

Small Patch Communities of Birch Mountains Wildland Provincial Park

Lorna Allen and J. Derek Johnson



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Front page: Pond edged with water sedge and willow communities.
Photo by L. Allen

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Introduction

In July 2004, areas within Birch Mountains Wildland Provincial Park were surveyed to document small patch ecological communities. Small patch ecological communities add considerably to the diversity of a site, harbouring flora and potentially fauna dependent on these specialized habitats¹. They are, however, often overlooked in vegetation studies because they are neither extensive nor common enough to be considered representative. The focus of this study was to look within the matrix of the representative ecological communities to find and document the small patch communities that may be significant in a provincial context.

The Birch Mountains are one of several highland areas in northeastern Alberta (Figure 1), The slopes of the Birch Mountains are classified as part of the Lower Boreal Highlands Natural Subregion while the higher plateau areas are considered within the Upper Boreal Highlands Natural Subregion² (Figure 1). As defined by the two subregions, the Birch Mountains cover approximately 13200 sq km and rise over 400 m above the surrounding boreal plains.

The Lower Boreal Highlands Natural Subregion is characterized by slopes of diverse Mixedwood forests composed principally of aspen (*Populus tremuloides*), white birch (*Betula papyrifera*) and white spruce (*Picea glauca*). Stands of jack pine (*Pinus banksiana*) or of the lodgepole x jack pine hybrid (*Pinus x murraybanksiana*) are common on dry sites. Extensive wetlands, primarily fens and bogs, are also characteristic, often located at the base of slopes².

The Upper Boreal Highlands Natural Subregion is higher in elevation, occurring on the upper slopes and plateaus in the Birch Mountains. Forests are primarily coniferous, dominated primarily by lodgepole x jack pine hybrid, lodgepole pine (*Pinus contorta*) and black spruce (*Picea mariana*). Extensive organic wetlands occur in low-lying areas of the plateaus².

The Birch Mountains are an erosional remnant of upper cretaceous bedrock³. Deposits of glacial till cover the top, with alluvial fans and colluvium on the slopes⁴. Surface materials are primarily fine grained till, with localized areas of coarser till³. There are some areas classified as Organic soils, and organic veneers are common³.

The Birch Mountains fall within the continental high boreal wetland region⁵. Fens and bogs are the most widespread wetland types in this wetland region. Swamps do occur on edges of bogs and along streams. Marshes are relatively rare, but occur along lakeshores and at inland deltas. The wetland types considered characteristic of the region are⁵:

- northern ribbed fen
- horizontal fens in poorly-defined depressions
- basin fens
- peat plateaus and palsa bogs; usually occur as treed areas within fens
- collapse scar fens
- basin bogs and flat bogs

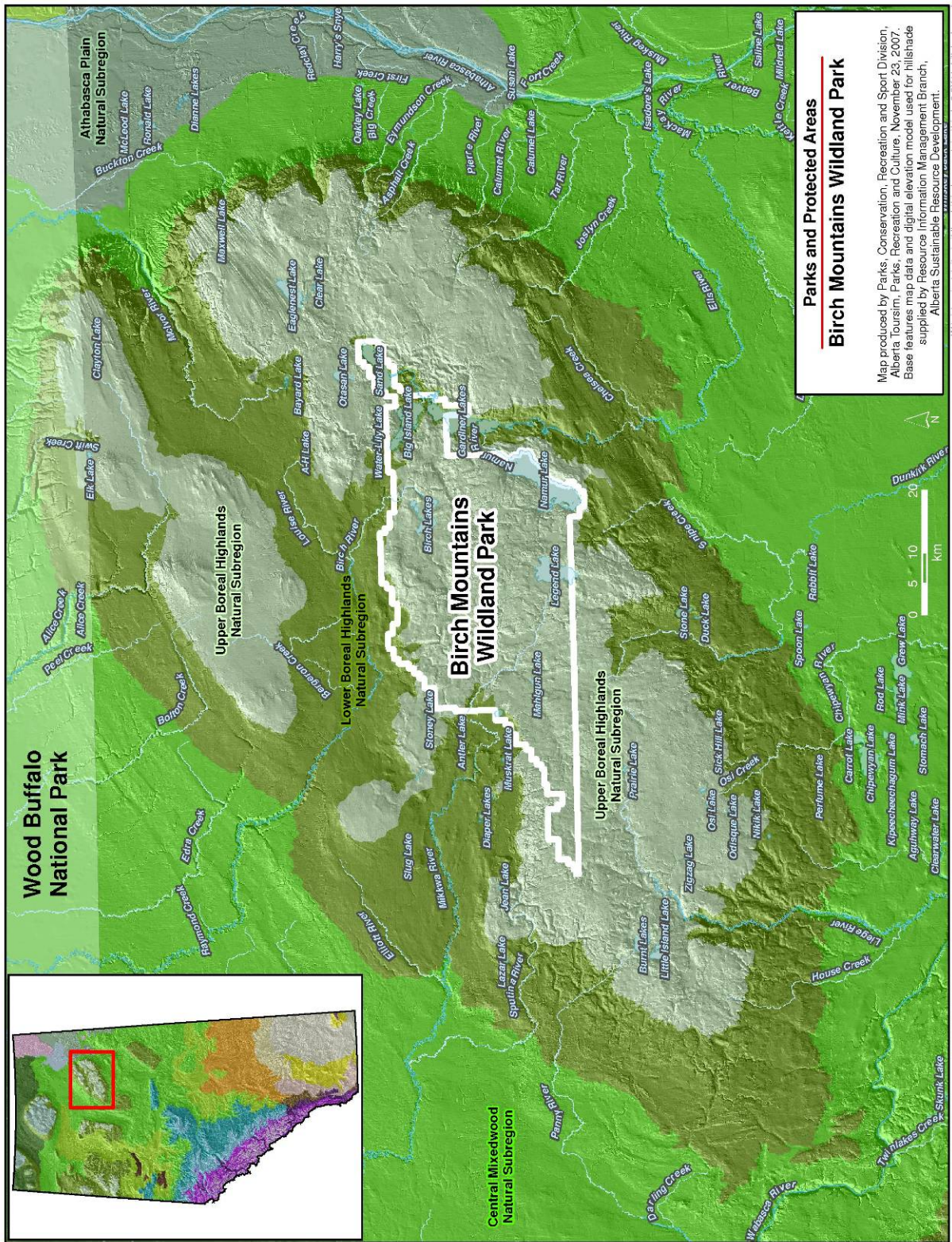


Figure 1. Birch Mountains Wildland Provincial Park: Location and Natural Subregions

Of these, basin bogs and flat bogs are not common in Alberta, and no ribbed fens were picked out during the review of aerial photographs for the site. The other types could be expected to occur in the Birch Mountains.

The Study Area

The Birch Mountains Wildland Provincial Park (BMWPP) covers 144,505 ha of the Birch Mountains. Plateaus within the Upper Boreal Highlands Natural Subregion make up the majority of the site. Small areas classified as Lower Boreal Highlands occur in the northwest and northern edge of the park, and the lakes area in the northeast (Figure 3).

There is a series of lakes, many of them shallow. Most are unnamed, but the following named ones are all or partially within BMWPP: Whyetnow Lake, Mahigun Lake, Birch Lakes, Big Island Lake, Sand Lake, Gardiner Lakes, Legend Lake and the largest, Namur Lake (Figure 3).

Large burned-over areas occur throughout the study area. Most of the burns occurred in the 1980s, with more recent burns around Namur Lake. Permafrost melt is obvious, with extensive areas of thermokarst scarring. For example, thermokarst features can be seen in aerial photographs of the Whyetnow Lake area (Figure 2).



Figure 2. Aerial image of Whyetnow Lake Area (photo by J.D. Johnson)

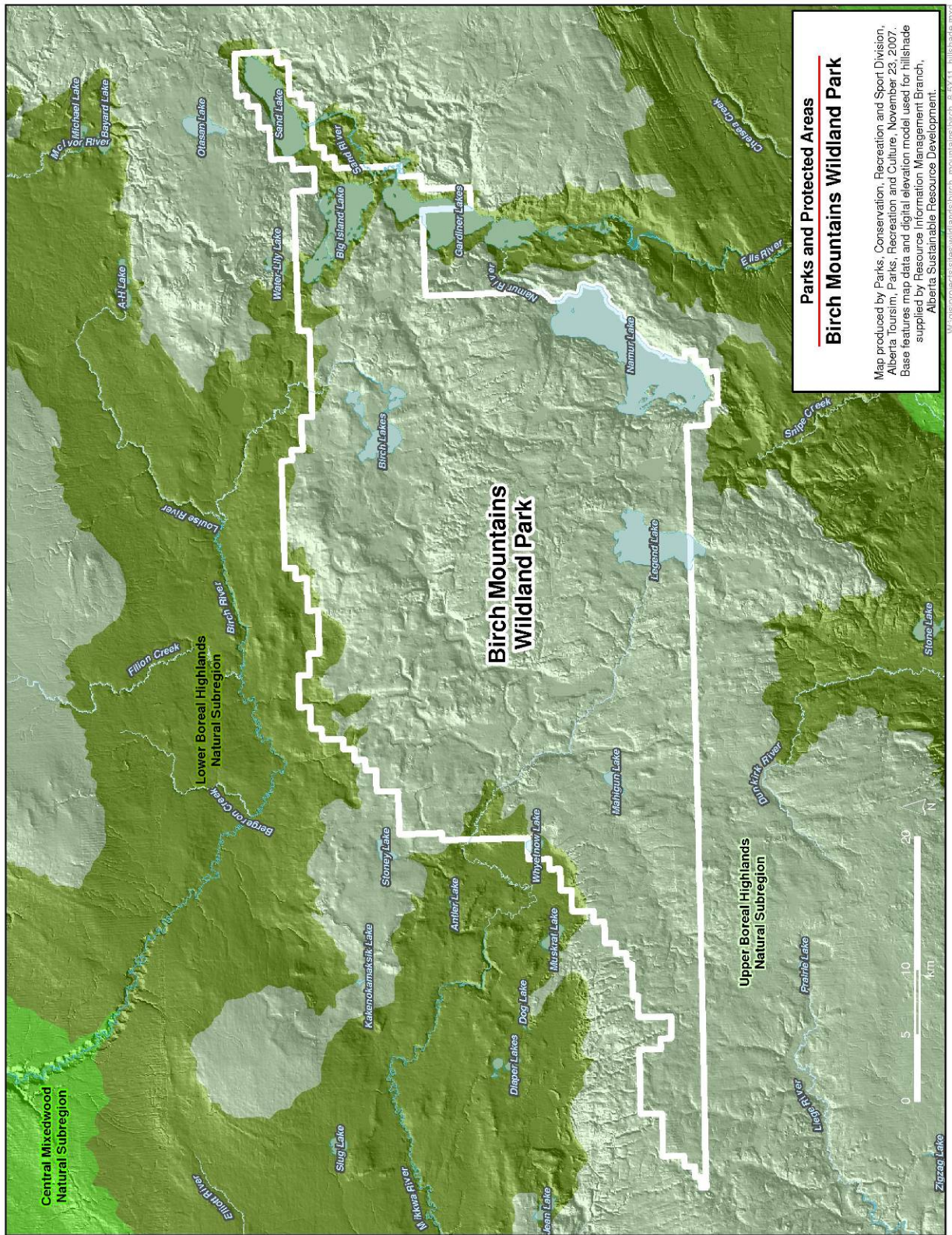


Figure 3. Main lakes and rivers in Birch Mountains Wildland Provincial Park

Methods

The focus of this work was to collect information on small patch communities in Birch Mountains Wildland Provincial Park. Although the information presented here will supplement the information on representative vegetation, emphasis was placed on documenting communities that may be significant in a provincial context.

