeded on the site. These stands are generally the most productive and provide the best grazing opportunities for livestock. In figure 9, these plant communities are indicated by the **bolded** boxes and represent various seed mixes sown on submesic to subhygric sites (not just those species in the plant community name) They are considered to be in the healthy category for range health.

The plant communities represented by the boxes **above** the bolded boxes may be the result of a number of different factors. For example, when the site is under-grazed, the stand becomes dominated by species that are the most competitive in the absence of grazing disturbance. In this case, trees and shrubs growth is unchecked and they can out-compete seeded plants for light and other resources. Poor forage establishment is another factor that can result in stands that are dominated by native or weedy species. Although shrubs and trees can occur on all tame pasture community types, the extent to which invasion occurs is influenced by site preparation, forage establishment, moisture conditions, age of stand and grazing history.

Plant community changes which occur under heavy grazing are dependent on the grazing history (level of use, season of use and duration of the grazing regime). Overgrazed community types [plant communities at **bottom** of Figure 9] develop over a long period of repeated overgrazing. If weedy species such as tall buttercup or Canada thistle, become established on overgrazed sites, they can quickly become a dominant species.

Figure 9. Successional sequences of tame pasture communities on 3 moisture regimes in the Central Mixedwood subregion.

	SUBMESIC SITES	MESIC SITES	SUBHYGRIC SITES	SUCCESSION FACTORS
SUCCESSIONAL CHANGES				
tree species become dominant				↑
some woody regrowth and native herbaceous species	Creeping Red Fescue (CRF)- Hairgrass CMB5	Marsh Reedgrass/ Strawberry CMB13		↑
reversion to native plants				poor stand establishment or under-grazing
dominated by the tall, productive species originally seeded [i.e. desirable species]		Brome / Timothy CMB8		light to moderately grazed
				moderately to heavily grazed
decline in desirable species with some grazing induced species present		CRF-Kentucky Bluegrass-Timothy CMB9		↓
dominated by grazing induced species with some weedy species		CRF- Kentucky Bluegrass/ Dandelion CMB10	Willow-CRF- Kentucky Bluegrass CMB12	heavily grazed
				↓
dominated by grazing induced and/or weedy species		Clover/Dandelion CMB11		very heavily grazed

Table 8. Tame forage communities of the Central Mixedwood subregion

Ecological Site	Community number	Community type	Prod. Total (kg/ha)	Recommended	Sustainable Stocking Rate ha/AUM (Aum/ac) Range
submesic/medium	Submesic (Dry)				
	CMB5	Creeping Red Fescue (CRF)-Hairgrass	1134	0.67 (0.6)	0.81-0.58 (0.5-0.7)
mesic/medium	Mesic				
	CMB8	Brome/Timothy	2419	0.34 (1.2)	0.4-0.27 (1.0-1.5)
	CMB9	CRF-Kentucky Bluegrass-Timothy	2712	0.45 (0.9)	0.37-0.58 (0.7-1.2)
	CMB10	CRF-Kentucky Bluegrass/Dandelion	2594	0.58 (0.7)	0.58-1.35 (0.3-1.2)
	CMB11	Clover/Dandelion	2380	>0.81 (<0.5)	N/A
subhygric/medium	CMB 13	Marsh Reedgrass/Strawberry	2051	0.6 (0.68)	0.5-0.7 (0.8-0.58)
	Subhygric				
	CMB 12	Willow-CRF-K. Bluegrass	2242	0.51 (0.8)	0.45-0.58 (0.7-0.9)

*Estimate

Key to Tame Grass Plant Communities - Central Mixedwood Subregion

1. Tame forage stand dominated by tall productive species or sites invaded by native plants like marsh reedgrass.....2
 Tame forage stand modified by grazing or poorly established.....3
2. Mesic sites dominated by brome, wheat grass, timothy or other tall productive species.....**Brome/Timothy (CMB8)**
 Invaded tame pasture dominated by marsh reedgrass and strawberry.....
**Marsh Reedgrass/Strawberry(CMB13)**
3. Heavily grazed mesic to subhygric sites.....4
 Submesic sites with poor establishment of seed mix, extensive bare ground and many weedy species..... **Creeping Red Fescue-Hairgrass (CMB5)**
4. Heavily grazed creeping red fescue and/or Kentucky bluegrass dominates.....5
 Very heavily grazed, weedy invaders common, low-growing species (e.g. clover) dominate
**Clover/Dandelion (CMB11)**
5. Some tall productive species (brome, timothy) still present in the stand.....
**Creeping Red Fescue-Kentucky Bluegrass-Timothy (CMB9)**
 Site dominated by grazing resistant species.....6
6. Mesic site (submesic to subhygric).....
**Creeping Red Fescue-Kentucky Bluegrass-Dandelion (CMB10)**
 Subhygric site, willow present.....
**Willow-Creeping Red Fescue-Kentucky Bluegrass (CMB12)**

CMB5. Creeping red fescue-Rough hairgrass

(Festuca rubra-Agrostis scabra)

n=1 This community type represents an area that was cleared and seeded, however due to poor soil conditions, it established poorly. The soils on this site are sandy to a depth of about 6 inches and hairgrass is well adapted to growing on these disturbed sites with poor nutrients. The overall cover of vegetation is sparse, therefore grazing should only be light in order to maintain the little cover of vegetation. This site should not have been approved for range improvement.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
THREE TOOTHED CINQUEFOIL			
<i>(Potentilla tridentata)</i>	3	-	100
ROUGH CINQUEFOIL			
<i>(Potentilla norvegica)</i>	1	-	100
GRASSES			
ROUGH HAIRGRASS			
<i>(Agrostis scabra)</i>	6	-	100
TIMOTHY			
<i>(Phleum pratense)</i>	2	-	100
CREEPING RED FESCUE			
<i>(Festuca rubra)</i>	12	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
SUBMESIC

NUTRIENT REGIME (MEAN):
POOR

ELEVATION:
579M

SOIL DRAINAGE (MEAN):
WELL

PLANT COMPOSITION:
TAME

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION(KG/HA) n=1

GRASS	832
FORBS	302
SHRUBS	0
TOTAL	11

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.67 ha/AUM (0.81 -0.58)
0.6 AUM/ac (0.5 - 0.7)

CMB8. Brome/Timothy
(*Bromus spp. / Phleum pratense*)

n=4 This community type represents healthy condition tame pasture on mesic sites that were seeded with various mixtures of timothy, smooth brome, meadow brome, creeping red fescue, alfalfa, and/or clover. Timothy establishes much quicker than creeping red fescue or smooth brome on pastures that have been recently seeded. Eventually creeping red fescue and smooth brome will outcompete timothy and this community will likely become dominated by creeping red fescue and smooth brome. Heavy grazing pressure will cause the tall growing grass species (brome, timothy) to decline and allows low growing Kentucky bluegrass and dandelion to increase to form communities CMB9 and CMB10. Continued heavy grazing pressure will eventually lead to a community dominated by clover, dandelion and weeds (CMB11).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
CLOVER (<i>Trifolium spp.</i>)	2	0-3	75
DANDELION (<i>Taraxacum officinale</i>)	12	0-41	50
STRAWBERRY (<i>Fragaria virginiana</i>)	4	0-11	50
GRASSES			
SMOOTH BROME (<i>Bromus inermis</i>)	6	0-24	25
FRINGED BROME (<i>Bromus ciliatus</i>)	10	0-37	50
TIMOTHY (<i>Phleum pratense</i>)	26	8-51	100
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	11	0-27	100
CREEPING RED FESCUE (<i>Festuca rubra</i>)	1	0-3	25
SEDGES (<i>Carex spp.</i>)	2	0-6	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
(MESIC) TO SUBHYGRIC

NUTRIENT REGIME (MEAN):
(MEDIUM) TO RICH

ELEVATION:
576-853 (645)M

SOIL DRAINAGE (MEAN):
(WELL) TO MODERATELY WELL

PLANT COMPOSITION:
TAME

DESIRABLE SPECIES SHIFT SCORE: 8

FORAGE PRODUCTION(KG/HA) n=4

GRASS	1660(200-3568)
FORBS	758(4-1876)
SHRUBS	0
TOTAL	2419(670-5444)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.34 ha/AUM (0.4 - 0.27)
1.2 AUM/ac (1.0 - 1.5)

CMB9. Creeping Red Fescue-Kentucky Bluegrass-Timothy (*Festuca Rubra-Poa pratensis-Phleum pratense*)

n=10 This community type develops on mesic sites that were seeded to a mixture of brome, timothy or other productive species with some grazing resistant species like creeping red fescue. Heavy grazing pressure results in a decline in the proportions of tall, productive species and an increase in the grazing resistant species. Heavy continuous grazing will allow Kentucky bluegrass and dandelion to invade into the stand to form a Kentucky bluegrass or Quackgrass/Dandelion dominated community type. This community type is usually considered to be in the 'healthy with problems' category.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
CLOVER (<i>Trifolium spp.</i>)	20	1-67	100
DANDELION (<i>Taraxacum officinale</i>)	20	1-47	100
STRAWBERRY (<i>Fragaria virginiana</i>)	5	0-16	73
YARROW (<i>Achillea millefolium</i>)	1	0-4	82
GRASSES			
CREEPING RED FESCUE (<i>Festuca rubra</i>)	21	0-73	55
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	20	0-64	82
TIMOTHY (<i>Phleum pratense</i>)	14	1-25	100
SMOOTH BROME (<i>Bromus inermis</i>) 3	0-17	36	

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
(MESIC) TO SUBHYGRIC

NUTRIENT REGIME (MEAN):
(MEDIUM) TO RICH

ELEVATION:
576-853(624)m

SOIL DRAINAGE (MEAN):
(WELL) TO MODERATELY WELL

PLANT COMPOSITION:
TAME

DESIRABLE SPECIES SHIFT SCORE: 4 - 0

FORAGE PRODUCTION(KG/HA) n=10

GRASS	1774(848-5304)
FORBS	938(68-2042)
SHRUB	0
TOTAL	2712(1214-5372)

ECOLOGICALLY SUSTAINABLE STOCKING RATE 0.45 ha/AUM (0.58 - 0.34) 0.9 AUM/ac (0.7 - 1.2)
--

CMB10. Creeping Red Fescue-Kentucky Bluegrass/Dandelion

(*Festuca Rubra-Poa pratensis-Taraxacum officinale*)

n=14 This community is representative of heavily grazed mesic sites and is dominated by grazing resistant species like Kentucky Bluegrass, Creeping Red Fescue or Quackgrass. Heavy grazing tends to favour the growth of these low-growing or rhizomatous species and that of weedy or disturbance induced species such as dandelion. These sites have poor health ratings and lower production than community types dominated by species like timothy and brome.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
CLOVER (<i>Trifolium spp.</i>)	9	0-35	43
DANDELION (<i>Taraxacum officinale</i>)	13	0-89	86
CANADA THISTLE (<i>Cirsium arvense</i>)	1	0-19	14
GRASSES			
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	40	4-81	100
CREEPING RED FESCUE (<i>Festuca rubra</i>)	22	0-79	50
SMOOTH BROME (<i>Bromus inermis</i>)	1	0-8	36
QUACKGRASS (<i>Agropyron repens</i>)	7	0-55	14
TIMOTHY (<i>Phleum pratense</i>)	1	0-3	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):

SUBMESIC TO SUBHYGRIC (MESIC)

NUTRIENT REGIME (MEAN):

(MEDIUM) TO RICH

ELEVATION:

333-667 (574)m

SOIL DRAINAGE (MEAN):

RAPIDLY TO MODERATELY WELL (WELL)

PLANT COMPOSITION:

TAME

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION(KG/HA) n=14

GRASS 1883(724-4406)

FORBS 746(0-3322)

SHRUBS 86(0-162)

TOTAL 2594(988-4866)

ECOLOGICALLY SUSTAINABLE STOCKING RATE

0.58 ha/AUM (1.35 - 0.34)

0.7 AUM/ac (0.3 - 1.2)

CMB11. Clover/Dandelion
(*Trifolium spp./Taraxacum officinale*)

n=1 This community represents extremely heavily grazed mesic pasture sites. Generally, all that is left growing on these areas is clover and dandelion. There also tends to be a lot of bare soil, which provides a place for noxious weeds (e.g. Canada thistle) to become established. This community would be rated unhealthy.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
FORBS			
CLOVER			
(<i>Trifolium spp.</i>)	33	33	100
DANDELION			
(<i>Taraxacum officinale</i>)	4	4	100
SHEPHERD'S PURSE			
(<i>Capsella bursa-pastoris</i>)	5	5	100
ANNUAL HAWKSBEARD			
(<i>Crepis tectorum</i>)	4	100	
GRASSES			
KENTUCKY BLUEGRASS			
(<i>Poa pratensis</i>)	4	4	100
TIMOTHY			
(<i>Phleum pratense</i>)	11	11	100
FOWL BLUEGRASS			
(<i>Poa palustris</i>)	7	7	100
QUACKGRASS			
(<i>Agropyron repens</i>)	4	4	100
CREEPING RED FESCUE			
(<i>Festuca rubra</i>)	1	1	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
MESIC

NUTRIENT REGIME (MEAN):
MEDIUM

ELEVATION:
333M

SOIL DRAINAGE (MEAN):
MODERATELY WELL

PLANT COMPOSITION:
TAME

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION(KG/HA) n=1

GRASS	1154
FORBS	1226
SHRUBS	0
TOTAL	2380

ECOLOGICALLY SUSTAINABLE STOCKING RATE
> 0.81 ha/AUM
<0.5 AUM/ac

CMB12. Willow/Creeping red fescue/Kentucky Bluegrass
(Salix spp./Festuca rubra/Poa pratensis)

n=2 This community represents subhygric pastures that have been heavily grazed and is dominated by grazing resistant species such as creeping red fescue and Kentucky bluegrass. The moisture regime has led to the encroachment of willow species. Burning, cultivation and spraying with herbicide are all options that can be considered in order to control shrub regrowth.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
WILLOW <i>(Salix spp.)</i>	14	14	100
PRICKLY ROSE <i>(Rosa acicularis)</i>	5	3-6	100
WILD RED RASPBERRY <i>(Rubus idaeus)</i>	4	3-4	100
FORBS			
CLOVER <i>(Trifolium spp.)</i>	19	11-27	100
DANDELION <i>(Taraxacum officinale)</i>	22	14-28	100
STRAWBERRY <i>(Fragaria virginiana)</i>	7	2-12	100
GRASSES			
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	30	1-59	100
CREEPING RED FESCUE <i>(Festuca rubra)</i>	24	0-47	50
TIMOTHY <i>(Phleum pratense)</i>	3	1-6	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
MESIC TO (SUBHYGRIC)

