Vegetation Communities of Maybelle River Wildland Provincial Park

Prepared for

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Prepared by

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INTRODUCTION

Maybelle River Wildland Provincial Park, a newly established park located in northeastern Alberta, encompasses some 15,309 hec. The Athabasca Sand Dunes Ecological Reserve is located within the park boundary. The landscape within the park reflects the activity of windblown sand, in the past and present, and fire.

The Athabasca Sand Dunes Ecological Reserve includes a fairly extensive area of active sand movement. The dune field is continually moving eastward with the action of the prevailing winds, burying communities in its path and exposing past vegetation in its wake. The surrounding area consists of sand dunes with various levels of stabilization. The sandy environment is a major determinant in the vegetation found in this area. Pine is the dominant species in the park. It can tolerate the extremely dry, nutrient poor, sandy soils and requires fire to release seeds from the cones in order for seed dispersal and regeneration to occur. Organic wetlands are interspersed throughout this area at the bases of dunes (moving and stabilized), in low-lying areas and adjacent to small lakes. Organic soils appear to be the exception and in many places form veneers over sandy glaciofluvial or eolian materials.

A large part of the landscape within the park is a mosaic of various age pine stands reflecting the fire history of the area. Many of the pine stands are “doghair stands” (dense and even-aged) indicating they are relatively young and have not yet thinned out. Short and tall shrub communities consisting of dense pine are not unusual and reflect the most recent occurrences of fire.

This vegetation study was one component of a multi-disciplinary project, which was conducted to develop a preliminary inventory of the natural components of the area. The objective of this vegetation study was to characterize the modal or more commonly occurring vegetation communities and the particular site conditions with which they are associated. The area of the Athabasca Sand Dunes Ecological Reserve has been studied quite extensively in the past (Raup and Argus 1982; Landals 1978); however, relatively little research has been conducted in the surrounding park area.

METHODS

Field Investigation

The data discussed in this report was collected using parameters provided in the *Ecological Land Survey Site Description Manual* (Alberta Environmental

Protection 1994). Vegetation data was collected by M. Meijer and site and soils data was collected by C. Jedrzycki at 16 sites over a period of 4 days from between June 16 and June 23, 2000. Information was collected for general community classification and mapping purposes, therefore it was more important to observe as many of the more common terrain types and vegetation communities possible than to obtain detailed species lists for the field sites conducted.

Sample sites were selected prior to the actual fieldwork. These selections were based on differences in terrain and vegetation cover observed on maps and air photos. Occasionally a site was selected in the field as a result of landscape features of interest, which became apparent during the fieldwork. Vegetation sample plots were positioned so that they were homogenous in composition and provided the best representation of the area being defined.

Dominant plant species (including lichens and bryophytes) and any other plant species visible were recorded. Site and soils information was also gathered at these sites. It should be noted that a thorough plant inventory of the entire plot was not conducted, due to time limitations. Species that were present in trace amounts or not easily observed may have been omitted. Only dominant plant species were recorded for site 16.

Plants were identified to species where possible, with species names corresponding to those in "Alberta Plants and Fungi – Master Species List and Species Group Checklists" (Alberta Environmental Protection 1993). Bryophytes and lichens with an NV cover (no cover value, presence noted) were observed in the vicinity of field sites by Derek Johnson (Northern Forestry Centre, Edmonton) and identified by Derek Johnson unless otherwise noted.

Two species of birch occurred in this area; Alaska birch (*Betula noealaskana*) and white birch (*Betula papyrifera*). Often they were interspersed and some difficulty in distinguishing the 2 species occurred.

Community Characterization

Field information for each sample plot was reviewed and each plot was labeled with a field-identified community, which was based on the dominant vegetation species present. This task was generally completed in the field. A qualitative approach was then used to group similar field identified communities into community groupings based on site moisture and nutrients and dominant canopy species (or where absent, tallest physiognomic strata). Canopy cover was described for woodlands as open or closed, with canopies of 6 to 50 % cover defined as open and > 50 % cover closed. Woodland communities were further refined based on presence of dominant shrub, forb, moss and lichen species present.

Presentation of Community Information

Community Name - The naming convention for the communities includes the forestry code for the tree layer and the 7-letter species code (Alberta Environmental Protection 1994) for other dominant species in the community. The community name is based on the dominant species within each strata as observed in the study plots. Separations between strata have been indicated by a forward slash (/) and co-dominant species within a strata have been separated by a dash (–). If a species was considered important, but occurred only occasionally, the species name was enclosed within brackets ( ).

Location - Location information makes reference to the UTM coordinates obtained through the use of a handheld geographical positioning system (GPS).

Air Photos - The air photo numbers provided include the photos on which the GPS coordinates or Sites are located. The photos mentioned can be used as a stereo pair.

Site and Soil - Site and soil conditions for each vegetation community is listed and further reviewed in the discussion.

Vegetation - The vegetation composition of each sampled plot belonging to the community is listed. Seven-letter codes, scientific names and common names (where applicable) are listed for each species observed in the plots. Cover data is presented as % cover. Cover values of 0.5% indicate 0 to 0.5 % covers, including single plants or trace amounts. Average species cover values for the communities are not provided. Due to the limited number of plots representing each community, it was felt that cover averages for plant species would not be representative. Aspects of the vegetation are further reviewed in the discussion.

Field Guide Classification - This classification refers to the classification of the identified community relative to the appropriate existing field guides. Both the Boreal Mixedwood and Canadian Shield Sections of the *Field Guide to Ecosites of Northern Alberta* (Beckingham and Archibald 1996) were reviewed and the identified communities were classified based on the appropriate natural subregion classification and/or the classification which seemed to best identify the community. In cases where an exact match did not exist, a best fit was given and an explanation was then provided detailing the significant differences.

Discussion - This section involves discussion of various aspects of the community. Any other observations made at the sites are also indicated here.

RESULTS

The 16 sites sampled included; 3 wetland communities (3 sites), 2 deciduous woodland communities (2 sites), 2 pine regrowth communities (6 sites) and 2 pine woodland communities (5 sites). The community descriptions provided in this report are based on information gathered at the sampled sites.