A literature review was done for sites with similarities to the Wildland Provincial Park, including sites in northern Alberta and the nearby Northwest Territories. Ecological communities or habitats that have been documented as unusual in any way were noted as community types of interest that potentially occur within BMWPP. Wherever possible these community types of interest were linked to habitats that could be picked out on aerial photographs. The types of interest and target habitats are listed in Appendix 1.

The Alberta Natural Heritage Information Centre Preliminary Plant Community Tracking List⁶ (TL) is a compilation of ecological communities thought to be of restricted distribution in the province. Types known to occur in the Boreal Forest Natural Region were linked to a habitat, and are listed in Appendix 2.

In total, 41 unusual communities or sites were identified through the literature and tracking list review and linked to target habitats (Appendices 1 and 2). In all, 19 different habitats were recognized as having potential to include one or more of the 41 unusual communities or sites. Appendix 3 summarizes the 19 target habitats. Aerial photographs for the Wildland Provincial Park were then reviewed and all locations of target habitats were marked. Thirteen of the 19 target habitats were considered likely to occur in BMWPP, as noted in Appendix 3, although not all could be located on aerial photographs.

As many target areas as possible were visited during the field program (July 7 - 21, 2004). Sites were reached primarily by foot or by boat. Float plane was used to access three sites: Namur Lake, Birch Lake and Sand Lake. One helicopter day allowed access to sites in the northwest portion of the park, generally in the Whyetnow Lake area.

At least one location of each of the target areas chosen through the preliminary air-photo investigation was surveyed. In most cases, unusual communities were not encountered.

When an ecological community that might be unusual was encountered, a vegetation plot was subjectively placed in a homogeneous location. Site data and floristic composition were documented and the percent cover of each species visually estimated. Plot sizes were chosen appropriate to the physiognomy of the vegetation. They are as follows:

- 20 X 20 m for cover values of tree species in forested stands
- 10 X 10 m for shrublands and for understory estimates in forested stands
- 5 X 5 m for dwarf shrublands or grasslands

Specimens of difficult taxonomic groups or of unknown species were collected and identified in the camp or pressed for later identification. Scientific names for the most part follow Moss⁷, but have been updated to be consistent with the taxonomy used by the Alberta Natural Heritage Information Centre. When taxonomy other than Moss is used, the name found in Moss is included in parenthesis in the discussion of the community type (CT). Common names generally follow Ealey⁸, supplemented by Brodo *et al.*⁹ for lichens. The methods outlined here are discussed in more detail in ANHIC 2002¹⁰.

Results

Table 1 summarizes the targeted landscapes that the literature suggested may include some unusual community types and that the aerial photograph review suggested might be expected to occur in BMWPP. Of the 19 target habitats listed in Appendix 3, twelve had potential to occur in BMWPP. If a community type (CT) was located that was considered potentially significant, it is noted in the observations column and documented in further detail in the following section.

Table 1. Target Habitats	
Target Habitats	Observations
Uplands	
Deciduous stands	Stands visited, no unusual types noted
Forest openings	Sites visited, no unusual types noted
Open black spruce / lichen stands	Stands visited, no unusual types noted
Open pine stands	Stands visited, no unusual types noted
Riparian	
Deciduous stands	Stands visited, no unusual types noted
Shrublands	Sites visited, no unusual types noted
Wetlands	
Beaver ponds, ponds with open water	Sites visited, no unusual types documented.
Non-patterned fens	Sites visited, no unusual types noted
Tamarack fen	Sites visited, no unusual types noted
Protected bays in lakes	Sites visited, no unusual types noted
Sandy shoreline	Sites visited, <i>Isoetes echinospora</i> CT noted, Namur Lake
Slow moving streams	Sites visited, no unusual types noted

Ecological Communities Documented

Most habitat types visited during the 2004 survey did not support ecological communities that were considered unusual. In these cases, ecological communities present were simply noted. A short description and discussion of these types is included in Appendix 4, and summarized as follows. Photographs for selected communities are provided in Appendix 5. Where a specific CT is discussed in the following section, the corresponding code from Appendix 4 is supplied in brackets.

Extensive deciduous forests composed principally of aspen were found on morainal slopes in the portions of BMWPP within the Lower Boreal Highlands Natural Subregion. This is primarily the area around Gardiner and Big Island lakes. Balsam poplar (*Populus balsamifera*) stands were common on the moraine slopes east of Gardiner Lake. Birch stands were less common, and Alaska birch (*Betula neoalaskana*) tended to be the dominant species, rather than white birch (*Betula papyrifera*); the species that is mentioned in the summary for the natural subregion². Outside of the Gardiner – Big Island lakes area, deciduous stands were uncommon.

White spruce stands occurred only in small patches and tended to be restricted to small stands on levees or other riparian areas underlain by mineral fluvial deposits and without permafrost. In areas where black spruce is the dominant tree, white spruce tends to be restricted to fine-textured and/or nutrient rich sites¹¹.



Figure 4. Small white spruce patches on creek levee (Photo by L. Allen)

Stands of pine, primarily the lodgepole x jack pine hybrid, are restricted to dry sites. In the BMWPP, the sites visited were generally on sandy situations along lakes. Pine stands were also noted from the air, on the tops of moraine hills north of Big Island Lake, but were not visited.

Black spruce was found to be the dominant tree in both upland and wetland habitats in the Birch Mountains. Feather mosses dominate in the understory of mature upland black spruce stands. More open stands have a strong lichen component.

The top of the Birch Mountains is dominated by peatlands. Peat plateaus, usually with open, stunted black spruce communities on permafrost occur in unburned areas. Burned bog areas are extensive. They tend to be regenerating with a number of different shrub types, dominated by bog birch (*Betula glandulosa*), leatherleaf (*Chamaedaphne calyculata*) and/or common Labrador tea (*Ledum groenlandicum*).

Thermokarst collapse scar fens are common within the bogs. These are always wet, sometimes with open water in the middle, and commonly edged with shore-growing peat moss (*Sphagnum riparium*) and poor fen peat moss (*Sphagnum angustifolium*) (B2). Often, a floating mud sedge / poor fen peat moss (*Carex limosa* / *Sphagnum angustifolium*) CT (H5) occurs in older collapse scars. A drainage in the Whyetnow Lake area probably started as one or several collapse scar fens that have merged and now drain toward the lake in an ill-defined channel, an incipient channel fen with a water sedge CT in standing water in the centre of the drainage, and a dwarf birch / water sedge (*Betula pumila* / *Carex aquatilis*) zone (S6) along the edge. A similar area in the Birch Mountains is described by Vitt et al.¹² as an area of wooded permafrost bog with collapse scars. In some areas the collapse scars are integrated with drainage, leading to temporary degradation of permafrost, usually associated with burns.

Water sedge fens (H2) are common adjacent to drainages and small ponds. On some of the larger lakes, such as Big Island Lake, this CT forms an emergent band of vegetation around much of the lake. Other emergent CTs were present, including a small bottle sedge (*Carex utriculata*) CT (H8) and an extensive area of swamp horsetail (*Equisetum fluviatile*) (H9) at the mouth of the Sand River.



Figure 5. Water sedge fen at the mouth of the Sand River
(Photo by L. Allen)

A bluejoint (*Calamagrostis canadensis*) CT (H1) forms patches or narrow bands beside some lakes, rivers and streams. On larger lakes, it tends to be narrow bands, perhaps kept narrow due to ice push. On ponds and in protected bays it can form fairly extensive meadows. An open *Salix planifolia* / *Calamagrostis canadensis* shrubland (S15) often forms adjacent to H1. A dense, mixed *Salix* spp. shrubland was looked at along the floodplain of the Sand River (S13).

Aquatic communities dominated by various pondweeds (*Potamogeton* spp.) were common in Gardiner, Sand and Big Island lakes. A clasping-leaf pondweed (*Potamogeton richardsonii*) CT (A3) was the most widespread type noted, although sago pondweed (*Potamogeton pectinatus*) (A4) and flat-stemmed pondweed (*Potamogeton zosteriformis*) (A5) areas were common in Gardiner Lakes.

One location for the tracked northern quillwort (*Isoetes echinospora*) aquatic community was located in a sheltered bay on the south side of Pelican Island in Namur Lake. This is a community of the Boreal Forest and Canadian Shield Natural Regions, ranked S1⁶. It forms bands in shallow water on sandy substrates, usually in protected sites with little wave action and water less than 1.5 m deep. It is essentially a monotypic community, although seedlings of other aquatic species may be present.

Discussion

The Birch Mountains are predominantly covered by black spruce communities, with peatlands covering up to 25% of the landscape¹². Given the simplicity of the regional vegetation, it is not surprising that few small patch communities of significance were noted. Deciduous woodlands are generally not extensive in the area and it is possible that some of the deciduous community types may be restricted in distribution, but more work is needed to define types and to determine their significance. Other groups that may include significant types are aquatic communities and herbaceous communities, but further work is needed to characterize and document these.

Although Horton *et al.*¹³ considered ombrotrophic or weakly minerotrophic pools associated with thaw pockets unusual, thermokarst pools were found frequently in the Birch Mountains and are common throughout the Upper Boreal Highlands, Boreal Subarctic and Northern Mixedwood subregions of Alberta. However they were unusually extensive in the area around Whyetnow Lake, giving the landscape a pock-marked appearance on the aerial photographs. In addition there were some areas of dwarfed trees that may indicate some unusual properties that merit additional exploration.