NUTRIENT REGIME (MEAN):
MEDIUM

ELEVATION:
606-636 (621)M

SOIL DRAINAGE (MEAN):
(MODERATELY WELL) TO WELL

PLANT COMPOSITION:
TAME

DESIRABLE SPECIES SHIFT SCORE: 0

FORAGE PRODUCTION(KG/HA) n=2

GRASS 927 (700-1154)
 FORB 1265 (1226-1304)
 SHRUB 50 (0-100)
 TOTAL 2242 (2104-2380)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 0.51 ha/AUM (0.45-0.58)
 0.8 AUM/ac (0.7-0.9)

CMB13. Marsh Reed Grass/Strawberry
(*Calamagrostis canadensis/Fragaria virginiana*)

n=2 This community type appears to be in an early to mid-successional stage. It can occur on clear-cuts that were harvested within the past one or two years, range improvements that had poor seed establishment, range improvement sites that have received low grazing intensities, or on pipelines that were not seeded or had poor seed establishment. This community type appears to be associated with a low grazing intensity and it will likely succeed towards aspen and coniferous forest.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	3	1-5	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	1	1-2	100
FORBS			
STRAWBERRY (<i>Fragaria virginiana</i>)	9	1-17	100
CLOVER (<i>Trifolium spp.</i>)	6	1-10	100
FIREWEED (<i>Epilobium angustifolium</i>)	8	0-15	50
DANDELION (<i>Taraxacum officinale</i>)	22	14-28	100
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	1	1-2	100
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	23	18-27	100
TIMOTHY (<i>Phleum pratense</i>)	5	4-5	100
BLUNT SEDGE (<i>Carex obtusata</i>)	2	1-3	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME (MEAN):
(MESIC) TO SUBHYGRIC

NUTRIENT REGIME (MEAN):
(MEDIUM) TO RICH

ELEVATION:
853-914 (884)m

SOIL DRAINAGE (MEAN):
MODERATELY WELL TO WELL

PLANT COMPOSITION:
TAME

DESIRABLE SPECIES SHIFT SCORE: 4

FORAGE PRODUCTION(KG/HA) n=2

GRASS	1049 (594-1504)
FORB	962 (724-1200)
SHRUB	40 (0-80)
TOTAL	2051 (1318-2784)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
0.6 ha/AUM (0.5-0.7)
0.68 AUM/ac (0.8-0.58)

CENTRAL MIXEDWOOD SUBREGION
DECIDUOUS FOREST COMMUNITY TYPES



Photo 9. Aw/Rose/Clover community type represents a Central Mixedwood deciduous community that has been moderately to heavily grazed for a number of years.

DECIDUOUS FOREST COMMUNITIES

Balsam poplar is most commonly found on moist upland and alluvial bottomland sites; its best growth is on moist rich bottom lands with deep soil (Peterson and Peterson 1992). The nine stands with predominant balsam poplar (Pb) cover represent four community types in the Central Mixedwood subregion. The Pb-Aw/River alder community is found on lower slope positions and stream channels where there is seepage throughout the growing season. The Pb/Rose-Alder, Pb-Aw/Beaked hazelnut-Rose and Aw-Pb/Honeysuckle community types are found upslope on slightly drier and better drained soils. These three community types integrate into the Aw/Rose dominated community types on mesic/medium ecosites.

White birch is indicative of well-drained, sandy or silty loams (Wilkinson 1990). In Alberta this tree is found in association with balsam poplar on moist sites adjacent to small creeks and lowland areas. Pure stands of Alaska variety white birch are also found on dry sandy ridges with high watertables throughout northern Alberta. Beckingham (1993), found that white birch was well adapted to growing on a soil with a pH of less than 5.3. The White birch/Willow dominated community type maybe indicative of sites with slightly lower pH's.

More mesic sites tend to be dominated by aspen and rose. It is the underlying soil conditions and site history that appear to dictate which forb and shrub species will dominate these mesic sites. Blueberry and twinflower appear to indicate sandy soils with poorer nutrient regimes. An abundance of tall forbs (Aw/Rose/Tall forb) appears to be indicative of higher nutrient regimes that have not been disturbed by livestock. In contrast the low forb (Aw/Rose/Low forb) dominated type occupies sites similar to the tall forb type, but these sites appear to have been disturbed by livestock. Increased grazing pressure on these two community types leads to the formation of strawberry and clover dominated community types (Pb-Aw/Rose/Strawberry, Aw/Rose/Clover).

Sites that have a more subhygric moisture regime and are moderately well-drained tend to be dominated by willow and alder (Aw/Alder-Willow-Rose, Aw/Willow). The Aw/Rose-Saskatoon community was described on south and west facing slopes overlooking streams and rivers. This community is very similar to the community that was described in the Dry Mixedwood subregion. On sites with rich nutrient regimes red osier dogwood and horsetail dominated communities are very common. The Aw/Horsetail community is usually found on moister sites than the Aw-Pb/Red osier dogwood-Rose community type.

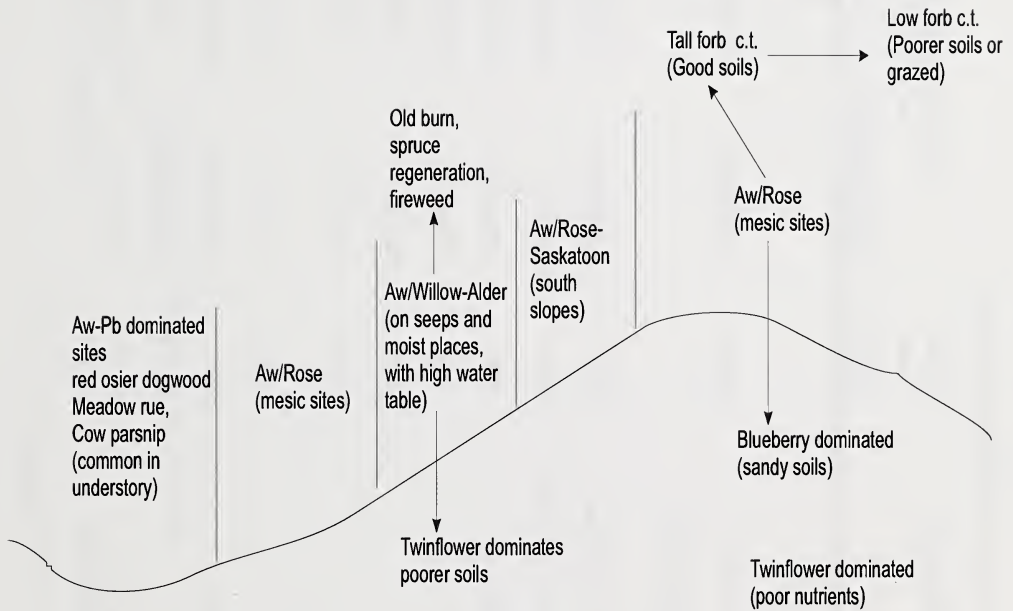


Figure 10. Sequence of Aspen/Rose dominated community types of the Central Mixedwood subregion.

Figure 4 Sequence of Aspen/Rose dominated community types in the landscape of the Central Mixedwood subregion.

Table 9. Deciduous community types described in the Central Mixedwood subregion

Ecological site	Community number	Community type	Prod. Total (Kg/ha)	Recommended	Sustainable stocking rate ha/AUM (AUM/ac)	Range
b submesic/ medium	Ecological site phase	b2 blueberry Aw				
	CMC5	Aw/Blueberry	1284	2.70 (0.15)	4.05-2.02 (0.1-0.2)	
d mesic/ medium	Ecological site phase	d1 low-bush cranberry Aw				
	CMC3	Aw-Pb/Beaked hazelnut-Rose	933	2.70 (0.15)	4.05-1.62 (0.1-0.25)	
	CMC8	Aw/Rose/Tall forb	978	2.02 (0.2)	4.05-1.35 (0.1-0.3)	
	CMC8a	Aw/Buffaloberry-Rose	1071	2.70 (0.15)	4.05-2.02 (0.1-0.2)	
	CMC9	Aw/Rose-Saskatoon	733	4.05 (0.1)	4.05-1.35 (0.1-0.3)	
	CMC12	Aw/Alder	499	4.05 (0.1)	4.05-2.02 (0.1-0.2)	
	CMC13	Aw/Willow	1060	2.70 (0.15)	4.05-2.02 (0.1-0.2)	
	Ecological site phase	d1 grazed Aw				
	CMC6	Aw/Rose/Twinflower	406	8.09 (0.05)	40.47-4.05 (0.01-0.1)	
	CMC7	Aw/Rose/Low forb	846	2.70 (0.15)	4.05-2.02 (0.1-0.2)	
	CMC10	Aw-Pb/Rose/Strawberry	721	2.70 (0.15)	4.05-2.02 (0.1-0.2)	

Table 9. Deciduous community types described in the Central Mixedwood subregion

Ecological site	Community number	Community type	Prod. Total (Kg/ha)	Recommended	Sustainable stocking rate ha/AUM (AUM/ac)	Range
	CMC11	Aw/Rose/Clover	801	4.05 (0.1)	8.09-2.70	(0.05-0.15)
	CMC16	Aw/Smooth brome	1100*	4.05 (0.1)	4.05-2.02	(0.1-0.2)
e subhygric/ rich	Ecological site phase	e1 dogwood Pb-Aw				
	CMC1	Pb/Rose-Alder	744	2.7 (0.15)	4.05-2.02	(0.1-0.2)
	CMC2	Pb-Aw/River alder	540	8.09 (0.05)	40.47-4.05	(0.01-0.1)
	CMC3a	Pb-Aw/Honeysuckle	956	2.02 (0.2)	2.70-1.62	(0.15-0.25)
	CMC14	Aw-Pb/Red Osier dogwood-Rose	431	4.05 (0.1)	8.09-2.70	(0.05-0.15)
	CMC17	Aw/Thimbleberry	735	2.5 (0.16)	6.7-1.62	(0.06-0.25)
f hygric/rich	Ecological site phase	f1 horsetail Pb-Aw				
	CMC15	Aw/Horsetail-Cow parsnip	2732	2.02 (0.2)	4.05-1.35	(0.1-0.3)
j subhygric/ medium	Ecological site phase	j2 shrubby poor fen				
	CMC4	Bw/Willow	756	40.47 (0.01)	40.47-40.47	(0.01-0.01)

* Estimate

Key to Deciduous Community Types - Central Mixedwood Subregion

1. Community dominated by balsam poplar or birch, richer, moister sites (aspen may be present but is only co-dominant).....2
Community dominated by aspen.....7
2. Community dominated by paper birch with willow understory.....**Bw/Willow (CMC4)**
Community dominated by Pb, Bw and Aw only minor.....3
3. Understory dominated by hazelnut, mesic sites.....
.....**Aw-Pb/Beaked Hazelnut-Rose (CMC3)**
Community dominated by green or river alder, honeysuckle or red osier dogwood.....4
4. Community understory dominated by honeysuckle.....**Pb-Aw/Honeysuckle (CMC3a)**
Community dominated by river or green alder or red osier dogwood.....5
5. Community dominated by river or green alder.....6
Community dominated by red osier dogwood, fluvial floodplains next to rivers.....10
6. Community dominated by green alder, more upland sites with mesic moisture regimes...
.....**Pb/Alder-Rose (CMC1)**
Community dominated by river alder, moist seepage areas next to rivers.....
.....**Pb-Aw/River Alder (CMC2)**
7. Wetter, richer sites, willow, alder, thimbleberry or red osier dogwood dominate the understory.....8
Mesic sites, rose, saskatoon, buffaloberry, and blueberry dominate understory.....12
8. Willow or Alder dominates the understory.....9
Red osier dogwood, horsetail, cow parsnip, or thimbleberry dominate.....10
9. Willow dominates understory, alder cover very small, fire origin.....
.....**Aw/Willow (CMC13)**
Alder dominates understory, fire origin.....**Aw/Alder-Willow-Rose (CMC12)**
10. Red osier dogwood is dominant shrub, rose is co-dominant, community type found on rich fluvial floodplains adjacent to river or stream.....
.....**Aw-Pb/Red Osier Dogwood-Rose (CMC14)**
Nutrient rich seepage areas, understory dominated by horsetail, thimbleberry and/or cow parsnip, moist type associated with willow lowlands.....11
11. Horsetail and cow parsnip dominate.....**Aw/Horsetail-Cow Parsnip (CMC15)**
Thimbleberry dominates the understory.....**Aw/Thimbleberry(CMC17)**

12. Blueberry dominates shrub layer, rose is co-dominant, dry, sandy soils.....
.....**Aw/Blueberry (CMC5)**
Mesic sites dominated by buffaloberry, rose, or saskatoon.....13
13. Buffaloberry dominates shrub understory.....**Aw/Buffaloberry-Rose (CMC8a)**
Rose or saskatoon dominate shrub layer.....14
14. Saskatoon is dominant shrub with rose, community type found on south facing
slopes above rivers and streams.....**Aw/Rose-Saskatoon (CMC9)**
Rose is dominant shrub.....15
15. Community not modified appreciably by grazing (tall forb dominated - wild sarsaparilla,
showy aster, fireweed, peavine).....**Aw/Rose/Tall Forb (CMC8)**
Community moderately to severely modified by grazing (low forb dominated) or poorer
nutrient sites which are dominated by twinflower or smooth brome.....16
16. Clover common in understory.....**Aw/Rose/Clover (CMC11)**
Clover not common in understory (low forb or smooth brome dominated).....17
17. Twinflower dominates forb layer, poorer soils.....**Aw/Rose/Twinflower (CMC6)**
Other low forbs (bunchberry, wintergreen, strawberry, wild lily of the valley) or smooth
brome dominate understory.....18
18. Moderately grazed, Pb in overstory.....**Aw-Pb/Rose/Strawberry (CMC10)**
Primarily aspen overstory, dominated by low forbs (strawberry, bunchberry, wintergreen,
etc.), or smooth brome, low cover of shrubs.....19
19. Native understory dominated by low growing forbs.....**Aw/Rose/Low forb (CMC7)**
Smooth brome dominates the understory.....**Aw/Smooth brome (CMC16)**

CMC1. Pb/Alder-Rose

(*Populus balsamifera/ Alnus crispa- Rosa acicularis*)

n=5 This community was found on moderately well-drained sites with subhygric moisture regimes. Beckingham (1993), described a similar community type. He found these forests to develop on parent materials that are neutral to alkaline, thus they tended to have a relatively high level of nutrient availability and potentially high production levels.