Jack pine (*Pinus banksiana*) communities (particularly Pj / lichen or Pj / pine needles) were the most extensive in the sandy park environment. These communities were species depauperate. Raup and Argus (1982) had similar observations in the Lake Athabasca Sand Dunes area. Locations near lakes, at the base of slopes or in topographic depressions generally had higher moisture conditions. As moisture increased so did the floristic diversity. Aspen (*Populus tremuloides*) and birch communities were associated with these moister sites and often possessed a very similar floristic composition. Landals (1978) made similar observations in the Lake Athabasca Sand Dunes and surrounding area. Many of the wetlands in this park appear to be transitional to bogs.

It is interesting to note that with regards to the classification, many of the upland communities are similar to those associated with the Boreal Mixedwood or the Central and Dry Mixedwood Natural Subregions, while the wetlands more closely resemble those of the Canadian Shield Natural Region.

As a result of a relatively small sample size, distinguishing specific community variation can be difficult, particularly where differences are not readily apparent. In some cases, a community may be defined based on the existence of major differences from other sampled sites and only possess minimal similarities to other sites within the defined community. A larger sampling of communities is required to more effectively determine community characteristics.

It should be noted that only a very small portion of the park was sampled. The sites visited appear to represent some of the more common communities in the park; however, it should be considered as a preliminary list, until more areas of the park have been sampled. The species identified at the field sites and presented in this report are by no means an exhaustive listing of all plant species growing in the park. Other components of this inventory, which dealt with rare and unusual plant communities and plant species (Allen and Johnson 2001, Gould in progress), also provide insight into the vegetation associated with this landscape..

The information provided in this report should be viewed as preliminary information to be expanded upon in the future. Both the amount of time available (4 days) for sampling sites and access (helicopter) was limited. Four days is far to short a time frame to adequately inventory a park that is 15,309 hec. It should be noted that the information collected reflects a very small portion of the park. Further study is required to do justice to this area and to obtain a more refined and detailed picture of the vegetation communities that exist across this landscape.

Table 1. Communities identified at Maybelle River Wildland Provincial Park.

Plot	Site Conditions	Physiognomic Structure	Field Identified Community	Community
MAY 05	very xeric, oligotrophic	open woodland - coniferous	Pj/ Pine needles (Clad spp.)	
MAY 07	very xeric, oligotrophic	open woodland - coniferous	Pj/ Pine needles	**Pj / Pine needles**
MAY 15	xeric, oligotrophic	closed woodland - coniferous	Pj/ Pine needles (Poly pil - Clad spp.)	
MAY 02	very xeric, oligotrophic	low shrubland - pine regen	Pinu ban/ Pine needles	
MAY 06	xeric, submesotrophic	tall shrubland - pine regen	Pinu ban/ Pine needles (Clad spp.)	
MAY 03	xeric, mesotrophic	tall shrubland - pine regen	Pinu ban/ Pine needles (Clad cor)	**Pinu ban / Pine needles**
MAY 01	subxeric, oligotrophic	tall shrubland - pine regen	Pinu ban / (Vacc myr) / Pine needles	**(early seral stage)**
MAY 11	subxeric, submesotrophic	tall shrubland - pine regen	Pinu ban / (Vacc myr) / Pine needles	
MAY 12	xeric, submesotrophic	tall shrubland - pine regen	Pinu ban/ Vacc myr - Betu neo / Clad spp.	**Pinu ban / Betu neo – Vacc myr**
MAY 08	very xeric, oligotrophic	open woodland - coniferous	Pj/ Betula (Vacc myr) / Clad spp. - Poly pil	**P j/ Vacc myr/ Clad spp. - Poly pil**
MAY 09	subxeric, submesotrophic	open woodland - pine	Pj / Vacc myr/ Clad spp. - Poly pil	
MAY 10	subxeric, mesotrophic	closed woodland - deciduous	Bw – Ba Vacc myr - Vacc vit – Betu spp. / Forbs	**Bw – Ba Vacc myr - Vacc vit / Forbs**
MAY 04	subxeric, mesotrophic	open woodland - deciduous	Aw – Ba / Vacc myr – Alnu cri	**Aw – Ba / Vacc myr – Alnu cri**
MAY 14	Subhydric, hydric, mesotrophic	wetland – coniferous	Sb/ Ledu gro / Pleu sch	**Sb/ Ledu gro / Pleu sch**
MAY 16	hydric, permesotrophic	wetland - shrubby poor fen to bog *	Pice mar - Ledu gro / Sphagnum	**(Lari lar) /Ledu gro – Cham cal – Pice mar / Sphagnum**
MAY 13	hydric, permesotrophic	shrubby poor fen to bog*	Pice mar – Kalm pol / Sarr pur/ Erio vag / Spha fus	**Pice mar – Kalm pol / Sarr pur/ Erio vag / Spha fus**

* For further information see community descriptions.

Pj / Pine needles
(Jack pine / Pine needles)

Location:

Site 5	12V509677	6446917	NAD 83
Site 7	12V509633	6447321	NAD 83
Site 15	12V506020	6450896	NAD 83

Air photos

Site 5	AS4977	#129-130
Site 7	AS4977	#129-130
Site 15	AS4977	#127-128

Site and Soil

Field Sites	**5**	**7**	**15**
Site			
Slope (%)	7	12	0
Aspect (°)	220	130	
Exposure	wind	not applicable	not applicable
Flood Hazard	no hazard	no hazard	no hazard
Soil Drainage	very rapid	very rapid	rapid
Site-Macro	apex	middle slope	plain
Site Meso	crest	middle slope	level
Site Shape	convex	straight	straight
Moisture	very xeric	very xeric	xeric
Nutrients	oligotrophic	oligotrophic	oligotrophic
Factors		fire	
Soils			
Parent Material	eolian veneer / moraine	eolian veneer / moraine	eolian veneer / glaciofluvial
Surface Expression	rolling	blanket	level
Soil Subgroup	E.EB	E.EB	E.DYB
Dominant Texture	S	S	S
Effective Texture	fS	S	S
Texture	LS/S	S	S

Vegetation

Code	Scientific Name	Common Name	5 Cover	7 Cover	15 Cover
Canopy					
PINUBAN	*Pinus banksiana*	jack pine	41	40	70
Low Shrubs					
ARCTUVA	*Arctostaphylos uva-ursi*	common bearberry	0.5	0.5	0.5
HUDSTOM	*Hudsonia tomentosa*	sand heather	0.5		
PINUBAN	*Pinus banksiana*	jack pine	0.5	1	0.5