Recommendations

One rare ecological community was located during this study, the northern quillwort aquatic community, ranked S1. The occurrence at Pelican Island in Namur Lake should be recognized as a special feature of provincial significance.

Further work is recommended for several community types or groupings of communities noted during the course of this study. These are listed below, followed by the number of the corresponding type(s) as discussed in Appendix 4:

- Aquatic communities in Alberta generally need better documentation (types A1 through A6).
- Wetland communities for the Lower Boreal Highlands and Upper Boreal Highlands subregions are not well documented. Although some (CTs H1, H2, H8, H9, H10 and H12) are types that are widespread and well documented, further work is needed on others such as H4.
- Successional community types are generally not well documented (types H7, H11, S4, S5, S10, S11, W22 and W23) and it is therefore difficult to make recommendations regarding significance.
- More work is needed to characterize the shrublands found along the creeks and shorelines of lakes (types S1, S2, S3, S6, S7, S8, S9, S12, S13, S14, S15 and S16), although most are likely widespread CTs.
- Birch stands are not well documented in the province and further work is needed to determine if there are some provincially significant CTs (types W3 through W7 and mixed stands such as W1 and W2).
- Aspen or balsam poplar woodlands are generally not extensive in the area, but more work is needed to define types and determine their significance (types W20 through W25).
- While many of the forest/woodland types noted are common and widespread (W9, W10, W11, W12, W13, W15, W16, W19 and W20), types W6 and W18 may be regionally uncommon and require further study to determine their significance.
- W14 is common in the Birch Mountains, but may be rare in the provincial context. More work in other locations within the Boreal Natural Region is required to determine this.

BMWPP is a large site and the 2004 study looked at only a small part of it. Only limited time was spent in the Whyetnow Lake area, but the large number of thermokarst pools and unusual tree morphology suggested that this area merits more detailed study. Many other potentially interesting locations were not accessed at all.

Conclusion

This study concentrated on documenting small patch communities of the Birch Mountains Wildland Provincial Park. Information gaps still remain on this aspect of the biodiversity of the wildland provincial park, and further work is recommended.

References Cited

1. Anderson, M., P. Comer, D. Grossman, C. Groves, K. Poiani, M. Reid, R. Schneider, B. Vickery and A. Weakley. 1999. Guidelines for representing ecological communities in ecoregional conservation plans. The Nature Conservancy, Arlington VA. 74 pp.
2. Natural Regions Committee. 2006. Natural Regions and Subregions of Alberta. Compiled by D.J. Downing and W.W. Pettapiece. Government of Alberta. Pub. No. T/852.
3. Archibald, J.H, T.R. Bossenberry, Z.J. Nemeth, R.C. Shelford, J.E. Przeczek. 1979. Alberta land inventory land capability classification for forestry. ENR Report No. 111. Alberta Energy and Natural Resources, Edmonton, Alberta. 41 pp.
4. Stringer, P.W. 1976. A preliminary vegetation survey of the Alberta Oil Sands Environmental Research Program study area. Alberta Oilsands Environmental Research Program Subproject VE 2.2. 84 pp.
5. National Wetlands Working Group. 1988. Wetlands of Canada. Ecological Land Classification Series, No. 24. Sustainable Development Branch, Environment Canada, Ottawa, Ontario, and Polyscience Publications Inc. Montreal, Quebec. 452 pp.
6. Allen, L. 2004. Alberta Natural Heritage Information Centre preliminary plant community tracking list. Alberta Community Development, Edmonton, Alberta. 79 pp.
7. Moss, E.H. 1983. Flora of Alberta (2nd edition). Revised by J.G. Packer. University of Toronto Press, Toronto, Ontario. 687 pp.
8. Ealey, D. 1993. Alberta plants and fungi - master species list and species group checklist. Alberta Energy, Forestry, Lands and Wildlife, Edmonton, Alberta.
9. Brodo, I.M., S. Sharnoff and S.D. Sharnoff. 2001. Lichens of North America. Yale University Press, 795 pp.
10. ANHIC. 2002. Draft plant community sampling guidelines. Posted on the ANHIC website at http://www.cd.gov.ab.ca/preserving/parks/anhic/plantcomm_sampling_guidelines.asp
11. Timoney, K.PL, G.H. La Roi, S.C. Zoltai and A.L. Robinson. 1992. Vegetation communities and plant distributions and their relationships with parent materials in the forest-tundra of northwestern Canada. *Ecography* 16: 174-188. Copenhagen 1993
12. Vitt, D.H., L.A. Halsey, M.N. Thormann and T. Martin. 1998. Peatland inventory of Alberta. Phase 1: Overview of peatland resources in the natural regions and subregions of the province. Prepared for the Alberta Peat Task Force, Fall 1996. Sustainable Forest Management Network of Centres of Excellence, University of Alberta, Edmonton, Alberta. 117 pp. + appendices.

13. Horton, D.G., D.H. Vitt and N.G. Slack. 1979. Habitats of circumboreal-subarctic Sphagna: 1. A quantitative analysis and review of species in the Caribou Mountains, northern Alberta. *Canadian Journal of Botany* 57: 2283-2317.
14. Allen, L., J. D. Johnson and K. Vujnovic. 2003. Small patch communities of Fidler-Greywillow Wildland Provincial Park. A report prepared for Parks and Protected Areas, Alberta Community Development, Edmonton, Alberta. 37 pp.
15. Lee, P.G., R.A. Ellis and P.L. Achuff. 1981. Vegetation and flora of the Caribou Mountains, Alberta. A report prepared for the Natural Areas Program, Edmonton, Alberta. 73 pp.
16. Raup, H.M. 1935. Botanical investigations in Wood Buffalo Park. Bulletin No. 74, Biological Series, No. 20. Canada Dept. of Mines and National Museum of Canada, Ottawa, Ontario. 174 pp.
17. Wallis, C.W. and C. Wershler. 1984. Kazan Upland resource assessment for ecological reserves planning in Alberta. Alberta Energy and Natural Resources, Edmonton, Alberta. 81 pp. + maps.
18. Snyder, J. M. and P.G. Lee. 1994. Notes on the Caribou Mountains overview flight. Unpublished information housed in the files of Alberta Community Development, Parks and Protected Areas. Edmonton, Alberta. 2 pp.
19. Raup, H.M. and G. W. Argus. 1982. The Lake Athabasca sand dunes of northern Saskatchewan and Alberta, Canada. 1. The land and vegetation. *Publications in Botany*, No. 12, National Museum of Natural Sciences, Ottawa, Ontario. 96 pp.
20. Fairbarns, M. 1990. The salt meadows of northwestern Alberta: a reconnaissance biophysical inventory. Alberta Forestry, Lands and Wildlife, Edmonton, Alberta. 25 pp.
21. Moss, E.H. 1953. Marsh and bog vegetation in northwestern Alberta. *Canadian Journal of Botany* 31:448-470.
22. Looman, J. 1986. The vegetation of the Canadian prairie provinces III. Aquatic & semi-aquatic vegetation, Part 3. Aquatic plant communities. *Phytocoenologia* 14(1): 19-54.
23. Allen, L., J. D. Johnson and K. Vujnovic. 2006. Small patch communities of Caribou Mountains Wildland Provincial Park. A report prepared for Parks and Protected Areas, Alberta Community Development, Edmonton, Alberta. 43 pp.
24. MacKenzie, W.H. and J.R. Moran. 2004. Wetlands of British Columbia: a guide to identification. Res. Br., B.C. Min. For., Victoria BC Land Manage. Handbook No. 52. 287 pp.
25. Allen, L., J. D. Johnson and K. Vujnovic. 2002. Small patch communities of La Butte Creek Wildland Provincial Park. A report prepared for Parks and Protected Areas, Alberta Community Development, Edmonton, Alberta. 38 pp.

26. Allen, L., J. D. Johnson and K. Vujnovic. 2004. Small patch communities of Colin-Cornwall Lakes Wildland Provincial Park. A report prepared for Parks and Protected Areas, Alberta Community Development, Edmonton, Alberta. 33 pp.
27. Boggs, K. 2000. Classification of community types, successional sequences and landscapes of the Copper River Delta, Alaska. Gen. Tech. Rep. PNW-GTR-469. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 244 p.
28. NatureServe. 2007. NatureServe Explorer: An online encyclopaedia of life [web application]. Version 6.2. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>.
29. Zoltai S.C. 1993. Cyclic development of permafrost in the peatlands of northwestern Alberta, Canada. *Arctic and Alpine Research*. Vol. 25, No. 3, 1993, pp. 240-246.
30. Beilman, D.W. 2001. Plant diversity and change due to localized permafrost dynamics in bogs of western Canada. *Can. J. Bot.* 79: 983-993.
31. Beilman, D.W, D.H. Vitt and L.A. Halsey. 2001. Localized permafrost peatlands in Western Canada: definitions, distributions, and degradation. *Arctic and Alpine Research*, Vol. 33, No. 1: 70 - 77.
32. Belland, R., and Vitt, D.H. 1995. Bryophyte vegetation patterns. along environmental gradients in continental bogs. *Ecoscience* 2 (4): 395-407.
33. Gould, J. 2004. Alberta Natural Heritage Information Centre Tracking and Watch Lists — Vascular Plants, Mosses, Liverworts and Hornworts. Alberta Community Development, Parks and Protected Areas Division, Edmonton, Alberta.
34. Timoney, K. 2004. A Peace-Athabasca Delta vegetation primer. A report developed for BC Hydro, Burnaby, British Columbia. 72 pp.
35. Willoughby, M. G., C. Stone, C. Hincz, D. Moisey, G. Ehlert and D. Lawrence. 2005. Guide to range plant community types and carrying capacity for the Dry and Central Mixedwood subregions in Alberta. Fifth approximation. Alberta Sustainable Resource Development, Public Lands And Forests Division. 231 pp.
36. Allen, L. and J. D. Johnson. 2000. Potentially trackable small patch communities of the Maybelle River, Richardson River Dunes and Marguerite Crag and Tail wildland parks. A report prepared for Parks and Protected Areas, Alberta Community Development, Edmonton, Alberta. 32 pp.
37. Boggs, K., A. Garibaldi, J. Stevens, J. Grunblatt and T. Helt. 2000. Landcover classes and plant associations of Denali National Park and Preserve. Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska Anchorage, 707 A Street, Anchorage, AK 99501. 149 pp.