This community is producing only a moderate forage base for domestic livestock. Green alder, which makes up a large part of the total forage production for this vegetation type, is generally unpalatable to livestock. This community type would be rated as secondary or non-use range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	1	0-2	40
BALSAM POPLAR (<i>Populus balsamifera</i>)	51	10-65	100
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	16	6-28	100
GREEN ALDER (<i>Alnus crispa</i>)	23	12-40	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	7	0-16	80
FORBS			
STRAWBERRY (<i>Fragaria virginiana</i>)	7	1-11	100
TWINFLOWER (<i>Linnaea borealis</i>)	1	0-4	60
NORTHERN BEDSTRAW (<i>Galium boreale</i>)	4	0-8	80
TALL LUNGWORT (<i>Mertensia paniculata</i>)	4	3-7	100
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	4	1-6	100
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	4	0-16	40
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	8	2-16	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

SUBHYGRIC

NUTRIENT REGIME:

MEDIUM

ELEVATION:

567 M

SOIL DRAINAGE:

MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=5

GRASS	181(0-552)
FORBS	398(234-978)
SHRUBS	165(0-250)
TOTAL	744(474-1530)

ECOLOGICALLY SUSTAINABLE STOCKING RATE 2.70 ha/AUM (4.05 - 2.02) 0.15 AUM/ac (0.1 - 0.2)
--

CMC2. Pb-Aw/River alder
(*Populus balsamifera*-*Populus tremuloides*/*Alnus tenuifolia*)

n=4 This community type is found on moist lower slope positions. A similar community type was described on similar sites in the Lower Foothills subregion (Willoughby and Downing 1995). The high cover of alder limits the light reaching the understory and results in low production of grass and forbs. The majority of the total forage production comes from alder which is generally inaccessible and unpalatable to livestock. Consequently this community type would be rated as non-use for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	23	0-35	75
BALSAM POPLAR (<i>Populus balsamifera</i>)	26	19-45	100
SHRUBS			
RIVER ALDER (<i>Alnus tenuifolia</i>)	27	7-35	100
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	10	5-17	100
BRACED HONEYSUCKLE (<i>Lonicera involucrata</i>)	3	0-10	25
PRICKLY ROSE (<i>Rosa acicularis</i>)	9	4-18	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	4	1-10	100
FORBS			
HORSETAIL (<i>Equisetum arvense</i>)	14	1-45	100
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	6	1-8	100
BISHOP'S CAP (<i>Mitella nuda</i>)	4	0-7	75
STRAWBERRY (<i>Fragaria virginiana</i>)	3	2-4	75
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	2	2-4	75
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	3	2-5	75
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	2	0-7	50
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	1	0-4	75

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC TO HYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
150-606 (454) M

PERCENT SLOPE GRADIENT:
0 - 2

SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=4

GRASS	7(2-20)
FORBS	193(62-376)
SHRUBS	340(200-438)
TOTAL	540(202-816)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
8.09 ha/AUM (40.47 - 4.05)
0.05 AUM/ac (0.01 - 0.1)

CMC3. Aw-Pb/Beaked hazelnut-Rose
(*Populus tremuloides*-*Populus balsamifera*/*Corylus cornuta*-*Rosa acicularis*)

n=4 This community type was described on south facing slopes and is very similar to the the beaked hazelnut communities described in the Dry Mixedwood subregion. This type appears to occupy warmer and drier microsites that resemble the Dry Mixedwood's climate. The total production of this type is high, but the majority of production is coming from hazelnut which is largely unpalatable to livestock at proper stocking levels. The high cover of hazelnut also restricts access to livestock, limiting the forage availability. This community would be rated as secondary range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	33	25-60	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	18	0-65	75
SHRUBS			
HAZELNUT (<i>Corylus cornuta</i>)	22	13-32	100
SASKATOON (<i>Amelanchier alnifolia</i>)	7	0-12	75
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	3	0-11	25
PRICKLY ROSE (<i>Rosa acicularis</i>)	12	4-18	100
FORBS			
WILD LILY-OF-THE-VALLEY (<i>Maianthemum canadense</i>)	3	1-8	100
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	6	0-12	75
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	3	1-6	100
VEINY MEADOW RUE (<i>Thalictrum venulosum</i>)	2	0-3	75
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	10	0-23	75
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	3	0-9	50
MOUNTAIN RICEGRASS (<i>Oryzopsis asperifolia</i>)	2	0-7	50
SEDGE (<i>Carex spp.</i>)	3	0-10	50

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO SUBHYGRIC

NUTRIENT REGIME:
MEDIUM TO RICH

ELEVATION:
576-686 (637) M

PERCENT SLOPE GRADIENT:
5-10 (7.5)%

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=4

GRASS	143(72-370)
FORBS	329(234-310)
SHRUBS	462(152-670)
TOTAL	933(776-1054)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.70 ha/AUM (4.05 - 1.62)
0.15 AUM/ac (0.1 - 0.25)

CMC3a. Pb-Aw/Honeysuckle

(*Populus balsamifera*-*Populus tremuloides* /*Lonicera involucrata*)

n=5 This community type is represented by one of the Public Lands Peace River benchmark sites. It is a relatively moist and nutrient rich site and represents the honeysuckle ecosite as described by Beckingham and Archibald (1996). The high tree and shrub layer limit the amount of light reaching the forest floor. Consequently, there is little growth of grasses and forbs. Shrub production is largely honeysuckle which is generally unpalatable to domestic livestock. This community type should be rated as secondary range.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

TREES

TREMBLING ASPEN (<i>Populus tremuloides</i>)	25	0-60	80
BALSAM POPLAR (<i>Populus balsamifera</i>)	46	20-70	100

SHRUBS

HONEYSUCKLE (<i>Lonicera involucrata</i>)	3	3-31	100
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	1	0-3	80
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	5	0-13	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	12	3-20	100

FORBS

FIREWEED (<i>Epilobium angustifolium</i>)	1	0-5	80
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	3	0-10	80
PALMATE LEAVED COLTSFOOT (<i>Petasites palmatus</i>)	1	1-3	100
TALL LUNGWORT (<i>Mertensia paniculata</i>)	4	1-10	100
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	6	0-20	80
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>) ⁷		3-10	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

SUBHYGRIC

NUTRIENT REGIME:

RICH

ELEVATION:

869 M

SOIL DRAINAGE:

WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=1

GRASS	151
FORBS	288
SHRUBS	517
TOTAL	956

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.02 ha/AUM (2.70 - 1.62)
0.2 AUM/ac (0.15 - 0.25)

CMC4. Bw/Willow
(*Betula papyrifera/Salix spp.*)

n=1 This community type was described on a very moist site that was burned or cleared and is now undergoing succession to a paper birch dominated community type. The understory of this community type is dominated by sphagnum moss, which is characteristic of the poor fen ecosite described by Beckingham and Archibald (1996). The site was likely dominated by black spruce and larch prior to disturbance. The poor nutrient status and very moist conditions make this community type unsuitable for livestock grazing.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
PAPER BIRCH (<i>Betula papyrifera</i>)	55	-	100
SHRUBS			
WILLOW (<i>Salix spp.</i>)	50	-	100
FORBS			
SMALL BOG CRANBERRY (<i>Oxycoccus microcarpus</i>)	25	-	100
SWAMP HORSETAIL (<i>Equisetum fluviatile</i>)	19	-	100
MARSH CINQUEFOIL (<i>Potentilla palustris</i>)	12	-	100
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	7	-	100
HAIR-LIKE SEDGE (<i>Carex capillaris</i>)	6	-	100
BEAKED SEDGE (<i>Carex rostrata</i>)	6	-	100
MOSSES			
PEAT MOSS (<i>Sphagnum spp.</i>)	93	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYDRIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
576 M

SOIL DRAINAGE:
VERY POOR

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=1

GRASS	340
FORBS	342
SHRUBS	74
TOTAL	756

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.47 ha/AUM (40.47 - 40.47)
0.01 AUM/ac (0.01 - 0.01)

CMC5. Aw/Blueberry
(*Populus tremuloides/ Vaccinium myrtilloides*)

n=5 This is a very dry, well-drained community type with sandy soil. It is found in conjunction with jack pine stands. Productivity of shrubs is largely blueberry, which is unpalatable to livestock.

These stands tend to be relatively open allowing for easy access by livestock, but the dry site conditions and poorer nutrient status limit the amount of regrowth after grazing. If this community type is managed for one rotation a year, it can contribute significantly to the overall carrying capacity of a lease.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	48	35-65	100
SHRUBS			
WILLOW (<i>Salix spp.</i>)	6	0-20	60
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	1	0-5	40
BLUEBERRY (<i>Vaccinium myrtilloides</i>)	19	11-37	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	9	1-16	100
FORBS			
BUNCHBERRY (<i>Cornus canadensis</i>)	7	1-21	100
BEARBERRY (<i>Arctostaphylos uva-ursi</i>)	3	0-13	20
YELLOW PEAVINE (<i>Lathyrus ochroleucus</i>)	4	1-8	100
TWINFLOWER (<i>Linnaea borealis</i>)	4	0-7	80
STRAWBERRY (<i>Fragaria virginiana</i>)	3	1-5	100
GRASSES			
PURPLE OAT GRASS (<i>Schizachne purpurascens</i>)	2	0-7	60
HAIRY WILD RYE (<i>Elymus innovatus</i>)	4	0-10	80
MOUNTAIN RICEGRASS (<i>Oryzopsis asperfolia</i>)	2	0-6	80

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
600-909 (682) M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=5

GRASS	913(98-1794)
FORBS	230(0-388)
SHRUBS	205(0-452)
TOTAL	1284(762-1794)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.70 ha/AUM (4.05 - 2.02)
0.15 AUM/ac (0.1 - 0.2)

CMC6. Aw/Rose/Twinflower
(*Populus tremuloides/ Rosa acicularis/ Linnaea borealis*)

n=6 This community type has been grazed moderately to heavily and is very similar to the grazed Pb/Rose/Strawberry and Aw/Rose/Low forb community types. Grazing pressure reduces the cover of shrubs and tall-growing forbs and allows the low-growing forbs to increase in cover. This community type occupies soils with poor nutrient regimes. The poor nutrient status appears to favour the growth of twinflower, a species that is well adapted to growing on poor soils (Corns and Annas 1986). This may explain why twinflower is predominant on this community type and not on the other grazed community types.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

TREES

BALSAM POPLAR (<i>Populus balsamifera</i>)	3	0-15	17
TREMBLING ASPEN (<i>Populus tremuloides</i>)	53	25-75	100

SHRUBS

PRICKLY ROSE (<i>Rosa acicularis</i>)	11	6-18	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	1	0-1	50
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	2	0-7	83
SNWBERRY OR BUCKBRUSH (<i>Symphoricarpos occidentalis</i>)	3	1-5	100

FORBS

CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	3	1-7	100
BUNCHBERRY (<i>Cornus canadensis</i>)	5	1-10	100
TWINFLOWER (<i>Linnaea borealis</i>)	19	11-31	100
STRAWBERRY (<i>Fragaria virginiana</i>)	5	2-9	100
WINTERGREEN (<i>Pyrola asarifolia</i>)	3	1-7	100

GRASSES

MOUNTAIN RICEGRASS (<i>Oryzopsis asperifolia</i>)	1	0-7	33
HAIKY WILD RYE (<i>Elymus innovatus</i>)	3	0-5	83
PURPLE OAT GRASS (<i>Schizachne purpurascens</i>)	3	0-5	83
KENTUCKY BLUEGRASS (<i>Poa pratensis</i>)	2	0-6	83

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC TO MESIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
579-733 (634) M

PERCENT SLOPE GRADIENT:
2(0-5)%

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 12

FORAGE PRODUCTION(KG/HA) n=6

GRASS	56(6-134)
FORBS	230(70-464)
SHRUBS	120(16-294)
TOTAL	406(190-692)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
8.09 ha/AUM (40.47 - 4.05)
0.05 AUM/ac (0.01 - 0.1)

CMC7. Aw/Rose/Low forb
(*Populus tremuloides/Rosa acicularis/Low forb*)

n=23 This type occupies mesic, well-drained sites with medium nutrient regimes. This type is similar to the Aw/Rose/Tall forb community type, but this type appears to occupy drier sites with poorer nutrient regimes. It has also been observed that this type can also be produced when the tall forb community is grazed for a number of years. The increased grazing pressure may explain why the production on this type is lower than the tall forb type. Forage production in this type is good, but the low-growing forbs are not as accessible to livestock as the tall growing forbs.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	50	25-70	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	5	0-20	30
WHITE SPRUCE (<i>Picea glauca</i>)	1	0-8	40
SHRUBS			
SASKATOON (<i>Amelanchier alnifolia</i>)	4	0-16	70
PRICKLY ROSE (<i>Rosa acicularis</i>)	15	4-42	100
WILD RED RASPBERRY (<i>Rubus idaeus</i>)	4	0-23	70
SNWBERRY (<i>Symphoricarpos occidentalis</i>)	6	0-36	74
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	2	0-9	78
FORBS			
STRAWBERRY (<i>Fragaria virginiana</i>)	5	1-10	100
FIREWEED (<i>Epilobium angustifolium</i>)	2	0-10	61
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	3	0-11	87
DEWBERRY OR RUNNING RASPBERRY (<i>Rubus pubescens</i>)	3	0-10	80
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	3	0-8	78
BUNCHBERRY (<i>Cornus canadensis</i>)	6	0-18	92
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	5	0-20	87
HAIRY WILD RYE (<i>Elymus innovatus</i>)	3	0-12	70

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
579-667 (649) M

PERCENT SLOPE GRADIENT:
3(0-15)%

ASPECT:
VARIABLE

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 12

FORAGE PRODUCTION(KG/HA) n=22

GRASS	288(6-660)
FORBS	312(76-830)
SHRUBS	255(38-1154)
TOTAL	846(312-2086)

ECOLOGICALLY SUSTAINABLE STOCKING RATE	
2.70 ha/AUM (4.05 - 2.02)	
0.15 AUM/ac (0.1 - 0.2)	

CMC8. Aw/Rose/Tall forb
(*Populus tremuloides/Rosa acicularis/Tall forb*)

n=23 This type appears to be the modal aspen community type in the absence of disturbance on mesic, medium to rich sites. The presence of tall forbs wild sarsaparilla, fireweed, and peavine distinguish this community from the low forb type. It is unclear why there is a difference in the tall and low forb types. Corns and Annas (1986) recognized the two types in the Lower Foothills subregion. They felt the wild sarsaparilla type was moister and had a higher nutrient regime. It has also been observed that the low forb type can be produced when the tall forb community is lightly to moderately grazed for a number of years (Willoughby 1996).