Code	Scientific Name	Common Name	5 Cover	7 Cover	15 Cover
VACC MYR	*Vaccinium myrtilloides*	common blueberry	0.5	1	
VACCVIT	*Vaccinium vitis-idaea*	bog cranberry		0.5	0.5
Forbs					
ARABLYR	*Arabis lyrata*	lyre-leaved rock cress	0.5		
MAIACAN	*Maianthemum canadense*	wild lily-of-the-valley	0.1		
PYROCHL	*Pyrola chlorantha*	greenish-flowered wintergreen			0.5
Grass					
CARESIC	*Carex siccata*	hay sedge	0.1		
CARETON	*Carex tonsa*		0.1		
ORYXPUN	*Oryzopsis pungens*	northern rice grass	0.1		
Moss					
DICRUND	*Dicranum undulatum*	wavy dicranum			NV
POLYPIL	*Polytrichum piliferum*	awned hair-cap	2	1	15
POLYSTR	*Polytrichum strictum*	slender hair-cap			NV
Lichen					
CETRERI	*Cetraria ericetorum*		0.5		NV
CETRNIV	*Cetraria nivalis*				0.5
CLADBOR	*Cladonia borealis*				NV
CLADCOR	*Cladonia cornuta*		1	1	4
CLADCRI	*Cladonia crispata*		6		NV
CLADCRY	*Cladonia cryptochlorophaea*			1	2
CLADDEF	*Cladonia deformis*		1	0.5	1
CLADGRA	*Cladonia gracilis*		5	1	2
CLADMIT	*Cladina mitis*	reindeer lichen		0.5	0.5
CLADRAN	*Cladina rangiferina*	reindeer lichen	1		
CLADSUL	*Cladonia sulphurina*		1		
CLADUNC	*Cladonia uncialis*				NV
PELTRUF	*Peltigera rufescens*				NV
Litter					
pine needles			40	60	65
deadwood				25	15

Field Guide Classification

Best fit: Boreal Mixedwood A1.1 Pj/bearberry/lichen

There is no community in field guide classification, which recognizes the high pine needle cover. Perhaps this is because it is litter and not part of the biotic component. The high needle covers and relatively low lichen covers, may have been attributable to relatively recent burns. The community defined here may be a seral stage to the A1.1 community defined in the field guide. If this community were to remain unaffected by fire perhaps a lichen mat would develop. This community is so prevalent in the area it should be recognized.

Discussion

This community is associated with oligotrophic, xeric to very xeric conditions, in a wide range of topographic positions (crest to level). The jack pine canopy cover

ranged from 40 to 70%. The canopy appeared to be denser in level and lower slope positions. Fire was a major factor in this community. High deadfall cover was prominent at sites 7 and 15. Limited lichen cover was observed. Lichen was primarily associated with openings in the canopy. Awned hair-cap moss (*Polytrichum piliferum*) was prevalent under the closed canopy at site 15 (15% cover). The dominant substrate cover was pine needles (average = 55%). The dry conditions appeared to be attributable to the rapid drainage, associated with the sandy soil and the lack of a well-developed mineral-organic horizon to trap any moisture that may become available. Fire may compound the effect by eliminating any organic material that may accumulate on the surface substrate. This community was prevalent throughout the park. Floristic diversity was very limited. The dominance of pine needles, in addition to very dry conditions, may well hinder forb and shrub growth by acidifying the upper soil horizons.

A sandhill crane nest with 2 eggs was observed amidst the deadfall at site 7. An adult bird was also in the area.

Pinu ban / Pine needles (early seral stage)
(Jack pine regrowth / Pine needles)

Location:

Site 1	12V513461	UTM 6461958	NAD 83
Site 2	12V513634	UTM 6462101	NAD 83
Site 3	12V513062	UTM 6461820	NAD 83
Site 6	12V509748	UTM 6446860	NAD 83
Site 11	12V507102	UTM 6450354	NAD 83

Air photos

Site 1	AS4977	#176-177
Site 2	AS4977	#176-177
Site 3	AS4977	#176-177
Site 6	AS4977	#129-130
Site 11	AS4977	#127-128

Site and Soil

Field Sites	**1**	**2**	**3**	**6**	**11**
Site					
Slope (%)		2	5	1	4
Aspect (°)	0	20	270	30	230
Exposure	cold air drainage	not applicable	wind	cold air drainage	not applicable
Flood Hazard	not applicable	not applicable	not applicable	not applicable	no hazard
Soil Drainage	well	rapid	rapid	rapid	rapid
Site-Macro	plain	plain		valley floor	plain
Site Meso	depression	crest	middle slope	level	level
Site Shape	concave	straight	straight	straight	straight
Moisture	subxeric	very xeric	xeric	xeric	subxeric
Nutrients	oligotrophic	oligotrophic	mesotrophic	submesotrophic	submesotrophic
Factors	fire	fire	fire	fire	hummocky
Soils					
Parent Material	eolian / moraine/M blanket	eolian blanket / moraine	eolian blanket / moraine	eolian veneer / moraine	eolian / glaciofluvial
Surface Expression	level	undulating	undulating	undulating	undulating
Soil Subgroup	O.R	E.EB	E.EB	E.EB	E.DYB
Dominant Texture	S	S	S	S	S
Effective Texture	LS	S	S	S	LS
Texture	S	S	S	S	S/LSg