38. Boggs, K. and M. Sturdy. 2004. Plant associations and post-fire vegetation succession in Yukon-Charley Rivers National Preserve. Alaska Natural Heritage Program, Environment and Natural Resources Institute, University of Alaska Anchorage, 707 A Street, Anchorage, AK 99501. 190 p.
39. Wallis, Cliff and Cleve Wershler. 2001. Natural History Inventory 2000; Grizzly Ridge Wildland Park. Natural Resources Service, AE, Valleyview, Alberta. 54 pp. + appendices and maps.
40. Baldwin, K.A., D. Meidinger, K.A. McIlwrick, J.H. Archibald, W.H. MacKenzie, M. McLaughlan, C.E. Kennedy, C. DeLong, L. Allen. 2004. Canadian National Vegetation Classification & Canadian Forest Ecosystem Classification: Boreal associations and sub-associations for western Canada. Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre, Sault Ste. Marie, Ontario. Unpublished document.
41. Corns, I. G. W. 1983. Forest community types of west-central Alberta in relation to selected environmental factors. Canadian Journal of Forest Research. 13: 995-1010.
42. Hastings, R.I. and R.A. Ellis. 1990. Environment, vegetation and flora of the Andrew Lake area, northeastern Alberta. In McGillvray and Hastings. 1990. Natural history of the Andrew Lake region, Northeastern Alberta. Natural History Occasional Paper No. 12. Provincial Museum of Alberta, Edmonton, Alberta. 97 pp.
43. Meijer, M. 2002. Vegetation communities of Maybelle River Wildland Provincial Park. Prepared for Parks and Protected Areas, Alberta Community Development, Lac La Biche, Alberta. 31 pp.
44. Beckingham, J.D. and J.H. Archibald. 1996. Field guide to ecosites of Northern Alberta. Natural Resources Canada, Canadian Forest Service. Northern Forestry Centre, Edmonton, Alberta. Special Report 5.
45. Beckingham, J.D., D.G. Niwlawn and V.A. Futoransky. 1996. Field guide to ecosites of the Mid-Boreal Ecoregions of Saskatchewan. Natural Resources Canada, Canadian Forest Service. Northern Forestry Centre, Edmonton, Alberta. Special Report 6.
46. Willoughby, M.G., K. Sundquist & D. Downing. 1997. Range plant community types and carrying capacity for the Dry and Central Mixedwood subregions of Alberta. Alberta Environmental Protection, Edmonton, Alberta. 145 pp.

Appendices

Appendix 1. Unusual communities or habitats that potentially occur in the Birch Mountains from literature review

Community	Reason	Target Habitat
Aquatic communities	Not well documented, may be some restricted types ¹⁴	Protected bays in lakes
		Slow moving streams
		Small ponds, other open water bodies
Birch and aspen stands	May be some restricted types ¹⁴	Deciduous stands
<i>Eleocharis quinqueflora</i> (few-flowered spike-rush) minerotrophic fen	Reported as a rare community of the Caribou Mountains ¹⁵	Fens
Grasslands	Restricted in extent ¹⁶	Upland forest openings
Grassy, south/southwest-facing slopes	Restricted habitat ¹⁷	Open, south/southwest-facing slopes
Open pine stands	May be some restricted types	Open pine
Open black spruce / lichen	May be unusual in the provincial context ¹⁸	Open black spruce / lichen
Rich fens	May be some restricted types ¹⁴	Fens
Riparian shrublands	May be some restricted types ¹⁴	Riparian* shrublands
Rocky shore	Minor habitat ¹⁹	Rocky shore
Salt meadow	Restricted to a few sites ²⁰	Saline seepages
Sandy shore	Few vegetated sandy shores ¹⁹ , may have communities of interest	Sandy shorelines
Thaw pockets	Unusual aquatic habitat embedded in a terrestrial ecosystem ¹³	Small round ponds

* Riparian is defined here as the terrestrial area where the vegetation is a product of the influence of high water tables associated with adjacent aquatic ecosystems.

Appendix 2. Communities on the Preliminary Plant Community Tracking List⁶ that occur in the Boreal Forest Natural Region

Community		SRank	Target Habitat
Scientific name	Common name		
Upland Communities			
<i>Amelanchier alnifolia</i> / <i>Arctostaphylos uva-ursi</i> / <i>Oryzopsis pungens</i>	saskatoon / common bearberry / northern rice grass	S2S3	Upland forest openings
<i>Picea glauca</i> / <i>Cetraria islandica</i>	white spruce / lichen	S1	Open spruce stands, sandy knolls
<i>Populus tremuloides</i> / <i>Rosa acicularis</i> / <i>Apocynum androsaemifolium</i>	aspen / prickly rose / spreading dogbane	SU	Deciduous stands
<i>Populus tremuloides</i> / <i>Rubus parviflorus</i> / <i>Aralia nudicaulis</i>	aspen / thimbleberry / wild sarsaparilla	S2S3	Deciduous stands
Riparian Communities			
<i>Picea glauca</i> / <i>Alnus tenuifolia</i> – <i>Betula neoalaskana</i> / <i>Equisetum pratense</i> / <i>Hylocomium splendens</i>	white spruce / river alder - Alaska birch / meadow horsetail / stair-step moss	S3	Spruce stands, river terraces
<i>Populus balsamifera</i> / <i>Alnus tenuifolia</i> / <i>Cornus stolonifera</i> / <i>Equisetum pratense</i>	balsam poplar / river alder / red-osier dogwood / meadow horsetail	S3	Deciduous stands, river terraces
<i>Populus balsamifera</i> / <i>Rhamnus alnifolia</i> / <i>Equisetum arvense</i>	balsam poplar / alder-leaved buckthorn/common horsetail	S1	Riparian deciduous stands
<i>Populus balsamifera</i> / <i>Viburnum opulus</i> / <i>Matteuccia struthiopteris</i>	balsam poplar / high-bush cranberry / ostrich fern	S1S2	Deciduous stands, river terraces
<i>Populus tremuloides</i> / <i>Salix bebbiana</i> - <i>Corylus cornuta</i> / <i>Calamagrostis canadensis</i> – <i>Matteuccia struthiopteris</i>	aspen / Bebb's willow - beaked hazelnut / bluejoint - ostrich fern	S1	Riparian deciduous stands
<i>Salix drummondiana</i> / <i>Scirpus microcarpus</i> – <i>Calamagrostis canadensis</i>	Drummond's willow / small-fruited bulrush - bluejoint	S1	Riparian shrubland
Wetland communities			
<i>Atriplex subspicata</i> - <i>Puccinellia nuttalliana</i> - <i>Triglochin palustris</i> string fen	spearscale saltbrush - Nuttall's salt-meadow grass - slender arrow grass string fen	S1S3	Patterned fen
<i>Betula neoalaskana</i> / <i>Ledum groenlandicum</i> / <i>Calamagrostis canadensis</i> peatland	Alaska birch / common Labrador tea / bluejoint peatland	SU	Fen

<i>Calamagrostis stricta</i> - <i>Triglochin maritima</i> string fen	narrow reed grass - seaside arrowgrass string fen	S1S3	Patterned fen
<i>Carex limosa</i> - <i>Menyanthes trifoliata</i> - <i>Cardamine pratensis</i>	mud sedge - buck-bean - meadow bitter cress	S1S2	Fen
<i>Carex limosa</i> - <i>Scheuchzeria palustris</i> / <i>Sphagnum teres</i> - <i>S. subsecundum</i>	mud sedge - scheuchzeria / thin-leaved peat moss – twisted peat moss	S2?	Patterned fen
<i>Carex pseudocyperus</i> - <i>Calla palustris</i>	cypress-like sedge - water arum	S1S2	Beaver ponds, ponds with open water
<i>Cymbella pusilla</i> - <i>Mastogloia smithii</i> - <i>Nitzschia palea</i>	diatom ponds	S1S3	Ponds with open water
<i>Elymus trachycaulus</i> - <i>Distichlis stricta</i>	slender wheat grass - salt grass	S1	Saline seepage
<i>Elymus trachycaulus</i> - <i>Hierochloa odorata</i>	slender wheat grass - sweet grass	SU	Saline seepage
<i>Elymus trachycaulus</i> - <i>Koeleria macrantha</i>	slender wheat grass - June grass	SU	Saline seepage
<i>Glyceria borealis</i> - <i>Sium suave</i> - <i>Sparganium angustifolium</i>	northern manna grass - water parsnip - narrow leaved bur-reed	S1?	Slow moving streams
<i>Isoetes echinospora</i>	northern quillwort	S1	Sandy shorelines
<i>Larix laricina</i> / <i>Carex prairea</i>	tamarack / prairie sedge	S1	Larix fen
<i>Puccinellia nuttalliana</i> – <i>Suaeda calceoliformis</i> – <i>Spergularia marina</i> barren	Nuttall's salt-meadow grass - western sea-blite - salt-marsh sand spurry barren	S2	Saline seepage
<i>Salicornia europaea</i>	samphire	S2	Saline seepage
<i>Salix athabascensis</i> string shrubland	Athabasca willow string shrubland	SP	Patterned fen

**Appendix 3. Target Habitats and the likelihood that they occur within Birch Mountains
Wildland Provincial Park**

Target Habitats	Number of Associated Communities (from Appendices 1 and 2, above)	Likelihood Target Habitat is present in CMWPP (H = High; L = Low)
Upland Habitats		
Deciduous stands	3	H, characteristic of Lower Boreal Highlands Natural Subregion
Forest openings	2	H, hard to spot on photos, but could occur
Open black spruce / lichen	1	H, likely occurs on plateaus
Open, graminoid slopes	1	L, none noted in aerial photograph review
Open pine	1	H, likely to occur in moraine areas
Sand Dune Habitats		
Open spruce stands, sandy knolls	1	L, no dune formations
Riparian Habitats		
Deciduous stands, large river terraces	2	L, no large river terraces
Riparian deciduous stands	2	H, may develop on smaller riparian systems such as along streams
Riparian shrubland	2	H, may develop on smaller riparian systems such as along streams
Spruce stands, large river terraces	1	L, no large river terraces
Wetland Habitats		
Beaver ponds, ponds with open water	4	H
Fens	4	H
Larix fen	1	H
Patterned fen	4	L, none noted in aerial photograph review
Protected bays in lakes	1	H
Rocky shore	1	L, requires extensive beaches to develop a distinctive CT.
Saline seepage	6	L, no saline seepages likely given geology and topography
Sandy shorelines	2	H, sandy shores occur on east end of some larger lakes
Slow moving streams	2	H