The forage production on this community type is good. The majority of the vegetation is palatable to livestock. This community type would be rated as primary range for domestic livestock. Wild sarsaparilla, a major component of this community type appears to be very sensitive to any disturbance by livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR (<i>Populus balsamifera</i>)	7	0-30	44
TREMBLING ASPEN (<i>Populus tremuloides</i>)	54	10-75	100
SHRUBS			
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	2	0-7	48
WILD RED RASPBERRY (<i>Rubus ideaus</i>)	2	0-5	70
PRICKLY ROSE (<i>Rosa acicularis</i>)	15	5-33	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	11	0-26	87
FORBS			
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	15	0-69	96
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	4	1-12	100
DEWBERRY (<i>Rubus pubescens</i>)	5	0-15	91
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	2	0-2	78
FIREWEED (<i>Epilobium angustifolium</i>)	5	0-19	83
STRAWBERRY (<i>Fragaria virginiana</i>)	3	0-9	87
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	8	2-21	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MEDIUM TO RICH

ELEVATION:
576-909 (683)M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=21

GRASS	216(3-812)
FORBS	466(179-1014)
SHRUBS	296(60-1058)
TOTAL	978(459-1602)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.02 ha/AUM (4.05 - 1.35)
0.2 AUM/ac (0.1 - 0.3)

CMC8a. Aw/Buffaloberry-Rose
(Populus tremuloides/Shepherdia canadensis-Rosa acicularis)

n=2 This community type was found on a mesic site at higher elevations in the Central Mixedwood subregion west of Beaverlodge. Beckingham (1993) felt the Aw/Buffaloberry type was slightly drier and had a slightly poorer nutrient regime than the modal Aw/Rose community types. This type is providing a moderate amount of forage for domestic livestock, but the drier site conditions and poorer nutrient status will limit regrowth after grazing. Buffaloberry the predominant shrub species in this community type, is generally unpalatable to livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN <i>(Populus tremuloides)</i>	63	50-75	100
WHITE SPRUCE <i>(Picea glauca)</i>	6	0-12	50
SHRUBS			
BUFFALOBERRY <i>(Shepherdia canadensis)</i>	21	15-26	100
PRICKLY ROSE <i>(Rosa acicularis)</i>	12	11-13	100
LOW BUSH CRANBERRY <i>(Viburnum edule)</i>	7	1-13	100
FORBS			
BUNCHBERRY <i>(Cornus canadensis)</i>	4	0-8	50
CREAMY PEAVINE <i>(Lathyrus ochroleucus)</i>	2	2-2	100
DEWBERRY <i>(Rubus pubescens)</i>	2	2-2	100
FIREWEED <i>(Epilobium angustifolium)</i>	3	0-6	50
STRAWBERRY <i>(Fragaria virginiana)</i>	2	1-4	100
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	2	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MEDIUM TO POOR

ELEVATION:
701-800 (750)M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=2

GRASS	230(60-400)
FORBS	476(364-588)
SHRUBS	365(200-531)
TOTAL	1071(955-1188)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.70 ha/AUM (4.05 - 2.02)
0.15 AUM/ac (0.1 - 0.2)

CMC9. Pb-Aw/Rose-Saskatoon

(*Populus balsamifera*-*Populus tremuloides*/*Rosa acicularis*-*Amelanchier alnifolia*)

n=4 This community type is found on mesic, well drained south facing slopes that overlook rivers and creeks. This community is also similar to the Aw/Saskatoon-Rose community that was described in the Dry Mixedwood subregion. Both community types occur on south and west facing slopes. Saskatoon provides important browse for wild ungulates. Livestock also find saskatoon palatable and in areas where there is extensive cattle grazing this species can be heavily browsed.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	36	0-65	75
BALSAM POPLAR (<i>Populus balsamifera</i>)	14	0-45	75
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	28	24-38	100
SASKATOON (<i>Amelanchier alnifolia</i>)	25	11-45	100
SNOWBERRY (<i>Symphoricarpos occidentalis</i>)	7	1-14	100
RIVER ALDER (<i>Alnus tenuifolia</i>)	4	0-15	25
WILLOW (<i>Salix spp.</i>)	4	0-15	25
FORBS			
HORSETAIL (<i>Equisetum arvense</i>)	1	0-3	50
BUNCHBERRY (<i>Cornus canadensis</i>)	2	0-6	25
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	7	1-8	100
DEWBERRY (<i>Rubus pubescens</i>)	4	0-10	75
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	4	0-8	75
STRAWBERRY (<i>Fragaria virginiana</i>)	6	1-14	100
GRASSES			
MOUNTAIN RICEGRASS (<i>Oryzopsis asperifolia</i>)	3	0-9	50
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	7	0-14	75

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
606 M

SOIL DRAINAGE:
WELL TO RAPIDLY

SLOPE:
26(2-50)%

ASPECT:
WESTERLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=4

GRASS	203(0-290)
FORBS	312(240-488)
SHRUBS	218(10-227)
TOTAL	733(250-1014)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
4.05 ha/AUM (4.05 - 1.35)
0.1 AUM/ac (0.1 - 0.3)

CMC10. Aw-Pb/Rose/Strawberry

(*Populus tremuloides*-*Populus balsamifera*/*Rosa acicularis*/*Fragaria virginiana*)

n=2 This community type appears to have been moderately grazed in the past. As grazing pressure becomes heavy, there is a reduction in shrub, tall forbs and native grass cover and an increase in cover of low growing forbs (dandelion and strawberry). Continued heavy grazing pressure eventually leads to a decline in all native plants and Kentucky bluegrass, clover and dandelion will predominate in the understory (Willoughby 1996). The forage production on this community type is only moderate and is slightly less than other Aw and Pb dominated community types. A period of rest would greatly benefit the production on this community type.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
BALSAM POPLAR			
(<i>Populus balsamifera</i>)	28	20-35	100
TREMBLING ASPEN			
(<i>Populus tremuloides</i>)	45	40-50	100
SHRUBS			
PRICKLY ROSE			
(<i>Rosa acicularis</i>)	4	2-6	100
RED OSIER DOGWOOD			
(<i>Cornus stolonifera</i>)	4	1-6	100
SNOWBERRY OR BUCKBRUSH			
(<i>Symphoricarpos occidentalis</i>)	5	2-6	100
FORBS			
STRAWBERRY			
(<i>Fragaria virginiana</i>)	10	3-16	100
DANDELION			
(<i>Taraxacum officinale</i>)	3	2-3	100
DEWBERRY OR RUNNING RASPBERRY			
(<i>Rubus pubescens</i>)	1	1-2	100
NORTHERN BEDSTRAW			
(<i>Galium boreale</i>)	3	2-3	100
LINDLEY'S ASTER			
(<i>Aster ciliolatus</i>)	3	2-3	100
CREAMY PEAVINE			
(<i>Lathyrus ochroleucus</i>)	3	0-5	50
GRASSES			
MARSH REED GRASS			
(<i>Calamagrostis canadensis</i>)	1	1-2	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

MESIC TO SUBHYGRIC

NUTRIENT REGIME:

MEDIUM

ELEVATION:

576-606 (578) M

PERCENT SLOPE GRADIENT:

LEVEL

SOIL DRAINAGE:

WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 12

FORAGE PRODUCTION(KG/HA) n=2

GRASS	309(0-617)
FORBS	333(142-524)
SHRUBS	80(23-136)
TOTAL	721(660-782)

ECOLOGICALLY SUSTAINABLE STOCKING RATE

2.70 ha/AUM (4.05 - 2.02)

0.15 AUM/ac (0.1 - 0.2)

CMC11. Aw/Rose/Clover
(Populus tremuloides/Rosa acicularis/Trifolium spp.)

n=3 This community type is represented by aspen stands that have received moderate to heavy grazing pressure for a number of years. As a result, native forbs have declined and clover has increased in the understory. A small portion of the original shrub and tall forb understory still remains. Although, grass production has dropped, forb production remains high due to the dense cover of clover. This community has not been grazed as long as the Aw/Kentucky bluegrass/Clover community type (Willoughby 1996).

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN <i>(Populus tremuloides)</i>	52	30-65	100
BALSAM POPLAR <i>(Populus balsamifera)</i>	6	0-18	33
SHRUBS			
WILD RED RASPBERRY <i>(Rubus idaeus)</i>	3	0-4	67
PRICKLY ROSE <i>(Rosa acicularis)</i>	19	5-38	100
FORBS			
CLOVER <i>(Trifolium sp.)</i>	12	8-18	100
DANDELION <i>(Taraxacum officinale)</i>	5	4-6	100
STRAWBERRY <i>(Fragaria virginiana)</i>	3	1-4	100
HORSETAIL <i>(Equisetum arvense)</i>	2	0-4	33
WILD LILY-OF-THE-VALLEY <i>(Maianthemum canadense)</i>	1	1-2	100
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	6	1-8	100
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	4	0-10	67
CREEPING RED FESCUE <i>(Festuca rubra)</i>	2	0-4	67
HAIRY WILD RYE <i>(Elymus innovatus)</i>	2	1-5	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

MESIC

NUTRIENT REGIME:

MEDIUM

ELEVATION:

606-716 (669) M

SOIL DRAINAGE:

WELL

ECOLOGICAL STATUS SCORE: 6

FORAGE PRODUCTION(KG/HA) n=3

GRASS	344(260-512)
FORBS	167(130-192)
SHRUBS	205(172-226)
TOTAL	801(606-930)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 4.05 ha/AUM (8.09 - 2.70)
 0.1 AUM/ac (0.05 - 0.15)

CMC12. Aw/Alder
(*Populus tremuloides/ Alnus crispa*)

n=14 This community type is scattered throughout the Central Mixedwood subregion on mainly mesic to subhygric, well-drained sites. This community is likely of fire origin. Many of the plots were described from a large fire that burned through the area in 1968. The aspen trees are also young and very dense. The high cover of aspen, alder, and willow limits the amount of light reaching the understory. Consequently, there is little forage available for domestic livestock. This community type would be rated as secondary or non-use range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	60	30-90	100
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	11	0-23	92
BLUEBERRY (<i>Vaccinium myrtilloides</i>)	1	0-2	31
WILLOW (<i>Salix spp.</i>)	12	0-43	61
GREEN ALDER (<i>Alnus crispa</i>)	34	13-85	100
FORBS			
BUNCHBERRY (<i>Cornus canadensis</i>)	10	0-26	92
STRAWBERRY (<i>Fragaria virginiana</i>)	2	0-6	61
TWINFLOWER (<i>Linnaea borealis</i>)	11	0-45	85
DEWBERRY (<i>Rubus pubescens</i>)	4	0-10	85
WILD LILY-OF-THE-VALLEY (<i>Maianthemum canadense</i>)	2	0-6	77
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	2	0-9	69
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	5	0-19	92
HAIRY WILD RYE (<i>Elymus innovatus</i>)	1	0-2	39
MOUNTAIN RICEGRASS (<i>Oryzopsis asperfolia</i>)	T	0-2	15

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO SUBHYGRIC

NUTRIENT REGIME:
MEDIUM TO RICH

ELEVATION:
333-758 (635) M

PERCENT SLOPE GRADIENT:
5(0-15)%

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=14

GRASS	75(8-350)
FORBS	200(2-476)
SHRUBS	225(5-660)
TOTAL	499(100-930)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
4.05 ha/AUM (4.05 - 2.02)
0.1 AUM/ac (0.1 - 0.2)

CMC13. Aw/Willow
(*Populus tremuloides/Salix spp.*)

n=7 This community type is similar to the Aw/Alder-Willow-Rose community type, but lacks the cover of alder. Previously, this community type was split into four community types (Willoughby and Downing 1995). These included the Aw/Willow-Rose/Twinflower, Aw/Willow-Rose/Bunchberry, Aw/Rose-Willow-Pin cherry/Fireweed and Aw/Rose-Willow-Saskatoon. All four community types appeared to have had a fire origin, but had slightly different moisture and nutrient regimes which affected forage productivity. Productivity varied from 1326 to 1306 kg/ha on the Aw/Willow-Rose/Bunchberry and Aw/Rose-Willow-Pin cherry/Fireweed types to 606 kg/ha on the Aw/Willow-Rose/Twinflower type. Because the sample size was so small it was felt to be impractical to split the four community types and they were lumped into this one type for the purpose of this guide. As this community undergoes succession forage productivity will decline.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	46	35-68	100
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	15	11-21	100
WILLOW SPP. (<i>Salix spp.</i>)	25	15-35	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	3	0-12	57
FORBS			
BUNCHBERRY (<i>Cornus canadensis</i>)	8	0-30	86
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	5	0-18	43
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	4	1-10	100
DEWBERRY (<i>Rubus pubescens</i>)	8	2-12	100
WILD LILY-OF-THE-VALLEY (<i>Maianthemum canadense</i>)	4	3-11	100
FIREWEED (<i>Epilobium angustifolium</i>)	7	0-32	86
TWINFLOWER (<i>Linnaea borealis</i>)	5	0-11	71
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	9	1-17	100
HAIRY WILD RYE (<i>Elymus innovatus</i>)	3	0-10	57

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC TO SUBHYGRIC

NUTRIENT REGIME:
MEDIUM TO RICH

ELEVATION:
333-901 (631) M

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=6

GRASS	420(2-708)
FORBS	446(262-552)
SHRUBS	193(107-378)
TOTAL	1060(606-1367)

ECOLOGICALLY SUSTAINABLE STOCKING RATE	
2.70 ha/AUM (4.05 - 2.02)	
0.15 AUM/ac (0.1 - 0.2)	

CMC14. Aw-Pb/Red osier dogwood-Rose

(*Populus tremuloides*-*P. balsamifera*/*Cornus stolonifera*-*Rosa acicularis*)

n=11 This community is typical of river floodplains throughout the Central Mixedwood subregion. This community has a subhygric moisture and rich nutrient regime. Beckingham and Archibald (1996) found this community type on mid to lower slope topographic positions or near water courses where they receive nutrient-rich seepage or flood waters for a portion of the growing season. This community type is one of the most productive in the Central Mixedwood, but the high cover of shrubs limits access to livestock. The high cover of tall growing shrubs (alder, red osier dogwood) also limits the growth of low shrubs, forbs and grass the principle forage species for domestic livestock in deciduous forests. As a result, this community should be rated as secondary or non-use range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	38	0-70	90
BALSAM POPLAR (<i>Populus balsamifera</i>)	31	0-80	80
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	9	0-26	90
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	20	8-40	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	6	0-30	80
FORBS			
LADY FERN (<i>Athyrium filix-femina</i>)	1	0-11	10
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	5	0-20	70
DEWBERRY (<i>Rubus pubescens</i>)	2	0-6	60
WILD LILY-OF-THE-VALLEY (<i>Maianthemum canadense</i>)	2	0-10	60
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	3	1-10	100
TALL LUNGWORT (<i>Mertensia paniculata</i>)	3	0-10	90
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	8	1-20	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
600-606 (604)M

SLOPE PERCENT:
2(1-3)%

SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=5

GRASS	6(2-22)
FORBS	212(66-372)
SHRUBS	214(20-358)
TOTAL	431(226-714)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
4.05 ha/AUM (8.09 - 2.70)
0.1 AUM/ac (0.05 - 0.15)