Vegetation

Code	Scientific Name	Common Name	1 Cover	2 Cover	3 Cover	6 Cover	11 Cover
Canopy							
PINUBAN	*Pinus banksiana*	jack pine	5		5	2	
Tall Shrubs							
BETUPAP	*Betula papyrifera*	white birch			1		
PINUBAN	*Pinus banksiana*	jack pine	80	2	80	60	80
Low Shrubs							
ALNUCRI	*Alnus crispa*	green alder	0.5				0.5
ARCTUVA	*Arctostaphylos uva-ursi*	common bearberry		1		0.5	1
HUDSTOM	*Hudsonia tomentosa*	sand heather				1	
LEDUGRO	*Ledum groenlandicum*	common Labrador tea					0.5
LINNBOR	*Linnaea borealis*	twinflower	0.5		0.5		
PINUBAN	*Pinus banksiana*	jack pine	2	70	5	10	5
VACC MYR	*Vaccinium myrtilloides*	common blueberry	4		0.5		7
VACCVIT	*Vaccinium vitis-idaea*	bog cranberry	0.5		0.5		
Forbs							
ACHIMIL	*Achillea millefolium*	common yarrow	0.5				
ANEMMUL	*Anemone multifida*	cut-leaved anemone	0.5				
ARALNUD	*Aralia nudicaulis*	wild sarsaparilla	0.1				
ASTELAE	*Aster laevis*	smooth aster	0.5				
EPILANG	*Epilobium angustifolium*	fireweed	0.5				
MAIACAN	*Maianthemum canadense*	wild lily-of-the-valley	0.5		0.1	0.5	
PYROCHL	*Pyrola chlorantha*	greenish-flowered wintergreen	0.5				
SOLIMUL	*Solidago multiradiata*	alpine goldenrod		0.1		0.5	
Grass							
AGROSPP	*Agropyron* sp.	wheatgrass	0.5				
CARESIC	*Carex siccata*	hay sedge				0.1	
ORYXPUN	*Oryzopsis pungens*	northern rice grass	0.5				
Moss							
POLYPIL	*Polytrichum piliferum*	awned hair-cap				1	20
Lichen							
CLADCAR	*Cladonia cariosa*						NV
CLADCOR	*Cladonia cornuta*		0.5		5	4	5
CLADCRY	*Cladonia cryptochlorophaea*					1	0.5
CLADDEF	*Cladonia deformis*		0.5		0.1	1	0.5
CLADGRA	*Cladonia gracilis*		0.5		1	2	10
CLADMIT	*Cladina mitis*	reindeer lichen	0.5	0.1	0.1	1	1
CLADSUL	*Cladonia sulphurina*		0.5	0.1	1	0.5	
CLADVER	*Cladonia verticillata*						0.5
Litter							
pine needles			90	90	high	35	40
deadwood			30	high	20	25	10

Field Guide Classification

Best fit: Boreal Mixedwood A1.1 Pj/bearberry/lichen Sites 2, 3, 6
Best fit: Boreal Mixedwood A1.2 Pj/blueberry/lichen Sites 4, 11

As indicated for the previously defined community, there is no community in the field guide classification, which recognizes the high pine needle cover. This community is an early seral stage of succession. The high needle covers and relatively low lichen covers should be recognized in this community. Sites 4 and 11 differ slightly with the presence of very low covers of blueberry; however the pine needle cover still remains dominant. This community could be defined by either A1.1 or A1.2, since covers of the existing shrubs are exceedingly low.

Discussion

This community occupied landscape positions similar to the previously defined community. It appears to be an earlier seral stage of the Pj / Pine needle community previously described. The recent effect of fire has eliminated any decomposed organic material that may have existed. Deadfall was prolific within this community. The canopy ranged from 2 to 5 m. Remnant pine trees, which survived the burn were scattered throughout the area. Pine needle cover was very high, compounding the limited floristic diversity as in the previous community. Generally only 1 or 2 individuals of any forb species were present. Lichen covers were less than 10%. The slightly richer conditions at site 1 are reflected in a more diverse forb presence; however, cover was still quite limited.

Site 1 and 11 had low covers of blueberry (*Vaccinium myrtilloides*), which distinguished them somewhat from the other sites in this community. The dominance of pine needles and the low covers of blueberry (4% and 7%); however, appeared to separate the sites from the Pinu ban / Vacc myr / Clad spp. community which follows. At this time they appear to fit more suitably into this community. More sites need to be sampled to determine to which community these 2 sites best fit. Perhaps they form a distinct community on their own.

This community was separated from the previous community based on the height (age) of the pine. It was identified as an earlier seral stage or a regenerating pine site.

This community may be divided further into two communities based on the height (age of the pine). At site 2 the pine was part of the low shrub strata (< 2.5 m), while at the remaining sites the pine fit into the tall shrub layer (2.5 – 5 m). Site 2 possessed a higher level of deadfall. This may indicate a more recent burn; however, it may also indicate that the tree density was much higher at the site prior to the burn.

Moose scat was observed at site 3.

Pinu ban / Betu neo - Vacc myr
(Jack pine regrowth / Blueberry)

Location:

Site 12 12V507286 UTM 6450672 NAD 83

Air photos

Site 12 AS4977 #127-128

Site and Soil

Site

Slope (%)	3
Aspect (	290
Exposure	wind
Flood Hazard	no hazard1
Soil Drainage	very rapid
Site-Macro	upland
Site Shape	straight1
Moisture	Xeric
Nutrients	submesotrophic

Soils

Parent Material	eolian veneer / fluvial
Surface Expression	undulating
Soil Subgroup	E.DYB
Dominant Texture	S
Effective Texture	S
Texture	S/Sg

Vegetation

Code	Scientific Name	Common Name	Cover
Canopy			
BETUNEO	*Betula neoalaskana*	Alaska birch	1
Tall Shrubs			
BETUNEO	*Betula neoalaskana*	Alaska birch	5
PINUBAN	*Pinus banksiana*	jack pine	25
SALIBEB	*Salix bebbiana*	beaked willow	0.5
Low Shrubs			
ALNUCRI	*Alnus crispa*	green alder	
ARCTUVA	*Arctostaphylos uva-ursi*	common bearberry	5
BETUNEO	*Betula neoalaskana*	Alaska Birch	25
CORNCAN	*Cornus canadensis*	bunchberry	1
LEDUGRO	*Ledum groenlandicum*	common Labrador tea	0.5
PINUBAN	*Pinus banksiana*	jack pine	5
VACC MYR	*Vaccinium myrtilloides*	common blueberry	65
VACCVIT	*Vaccinium vitis-idaea*	bog cranberry	10

Code	Scientific Name	Common Name	Cover
Forbs			
MAIACAN	*Maianthemum canadense*	wild lily-of-the-valley	1
Grass			
ORYXPUN	*Oryzopsis pungens*	northern rice grass	0.5
Moss			
POLYPIL	*Polytrichum piliferum*	awned hair-cap	
Lichen			
CLADCAR	*Cladonia cariosa*		
CLADCOR	*Cladonia cornuta*		1
CLADCRY	*Cladonia cryptochlorophaea*		1
CLADDEF	*Cladonia deformis*		
CLADGRA	*Cladonia gracilis*		5
CLADMIT	*Cladina mitis*	reindeer lichen	1
CLADVER	*Cladonia verticillata*		
Litter			
pine needles			
deadwood			25

Field Guide Classification

Best fit: Boreal Mixedwood A1.2 Pj/blueberry/lichen

This best fit is based on the dry, nutrient poor conditions; however, the presence of birch saplings is not recognized in the A1.2 community. Further field studies are required to determine if the birch is just opportunistic during its early growth and then dies out. This site appeared relatively dry for birch; however, if the birch is able to tap into a source of moisture then it may survive. If the birch can survive to maturity then this site should be recognized as a B ecosite with a pine-birch mixedwood. This, however, appears unlikely as no mature mixedwood stands of this nature were observed in the area.