Appendix 4. Additional ecological communities noted in Birch Mountains Wildland Provincial Park

No.	Community	Description and Location	Community Distribution and Significance*
Aquatic communities			
A1	<i>Nuphar lutea</i>	Patches of <i>Nuphar lutea</i> were noted occasionally in locations such as sheltered bays of lakes or in small ponds throughout the area. In some locations, the cover of <i>Nuphar</i> was patchy while in others the leaves formed thick mats.	Numerous studies document <i>Nuphar lutea</i> CTs throughout Alberta's boreal ^{16,21,22, 23} . Although not commonly encountered in BMWPP, this is likely a common and widespread CT.
A2	<i>Potamogeton praelongus</i>	Small patches of <i>P. praelongus</i> were observed in spots out from the shores of Gardiner, Big Island and Sand lakes.	Looman ²² recognizes a Potamogetum praelongi Association of boreal, low to medium eutrophic lakes in 4 m water or deeper. A preliminary CT dominated by <i>P. praelongus</i> is noted from the BC coast and interior in 2.5 to 4m deep waters in sites with sandy bottoms ²⁴ . Only small patches of <i>P. praelongus</i> were noted in the BMWPP, - further work is needed to determine if they should be recognized as a community type.
A3	<i>Potamogeton richardsonii</i>	An aquatic community dominated by <i>P. richardsonii</i> was noted in several bays around Big Island Lake as well as in the protected bay on the south shore of Sand Lake, where the Sand River originates and in slow moving areas along the river.	<i>P. richardsonii</i> is a widespread species in AB, and often dominant where it occurs. A CT dominated by <i>P. richardsonii</i> was documented in several of Alberta's northern wildland parks ^{23,25,26} . This CT is documented in Alaska ²⁷ , where it is considered common. Looman ²² recognizes a <i>Potamogeton richardsonii</i> CT at the sociation level. Likely a common submergent aquatic community, but not well documented in Alberta.
A4	<i>Potamogeton pectinatus</i>	An aquatic community dominated by <i>Potamogeton pectinatus</i> was noted in about 1 m deep water in a protected bay at the north end of Gardiner Lakes. This was essentially a single species CT, although there is an area where this and CT A5 overlap.	<i>Potamogeton pectinatus</i> dominated CTs are documented in WBNP on sand, gravel or mud bottomed sites with little wave action ¹⁶ . A preliminary type is also noted in Alaska ²⁷ in ponds with permanent standing water. Likely a common submergent aquatic community, but not well documented.

No.	Community	Description and Location	Community Distribution and Significance*
A5	<i>Potamogeton zosteriformis</i>	Areas of predominantly <i>P. zosteriformis</i> were noted in slightly deeper water, then overlapping with the <i>P. pectinatus</i> CT (A4). Found in a protected bay at the north end of Gardiner Lakes. This was essentially a single species CT, except in the area of overlap.	Looman ²² recognizes a widespread and common <i>Potamogeton zosteriformis</i> type in eutrophic lakes, at depths of 1.5 to 2.5 m. He suggests this CT occurs where nitrogen and phosphorous levels are high. This CT was found in a shallow bay that may be naturally eutrophic because the water tends to be warmer and the rate of decomposition higher than in deeper waters. In addition, there may be a heightened nutrient level as a result of the numerous old burns around the lake.
A6	<i>Sparganium angustifolium</i>	A community dominated by the floating-leaved aquatic <i>Sparganium angustifolium</i> was noted in several locations. The long narrow bay on Gardiner L. north of the inflow of the Sand R, had extensive beds of 35% cover <i>S. angustifolium</i> with no other species noted (approx. depth 30 cm). Patches of <i>S. angustifolium</i> alternated with small occurrences of <i>Nuphar lutea</i> in the creek mouth at the NW end of Big Island L. and some of the small ponds scattered throughout BMWPP.	A generic “ <i>Sparganium</i> Species” type is recognized as a minor but widely distributed type on the Copper River Delta, Alaska ²⁷ . A <i>Sparganium angustifolium</i> CT is recognized as a widespread type, ranked G4 ²⁸ .
Bryophyte Communities			
B1	<i>Sphagnum riparium</i>	<i>Sphagnum riparium</i> was noted as a single-species CT in several locations. In the Whyetnow L. area it occurred in a water-filled drainage channel with abrupt edges. There were also small pools with a <i>S. riparium</i> mat at the edge of Gardiner L. and in the middle of meltout pools north of Gardiner L.	<i>S. riparium</i> reaches maximum abundance at water surface level ²⁹ and commonly forms a mat at the wet edges of collapse scars.
B2	<i>Sphagnum riparium</i> - <i>S. angustifolium</i>	<i>Sphagnum riparium</i> and <i>S. angustifolium</i> grow together as a “mat” that often forms at the edge of thermokarst pools and other ponds. This CT was also noted along sluggish drainages. At one site, <i>S. fuscum</i> was also present, suggesting it might be a slightly older collapse scar, in transition to a B1 type.	A CT dominated by <i>S. riparium</i> and <i>S. angustifolium</i> is indicative of newly-collapsed surfaces and wet conditions ³⁰ and was also noted in CM ²³ . These occur in a zone from north-central Alberta through to central Manitoba ³¹ . Belland & Vitt recognize a type dominated by <i>S. riparium</i> and <i>S. angustifolium</i> that is associated with open, very wet, treeless peatlands with a high water table, low shade and high pH ³² .

No.	Community	Description and Location	Community Distribution and Significance*
B3	<i>Warnstorfia exannulata</i>	<i>Warnstorfia exannulata</i> was noted in wet areas at the center of thermokarst pools, often grading into a cover of <i>S. teres</i> in more elevated microsites or along the pond edges.	<i>Sphagnum teres</i> is commonly a pond edge species and this type of habitat is prevalent in BMWPP.
Herbaceous Communities			
H1	<i>Calamagrostis canadensis</i>	Forms patches or narrow bands beside some lakes, rivers and streams. On larger lakes, it tends to be narrow bands, perhaps kept narrow due to ice push. On ponds and in protected bays it can form fairly extensive meadows. A tracked species, <i>Barbarea orthoceras</i> (ranked S2 in 2004) ³³ , was often associated with this CT. In an extensive stand along the Birch River, <i>Calamagrostis</i> forms 80 cm high tussocks with few other species, although <i>Barbarea orthoceras</i> , <i>Stellaria longifolia</i> , <i>Galium trifidum</i> , and small, scattered <i>Salix planifolia</i> were present. Mosses noted at the base of the tussocks were <i>Bryum pseudotriquetrum</i> and <i>Drepanocladus aduncus</i> .	Extensive <i>C. canadensis</i> meadows have been documented for the Peace-Athabasca Delta ^{16,34} associated with a variety of hydric to mesic site types ³⁴ . This CT (also noted at Colin Lake ²⁶) occurs in both the Dry and Central Mixedwood natural subregions ³⁵ and is very similar to a type reported in Alaska ²⁷ . This appears to be a widespread CT in North America, usually found as small patches in locations such as drying beaver meadows and moist forest openings ²⁸ .
H2	<i>Carex aquatilis</i>	<i>Carex aquatilis</i> commonly edges small ponds or forms a linear community along drainages. On some of the larger lakes, such Big Island Lake, it forms an emergent band of vegetation around much of the lake.	Also noted at other northern Alberta wildland parks ^{14, 23, 25, 26, 36} and documented in Alaska ²⁷ . Noted in the Caribou Mountains as frequent at the edge of thaw pockets ¹³ . A well-recognized, widespread type in North America, defined by <i>Carex aquatilis</i> clearly dominant and <i>Carex utriculata</i> with low cover or absent ²⁸ .
H3	<i>Carex aquatilis</i> - <i>Calamagrostis canadensis</i> / <i>Sphagnum angustifolium</i>	Noted once in a small pond separated from Big Island Lake by a sandy levee.	Similar types have been reported in WBNP ¹⁶ and CM ²³ , but likely a transition zone between a wet H2 CT and the slightly drier conditions that favour the H1 CT ²⁶ .
H4	<i>Carex diandra</i> – <i>C. aquatilis</i>	One site dominated by <i>Carex diandra</i> , with prominent <i>C. aquatilis</i> and <i>Potentilla palustris</i> , was noted in a collapse scar in a bog area on the west shore of Gardiner Lake.	A <i>Carex diandra</i> type is documented in Manitoba and Colorado ²⁸ , but no details on composition or status are available.

No.	Community	Description and Location	Community Distribution and Significance*
H5	<i>Carex limosa</i> / <i>Sphagnum angustifolium</i>	Floating mats dominated by <i>Carex limosa</i> and <i>Sphagnum angustifolium</i> at the edge of thermokarst pools and lining open water occupying the centre of sluggish drainage channels. Patches of <i>Chamaedaphne calyculata</i> or <i>Andromeda polifolia</i> sometimes present on small hummocks with <i>Sphagnum magellanicum</i> .	Several CTs dominated by <i>C. limosa</i> have been documented in Alberta, and a number of them are on the plant community tracking list ⁶ . This may represent one of the more common types for Alberta.
H6	<i>Carex limosa</i> / <i>Sphagnum magellanicum</i>	Lower areas in a burned peat plateau in the Birch Lake area. <i>Carex limosa</i> , <i>Andromeda polifolia</i> and <i>Sphagnum magellanicum</i> dominant. They are wetter than the surrounding plateau, but not necessarily under water, and have an interesting leafy liverwort component. (<i>Scapania</i> species prominent).	These are interesting areas of partial melt-out (usually following a fire) in relatively large peat plateaus on permafrost. The melt area is either small or the melting is not extensive enough to eliminate all the permafrost down to the water table. This is an “intermediate” or transitional CT between the really wet <i>Sphagnum riparium</i> – <i>S. angustifolium</i> “lawn” (B2) and the dry peat plateau dominated by <i>Picea mariana</i> such as W15.
H7	<i>Carex siccata</i>	<i>Carex siccata</i> dominant in a dry, open grassy area on sand. Patches of <i>Leymus innovatus</i> . Main herbs noted include <i>Fragaria virginiana</i> , <i>Maianthemum canadense</i> and <i>Solidago spathulata</i> . Site may have been cleared.	<i>Carex siccata</i> dominated communities are documented in several other northern wildland parks ^{26,36} . Although often found on south-facing slopes, some in MR were associated with disturbed areas as a fairly common successional type of sandy sites ³⁶ .
H8	<i>Carex utriculata</i>	Extensive <i>Carex utriculata</i> stands were noted on a sand substrate in about 10 cm of water in a sheltered bay where the Sand River enters Gardiner Lake. <i>Carex utriculata</i> dominates, some <i>Lemna minor</i> , occasional plants of <i>Sium suave</i> . Smaller stands were noted in other locations including along the Sand River and ringing some of the smaller ponds.	A well-recognized, widespread type defined by <i>Carex utriculata</i> clearly dominant and <i>Carex aquatilis</i> with low cover or absent ^{23, 28} .
H9	<i>Equisetum fluviatile</i>	Emergent CT near the mouth of the Sand R.	Widespread CT ²⁸ associated with quiet waters and muddy substrate ¹⁶ . Found in Alaska ^{27, 37} , WBNP ¹⁶ , the Peace-Athabasca Delta ³⁴ , the Central Mixedwood Subregion ³⁵ and several northern wildland parks in Alberta ^{14,23,25,26,36} although not commonly encountered at BMWPP.