CMC15. Aw/Horsetail-Cow parsnip
(Populus tremuloides/Equisetum arvense-Heracleum lanatum)

n=1 This community type occupies lowland sites adjacent to black spruce and willow lowlands. It is very moist and nutrient rich. Horsetail types in other subregions also tend to be moister and richer than the modal Aw/Rose types. This site is very productive and produces a large amount of forage for domestic livestock. Horsetail is generally unpalatable to livestock and can be poisonous to horses. In contrast cow parsnip is very palatable to livestock. This community type would therefore be rated as primary or secondary range for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN <i>(Populus tremuloides)</i>	12	-	100
SHRUBS			
WILD RED RASPBERRY <i>(Rubus idaeus)</i>	3	-	100
FORBS			
COW PARSNIP <i>(Heracleum lanatum)</i>	30	-	100
FIREWEED <i>(Epilobium angustifolium)</i>	1	-	100
HORSETAIL <i>(Equisetum arvense)</i>	25	-	100
TALL LUNGWORT <i>(Mertensia paniculata)</i>	18	-	100
TALL LARKSPUR <i>(Delphinium glaucum)</i>	13	-	100
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	47	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

SUBHYGRIC TO HYGRIC

NUTRIENT REGIME:

RICH

ELEVATION:

758 M

SOIL DRAINAGE:

MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=1

GRASS	1292
FORBS	1440
TOTAL	2732

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 2.02 ha/AUM (4.05 - 1.35)
 0.2 AUM/ac (0.1 - 0.3)

CMC16. Aspen/ Smooth brome
(Populus tremuloides/Bromus inermis)

n=1 This community type is similar to the previously described red osier dogwood dominated community type, but has a high cover of smooth brome in the understory. Smooth brome is an introduced grass that can increase with increased grazing pressure, but smooth brome is also highly invasive and can invade into ungrazed areas. The invasion of non-native invaders onto the site makes this community moderately productive for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

TREES

TREMBLING ASPEN
(Populus tremuloides) 80 - 100

SHRUBS

PRICKLY ROSE
(Rosa acicularis) 3 - 100

SNOWBERRY
(Symphoricarpos occidentalis) 3 - 100

RED OSIER DOGWOOD
(Cornus stolonifera) 1 - 100

FORBS

TALL LUNGWORT
(Mertensia paniculata) 10 - 100

VEINY MEADOW RUE
(Thalictrum venulosum) 3 - 100

CREAMY PEAVINE
(Lathyrus ochroleucus) 3 - 100

GRASSES

SMOOTH BROME
(Bromus inermis) 50 - 100

MARSH REED GRASS
(Calamagrostis canadensis) 3 - 100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
 MESIC-SUBHYGRIC

NUTRIENT REGIME:
 MEDIUM TO RICH

ELEVATION:
 600 M

SOIL DRAINAGE:
 MODERATELY WELL

ECOLOGICAL STATUS SCORE: 0 or MODIFIED

FORAGE PRODUCTION(KG/HA)

TOTAL: 1100*ESTIMATE

ECOLOGICALLY SUSTAINABLE STOCKING RATE 4.05 ha/AUM (4.05 - 2.02) 0.1 AUM/ac (0.1 - 0.2)

CMC17. Aspen/Thimbleberry
(*Populus tremuloides*/*Rubus parviflora*)

n=3 This community type was described on an east facing slope overlooking the Smoky River south of Grande Prairie. This community type is generally rare within the Central Mixedwood Subregion, and is more commonly found within the Montane Subregion south of the Crowsnest Pass. This community type is found on nutrient rich seepage areas. Forage production of this type can be quite high because of the favourable moisture and nutrient conditions. However, Thimbleberry is generally unpalatable to livestock and useable forage production is quite low due to the predominance of thimbleberry and is generally considered to be non-use for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	31	23-45	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	4	0-7	67
SHRUBS			
THIMBLEBERRY (<i>Rubus parviflorus</i>)	44	18-85	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	7	4-9	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	4	1-7	100
FORBS			
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	4	2-5	100
BUNCHBERRY (<i>Cornus canadensis</i>)	6	4-6	100
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	2	1-2	100
LILY-OF-THE-VALLEY (<i>Maianthemum canadense</i>)	2	1-2	100
DEWBERRY (<i>Rubus pubescens</i>)	1	1-2	100
GRASSES			
MOUNTAIN RICE GRASS (<i>Oryzopsis asperifolia</i>)	6	1-13	100
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	5	1-6	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
650 - 698 (675) M

SOIL DRAINAGE:
WELL - MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=3

GRASS	71(0-214)
FORBS	195(74-326)
SHRUBS	469(204-988)
TOTAL	735(288-1172)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.5 ha/AUM (6.7 - 1.62)
0.16 AUM/ac (0.06 - 0.25)

CENTRAL MIXEDWOOD SUBREGION

CONIFEROUS AND MIXEDWOOD FOREST COMMUNITIES

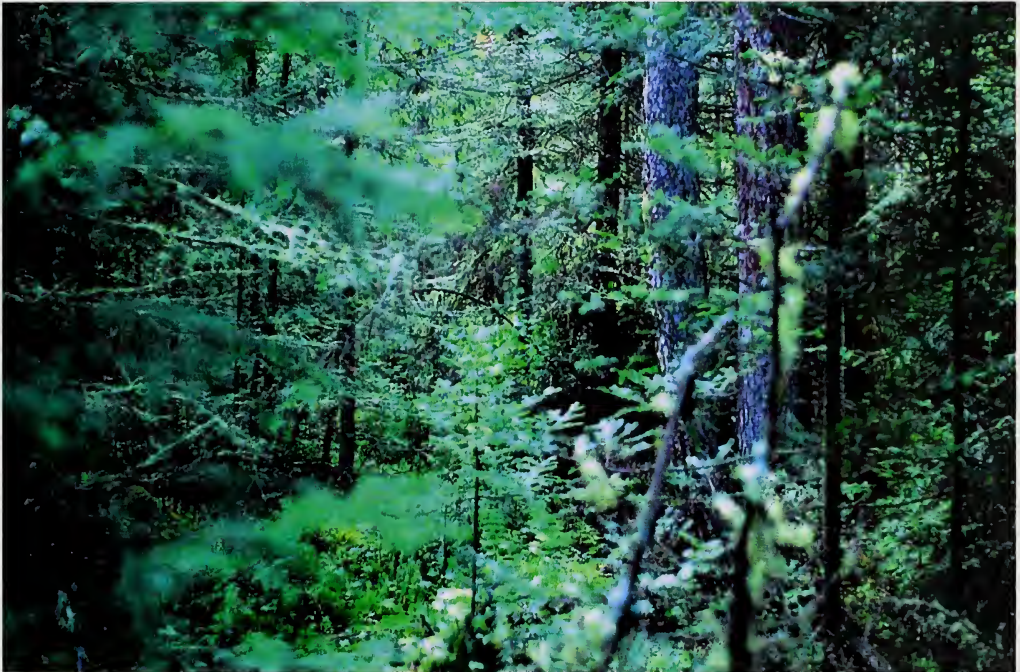


Photo 10. The Balsam fir-White spruce/Moss community type is the climatic climax community for the Central Mixedwood subregion.

CONIFEROUS AND MIXEDWOOD FORESTS

The mixedwood and coniferous community types described in this guide represent five ecological sites as described by Beckingham and Archibald (1996). On sites with subxeric moisture and poor nutrient regimes, coarse textured, sandy soils open stands of jack pine generally dominate (Pj/Alder, Pj/Bearberry). These community types commonly have a carpet of lichens covering the forest floor and a thin organic layer typically less than 5 cm thick (Beckingham and Archibald 1996).

On slightly moister sites with submesic moisture and medium nutrient regimes aspen grows in conjunction with jack pine to form the Aw-Pj/Bearberry/Lichen community type. The soils of this community type continue to be coarse-textured but the moisture and nutrient conditions are more favourable to the growth of aspen.

The mesic/medium sites are generally dominated by white spruce (Balsam fir-Sw/Moss, Sw/Moss, Sw/Creeping red fescue) and mixedwood communities of aspen and spruce (Aw-Sw/Rose/Low forb). These communities represent the reference ecosite for the Boreal Mixedwood subregion (Beckingham and Archibald 1996). Generally, these sites have moderately fine to fine-textured till or glaciolacustrine parent materials. Pioneer deciduous species (aspen, balsam poplar and birch) are replaced with white spruce and balsam fir as these sites develop successionaly. With succession shade tolerant plants take over the herbaceous layer as conifers dominate the canopy. These shade tolerant species are unproductive and often unpalatable for domestic livestock. Forage productivity declines from 2.0 ha/AUM in a deciduous community to 4.0 - 8.1 ha/AUM in a mixedwood community to less than 40 ha/AUM in a conifer community.

Black spruce and larch communities generally dominate on wetter sites with subhygric to subhydric moisture regimes and poor to medium nutrient regimes to form the Sb/Bog birch and Sb/Labrador tea/Moss community types. Larch is more tolerant of excessive moisture and is indicative of an enriched nutrient status, while black spruce is typical in areas of stagnating ground water with poor nutrient status (Hay et al. 1985). Generally, these community types are considered non-use for domestic livestock.

Beckingham and Archibald (1996), provide a good description on how the conifer and mixedwood communities are arranged in the landscape.

Table 10. Conifer and mixedwood communities of the Central Mixedwood subregion

Ecological site	Community number	Community type	Prod. Total (Kg/ha)	Sustainable Stocking Rate ha/AUM (AUM/ac)	Recommended	Range
a xeric/poor	Ecological site phase	a1 lichen Pj				
	CMD1	Pj/Alder	126	40.47 (0.01)	40.47-40.47	(0.01-0.01)
	CMD2	Pj/Bearberry	113	40.47 (0.01)	40.47-40.47	(0.01-0.01)
b submesic/medium	Ecological site phase	b1 blueberry				
	CMD3	Aw-Pj/Bearberry/Lichen	208	40.47 (0.01)	40.47-40.47	(0.01-0.01)
d mesic/medium	Ecological site phase	d2 low-bush cranberry Aw-Sw				
	CMD7	Aw-Sw/Rose/Low forb	408	4.05 (0.1)	4.05-2.02	(0.1-0.2)
	Ecological site phase	d3 low-bush cranberry Sw				
	CMD4	Balsam fir-Sw/Moss	102	40.47 (0.01)	40.47-40.47	(0.01-0.01)
	CMD5	Sw/Moss	143	40.47 (0.01)	40.47-40.47	(0.01-0.01)

	CMD11	Aw-Sw/Hazelnut	206	8.09 (0.05)	2.70-40.47 (0.15-0.01)
	Ecological site phase	d3 grazed spruce			
f	CMD6	Sw/Creeping red fescue	625	2.70 (0.15)	4.05-2.02 (0.1-0.2)
hygric/rich	Ecological site phase	f3 horsetail Sw			
	CMD12	Sw/Horsetail	560*	40.47 (0.01)	40.47-40.47 (0.01-0.01)
h	Ecological site phase	h1 Labrador tea/Horsetail Sw			
hygric/medium	CMD8	Aw-Sw/Labrador tea/Moss	192	40.47 (0.01)	40.47-40.47 (0.01-0.01)
	Ecological site phase	i1 treed bog			
i	CMD9	Sb/Labrador tea/Peat moss	228	40.47 (0.01)	40.47-40.47 (0.01-0.01)
subhygric/very poor	Ecological site phase	j1 treed poor fen			
j	CMD10	Sb/Bog birch	594	40.47 (0.01)	40.47-40.47 (0.01-0.01)
subhygric/medium					

*Estimate

Key to Conifer and Mixedwood Types - Central Mixedwood Subregion

1. Wet, lowland sites dominated by black spruce.....2
 Upland mesic sites or well drained sandy sites.....3
2. Bog birch, sedge dominate understory (rich fen).....**Sb/Bog Birch (CMD10)**
 Labrador tea dominates understory, larch
 present (poor fen).....**Sb/Labrador Tea/Peat Moss (CMD9)**
3. Mesic sites dominated by spruce, aspen, balsam poplar (maybe co-dominated by jack
 pine).....4
 Dry, sandy sites dominated by jack pine.....11
4. Mixedwood types, mixture of conifer and deciduous trees.....5
 White spruce or balsam fir dominated types.....8
5. Aw-Sw mixedwood, typical mesic sites.....6
 Drier sites with Jack pine, Aw-Pj dominated..... **Aw-Pj/Bearberry/Lichen (CMD3)**
6. Rose, low forb, hazelnut dominated, typical mesic sites.....7
 Labrador tea dominated, poorer nutrient sites.....**Aw-Sw/Labrador Tea/Moss (CMD8)**
7. Rose, low forb dominated.....**Aw-Sw/Rose/Low Forb (CMD7)**
 Hazelnut dominated.....**Aw-Sw/Hazelnut (CMD11)**
8. Balsam fir dominates(old growth forest).....**Balsam Fir-Sw/Moss (CMD4)**
 White spruce dominates overstory.....9
9. Spruce with agronomic species in the understory.....**Sw/Creeping Red Fescue (CMD6)**
 Spruce with native species in the understory.....10
10. Moss dominates understory.....**Sw/Moss (CMD5)**
 Horsetail dominates understory.....**Sw/Horsetail(CMD12)**
11. Jack pine overstory, bearberry or lichen dominates understory, alder low in cover or
 absent.....**Pj/Bearberry (CMD2)**
 Jack pine overstory, alder dominates understory.....**Pj/Alder (CMD1)**

CMD1. Pj/Alder
(*Pinus banksiana/ Alnus crispa*)

n=1 This community type is found on dry, rapidly drained, sandy soils with a poor nutrient status. Consequently, production is quite low. Cattle will utilize these areas due to the easy access, however overutilization will quickly deplete the area of forage. This community type would be rated as secondary or non-use range.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

TREES

JACK PINE
(*Pinus banksiana*) 45 - 100

SHRUBS

GREEN ALDER
(*Alnus crispa*) 41 - 100

PRICKLY ROSE
(*Rosa acicularis*) 5 - 100

BLUEBERRY
(*Vaccinium myrtilloides*) 13 - 100

FORBS

TWIN-FLOWER
(*Linnaea borealis*) 4 - 100

BEARBERRY
(*Arctostaphylos uva-ursi*) T - 100

WILD SARSAPARILLA
(*Aralia nudicaulis*) 3 - 100

WILD LILY-OF-THE-VALLEY
(*Maianthemum canadense*) 4 - 100

GRASSES

SEDGES
(*Carex spp.*) 4 - 100

HAIRY WILD RYE
(*Elymus innovatus*) 4 - 100

NORTHERN RICEGRASS
(*Oryzopsis pungens*) 5 - 100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

SUBXERIC

NUTRIENT REGIME

POOR

ELEVATION:

606 M

SOIL DRAINAGE:

RAPIDLY

PERCENT SLOPE GRADIENT:

2 - 8

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION (KG/HA) n=1

GRASS	0
FORBS	40
SHRUBS	86
TOTAL	126

ECOLOGICALLY SUSTAINABLE STOCKING RATE

GENERALLY NON-USE
40.47 ha/AUM (40.47 - 40.47)
0.01 AUM/ac (0.01 - 0.01)

CMD2. Pj/Bearberry
(*Pinus banksiana/Arctostaphylos uva-ursi*)

n=2 This community represents a jack pine forest which is very similar to the Pj/Alder community type. Like the previous community cattle will utilize these areas due to the easy access, however overutilization will quickly deplete the forage supply. This community type would be rated as secondary range and should be grazed on a single rotation per year.