Discussion

This tall shrub community was distinguished by the high cover of the 3 dominant species: pine, birch and blueberry. Forb diversity was limited to wild lily-of-the-valley (*Maianthemum canadense*). Fire was an important factor in this community, which had a high deadwood cover (25%). This community was an early seral stage for possibly a mixedwood (pine and birch), a birch or a pine community, which has a high cover of blueberry. Remnant patches of Pj / Vacc myr / Lichen were evident in the surrounding area. Some of these patches were severely impacted by blowdown. If these patches are representative of the community that was present prior to the burn, then perhaps the birch was opportunistic in the post burn conditions and would not survive much longer.

More sites have to be sampled to determine if this community is an early seral stage for a specific woodland community.

Pj / Vacc myr / Clad spp. – Poly pil
(Jack pine / Blueberry / Lichen – Awned hair cap moss)

Location:

Site 8	12V507286	UTM 6447516	NAD 83
Site 9	12V509230	UTM 6447317	NAD 83

Air photos

Site 8	AS4977	129-130
Site 9	AS4977	129-130

Site and Soil

Field Sites	**8**	**9**
Site		
Slope (%)	2	-24
Aspect (°)	240	260
Exposure	wind	cold air drainage
Flood Hazard	no hazard	no hazard1
Soil Drainage	very rapid	very rapid
Site-Macro	crest	lower slope
Site Meso	crest	middle slope3
Site Shape	convex	straight
Moisture	Very xeric	subxeric
Nutrients	oligotrophic	submesotrophic
Factors	fire	fire
Site Micro	hummocky	
Soils		
Parent Material	eolian veneer / moraine	eolian veneer / moraine
Surface Expression	rolling	rolling
Soil Subgroup	E.EB	E.EB
Dominant Texture	S	S
Effective Texture	S	S
Texture	S	S

Vegetation

Code	**Scientific Name**	**Common Name**	**8 Cover**	**9 Cover**
Canopy				
BETUNEO	*Betula neoalaskana*	Alaska Birch	1	
BETUPAP	*Betula papyrifera*	white birch	1	
PINUBAN	*Pinus banksiana*	jack pine	10	43
Tall Shrubs				
BETUNEO	*Betula neoalaskana*	Alaska Birch	1	0.5
BETUPAP	*Betula papyrifera*	white birch	1	
PINUBAN	*Pinus banksiana*	jack pine		1

Code	Scientific Name	Common Name	8 Cover	9 Cover
SALIBEB	*Salix bebbiana*	beaked willow	1	
Low Shrubs				
ALNUCRI	*Alnus crispa*	green alder	2	
ARCTUVA	*Arctostaphylos uva-ursi*	common bearberry		0.5
BETUNEO	*Betula neoalaskana*	Alaska Birch	35	0.5
BETUPAP	*Betula papyrifera*	white birch	10	
CORNCAN	*Cornus canadensis*	bunchberry	2	
LINNBOR	*Linnaea borealis*	twinflower	1	
PICEGLA	*Picea glauca*	white spruce	0.5	
PICEMAR	*Picea mariana*	black spruce		1
PINUBAN	*Pinus banksiana*	jack pine		1
SALIBEB	*Salix bebbiana*	beaked willow	1	
VACC MYR	*Vaccinium myrtilloides*	common blueberry	4	3
VACCVIT	*Vaccinium vitis-idaea*	bog cranberry		0.5
Forbs				
CYPRACA	*Cypripedium acaule*	stemless lady's-slipper	0.5	
EPILANG	*Epilobium angustifolium*	fireweed	0.5	
GEOCLIV	*Geocaulon lividum*	northern bastard toadflax		0.5
MAIACAN	*Maianthemum canadense*	wild lily-of-the-valley		0.5
Moss				
DICRSPP	*Dicranum* sp.	dicranum	0.5	
POLYPIL	*Polytrichum piliferum*	awned hair-cap	5	8
POLYSTR	*Polytrichum strictum*	slender hair-cap	0.5	
Lichen				
CLADCOR	*Cladonia cornuta*		2	1
CLADCRY	*Cladonia cryptochlorophaea*			5
CLADDEF	*Cladonia deformis*		0.5	0.5
CLADGRA	*Cladonia gracilis*		2	4
CLADMIT	*Cladina mitis*	reindeer lichen		0.5
Litter				
pine needles			10	
deadwood				15

Field Guide Classification

Best fit: Boreal Mixedwood A1.2 Pj/blueberry/lichen

Site 9 appears to fit very well with the field guide classification; however the presence of birch in the shrub strata at site 8 is somewhat problematic. The presence of a high cover of birch is not recognized in A1.2. Based on the existing moisture levels, nutrient conditions and canopy these sites should be classified as an A ecosite. It is questionable whether the birch will survive to maturity given the dryness of the sites. If the birch taproots can intercept moisture then survival chances are significantly increased. If the birch does survive then this community should be classed as a B ecosite based on site conditions. This would then require some revisions to the current field guide (addition of new community). However, no mature birch – pine mixedwood stands were observed.

Discussion

This woodland community was distinguished by the pine canopy, the presence of blueberry, though present in small quantities (3 and 4%), the presence of birch and a much lower cover in pine needles (than in previously described woodland communities). Possibly, this community is a later seral stage of the community encountered at site 12. This community was observed on west-facing slopes. Site 9 was on a steep mid slope while site 8 was in a crest position. The canopy density tended to increase as one moved down slope. This coincides with increased moisture availability due to slightly decreased insolation and increased surface drainage. The cover of birch tended to be higher in sites where the canopy was more open; however, whether or not the birch will survive to maturity is questionable. Birch generally tends to be associated with slightly moister conditions and no mature birch – pine mixedwood stands were observed in the area.