No.	Community	Description and Location	Community Distribution and Significance*
H10	<i>Eriophorum vaginatum</i> / <i>Sphagnum magellanicum</i>	Found in one collapse scar along a cut line north of Gardiner Lake. <i>Eriophorum vaginatum</i> forms distinct clumps interspersed with hummocks of <i>Sphagnum magellanicum</i> , sometimes with <i>S. fuscum</i> on the hummock top. Other species noted include <i>Oxycoccus microcarpus</i> and <i>Chamaedaphne calyculata</i> .	An <i>E. vaginatum</i> CT has been documented in Alaska ³⁷ , associated with a variety of habitats including pond edges and thermokarst ponds. This CT was found in relatively wet habitats for <i>E. vaginatum</i> in Alberta, but similar to those reported for Alaska; perhaps indicating near-arctic conditions. Commonly found as the dominant community type in thermokarst collapse scars in CM ²³ .
H11	<i>Schizachne purpurascens</i> - <i>Carex siccata</i>	Grassy area on a sandy terrace beside a beaver pond north of Gardiner L. Dominated by <i>Schizachne purpurascens</i> and <i>Carex siccata</i> .	Transition type made up of aspen understory remnants, after having been cleared by beaver. Not a stable type.
H12	<i>Typha latifolia</i>	Patches noted along the east shore of Big Island Lake.	<i>T. latifolia</i> tends to occur in dense, mono-specific stands. A widespread CT ^{24,28} , encountered infrequently in the study area. Northern Alberta may be near the northern range limit for this CT ²³ .
Shrub and Dwarf Shrub Communities			
S1	<i>Alnus incana</i> ssp. <i>tenuifolia</i> / <i>Calamagrostis canadensis</i>	Noted occasionally along the east shore of Gardiner L. usually forming a narrow strip above the wave and ice push zone.	<i>Alnus tenuifolia</i> -dominated shrublands are widespread ²⁸ and have been noted at other northern wildland parks in Alberta ^{23, 25, 26, 36} . A similar type with a <i>Calamagrostis canadensis</i> dominated understory is recognized in the western US, found along montane streams of moderate gradient, although it may be composed of a different sub-species of alder ²⁸ .
S2	<i>Alnus viridis</i> ssp. <i>crispa</i> / <i>Linnaea borealis</i>	A narrow band, noted at the edge of a <i>Pinus</i> stand and burn area on the well-drained slope of a melt water channel. Thick alder cover (90%) and leaf litter (80%) with few understory species. Only <i>Linnaea borealis</i> (10%) and <i>Cornus canadensis</i> (2%) noted.	<i>Alnus viridis</i> ssp. <i>crispa</i> communities are commonly found on sites subject to disturbance such as riparian fringe sites with short duration flooding or ice scour ²⁴ . In this case, the stand developed after fire on a site likely influenced by subsurface groundwater flow. May be a common, widespread type, but not well documented.
S3	<i>Arctostaphylos uva-ursi</i>	A community dominated by <i>Arctostaphylos uva-ursi</i> was noted along a sandy beach on the east shore of Gardiner L. It was found on low dunes, with few other species.	Various <i>Arctostaphylos uva-ursi</i> CTs have been documented throughout Alberta, but more work is needed to define types and assign status.

No.	Community	Description and Location	Community Distribution and Significance*
S4	<i>Betula glandulosa</i> / <i>Ledum groenlandicum</i>	Dominant CT in a regenerating burn between Gardiner and Big Island lakes. With scattered <i>Salix pyrifolia</i> and <i>Picea mariana</i> seedlings. <i>Vaccinium vitis-idaea</i> is the dominant understory species and <i>Sphagnum fuscum</i> the dominant bryophyte. Patches of <i>Eriophorum vaginatum</i> present, but dying as area dries out.	Successional community, regenerating after a burn. Also noted in CM ²³ . Likely a widespread type, but not well documented.
S5	<i>Betula glandulosa</i> / <i>Ledum groenlandicum</i> / <i>Polytrichum strictum</i>	A similar CT to S4 but with <i>Polytrichum strictum</i> as the dominant bryophyte was noted on the east shore of Gardiner L. 1.5 m tall <i>Picea mariana</i> form an open tall shrub layer. Lichen patches are common, composed primarily of <i>Cladina mitis</i> , <i>Cladonia deformis</i> and <i>Cladonia sulphurina</i> .	Successional community, regenerating after a burn. Similar to S4 above, but the height of the <i>Picea</i> and the prevalence of lichens suggest this is an older burn. Likely a widespread type, but not well documented.
S6	<i>Betula pumila</i> / <i>Carex aquatilis</i>	Found lining a drainage channel near Whyetnow L. along the NW side of BMWPP. <i>Carex aquatilis</i> was in standing water in the centre of the drainage, with a <i>Betula pumila</i> / <i>Carex aquatilis</i> zone along the edge. Area receives incoming water from adjacent uplands.	Shrubby birch and willow communities are common along watercourses in the region, although this CT was only found once. A similar type with <i>Betula glandulosa</i> is considered common in BC ²⁴ . More study is needed to determine the significance of these shrub wetlands.
S7	<i>Chamaedaphne calyculata</i> / <i>Eriophorum vaginatum</i>	CTs dominated by <i>Chamaedaphne calyculata</i> were frequently encountered in BMWPP, usually at the edge of ponds and collapse scars or as large patches in burnt bogs. They tend to have a hummocky topography, with <i>Chamaedaphne calyculata</i> dominant on the hummocks; <i>Rubus chamaemorus</i> and <i>Ledum groenlandicum</i> are usually present. Patches of <i>Cladina mitis</i> occasional. <i>Sphagnum fuscum</i> is the main moss on the hummocks. In the wetter areas between hummocks, <i>Sphagnum angustifolium</i> is dominant and <i>Eriophorum vaginatum</i> is often prominent. Usually associated with older burns.	Wet shrublands dominated by <i>C. calyculata</i> are documented in Alaska ³⁷ and a very similar type was found in CM ²³ . They seem to be widespread, but are not adequately documented to sort out types. In BMWPP, this CT is common, probably due to the extensive burns that cover most of the wildland park.
S8	<i>Chamaedaphne calyculata</i> / <i>Sphagnum angustifolium</i>	A linear community of <i>Chamaedaphne calyculata</i> hummocks and <i>S. angustifolium</i> hollows along the edge of channels that wind through an open bog community near Whyetnow L.. Located in a burn area.	A small patch type of wet sites at the edge of wetlands that may be similar is described in Alaska ³⁷ and was noted in CM ²³ . <i>C. calyculata</i> shrublands are not adequately documented to sort out types. Similar to S7, but with fewer species. May be a younger CT on a newer burn or on a wetter site.

No.	Community	Description and Location	Community Distribution and Significance*
S9	<i>Chamaedaphne calyculata</i> – <i>Andromeda polifolia</i> / <i>Sphagnum fuscum</i>	A hummocky CT found in the Whyetnow L. area. <i>Chamaedaphne calyculata</i> and <i>Andromeda polifolia</i> are the dominant shrubs on the hummocks and <i>Sphagnum fuscum</i> the dominant moss. Other hummock species include <i>Rubus chamaemorus</i> and <i>Ledum palustre</i> . In the hollows, <i>Sphagnum angustifolium</i> is dominant but other species noted include <i>Carex paupercula</i> , <i>Drosera rotundifolia</i> and <i>Eriophorum vaginatum</i> .	This CT has strong similarities to both S7 and S8, discussed above, but differs in the prominence of <i>Andromeda polifolia</i> on the hummocks. The hummocks tend to have a lower relief and lower cover. This seems to be an overall wetter type than the other <i>Chamaedaphne calyculata</i> discussed.
S10	<i>Ledum groenlandicum</i> – <i>Ledum palustre</i> / <i>Sphagnum</i> spp.	A hummocky shrubland dominated by <i>Ledum</i> spp. <i>Vaccinium vitis-idaea</i> and <i>Rubus chamaemorus</i> were prominent in some locations.	This is the main successional CT noted on burned bogs both in BMWPP and CM ²³ . A very similar successional CT is documented in Alaska ³⁸ . <i>Ledum groenlandicum</i> dominated shrublands are likely widespread, although not well documented.
S11	<i>Pinus x murraybanksiana</i> / <i>Vaccinium myrtilloides</i> – <i>V. vitis-idaea</i>	An open stand of 1 to 2 m tall hybrid pine on a north-facing slope, regenerating after a burn. Scattered <i>Populus tremuloides</i> ; pockets of <i>Ledum groenlandicum</i> .	Likely a fairly widespread, successional pine type, although not well documented. Possibly successional to W19, discussed below.
S12	<i>Salix glauca</i> – <i>Betula glandulosa</i> / <i>Ledum groenlandicum</i> / <i>Vaccinium vitis-idaea</i>	Mixed dense shrubland at edge of regenerating pine (S11) in an area burnt in the 1980s.	<i>Salix glauca</i> shrublands are likely widespread, although not well documented.
S13	<i>Salix glauca</i> - <i>S. bebbiana</i> - <i>S. planifolia</i> - <i>S. arbusculoides</i>	A mixed <i>Salix</i> shrubland along the floodplain of the Sand R. The dense <i>Salix</i> cover (about 90%) results in little understory. There were patches of <i>Calamagrostis canadensis</i> that became more prominent towards the edge of the stand, but <i>Aulacomnium palustre</i> was the dominant understory species. Few others species were present, and all with low cover.	Raup documents similar dense willow thickets in the CM, with <i>S. bebbiana</i> dominant ¹⁶ . Likely a widespread CT, although not well documented.
S14	<i>Salix planifolia</i>	Dense, young stand of willow in a narrow strip along lakeshores, forming a definable line. Often with no distinctive understory, but <i>Calamagrostis canadensis</i> is prominent in some areas. Found along the east shore of Gardiner L.	Also noted in CM ²³ . Likely a widespread type, but not well documented.