PLANT COMPOSITION CANOPY COVER(%)
MEAN RANGE CONST.

TREES			
JACK PINE (<i>Pinus banksiana</i>)		38	30-45
		100	
TREMBLING ASPEN (<i>Populus tremuloides</i>)	T	0-1	50
SHRUBS			
BOG CRANBERRY (<i>Vaccinium vitis-idaea</i>)	6	0-11	50
PRICKLY ROSE (<i>Rosa acicularis</i>)	T	0-1	50
BLUEBERRY (<i>Vaccinium myrtilloides</i>)	2	0-3	50
FORBS			
BEARBERRY (<i>Arctostaphylos uva-ursi</i>)	18	16-19	100
NORTHERN BEDSTRAW (<i>Galium boreale</i>)	T	0-1	50
WILD LILY-OF-THE-VALLEY (<i>Maianthemum canadense</i>)	1	0-1	100
PHILADELPHIA FLEABANE (<i>Erigeron philadelphicus</i>)	1	0-1	50
GRASSES			
HAIRY WILD RYE (<i>Elymus innovatus</i>)	2	0-3	50
SEDGE SPP. <i>Carex spp.</i>	6	0-11	100
NORTHERN RICEGRASS (<i>Oryzopsis pungens</i>)	2	1-2	100
MOSESSES			
MOSS SPP.	18	0-35	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBMESIC

NUTRIENT REGIME:
SUBMESOTROPHIC

ELEVATION:
576-671 (624) M

SOIL DRAINAGE:
RAPIDLY

PERCENT SLOPE GRADIENT:
10%

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION (KG/HA) n=2

GRASS	25(0-50)
FORBS	47(40-54)
SHRUBS	41(10-72)
TOTAL	113(100-126)

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE</p> <p>GENERALLY NON-USE</p> <p>40.47 ha/AUM (40.47 - 40.47)</p> <p>0.01 AUM/ac (0.01 - 0.01)</p>
--

CMD3. Aw-Pj/Bearberry/Lichen

(*Populus tremuloides*-*Pinus banksiana*/*Arctostaphylos uva-ursi*/*Lichen*)

n=2 This community type represents an aspen forest with a secondary canopy of jack pine. It is very similar to the Pj/Bearberry community type, but it is found on slightly moister soils with better nutrients. These conditions favour the growth of aspen. Like the previous community cattle will utilize these areas due to the easy access, however overutilization will quickly deplete the forage supply. This community type would be rated as secondary range and should be grazed on a single rotation per year.

PLANT COMPOSITION CANOPY COVER(%)

MEAN RANGE CONST.

TREES

JACK PINE
(*Pinus banksiana*) 15 10-20 100

TREMBLING ASPEN
(*Populus tremuloides*) 20 15-25 100

SHRUBS

BOG CRANBERRY
(*Vaccinium vitis-idaea*) 4 0-8 50

PRICKLY ROSE
(*Rosa acicularis*) 1 0-1 50

BLUEBERRY
(*Vaccinium myrtilloides*) 8 0-15 50

FORBS

BEARBERRY
(*Arctostaphylos uva-ursi*) 8 2-12 100

TWINFLOWER
(*Linnaea borealis*) T 0-1 50

WILD LILY-OF-THE-VALLEY
(*Maianthemum canadense*) 2 0-3 50

TOADFLAX
(*Comandra umbellata*) 1 0-1 100

GRASSES

SLENDER WHEAT GRASS
(*Agropyron trachycaulum*) 2 0-4 50

NORTHERN RICEGRASS
(*Oryzopsis pungens*) 2 0-4 50

SEDGE
(*Carex spp.*) 4 0-7 100

LICHENS 49 16-81 100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

SUBMESIC

NUTRIENT REGIME:

SUBMESOTROPHIC

ELEVATION:

576 M

SOIL DRAINAGE:

WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION (KG/HA) n=2

GRASS 28

FORBS 46

SHRUBS 134

TOTAL 208

ECOLOGICALLY SUSTAINABLE STOCKING RATE

GENERALLY NON-USE

40.47 ha/AUM (40.47 - 40.47)

0.01 AUM/ac (0.01 - 0.01)

CMD4. Balsam fir-Sw/Moss
(Abies balsamea-Picea glauca/ Moss)

n=1 This is a mature balsam fir forest which represents the climax vegetation for the area. The northerly aspect of this community type has probably protected the site from past disturbance by fires and allowed the community to undergo succession. The high canopy of balsam fir and spruce limits the light reaching the forest floor, limiting the growth of grasses and forbs. As a result, the forage productivity of this community type is very low. This community would be considered non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	25	-	100
BALSAM FIR <i>(Abies balsamea)</i>	40	-	100
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	T	-	100
FORBS			
BUNCHBERRY <i>(Cornus canadensis)</i>	10	-	100
TWINFLOWER <i>(Linnaea borealis)</i>	4	-	100
WOODLAND HORSETAIL <i>(Equisetum sylvaticum)</i>	6	-	100
RUNNING CLUBMOSS <i>(Lycopodium clavatum)</i>	3	-	100
MOSESSES			
FEATHER MOSS <i>(Pleurozium schreberi)</i>	51	-	100
STAIRSTEP MOSS <i>(Hylocomium splendens)</i>	37	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
333 M

SOIL DRAINAGE:
WELL

PERCENT SLOPE GRADIENT:
5%

ASPECT:
NORTHERLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION (KG/HA) n=1

GRASS	0
FORBS	102
SHRUBS	0
TOTAL	102

ECOLOGICALLY SUSTAINABLE STOCKING RATE

GENERALLY NON-USE
 40.47 ha/AUM (40.47 - 40.47)
 0.01 AUM/ac (0.01 - 0.01)

CMD5. Sw/Moss
(Picea glauca/Moss)

n=7 This community is considered successional mature. A more continuous cover of feather moss and presence of balsam fir would bring this community type closer to the climax community described previously. The limited light penetration in this community discourages understory development, making this a non-use area for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	49	20-70	100
TREMBLING ASPEN <i>(Populus tremuloides)</i>	4	1-13	50
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	4	0-10	86
RED OSIER DOGWOOD <i>(Cornus stolonifera)</i>	2	1-9	33
LOW BUSH CRANBERRY <i>(Viburnum edule)</i>	1	1-3	71
FORBS			
BUNCHBERRY <i>(Cornus canadensis)</i>	7	2-14	86
FIELD HORSETAIL <i>(Equisetum arvense)</i>	1	0-3	29
TWINFLOWER <i>(Linnaea borealis)</i>	7	0-18	71
PALMATE LEAVED COLTSFOOT <i>(Petasites palmatus)</i>	3	0-5	85
DEWBERRY <i>(Rubus pubescens)</i>	1	0-3	57
FIREWEED <i>(Epilobium angustifolium)</i>	1	0-3	29
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	1	0-2	71
MOSS			
STAIR STEP MOSS <i>(Hylocomium splendens)</i>	13	0-49	19
FEATHERMOSS <i>(Pleurozium schreberi)</i>	1	0-7	17

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
150-606 (415) M

SOIL DRAINAGE:
WELL

PERCENT SLOPE GRADIENT:
1%

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=6

GRASS	10(0-40)
FORBS	78(0-172)
SHRUBS	54(0-158)
TOTAL	143(36-370)

ECOLOGICALLY SUSTAINABLE STOCKING RATE

GENERALLY NON-USE
40.47 ha/AUM (40.47 - 40.47)
0.01 AUM/ac (0.01 - 0.01)

CMD6. Sw/Creeping red fescue
(*Picea glauca/Festuca rubra*)

n=1 This community type represents an old cultivated field which has been planted to white spruce. The canopy of spruce is beginning to shade the understory causing a decline in productivity, however, there is still enough forage for grazing between the spruce trees.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	1	-	100
WHITE SPRUCE (<i>Picea glauca</i>)	35	-	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	1	-	100
SHRUBS			
SNOWBERRY (<i>Symphoricarpos occidentalis</i>)	5	-	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	10	-	100
FORBS			
STRAWBERRY (<i>Fragaria virginiana</i>)	11	-	100
CLOVER (<i>Trifolium hybridum</i>)	5	-	100
DANDELION (<i>Taraxacum officinale</i>)	5	-	100
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	3	-	100
GRASSES			
CREEPING RED FESCUE (<i>Festuca rubra</i>)	29	-	100
HAIRY WILD RYE (<i>Elymus innovatus</i>)	12	-	100
SLENDER WHEAT GRASS (<i>Agropyron trachycaulum</i>)	11	-	100
SEDGE (<i>Carex spp.</i>)	3	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

MESIC

NUTRIENT REGIME:

MESOTROPHIC

ELEVATION:

606 M

SOIL DRAINAGE:

WELL

ECOLOGICAL STATUS SCORE: MODIFIED

FORAGE PRODUCTION (KG/HA) n=1

GRASS	525
FORBS	100
SHRUBS	0
TOTAL	625

ECOLOGICALLY SUSTAINABLE STOCKING RATE
2.70 ha/AUM (4.05 - 2.02)
0.15 AUM/ac (0.1 - 0.2)

CMD7. Aw-Sw/Rose/Low forb
(*Populus tremuloides*-*Picea glauca*/ *Rosa acicularis*/Low forb)

n=8 This community type is dominated by aspen in the primary canopy and by spruce in the secondary canopy. It occupies similar site conditions to the Aw/Rose/Low forb community type. As spruce succeeds into the canopy it reduces the amount of light reaching the forest floor reducing the growth of shrubs, forbs and grass. This community type would be rarely used by livestock and should be rated as secondary range.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE (<i>Picea glauca</i>)	33	9-80	100
TREMBLING ASPEN (<i>Populus tremuloides</i>)	32	20-60	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	2	0-10	29
SHRUBS			
SNOWBERRY (<i>Symphoricarpos occidentalis</i>)	1	0-4	29
PRICKLY ROSE (<i>Rosa acicularis</i>)	12	1-19	100
BRACKETED HONEYSUCKLE (<i>Lonicera involcrata</i>)	3	0-15	43
BUFFALOBERRY (<i>Shepherdia canadensis</i>)	3	0-7	71
FORBS			
TWINFLOWER (<i>Linnaea borealis</i>)	4	0-5	86
BUNCHBERRY (<i>Cornus canadensis</i>)	6	1-12	100
WINTERGREEN (<i>Pyrola asarifolia</i>)	1	0-3	52
DEWBERRY (<i>Rubus pubescens</i>)	2	0-4	71
BISHOP'S CAP (<i>Mitella nuda</i>)	1	0-2	57
GRASSES			
HAIRY WILD RYE (<i>Elymus innovatus</i>)	4	0-10	86
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	3	0-9	71
MOSESSES			
MOSS SPP.	4	4-7	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MESOTROPHIC

ELEVATION:
150-853 (635) M

SOIL DRAINAGE:
WELL

ECOLOGICAL STATUS SCORE: 18 - 12

FORAGE PRODUCTION (KG/HA) n=8

GRASS	128(2-308)
FORBS	190(70-418)
SHRUBS	169(50-308)
TOTAL	487(160-1034)

ECOLOGICALLY SUSTAINABLE STOCKING RATE
4.05 ha/AUM (4.05 - 2.02)
0.1 AUM/ac (0.1 - 0.2)

CMD8. Aw-Sw/Labrador tea/Moss

(*Populus tremuloides*-*Picea glauca*/*Ledum groenlandicum*/Moss)

n=1 This community type has relatively poor nutrient status. Labrador tea and bog cranberry are indicative of acidic soil surface soil conditions. Beckingham and Archibald (1996) described this ecosite with a jack pine and black spruce dominated overstory. The moisture and nutrient conditions of this community type are probably better than their ecosite, which allows aspen and white spruce to dominate the overstory, but the soil conditions are poorer than the Aw-Sw/Rose/Low forb community type. This community type produces little palatable forage and therefore would be classified as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	55	-	100
WHITE SPRUCE (<i>Picea glauca</i>)	40	-	100
SHRUBS			
LABRADOR TEA (<i>Ledum groenlandicum.</i>)	11	-	100
BLUEBERRY (<i>Vaccinium myrtilloides</i>)	8	-	100
BOG CRANBERRY (<i>Vaccinium vitis-idaea</i>)	4	-	100
FORBS			
BUNCHBERRY (<i>Cornus canadensis</i>)	5	-	100
TWINFLOWER (<i>Linnaea borealis</i>)	5	-	100
BASTARD'S TOADFLAX (<i>Geocaulon lividum</i>)	3	-	100
COW-WHEAT (<i>Melampyrum lineare</i>)	3	-	100
GRASSES			
HAIRY WILD RYE (<i>Elymus innovatus</i>)	1	-	100
MOSSSES			
Moss spp.	67	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

SUBMESIC- MESIC

NUTRIENT REGIME:

SUBMESOTROPHIC-MESOTROPHIC

ELEVATION:

333 M

SOIL DRAINAGE:

MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION (KG/HA) n=1

GRASS	0
FORBS	96
SHRUBS	96
TOTAL	192

ECOLOGICALLY SUSTAINABLE STOCKING RATE

GENERALLY NON-USE

40.47 ha/AUM (40.47 - 40.47)

0.01 AUM/ac (0.01 - 0.01)

CMD9. Sb/Labrador tea/Moss
(Picea mariana/Ledum groenlandicum/Moss)

n=8 This community type appears to be related to the bog ecosite described by Beckingham and Archibald (1996). The bog ecosite commonly has organic soils consisting of slowly decomposing peat moss. This community type is considered non-use for livestock, due to the lack of forage and poor accessibility.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
LARCH			
<i>(Larix laricina)</i>	14	10-75	50
BLACK SPRUCE			
<i>(Picea mariana)</i>	31	5-65	88
SHRUBS			
WILLOW SPP.			
<i>(Salix spp.)</i>	5	1-20	38
LABRADOR TEA			
<i>(Ledum groenlandicum)</i>	29	7-61	100
FORBS			
CLOUDBERRY			
<i>(Rubus chamaemorus)</i>	8	13-35	38
HORSETAIL			
<i>(Equisetum arvense)</i>	4	7-23	25
DWARF SCOURING RUSH			
<i>(Equisetum scirpoides)</i>	1	2-3	25
GRASSES			
MARSH REED GRASS			
<i>(Calamagrostis canadensis)</i>	3	3-10	50
SEDGE			
<i>(Carex aurea)</i>	4	7-14	38
WATER SEDGE			
<i>(Carex aquatilis)</i>	3	6-14	25
MOSESSES			
<i>(Sphagnum spp)</i>	44	75-99	63