Moose scat was observed at site 8 and rabbit (or hare) scat at site 9.

Bw – Ba / Vacc myr – Vacc vit / Forbs
(White birch – Alaska birch / Blueberry – Bog cranberry – Birch / Forbs)

Location:

Site 10 12V506761 UTM 6450222 NAD 83

Air photos

Site 10 AS4977 #127-128

Site and Soil

Site

Slope (%)	0
Aspect (	
Exposure	
Flood Hazard	no hazard
Soil Drainage	rapid
Site-Macro	plateau
Site Meso	toe
Site Shape	straight
Moisture	subxeric
Nutrients	mesotrophic
Site Micro	straight

Soils

Parent Material	eolian veneer / glaciofluvial
Surface Expression	veneer
Soil Subgroup	E.DYB
Dominant Texture	S
Effective Texture	S
Texture	LS/S

Vegetation

Code	Scientific Name	Common Name	Cover
Main Canopy			
BETUNEO	*Betula neoalaskana*	Alaska Birch	10
BETUPAP	*Betula papyrifera*	white birch	45
PICEMAR	*Picea mariana*	black spruce	1
PINUBAN	*Pinus banksiana*	jack pine	1
POPUTRE	*Populus tremuloides*	aspen	1
Tall Shrubs			
BETUNEO	*Betula neoalaskana*	Alaska Birch	3
BETUPAP	*Betula papyrifera*	white birch	3
PINUBAN	*Pinus banksiana*	jack pine	3
POPUTRE	*Populus tremuloides*	aspen	2
Low Shrubs			

Code	Scientific Name	Common Name	Cover
ALNUCRI	*Alnus crispa*	green alder	2
BETUNEO	*Betula neoalaskana*	Alaska Birch	15
BETUPAP	*Betula papyrifera*	white birch	5
CORNCAN	*Cornus canadensis*	bunchberry	1
LINNBOR	*Linnaea borealis*	twinflower	1
PICEMAR	*Picea mariana*	black spruce	2
PINUBAN	*Pinus banksiana*	jack pine	1
POPUTRE	*Populus tremuloides*	aspen	2
PRUNPEN	*Prunus pensylvanica*	pin cherry	1
VACC MYR	*Vaccinium myrtilloides*	common blueberry	35
VACCVIT	*Vaccinium vitis-idaea*	bog cranberry	20
Forbs			
CHIMUMB	*Chimaphila umbellata*	prince's pine	2
CYPRACA	*Cypripedium acaule*	stemless lady's-slipper	0.5
EPILANG	*Epilobium angustifolium*	fireweed	0.5
EQUISYL	*Equisetum sylvaticum*	woodland horsetail	0.5
GEOCLIV	*Geocaulon lividum*	northern bastard toadflax	2
LYCOCOM	*Lycopodium complanatum*	ground-cedar	2
LYCOOBS	*Lycopodium obscurum*	ground-pine	1
MAIACAN	*Maianthemum canadense*	wild lily-of-the-valley	1
Grass			
AGROSPP	*Agropyron* sp.	wheatgrass	0.1
CARESIC	*Carex siccata*	hay sedge	0.5
Moss			
DICRUND	*Dicranum undulatum*	wavy dicranum	0.5
PLEUSCH	*Pleurozium schreberi*	Schreber's moss	1
POLYSTR	*Polytrichum strictum*	slender hair-cap	0.5
Lichen			
CLADCRY	*Cladonia cryptochlorophaea*		0.5
CLADGRA	*Cladonia gracilis*		0.5
Litter			
deadwood			20

Field Guide Classification

Best fit: Boreal Mixedwood B2.1 Aw(Bw)/blueberry-bearberry

This community was identified as B2.1 based on the presence of birch in the canopy and the blueberry-bearberry low shrub strata. The B2.1 community does not recognize a dominant birch canopy and the absence of aspen therefore this is considered a best fit.

Discussion

Site 10 was situated in a low-lying area located at the base of a moving dune slope, on the eastern side of the dune field. In the near future this community will be buried. This community was one of only 2 deciduous communities recorded in the park during this study. A pH of 6.5 was recorded for the parent material. The area appeared to be situated in a topographic low, which formed a drainage

channel into a small lake located just to the north of the site. The increased moisture availability due to topography and the increased nutrients, was reflected in a significantly increased diversity in forbs and shrubs relative to the previously defined pine communities. This community was very limited in size and graded into pine very quickly as you moved eastward.

Aw – Ba / Vacc myr - Alnu cri
(Aspen – Alaska birch / Green alder – Bog cranberry)

Location:

Site 4 12V512963 UTM6461482 NAD 83

Air photos

Site 4 AS4977 #176-177

Site and Soil

Site

Slope (%)	var2-7
Exposure	wind, cold air drainage
Flood Hazard	no hazard
Soil Drainage	rapid
Site-Macro	valley floor
Site Meso	level
Site Shape	concave
Moisture	subxeric
Nutrients	mesotrophic
Factors	fire

Soils

Parent Material	eolian blanket / moraine
Surface Expression	rolling
Soil Subgroup	O.MB
Dominant Texture	S
Effective Texture	S
Texture	LS/S

Vegetation

Code	Scientific Name	Common Name	Cover
Canopy			
BETUNEO	*Betula neoalaskana*	Alaska Birch	7
PINUBAN	*Pinus banksiana*	jack pine	2
POPUTRE	*Populus tremuloides*	aspen	25
Tall Shrubs			
BETUNEO	*Betula neoalaskana*	Alaska Birch	4
PINUBAN	*Pinus banksiana*	jack pine	1
POPUTRE	*Populus tremuloides*	aspen	2
Low Shrubs			
ALNUCRI	*Alnus crispa*	green alder	25
BETUNEO	*Betula neoalaskana*	Alaska Birch	2
CORNCAN	*Cornus canadensis*	bunchberry	4
LINNBOR	*Linnaea borealis*	twinflower	1
LONIDIO	*Lonicera dioica*	twining honeysuckle	0.5