No.	Community	Description and Location	Community Distribution and Significance*
S15	<i>Salix planifolia</i> / <i>Calamagrostis canadensis</i>	Open <i>Salix</i> shrubland dominated by <i>S. planifolia</i> . Other <i>Salix</i> spp. may be present with low cover, although in one location <i>S. glauca</i> was co-dominant. Hummocky, with standing water in the hollows and <i>Calamagrostis canadensis</i> hummocks. The water table is at or near the surface and the sites likely subject to periodic flooding. Often adjacent to a <i>Calamagrostis canadensis</i> dominated wet meadow CT (H1). Found in a number of sites in BMWPP, including several locations along the shore of Gardiner L. and extensive areas along the Birch R.	<i>Salix planifolia</i> / <i>Calamagrostis canadensis</i> CTs have been documented in the Peace-Athabasca Delta ¹⁶ , A similar community is documented in CM but it lacked a <i>Salix glauca</i> component ²³ . This may be a widespread boreal CT, but has not been well documented.
S16	<i>Salix petiolaris</i> – <i>Alnus incana</i> ssp. <i>tenuifolia</i> / <i>Calamagrostis canadensis</i>	A shrubland forming a narrow strip along a 1m high ice push ridge along the sandy shore of Birch L.	A <i>Salix petiolaris</i> CT is noted in the Peace-Athabasca Delta ³⁴ from similar habitat (basins and levee back slopes). May be a widespread boreal CT, but has not been well documented
Woodland / Forest Communities			
W1	<i>Betula neoalaskana</i> – <i>Picea glauca</i> mixedwood	Mixedwoods dominated by birch and spruce were found in two locations in BMWPP. Both were mature stands. One was on a level site along the west shore of Gardiner L. Prominent understory species included <i>Ledum groenlandicum</i> , <i>Equisetum sylvaticum</i> , and <i>Vaccinium vitis-idaea</i> with mounds of <i>Pleurozium schreberi</i> and some <i>Sphagnum angustifolium</i> . A second site was on the tip of an island in Big Island Lake. In this site, <i>Abies balsamea</i> was present in the understory but <i>Cornus canadensis</i> and leaf litter were the dominant groundcover.	A mixed stand was documented in the CM ²³ similar to the Gardiner L. stand, but these types of mixedwoods are not well studied, so more inventory is needed to define types and to determine their significance.
W2	<i>Betula neoalaskana</i> – <i>Populus tremuloides</i> / <i>Salix bebbiana</i>	A mixed deciduous CT noted on a north-facing hill at the south end of Big Island Lake.	A similar mixed stand was documented in the Alberta Foothills ³⁹ , but understory species are different. Birch dominated communities tend to be small in area and scattered in occurrence. They are not well studied, so more inventory is needed to define types and to determine their significance

No.	Community	Description and Location	Community Distribution and Significance*
W3	<i>Betula neoalaskana</i> / <i>Equisetum sylvaticum</i>	A closed stand of <i>Betula neoalaskana</i> (75% cover) found mid-slope on a west-facing slope on the east side of Big Island Lake. Minor shrub component, although scattered <i>Picea glauca</i> forms an open understory (5% cover). <i>Equisetum sylvaticum</i> dominates the herb layer, with no other species prominent. Patches of <i>Hylocomium splendens</i> and some <i>Pleurozium schreberi</i> present.	A similar stand was noted at MR ³⁶ and at CM ²³ . <i>Betula</i> sp. CTs with an understory dominated by <i>Equisetum</i> spp. are found on rich sites throughout the boreal in Alberta. The types documented however often are mixed birch – poplar CTs with <i>Equisetum arvense</i> and/or <i>E. pratense</i> the dominant understory species. More inventory is needed to define birch types and to determine their significance.
W4	<i>Betula neoalaskana</i> / <i>Rosa woodsii</i> / <i>Leymus innovatus</i>	A small, mature stand restricted the south face of a 3 m high bank back from the west shore of Gardiner Lake.	<i>Betula</i> stands with a significant <i>Leymus innovatus</i> component were also noted at LaB ²⁵ .
W5	<i>Betula neoalaskana</i> / <i>Ledum groenlandicum</i> / <i>Cornus canadensis</i>	Young successional stand in a burn area between Gardiner and Big Island lakes.	Similar <i>Betula</i> stands with high cover of <i>Ledum groenlandicum</i> in the understory have been noted in MGT ³⁶ and CM ²³ . Those stands however generally had a significant <i>Vaccinium</i> component, that was lacking at BM.
W6	<i>Betula neoalaskana</i> / <i>Picea glauca</i>	Mature <i>Betula</i> stand with a distinct tall shrub to second canopy layer of <i>Picea glauca</i> . Situated on a point where the Sand River flows into Gardiner Lake.	A disturbed site that appears to be regularly used as a campsite. Much of the undergrowth has likely been cleared.
W7	<i>Betula neoalaskana</i> / <i>Vaccinium vitis-idaea</i>	A stand on a point on the east shore of Gardiner Lake.	A disturbed stand that has been used as a campsite.
W8	<i>Larix laricina</i> / needle cover	A dense pocket of <i>Larix</i> was noted on the west shore of Gardiner Lake. There was <i>Salix bebbiana</i> at the edge of the stand, but the interior was primarily needle cover with a sparse feather moss layer (5%). <i>Vaccinium vitis-idaea</i> , in scattered patches, was the only other vascular plant noted.	<i>Larix laricina</i> dominated stands were not common in the Birch Mountains and those noted were small patches. This is likely a common type in Alberta, although not well documented in the literature.
W9	<i>Picea glauca</i> / <i>Equisetum arvense</i>	Mature, small patch noted on a levee along a small creek that flows into the east shore of Gardiner Lake.	<i>Picea glauca</i> / <i>Equisetum</i> riparian communities are widespread and well documented, although not common in BMWPP. This CT and the following (W10) would fit in the CNVC 418 <i>Picea glauca</i> / <i>Equisetum</i> (<i>arvense</i> - <i>pratense</i>) Forest considered a small to medium patch forest found on river floodplains and upland seepage sites in Saskatchewan, Alberta, British Columbia and southern Yukon Territory ⁴⁰ .

No.	Community	Description and Location	Community Distribution and Significance*
W10	<i>Picea glauca</i> / <i>Equisetum pratense</i>	Mature stand on a levee along the Sand R.	A widespread CT associated with rich, subhygric sites ⁴⁰ but not common in BMWPP, as discussed above in CT9.
W11	<i>Picea glauca</i> / <i>Equisetum sylvaticum</i>	One stand noted on a levee on the west shore of Gardiner Lake and another on the north shore of Namur Lake. Both were mature, pure <i>Picea glauca</i> stands with the understory strongly dominated by <i>Equisetum sylvaticum</i> , although the Namur Lake site had bigger trees and a well-developed moss layer of primarily <i>Ptilium crista-castrensis</i> . A third stand on a levee back from the Sand R. had a significant moss cover dominated by <i>Pleurozium schreberi</i> but with patches of <i>Hylocomium splendens</i> .	The <i>Picea glauca</i> / <i>Equisetum</i> spp. stands, (W9, W10, W11) were all associated with similar riparian, rich, subhygric sites, but in each case a different species of <i>Equisetum</i> was clearly dominant. CNVC treats those with high cover of either <i>Equisetum arvense</i> or <i>E. pratense</i> as the same type, but <i>E. sylvaticum</i> was not a component of any of those stands ⁴⁰ . CT W11 may simply be a variant of this, although Corns (1983) ⁴¹ suggested <i>E. sylvaticum</i> may be associated with a lower pH than the other <i>Equisetum</i> species.
W12	<i>Picea glauca</i> / <i>Hylocomium splendens</i>	A closed, mature forest with little understory other than a high feather moss cover, dominated by <i>Hylocomium splendens</i> , although <i>Pleurozium schreberi</i> is also prominent. Three stands were looked at, one on a levee on an island in Namur L., one a small patch south of Big Island L., and the third on a terrace on the east side of Gardiner L.	Although <i>Picea glauca</i> stands were not common in BMWPP, <i>P. glauca</i> / feathermoss CTs are a widespread boreal type ²⁸ and were also noted in CM. This CT would fit in the CNVC ⁴⁰ 422 <i>Picea glauca</i> (<i>Pinus contorta</i>) / <i>Hylocomium splendens</i> Forest, a matrix late seral forest community found in British Columbia, Alberta, Saskatchewan and Yukon Territory.
W13	<i>Picea mariana</i> / feather moss	A closed, mature forest with <i>Pleurozium schreberi</i> the dominant feather moss in some stands, but often co-dominant with <i>Hylocomium splendens</i> . <i>Vaccinium vitis-idaea</i> , <i>Equisetum sylvaticum</i> and <i>Cornus canadensis</i> were often associated with this CT in the CM ^{lee+CM} and this was also found in BMWPP. Patches of this CT were noted around Gardiner L. and at the NE end of Sand L.	This appears to be a CT found across northern Alberta on unburned sites ^{17, 19, 42} and into the NWT ⁴² . Also noted at MR ⁴² , FGW ¹⁴ and CM ^{15, 23} . This CT fits well within the CNVC ⁴⁰ type 429 <i>Picea (glauca - mariana)</i> / <i>Hylocomium splendens</i> Forest, a large patch or matrix forest community in Alberta and Saskatchewan, although generally found only as small patches in BMWPP, possibly due to the fire history of the site.
W14	<i>Picea mariana</i> / feather moss – <i>Cladina mitis</i>	A patchy, old growth <i>Picea mariana</i> forest found in the Whyetnow L. area. Well developed hummocks up to 1 m high. <i>Cladina mitis</i> and <i>Pleurozium schreberi</i> the dominant understory species.	A similar type is fairly widespread in the Caribou Mountains and occurs on well-drained mineral soils ²³ .