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

SUBHYDRIC

NUTRIENT REGIME:

OLIGOTROPHIC

ELEVATION:

579-636 (615) M

SOIL DRAINAGE:

POORLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION (KG/HA) n=8

GRASS	52(0-192)
FORBS	61(0-286)
SHRUBS	91(0-200)
TOTAL	228(30-678)

ECOLOGICALLY SUSTAINABLE STOCKING RATE

GENERALLY NON-USE
 40.47 ha/AUM (40.47 - 40.47)
 0.01 AUM/ac (0.01 - 0.01)

CMD10. Sb/Bog birch
(*Picea mariana*/*Betula glandulosa*)

n=1 This community type is part of the poor fen ecosite (Beckingham and Archibald 1996) because it has an intermediate nutrient regime between the bog and rich fen ecosites. Drainage on this community type is poor to very poor, but has some movement of water through the site. This community type has a well developed shrub layer and the grass layer consists mainly of marsh reed grass and sedge species. The productivity of this type is moderate, but the high water table limits access to domestic livestock. This community would be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
LARCH			
(<i>Larix laricina</i>)	10	-	100
BLACK SPRUCE			
(<i>Picea mariana</i>)	5	-	100
SHRUBS			
WILLOW SPP.			
(<i>Salix spp.</i>)	30	-	100
BOG BIRCH			
(<i>Betula glandulosa</i>)	24	-	100
BLUEBERRY			
(<i>Vaccinium myrtilloides</i>)	12	-	100
FORBS			
SMALL BOG CRANBERRY			
(<i>Oxycoccus microcarpus</i>)	57	-	100
HORSETAIL			
(<i>Equisetum arvense</i>)	2	-	100
THREE LEAVED SOLOMON'S-SEAL			
(<i>Smilicina trifolia</i>)	5	-	100
GRASSES			
MARSH REED GRASS			
(<i>Calamagrostis canadensis</i>)	6	-	100
SEDGE			
(<i>Carex aurea</i>)	2	-	100
MOSSES			
(<i>Sphagnum spp.</i>)	47	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYDRIC

NUTRIENT REGIME:
OLIGOTROPHIC

ELEVATION:
576 M

SOIL DRAINAGE:
POORLY

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION (KG/HA) n=1

GRASS	104
FORBS	90
SHRUBS	400
TOTAL	594

ECOLOGICALLY SUSTAINABLE STOCKING RATE
GENERALLY NON-USE
40.47 ha/AUM (40.47 - 40.47)
0.01 AUM/ac (0.01 - 0.01)

CMD11. Sw/Beaked hazelnut/Moss

(*Picea glauca*/*Corylus cornuta*/ Moss)

n=1 This is a mixedwood forest which is approaching climax. The northerly aspect of this community type has probably protected the site from past disturbance by fires and allowed the community to undergo succession. The high canopy of spruce limits the light reaching the forest floor, limiting the growth of grasses and forbs. As a result, the forage productivity of this community type is very low. This community would be considered non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE (<i>Picea glauca</i>)	30	-	100
TREMBLING ASPEN (<i>Populus tremuloides</i>)	40	-	100
SHRUBS			
BEAKED HAZELNUT (<i>Corylus cornuta</i>)	30	-	100
RED OSIER DOGWOOD (<i>Cornus stolonifera</i>)	10	-	100
PRICKLY ROSE (<i>Rosa acicularis</i>)	10	-	100
FORBS			
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	20	-	100
SHOWY ASTER (<i>Aster conspicuus</i>)	3	-	100
TWINFLOWER (<i>Linnaea borealis</i>)	3	-	100
BUNCHBERRY (<i>Cornus canadensis</i>)	3	-	100
MOSSES			
MOSS SPP.	73	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:

MESIC

NUTRIENT REGIME:

MESOTROPHIC

ELEVATION:

606 M

SOIL DRAINAGE:

WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 206*ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE 8.09 ha/AUM (2.70 - 40.47) 0.05 AUM/ac (0.15 - 0.01)</p>
--

CMD12. Sw/Horsetail
(Picea glauca/Equisetum arvense)

n=1 This community type is wet and nutrient rich. These sites are commonly found on fluvial or glaciolacustrine parent materials where flooding or seepage enhances the substrate nutrient supply. With high water tables, wet soil conditions organic matter tends to accumulate which favours the growth of horsetails. Generally horsetails are unpalatable to livestock and the wet ground conditions limit access. Consequently, this community type should be rated as non-use.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
WHITE SPRUCE <i>(Picea glauca)</i>	80	-	100
BALSAM FIR <i>(Abies balsamea)</i>	1	-	100
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	1	-	100
RIVER ALDER <i>(Alnus tenuifolia)</i>	3	-	100
BRACTED HONEYSUCKLE <i>(Lonicera involucrata)</i>	3	-	100
FORBS			
DEWBERRY <i>(Rubus pubescens)</i>	3	-	100
HORSETAIL <i>(Equisetum sylvaticum)</i>	40	-	100
THREE LEAVED SOLOMONS SEAL <i>(Smilacina trifolia)</i>	10	-	100
BUNCHBERRY <i>(Cornus canadensis)</i>	3	-	100
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	10	-	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
HYGRIC

NUTRIENT REGIME:
PERMESOTROPHIC

ELEVATION:
600 M

SOIL DRAINAGE:
POOR TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA)

TOTAL 560*ESTIMATE

<p>ECOLOGICALLY SUSTAINABLE STOCKING RATE GENERALLY NON-USE 40.47 ha/AUM (40.47 - 40.47) 0.01 AUM/ac (0.01 - 0.01)</p>

CENTRAL MIXEDWOOD SUBREGION

FOREST CUTBLOCK COMMUNITIES



Photo 11. The Aspen/Rose/Marsh Reedgrass/Fireweed (CME1) community type develops after clear-cut logging of the modal Aspen/Rose/Tall Forb (CMC8) community.

FOREST CUTBLOCK COMMUNITIES

Timber harvesting affects the understory community through removal of the tree layer (overstory) as well as through root destruction, soil compaction, scarification, forest floor displacement, and understory destruction. These mechanical disturbances can alter the energy flows between soil and plants which in turn, can alter the tree regeneration, species diversity and production. Logging (overstory removal) will often increase understory production by eliminating competition between overstory and understory species for light and nutrients. Any increases in production as a result of sustainable yield timber harvest are not included in the calculation of the overall carrying capacity of the disposition because these increases are only temporary and are not always available to livestock. To determine the rates (ha/AUM) for grazing on harvested cutblocks the carrying capacity is based on the undisturbed (prior to harvest) mature stand. For example, (CME1) Aspen/Rose/Marsh Reedgrass/Fireweed has an average production at 2-8 years following harvesting of 1838 kg/ha; however to ensure sustainable timber and forage production a conservative approach is taken by limiting the stocking rate to the pre-harvest plant community Aspen/Rose/Tall Forb (CMC8) average production of 978 kg/ha or 2.0 ha/AUM (0.2 AUM/ac).

Although sustained timber yield cutblocks can be productive primary range for both livestock and wildlife, careful management of these areas is required to ensure that both forest regeneration is successful and that livestock pre-harvest stocking levels are maintained. With good range management cutblocks can be grazed without negatively impacting regeneration however, in extreme circumstances, both livestock and wildlife grazing can affect regeneration success. In addition, timber harvesting has the potential to negatively impact range management success. It has been demonstrated in the Central Mixedwood that if given an alternative, livestock will avoid regenerating deciduous cutblocks, resulting in a net loss of available AUMs and an increase in grazing pressure on alternative plant community types. It is strongly recommended that these potential impacts are discussed by the stakeholders involved and a mitigative agreement reached prior to the integrated grazing and/or harvesting activity taking place.

Table 11. Forest cutblock community types described in the Central Mixedwood subregion

Ecological site	Community number	Community type	Prod. Total (Kg/ha)	Recommended	Sustainable stocking rate ha/AUM (AUM/ac)	Range
d mesic/medium		d1 low-bush cranberry Aw				
	Ecological site phase					
	CME3	Beaked Hazelnut/Aw/Wild Sarsaparilla	1036	2.7 (0.15)	4.05-1.62 (0.1-0.25)	
	CME1	Aw/Rose/Marsh Reedgrass/Fireweed	1838	2.0 (0.2)	4.05-1.0 (0.1-0.4)	
	Ecological site phase	d1 grazed Aw				
	CME2	Clover/Rose/Marsh Reedgrass	1629	8.0 (0.05)	40.47-4.05 (0.01-0.1)	
e subhygric/rich		e1 dogwood Pb-Aw				
	Ecological site phase					
	CME4	Green Alder-Honeysuckle/Aw-Pb	1392	8.0 (0.05)	40.47-4.05 (0.01-0.1)	

Key to Forest Cutblock Types - Central Mixedwood Subregion

1. Mesic sites dominated by Rose, Clover, Hazelnut or Marsh Reedgrass.....2
Very moist, nutrient rich sites dominated by Alder and Honeysuckle.....
.....**Green Alder-Honeysuckle/Aw-Pb (CME4)**

2. Rose, Fireweed, Marsh Reedgrass and/or Clover dominate the site.....3
Hazelnut is dominant or co-dominant in the shrub layer.....
.....**Beaked Hazelnut/Aw/Wild Sarsaparilla (CME3)**

3. Moderately grazed or ungrazed sites dominated by Rose and Marsh Reedgrass.....
.....**Aw/Rose/Marsh Reedgrass/Fireweed (CME1)**

- Heavily grazed sites dominated by Clover and Dandelion.....
.....**Clover/Rose/Marsh Reedgrass (CME2)**

CME1. Aspen/Rose/Marsh Reedgrass/Fireweed

(*Populus tremuloides/Rosa acicularis/Calamagrostis canadensis/Epilobium angustifolium*)

n=4 This community type formed after clear-cut logging an Aspen/Rose dominated community type. The logging probably occurred two to eight years ago. After logging, more light reaches the understory and grasses and forbs are able to flourish. As the aspen reestablishes itself, it rapidly gains dominance on the site. As aspen forms and fills in an overstory canopy, marsh reed grass will decline and rose, along with other shrubs and forbs, will become more abundant. This community type provides fairly good grazing opportunities in its early stages, but gradually excludes grazing livestock as the aspen saplings grow taller and form barriers to livestock movement through the area. This community type is in good to excellent range condition.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN (<i>Populus tremuloides</i>)	8	4-11	100
BALSAM POPLAR (<i>Populus balsamifera</i>)	3	0-10	25
SHRUBS			
PRICKLY ROSE (<i>Rosa acicularis</i>)	7	1-11	100
LOW BUSH CRANBERRY (<i>Viburnum edule</i>)	4	0-9	75
BRACTED HONEYSUCKLE (<i>Lonicera involucrata</i>)	2	0-7	50
FORBS			
FIREWEED (<i>Epilobium angustifolium</i>)	5	3-7	100
DEWBERRY (<i>Rubus pubescens</i>)	4	1-6	100
CREAMY PEAVINE (<i>Lathyrus ochroleucus</i>)	3	0-4	75
LINDLEY'S ASTER (<i>Aster ciliolatus</i>)	3	0-9	75
WILD SARSAPARILLA (<i>Aralia nudicaulis</i>)	1	0-1	75
WILD STRAWBERRY (<i>Fragaria virginiana</i>)	3	1-10	100
NORTHERN BEDSTRAW (<i>Galium boreale</i>)	2	1-2	100
PALMATE-LEAVED COLTSFOOT (<i>Petasites palmatus</i>)	4	1-6	100
BUNCHBERRY (<i>Cornus canadensis</i>)	3	-	100
GRASSES			
MARSH REED GRASS (<i>Calamagrostis canadensis</i>)	23	7-45	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MEDIUM TO RICH

ELEVATION:
758 - 914 (821) M

SOIL DRAINAGE:
WELL TO MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=4

GRASS	714(150-1400)
FORBS	824(158-1408)
SHRUBS	300(92-698)
TOTAL	1838

ECOLOGICALLY SUSTAINABLE STOCKING RATE 2.0 ha/AUM (4.05 - 1.0) 0.2 AUM/ac (0.1 - 0.4)
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CME2. Clover/Rose/Marsh Reedgrass
(Trifolium spp./Rosa acicularis/Calamagrostis canadensis)

n=2 This community type describes the effects of moderate to heavy grazing of the CME1 Aw/marsh reed grass/rose/fireweed harvested community type. Low-growing forbs such as strawberry and clover indicate a moderate to heavy grazing regime for at least 2 to 3 growing seasons. With continued heavy grazing, succession will alter this community to a Kentucky bluegrass/clover-dandelion community. In order to sustain deciduous regeneration domestic grazing must be restricted to allow aspen and balsam suckers to emerge and proliferate.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN <i>(Populus tremuloides)</i>	5	0-10	50
SHRUBS			
PRICKLY ROSE <i>(Rosa acicularis)</i>	1	0-1	50
WILLOW <i>(Salix spp.)</i>	5	0-9	50
FORBS			
WHITE CLOVER <i>(Trifolium repens)</i>	13	2-24	100
DANDELION <i>(Taraxacum officinale)</i>	10	1-19	100
FIREWEED <i>(Epilobium angustifolium)</i>	5	0-10	50
DEWBERRY <i>(Rubus pubescens)</i>	2	0-3	50
LINDLEY'S ASTER <i>(Aster ciliolatus)</i>	1	0-2	50
STRAWBERRY <i>(Fragaria virginiana)</i>	1	0-2	50
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i> 3		1-5	100
KENTUCKY BLUEGRASS <i>(Poa pratensis)</i>	5	0-10	50
CREEPING RED FESCUE <i>(Festuca rubra)</i>	3	0-6	50
SEDGES <i>(Carex spp.)</i>	6	1-9	100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
606 - 914 (760) M

SOIL DRAINAGE:
WELL DRAINED

ECOLOGICAL STATUS SCORE: 6

FORAGE PRODUCTION(KG/HA) n=2

GRASS	723(290-1156)
FORBS	461(84-838)
SHRUBS	445(52-838)
TOTAL	1629

ECOLOGICALLY SUSTAINABLE STOCKING RATE
 8.0 ha/AUM (40.0 - 4.0)
 0.05 AUM/ac (0.01 - 0.1)