Code	Scientific Name	Common Name	Cover
PINUBAN	*Pinus banksiana*	jack pine	1
POPUTRE	*Populus tremuloides*	aspen	5
PRUNPEN	*Prunus pensylvanica*	pin cherry	0.5
VACC MYR	*Vaccinium myrtilloides*	common blueberry	60
VACCVIT	*Vaccinium vitis-idaea*	bog cranberry	0.5
Forbs			
ARALNUD	*Aralia nudicaulis*	wild sarsaparilla	1
EPILANG	*Epilobium angustifolium*	fireweed	0.5
LYCOOBS	*Lycopodium obscurum*	ground-pine	1
MAIACAN	*Maianthemum canadense*	wild lily-of-the-valley	1
TRIEBOR	*Trientalis borealis*	northern starflower	0.5
Moss			
DICRPOL	*Dicranum polysetum*	wavy dicranum	0.5
Lichen			
CLADBOT	*Cladonia botrytes*		NV
CLADCOR	*Cladonia cornuta*		NV
CLADCRI	*Cladonia crispata*		NV
CLADDEF	*Cladonia deformis*		NV

Field Guide Classification

Boreal Mixedwood B2.2 Aw(Bw)/blueberry-green alder

This community appeared to fit well into the field guide classification system.

Discussion

Similar to the previously described birch community, this community was located in a topographic low area. The immediate site area was concave and therefore may have received increased moisture due to drainage from the surrounding area. A pH of 6 was recorded at this site. This community also contained a greater forb and shrub diversity, attributable to the moister and richer site conditions. Charred wood was evident at this site. The nutrients made available as a result of the burn may also have contributed to more nutrient rich conditions. The floristic composition was similar to that of the birch community. Landals (1978) also indicated that aspen and birch appeared to be similar in location and floristic composition. She noted these 2 communities were generally situated in moist sites associated with; 1) depressions of the ice contact topography, 2) slope bases and 3)near lake margins.

Sb / Ledu gro / Pleu sch
(Black spruce / Common Labrador tea / Feather moss)

Location:

Site 14 12V506974 UTM 6450903 NAD 83

Air photos

Site 14 AS4977 #127-128

Site and Soil

Site

Slope (%)	0
Exposure	not applicable
Flood Hazard	no hazard
Soil Drainage	poor
Site-Macro	plain
Site Meso	level
Site Shape	Straight
Moisture	subhydric
Nutrients	mesotrophic
Site Micro	tussocky

Soils

Parent Material	organic
Surface Expression	level
Soil Subgroup	FI.M
Dominant Texture	Of
Effective Texture	Om
Texture	Of/Om

Vegetation

Code	Scientific Name	Common Name	Cover
Canopy			
PICEMAR	*Picea mariana*	black spruce	40
Tall Shrubs			
PICEMAR	*Picea mariana*	black spruce	5
Low Shrubs			
LEDUGRO	*Ledum groenlandicum*	common Labrador tea	90
PICEMAR	*Picea mariana*	black spruce	15
VACCVIT	*Vaccinium vitis-idaea*	bog cranberry	0.5
Moss			
DICRUND	*Dicranum undulatum*	wavy dicranum	0.5
PLEUSCH	*Pleurozium schreberi*	Schreber's moss	90
SPHAANG	*Sphagnum angustifolium*	peat moss	0.5
Lichen			
CLADMIT	*Cladina mitis*	reindeer lichen	0.5

Code	Scientific Name	Common Name	Cover
CLADSTE	*Cladina stellaris*	reindeer lichen	0.5
Litter			
deadwood			10

Field Guide Classification

Boreal Mixedwood I1.1 Sb/Labrador tea/cloudberry/peat moss transitional to G1.1 Sb-Pj/Labrador tea/feather moss

In this community black spruce was the canopy species. The subhydric conditions appeared to preclude the presence of pine. The multiple age stand present is characteristic of treed wetlands, as is the organic soil. This site was located on a slight knoll within a wetland, therefore conditions may have been slightly drier (particularly with recent drying trends) and therefore the site appeared transitional to the G ecosite. The presence of feather moss also created some similarity to the G ecosite.

Discussion

This community was situated on a slightly elevated area within a black spruce wetland, which made it slightly drier than the surrounding wetland. The organic soil was frozen 40 cm below the surface. The heavy cover of feather moss acted as an insulation layer slowing heat penetration. The canopy consisted of multiple height classes ranging from 5 to 14 m. Plant diversity was very limited in this community with common Labrador tea (*Ledum groenlandicum*) the dominant shrub (90% cover) and Schreber's moss (*Pleurozium schreberi*) the dominant bryophyte cover (90% cover). A pH of 4.5 and very limited plant diversity would suggest that this site is transitional to bog conditions.

(Lari lar) / Ledu gro – Cham cal – Pice mar / Sphagnum
(Occasional Tamarack / Common Labrador tea – Leatherleaf - Black spruce / Peat moss)

Location:

Site 16 12V504251 UTM 6454252 NAD 83

Air photos

Site 16 AS4977 #150-151

Site and Soil

Site

Slope (%)	0
Exposure	not applicable
Flood Hazard	no hazard
Soil Drainage	poor
Site-Macro	plain
Site Meso	level
Site Shape	straight
Moisture	hydric
Nutrients	permesotrophic
Site Micro	straight

Soils

Parent Material	organic veneer / glaciofluvial
Surface Expression	level
Soil Subgroup	TY.M
Dominant Texture	M
Effective Texture	S
Texture	Of.m/S

Vegetation

Code	Scientific Name	Common Name	Cover
Canopy			
LARILAR	*Larix laricina*	tamarack	1
Tall Shrubs			
LARILAR	*Larix laricina*	tamarack	4
Low Shrubs			
CHAMCAL	*Chamaedaphne calyculata*	leatherleaf	20
KALMPOL	*Kalmia polifolia*	northern laurel	10
LEDUGRO	*Ledum groenlandicum*	common Labrador tea	50
PICEMAR	*Picea mariana*	black spruce	10
Grass			
ERIOSPP	*Eriophorum* sp.	cotton grass	5
Moss			

Code	Scientific Name	Common Name	Cover
SPHASPP	*Sphagnum* sp.	peat moss	NV
Litter			
deadwood			5

Field Guide Classification

Best fit: Canadian Shield G2.1 river alder-green alder – black spruce/sedge/peat moss (shrubby poor fen) or Boreal Mixedwood I2.1 black spruce – Labrador tea/cloudberry/peat moss (shrubby bog)

This community bears some resemblance to both the CS G2.1 and BM I2.1 communities and appears transitional between a bog and poor fen. It could not really be defined as a bog because there was a minor tamarack component. Tamarack (*Larix laricina*) is generally indicative of nutrient rich conditions. The floristic composition of this community is more similar to that described for a shrubby poor fen (CS G2.1); however, with an absence of the alder component. Therefore, the best fit for this community would be G2.1 with an absence of the alder.