No.	Community	Description and Location	Community Distribution and Significance*
W15	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> / <i>Rubus chamaemorus</i> / <i>Sphagnum fuscum</i>	A hummocky <i>Picea mariana</i> CT of small trees (average height 4 m). Sites were noted north of Gardiner L. along the east shore and west shore of Gardiner L., east of Sand L. and in the Whyetnow L. area. <i>Ledum groenlandicum</i> and <i>Rubus chamaemorus</i> were present in all stands, although often with low cover. <i>Ledum palustre</i> was present in some stands. <i>Sphagnum fuscum</i> is the dominant moss, with <i>Sphagnum capillifolium</i> a secondary species.	A common small to large patch CT in the BMWPP. A widespread boreal type ⁴⁴ that is very similar to the widespread boreal treed bog CT from Alberta and Saskatchewan ^{42,45} . This CT was also noted in CM ²³ and fits within the CNVC ⁴⁰ type 430 <i>Picea mariana</i> / <i>Ledum groenlandicum</i> / <i>Sphagnum</i> spp. Woodland, <i>Rubus chamaemorus</i> sub-association, a small or large patch woodland community of Alberta, Saskatchewan and British Columbia.
W16	<i>Picea mariana</i> / <i>Ledum</i> spp. / <i>Cladina mitis</i>	One stand was visited on the west shore of Gardiner L. It has about 15% cover <i>Picea mariana</i> with scattered patches of <i>Ledum groenlandicum</i> and <i>Ledum palustre</i> but the understory clearly dominated by <i>Cladina mitis</i> . Also noted in the Sand Lake area. Extensive open areas of spruce with lichen understory were noted while flying between Gardiner and Namur lakes.	These may be examples of the classic Boreal Subarctic CT for Alberta, with hummocky topography, open to nearly absent tree cover and small trees. Not widespread in Alberta, it is however a common type in the Boreal Subarctic Natural Subregion ²³ and appears to be widespread in the Upper Boreal Highlands portion of BMWPP.
W17	<i>Picea mariana</i> / <i>Ledum groenlandicum</i> - <i>Salix glauca</i>	A closed stand of <i>Picea mariana</i> north of Gardiner L. The stand had 50% cover of shrubs and trees and a hummocky topography. <i>Tomentypnum nitens</i> and <i>Hylocomium splendens</i> form the dominant ground cover in areas of denser overstory; <i>Arctostaphylos rubra</i> , <i>Salix myrtilifolia</i> and <i>Cladina mitis</i> are prominent in open areas. <i>Betula pumila</i> prominent in spots. Ice hit about 30 cm below surface.	<i>Picea mariana</i> stands with <i>Salix</i> prominent in the understory are likely relatively common throughout the boreal and several different types have been documented. More work needed to document and compare.

No.	Community	Description and Location	Community Distribution and Significance*
W18	<i>Picea mariana</i> / <i>Sphagnum fuscum</i>	A patchy stand of <i>Picea mariana</i> of variable height up to 5 m tall. Hummocky micro-topography with hummocks averaging about 0.5 m and <i>Sphagnum fuscum</i> dominant on hummocks and <i>Cladina mitis</i> and <i>Hylocomium splendens</i> in openings between hummocks. Patches of <i>Ledum groenlandicum</i> and <i>Ledum palustre</i> may be present, separately or together. Found on the north shore of Gardiner L. Although generally vascular species poor, <i>Rubus chamaemorus</i> and <i>Vaccinium vitis-idaea</i> were usually present, and prominent in patches. The stand is underlain by permafrost that is melting at the edges, as indicated by a zone of leaning trees along the lakeshore.	Similar to W15, but a more closed stand with larger trees. The main distinctive feature here is the long-term presence of permafrost and a greater presence of <i>Cladina mitis</i> than in the unfrozen type.
W19	<i>Pinus x murraybanksiana</i> / <i>Vaccinium vitis-idaea</i>	An open stand of <i>Pinus x murraybanksiana</i> was looked at on a sandy terrace on the east shore of Gardiner L. The stand has been used as a campsite, with disturbances such as trampling, tree-cutting, etc. Patches of <i>Ledum groenlandicum</i> and <i>Vaccinium myrtilloides</i> were present, but dwarf shrubs dominate the understory, primarily <i>Vaccinium vitis-idaea</i> , with patchy lichens, mainly <i>Cladina mitis</i> . Other species present include <i>Maianthemum canadense</i> , <i>Cladina rangiferina</i> and <i>Cladina stellaris</i> . A younger stand with dense trees was looked at on a sandy point on the south shore of Big Island L. <i>Vaccinium vitis-idaea</i> was still the main understory species, but needle litter was predominant.	This CT is likely a relatively common Lower Boreal Highland type, but <i>Pinus x murraybanksiana</i> types are not well documented and the Natural Subregion itself is in general not well studied ² . S11 may be an early successional phase of W19. Hummocky moraine with pine on the uplands was flown over, but not visited. The stands on moraine may have different characteristics than W19, which is on sands. Similar to the communities of the Boreal Mixedwood lichen - jack pine ecosite (BMa1) ⁴⁴ .
W20	<i>Populus balsamifera</i> / <i>Viburnum edule</i>	<i>Populus balsamifera</i> stands were common on the hummocky moraine east of Gardiner L. and one small stand was visited north of Sand. L. <i>Rosa acicularis</i> was prominent in all stands, and <i>Viburnum edule</i> was usually significant.	This CT is likely a relatively common Lower Boreal Highland type, but not well documented. Further work is needed on northern <i>Populus</i> stands to define types and determine significance.

No.	Community	Description and Location	Community Distribution and Significance*
W21	<i>Populus tremuloides</i> / <i>Ledum groenlandicum</i>	A mature to old-growth closed canopy stand on the north shore of Namur L. There is a very open tall shrub layer of <i>Salix scouleriana</i> and some <i>Populus tremuloides</i> saplings. <i>Ledum groenlandicum</i> forms a closed low shrub layer. <i>Ptilium crista-castrensis</i> dominates a well-developed bryophyte layer. Few other species are present. A similar small patch that survived the burn was found north of Gardiner L.	A similar CT is documented from one stand in the Dry Mixedwood Natural Region (<i>Populus tremuloides</i> - <i>Picea glauca</i> / <i>Ledum groenlandicum</i> / feather moss CMC8) ⁴⁶ . May be a somewhat restricted boreal type due to burn frequency. Not well documented.
W22	<i>Populus tremuloides</i> / <i>Vaccinium myrtilloides</i>	Three similar <i>Populus tremuloides</i> stands on glaciofluvial sand were looked at. All were open, successional types with a sparse understory. <i>Vaccinium myrtilloides</i> was the most common species of a sparse understory. In one stand, <i>Shepherdia canadensis</i> was prominent and in another <i>Arctostaphylos uva-ursi</i> .	This is a successional type, coming in on poor, submesic sites on sands after a burn. Likely a widespread type, documented in several Boreal Natural Subregions ³⁵ .
W23	<i>Populus tremuloides</i> / <i>Vaccinium vitis-idaea</i>	A closed stand of young <i>Populus tremuloides</i> (50% cover, trees average 4 cm dbh, 5m tall). <i>Vaccinium vitis-idaea</i> was the dominant understory species (30% cover). Other species present include: <i>Cornus canadensis</i> , <i>Equisetum arvense</i> and <i>Epilobium angustifolium</i> .	This is a successional type, coming in on mesic sites on moraine after a burn. Likely a widespread type, but not well documented. May be successional to W24.
W24	<i>Populus tremuloides</i> / <i>Viburnum edule</i> - <i>Rosa acicularis</i>	Open to closed mature <i>Populus tremuloides</i> stands on mesic sites; noted in several locations on the well-drained morainal deposits around Gardiner Lakes. <i>P. tremuloides</i> is dominant, although scattered <i>Picea glauca</i> may be present in the canopy or understory. <i>Viburnum edule</i> is the dominant shrub, with <i>Rosa acicularis</i> prominent to co-dominant. Other species usually present include <i>Cornus canadensis</i> , <i>Epilobium angustifolium</i> and <i>Linnaea borealis</i> . In one stand looked at <i>Vaccinium vitis-idaea</i> was a dominant understory species.	This CT has been documented for the Boreal Highlands (BHd1.2) ⁴⁴ and is likely a common type. It was the most common <i>Populus tremuloides</i> type found in BMWPP.

No.	Community	Description and Location	Community Distribution and Significance*
W25	<i>Populus tremuloides</i> - <i>Picea glauca</i> / feather moss	Two Mixedwood stands were inspected, one west of Gardiner L. and the second, an older stand north of Namur L. Both stands had a sparse shrub layer, dominated by <i>Rosa acicularis</i> and a well-developed feather moss layer, with <i>Hylocomium splendens</i> dominant. <i>Vaccinium vitis-idaea</i> and <i>Linnaea borealis</i> were present in both, but <i>Linnaea borealis</i> was a dominant understory species with high cover (40%) in the Gardiner L. stand.	Mixedwoods were not common in BMWPP, perhaps due to the fire frequency. Similar types however are widespread in the Boreal. The BMWPP type fits with the <i>Populus tremuloides</i> - <i>Picea glauca</i> / feather moss described for the Boreal Mixedwood ⁴⁴ .

* The following abbreviations are used in the comments:

BC = British Columbia

BMWPP = Birch Mountains Wildland Provincial Park

CC = Colin-Cornwall Lakes Wildland Provincial Park

CM = Caribou Mountains

CNVC = Canadian National Vegetation Classification

CS = Canadian Shield Natural Region

CT = community type

LaB = La Butte Creek Wildland Provincial Park

MR = Maybelle River Wildland Provincial Park

MGT = Marguerite River Wildland Provincial Park

NWT = Northwest Territories

RRD = Richardson River Dunes Wildland Provincial Park

WBNP = Wood Buffalo National Park

Appendix 5. Gallery of Communities (all photos by L. Allen except as otherwise noted).



A6. *Sparganium angustifolium*



B2. *Sphagnum riparium* - *S. angustifolium* (Photo by J.D. Johnson)



H1. *Calamagrostis canadensis*



H2. *Carex aquatilis*



H5. *Carex limosa* / *Sphagnum angustifolium*



H9. *Equisetum fluviatile* (Photo by J.D. Johnson)



S9. *Chamaedaphne calyculata* – *Andromeda polifolia* / *Sphagnum fuscum*



S10. *Ledum groenlandicum* – *Ledum palustre* / *Sphagnum* spp



S13. *Salix glauca* - *S. bebbiana* - *S. planifolia* - *S. arbusculoides*



W3. *Betula neoalaskana* / *Equisetum sylvaticum*



W8. *Larix laricina* / needle cover



W15. *Picea mariana* / *Ledum groenlandicum* / *Rubus chamaemorus* / *Sphagnum fuscum*