CME3. Beaked Hazelnut/Aspen/Wild Sarsaparilla
(Corylus cornuta/Populus tremuloides/Aralia nudicaulis)

n=1 This community type formed after clear-cutting an Aw/hazelnut/wild forest community type similar to a CMC3 or DMC4. The presence of beaked hazelnut appears to be indicative of warmer sites that may have some fire history (Downing and Karpuk 1992). The opening of the canopy after logging seems to have allowed hazelnut to proliferate, possibly due to the increased light penetration and thus an increase in temperature. As aspen continues to mature, hazelnut may decline. Sites with high cover of hazelnut and/or thick aspen regeneration can have both limited access and forage availability for domestic livestock.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN <i>(Populus tremuloides)</i>	28		100
SHRUBS			
BEAKED HAZELNUT <i>(Corylus cornuta)</i>	22		100
PRICKLY ROSE <i>(Rosa acicularis)</i>	24		100
BUFFALOBERRY <i>(Shepherdia canadensis)</i>	11		100
SASKATOON <i>(Amelanchier alnifolia)</i>	8		100
WESTERN SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	4		100
FORBS			
DEWBERRY <i>(Rubus pubescens)</i>	5		100
WILD SARSAPARILLA <i>(Aralia nudicaulis)</i>	4		100
TALL LUNGWORT <i>(Mertensia paniculata)</i>	1		100
STRAWBERRY <i>(Fragaria virginiana)</i>	6		100
PALMATE-LEAVED COLTSFOOT <i>(Petasites palmatus)</i>	3		100
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>	3		100
FRINGED BROME <i>(Bromus ciliatus)</i>	5		100
HAIRY WILD RYE <i>(Elymus innovatus)</i>	1		100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
MESIC

NUTRIENT REGIME:
MEDIUM

ELEVATION:
686 M

SOIL DRAINAGE:
WELL DRAINED

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=1

GRASS	742
FORBS	190
SHRUBS	104
TOTAL	1036

ECOLOGICALLY SUSTAINABLE STOCKING RATE

2.0 ha/AUM (1.1 - 1.4)
0.2 AUM/ac (0.04 - 0.3)

CME4. Green Alder-Honeysuckle/Aspen-Balsam Poplar
(Alnus crispa-Lonicera involucrata/Populus tremuloides-Populus balsamifera)

n=1 This community type formed after clear-cut logging an Aw-Pb/green alder forest community type. This area is effected by a high (or perched) water table as indicated by the presence of balsam saplings and green alder. The high water table in this community type may be partially caused by the clear-cutting. Clear-cutting deciduous stands causes the water table to rise because, even though the amount of water going into the site is the same, the amount of transpiration and water leaving the site is greatly reduced. This community type may provide good grazing opportunities as a mature stand; however the density of green alder and balsam poplar will restrict domestic access until natural thinning occurs in later seral stages.

PLANT COMPOSITION CANOPY COVER(%)

	MEAN	RANGE	CONST.
TREES			
TREMBLING ASPEN <i>(Populus tremuloides)</i>	5		100
BALSAM POPLAR <i>(Populus balsamifera)</i>	7		100
SHRUBS			
GREEN ALDER <i>(Alnus crispa)</i>	19		100
BRACTED HONEYSUCKLE <i>(Lonicera involucrata)</i>	11		100
PRICKLY ROSE <i>(Rosa acicularis)</i>	5		100
LOW BUSH CRANBERRY <i>(Viburnum edule)</i>	5		100
WILD RED RASPBERRY <i>(Rubus idaeus)</i>	6		100
WESTERN SNOWBERRY <i>(Symphoricarpos occidentalis)</i>	2		100
FORBS			
COW PARSNIP <i>(Heracleum lanatum)</i>	9		100
COMMON HORSETAIL <i>(Equisetum arvense)</i>	11		100
FIREWEED <i>(Epilobium angustifolium)</i>	1		100
WILD SARSAPARILLA <i>(Aralia nudicaulis)</i>	2		100
WILD VETCH <i>(Vicia americana)</i>	1		100
GRASSES			
MARSH REED GRASS <i>(Calamagrostis canadensis)</i>			100

ENVIRONMENTAL VARIABLES

MOISTURE REGIME:
SUBHYGRIC

NUTRIENT REGIME:
RICH

ELEVATION:
758 M

SOIL DRAINAGE:
MODERATELY WELL

ECOLOGICAL STATUS SCORE: 18

FORAGE PRODUCTION(KG/HA) n=1

GRASS	384
FORBS	808
SHRUBS	200
TOTAL	1392

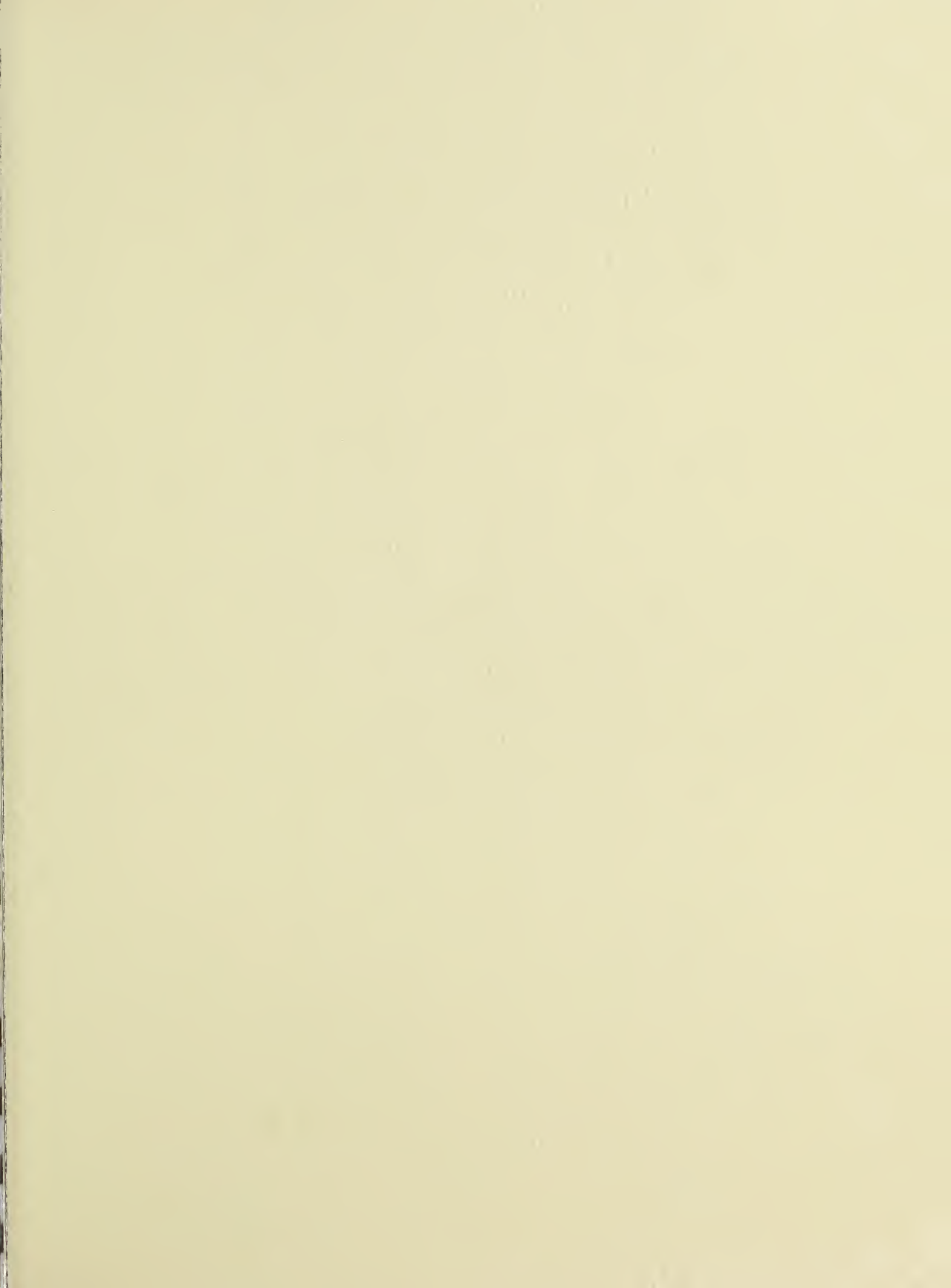
ECOLOGICALLY SUSTAINABLE STOCKING RATE
 2.0 ha/AUM (13.5 - 1.0)
 0.2 AUM/ac (0.03 - 0.4)

LITERATURE CITED

- Adams, B. 1981. Range ecology and the impact of livestock grazing on the Peace River Slopes, Alberta. Public Lands Division, Grazing Land Management, Range Management Unit. Peace River, Alta.
- Adams, B.W., G. Ehlert, C. Stone, D. Lawrence, M. Alexander, M. Willoughby, C. Hincz, D. Moisey, and A. Bogen. 2003. Rangeland Health Assessment for Grassland, Forest and Tame Pasture. Alberta Sustainable Resource Development. Public Lands Division. Edmonton. AB. Pub. No. T/044. 104pp.
- Alberta Rangeland Health Task Group. 1999. Terms of Reference. Alberta Agriculture Food and Rural Development (Public Lands Division), Alberta Environment (Forest Management Division). Edmonton, AB. 49pp.
- Bailey, A.W., M.G. Willoughby, R. Johansen and S. Smith. Management of Yukon Rangelands. Renewable Resources, Yukon Territorial Government, Whitehorse, Yukon. 55pp. ISBN-1-55018-138-6.
- Beckingham, J. 1993. Ecosystem associations of Northern Alberta. Dept. of Environmental Protection, Alberta Forest Service, Edmonton.
- Beckingham, J. and J.H. Archibald. 1996. Field guide to ecosites of Northern Alberta. Special report 5. Canadian Forest Service. Northwest Region. Edmonton, Alta.
- Brierly, D., D. Downing and D.O'Leary. 1985. An integrated resource inventory of the Keg River study area. Vol. 1 and 11, Vegetation Classification, Alberta Energy and Natural Resources. Edmonton, Alta.
- Corns, I.G.W. and R.M. Annas. 1986. Field guide to forest ecosystems of West-Central Alberta. Northern Forestry Center, Canadian Forestry Service, Edmonton, Alta. 251pp.
- Daubenmire, R. 1952. Forest vegetation of Northern Idaho and adjacent Washington and its bearing on concepts of vegetation classification. *Ecol. Monogr.* 22: 301-330.
- Department of Environmental Protection. 1994. Natural Regions of Alberta. Alberta Environmental Protection. Edmonton, Alta. Pub. no.: I/531. 18pp.
- Downing, D. and E. Karpuk. 1992. Aspen vegetation types of the Low Boreal Mixedwood ecoregion, East-Central Alberta. Alberta Forestry, Lands and Wildlife. Resource Information Branch. Land Information Services. Edmonton. AB. 79pp.

- Downing, D. 2000. Review of Forage Data Gaps: Native range community types, Central/Dry Mixedwood Natural Subregions, Lower Foothills Subregion. Forest Range Assessment Project. Alberta Agriculture Food and Rural Development, Public Lands Division. St.Paul. AB. 5pp.
- Gauch, H.G. 1982. Multivariate analysis in community ecology. Cambridge University Press, Cambridge, 298pp.
- Hay, W.K., J.M. Veltman and R.W. Haag. 1985. An integrated resource inventory of the East Beaver Lake Assessment Area, Physical Land and Forage Classifications. Vol. 1, Alberta Energy and Natural Resources, Resource Evaluation and Planning. Edmonton, Alta.
- Holechek, J.L., R.D. Pieper and C.H. Herbel. 1995. Range management principles and practices. 2nd. Prentice-Hall Inc. Engewood Cliff. New Jersey. Chapter 8.
- Invasive plants of natural habitats in Canada. 1992. Environmental Canada, Canadian Wildlife Service. Ottawa, Canada. 111pp.
- Johnson, D., L. Kershaw, A. MacKinnon and J. Pojar. 1995. Plants of the Western Boreal Forest and Aspen Parkland. Lone Pine Publishing. Edmonton. AB. 392pp.
- Lane, C.T., M.G. Willoughby and M.J. Alexander. 2000. Range plant communities and carrying capacity for the Lower Foothills subregion. 3rd approximation. Alberta Environment. Land and Forest Service. Edmonton. AB. Pub. No. T/532. 232pp.
- Lodge, R.W., A. McLean and A. Johnston. 1968. Stock-poisoning plants of Western Canada. Agriculture Canada. Publication # 1361. 35pp.
- Mackinnon, A. J. Pojar, and R. Coupe. 1992. Plants of Northern British Columbia. Lone Pine Publishing, Edmonton, Alta. 345pp.
- Mueggler, W.F. 1988. Aspen community types of the Intermountain Region. U.S.D.A. Intermountain Research Station. INT-250. 133pp.
- Peterson, E.B. and N. M. Peterson. 1992. Ecology, management and use of aspen and balsam poplar in the prairie provinces. Northern Forestry Center, Canadian Forest Service. Edmonton, AB. Special report 1. 252pp.
- Range Survey Manual. 1992. Range Management Section, Alberta Forest Service. Edmonton, Alta. 39pp.

- Strong, W.L. and J.M. Thompson. 1995. Ecodistricts of Alberta: Summary of Biophysical Attributes. Alberta Environmental Protection, Resource Data Division. Edmonton, Alta. Pub. no. T/319. 91pp.
- Strong, W.L. and K.R. Leggat. 1992. Ecoregions of Alberta. Alberta Forestry, Lands and Wildlife, Resource Information Branch, Edmonton, Alta. T/245. 77pp.
- Strong, W.L. 1992. Ecoregions and Ecodistricts of Alberta. Alberta, Forestry Lands and Wildlife. Land Information Services Division. Resource Information Branch. Edmonton, Alta. Pub. no. T/244, 77pp.
- Task Group on Unity and Concept. 1995. New concepts for assessment of rangeland condition. *J. Range Manage.* 38:220-225.
- Thompson, W.H. and P.L. Hansen. 2002. Classification and management of riparian and wetland sites of the Alberta Grassland Natural Region and adjacent subregions. Bitterroot Restoration Inc. Prepared for the Alberta Riparian Habitat Management Program-Cows and Fish, Lethbridge, Alberta. 416pp.
- Wilkinson, K. 1990. Trees and shrubs of Alberta. Lone Pine Publishing. Edmonton, Alta. 191pp.
- Wilkinson, K. and E.A. Johnson. 1982. Distribution of prairies and solonetzic soils in the Peace River district, Alberta. *Can. J. Bot.* 61: 1851-1860.
- Willoughby, M.G. and D. Downing. 1995. Deciduous plant communities and carrying capacity of the Boreal Ecoprovince of Alberta. Alberta Environmental Protection. Edmonton, Alta. Pub. no. T/312. 329pp.
- Willoughby, M.G. 1996. The effects of grazing on deciduous plant communities in the Boreal Ecoprovince of Alberta. Proceedings of the Fifth Int'l Rangeland Congress, Salt Lake City, Utah. Vol. 1. 610-611.





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