Discussion

This wetland community was burned in the recent past. The substrate consisted of an organic veneer (48 cm) over glaciofluvial sands. The pH of the upper surface was very acidic (pH = 4), which is consistent with a bog, while the underlying glaciofluvial sands had a pH of 6.0. Many bog species are present. This is attributable to the acidic surface conditions. Remnant tamarack trees, which survived the fire, were observed. This site has been classed as a poor fen as a result of the presence of tamarack, which is associated with fens rather than bogs; however the site does appear to be transitional to a bog. This community was distinguished from the previously defined wetland community by the lack of a tree canopy (height > 5m) and the presence of tamarack. It may be transitional to a treed poor fen with larch or it may be transitional to the previously defined community if acidic conditions are constant and paludification occurs. More research into these wetland areas is required in order to determine the actual processes that are taking place.

Pice mar – Cham cal / Sarr pur / Erio vag / Spha fus
(Black spruce regeneration – Leatherleaf / Pitcher plant / Cotton grass / Peat moss)

Location:

Site 13 12V507286 UTM 6450672 NAD 83

Air photos

Site 13 AS4977 #127-128

Site and Soil

Site

Slope (%)	0
Exposure	Cold air drainage
Flood Hazard	Not applicable
Soil Drainage	Poor
Site-Macro	Upper slope
Site Meso	Level
Site Shape	Straight
Moisture	Hydric
Nutrients	Permesotrophic
Site Micro	3

Soils

Parent Material	O
Surface Expression	I
Soil Subgroup	FI.M
Dominant Texture	f
Effective Texture	m
Texture	Of/Om

Vegetation

Code	Scientific Name	Common Name	Cover
Low Shrubs			
ANDRPOL	Andromeda polifolia	bog rosemary	1
CHAMCAL	Chamaedaphne calyculata	leatherleaf	4
KALMPOL	Kalmia polifolia	northern laurel	15
LARILAR	Larix laricina	tamarack	0.5
OXYCMIC	Oxycoccus microcarpus	small bog cranberry	0.5
PICEMAR	Picea mariana	black spruce	15
RUBUCHA	Rubus chamaemorus	cloudberry	0.5
Forbs			
DROSROT	Drosera rotundifolia	round-leaved sundew	1
SARRPUR	Sarracenia purpurea	pitcher-plant	2
SMILTRI	Smilacina trifolia	three-leaved Solomon's-seal	2
Grass			

Code	Scientific Name	Common Name	Cover
ERIOVAG	Eriophorum vaginatum	sheathed cotton grass	3
Moss			
SPHAFUS	Sphagnum fuscum	rusty peat moss	95
Lichen			
CLADMIT	Cladina mitis	reindeer lichen	1

Field Guide Classification

Best fit: Canadian Shield F2.1 black spruce – Labrador tea/ cloudberry/ peat moss (shrubby bog) or Boreal Mixedwood I2.1 black spruce – Labrador tea/cloudberry/peat moss (shrubby bog)

These 2 field guide communities (CS F2.2 and BM I2.1) possess the same name; however, the complement of plant species associated with each is quite different. This community lacks the Labrador tea common to both of these communities defined in the field guide. The floristic composition of this community however more closely resembles that of the Canadian Shield shrubby bog, with species such as: northern laurel (*Kalmia polifolia*), leatherleaf (*Chamaedaphne calyculata*), round-leaved sundew (*Drosera rotundifolia*) and cotton grass (*Eriophorum vaginatum*). The best fit for this community would be CS F2.1.

Discussion

This community also has been classed as a poor fen tending to bog conditions. The surface pH (to a depth of 50 cm) was 4.0 and the pH at a depth of 1 m was 5.5. The acidic, organic material near the surface may have been somewhat countered by the underlying glacial sands. Many of the shrub and forb species whose roots remain close to the surface are indicative of bog conditions. Tamarack, whose roots extend further down, can access the less acidic material which increases availability of nutrients. The water table was observed at a depth of 50 cm.

Wetland communities often appear defined in concentric zones related to topographic lows or water sources. This site was surrounded by a wetland community defined by more mature black spruce (> 5 m in height), generally similar site conditions, possible slightly drier and a similar floristic composition.

This community appeared to be very similar to the previously described shrubby poor fen; however, it was distinguished by the high covers of pitcher plant (*Sarracenia purpurea*), round-leaved sundew and cotton grass. None of these species were observed in the previous community.

RECOMMENDATIONS

The following are some recommendations for the direction of future of studies:

1. Overall, more work is required to characterize the representative plant communities.

2. More extensive sampling of the park and surrounding area is required to obtain a better understanding of the existing communities and their relationships to each other and the landscape.

3. Study into the distribution pattern of Alaska birch and white birch. Both were found in the park, in similar habitats. Is there some key condition, which determines which species occurs?

4. Study the successional communities. Consider both the effects of burns and drought on succession. Is there a cumulative effect?

5. How are the wetlands changing? Is paludification of wetlands occurring?

6. Both aspen and birch appear to occur in similar site conditions. What is the defining factor that determines which species occurs?

7. Determine the relationship between fire patterns and actual community patterns.

8. At several of the sites visited, a prominent birch shrub layer was present in a pine stand. Is this the early stage of a mixedwood community or will the birch regeneration not survive to maturity due to the xeric conditions?

9. Take a closer look at the current natural region map. It appears that perhaps the Canadian Shield Natural region boundary requires some revision. According to the current map (Alberta Environmental Protection 1994a) this park straddles the Boreal Forest and Canadian Shield Natural Regions. Much of the vegetation encountered, including vast jack pine stands and bog like fens, typically characterize the Canadian Shield Natural Region. The wetlands encountered were more similar to those defined in the Canadian Shield Section of the Northern Alberta Field Guide (Beckingham and Archibald 1996). The jack pine communities appear to be quite similar between the two natural regions; however, the extent of these stands, the lack of any aspen stands and the dominance of Brunisolic and Regolsolic soils tend to be more representative of the shield area.

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