MANITOBA FOREST ECOSYSTEM CLASSIFICATION
MANITOBA MODEL FOREST STUDY AREA

FIELD SURVEY SUMMARY-PROJECT 93-2-4

Manitoba Forest Ecosystem Classification

Manitou Abi Model Forest Study Area
- A Field Survey Summary -

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1.0 Introduction

Geomatics International Inc. has conducted a field survey of forest communities within the Manitou Abi Model Forest, as part of the preparation of a first approximation of an ecological forest site classification field guide for the Province of Manitoba. The province has expressed interest in developing and implementing a site classification system for several years. Furthermore, Abitibi-Price Inc., being one of the major forest products companies operating in Manitoba, has also expressed interest in having a forest site classification system developed and suitable for its forest management licence areas.

Prior to the survey, a draft field guide of forest ecosystems for Manitoba was prepared, based on available information. The major sources of quantitative data were pilot studies in the Duck Mountains, the Sandilands Provincial Forest and from the Nelson River area. These were supplemented by original data on forest communities and associated soil characteristics previously sampled by Geomatics in north-central Manitoba.

The field guide generally follows the forest classification system developed for the adjacent northwestern Ontario (NWO FEC). In previous testing of the NWO FEC in Manitoba, vegetation type descriptions were found quite effective in describing Manitoba forest types, although certain indicator species (*e.g. Aster ciliolatus, Arctostaphylos uva-ursi*) were different, particularly on sites in the south. On the basis of initial soil testing it appeared that deep soil descriptions were quite stable, particularly the fine clay and silt textured sites and the coarser, sandy textured sites.

Based on the literature review and analysis, a number of changes to forest and soil descriptions and associated keys have been proposed, in order to reflect the specifics of the Manitoba conditions. The literature review has also enabled identification of specific data gaps in the classification. This information was used to develop a field program to address the present data requirements. The survey of forest communities of the Manitou Abi Model Forest constitutes an integral part of this process.

The objective of the survey was twofold: 1) to collect additional data on forest community and soil types; and, 2) to test the effectiveness and robustness of the preliminary Manitoba FEC Classification System. It also provided an opportunity to discuss, with local knowledgeable personnel, various problems related to practical aspects of the classification system. The results of the survey will be used to further improve and refine the vegetation and soil keys and descriptions for the Manitoba FEC.

2.0 Methods

The goal of the sampling program was to collect representative, quantitative data on forest communities and soil types occurring in the Manitou Abi Model Forest area. An attempt was made to sample all observed combinations of forest cover and soil/substrate types and to distribute sampling plots in all geographical areas.

Potential sampling locations were identified following suggestions of the Abitibi-Price in Pine Falls and the Manitoba Department of Natural Resources in Beausejour forestry personnel, initial air photo interpretation and an analysis of FRI and soil maps for the area. The remaining locations were identified successively, as they were encountered in the field. The area was accessed using the existing road network. Field sampling took place between July 4 and July 26, 1992.

At the identified sites, a complete vegetation, soil and site evaluations were conducted. The process was consistent with that carried out previously in Manitoba by Geomatics, as part of the NWO FEC testing program. To be sampled, forest stands had to meet the criteria of size, age, homogeneity and lack of disturbance. In terms of size, stands represented mappable units, at least 100m^2, but usually were much larger. They were at least 40 years old. Homogeneity related to relative continuity of vegetation physiognomy, substrate and topography. The stands were also relatively free of recent disturbance, such as fire, extensive logging, flooding or insect damage. Plots were located at various distances from roads, usually up to 200 metres.

The standard plot size was 10 by 10 m. Distances were measured using a nylon rope. The four corner trees were marked with a flagging tape and the centre tree double-flagged and labelled with a plot number. At the sampling location, the forest edge at the road was also flagged. Plot locations were marked on air photo mosaics and the Manitou Abi Model Forest Land Status map.

Within each designated plot, a representative area was chosen and a 1x1x1 metre soil pit was excavated, exposing developed soil horizons. Each pit was photographed and the soil horizons were logged for thickness, colour, texture, pH and presence/absence of mottles based on the SOIL data sheets. At sites with suspected organic soils or high water tables, a surface plug (approx 0.5m x 0.5m) was removed and a pit was excavated to the water table. A Dutch auger was then utilized within the hole to examine material to a depth of 120 to 140 cm. Field texturing was performed on all horizons in mineral soils and the Von Post decomposition scale was used for organic material. All soil pits were filled in following classification.

The information on site characteristics, vegetation and soil was collected for the majority of the sampled plots. Occasionally, on rock outcrop sites where very thin or no soils were found, only the vegetation and site data were collected. Slide photos of the vegetation and soil pit were taken at each plot.

The qualitative and quantitative data were recorded on standard field data sheets. The SITE information included the following parameters:

- plot number and date
- surveyor(s) names
- general location and township
- FRI stand number
- tentative vegetation name
- soil moisture regime and drainage
- humus form and soil type
- plot position (*e.g.* crest, upper slope, middle slope, *etc.*)
- slope (°) and aspect
- microtopography (*e.g.* smooth, slightly mounded, moderately mounded, *etc.*)
- site surface shape (convex, concave or straight)
- forest floor characteristics (*e.g.* %cover of moss, litter, wood, stones, *etc.*)
- an outline of a plot's location along the local toposequence
- schematic outline of the soil profile

The VEGETATION data sheet included a general description of various structural and floristic characteristics of the community, as well as the following:

- list of vascular and cryptogam species occurring within the plot
- cover-abundance of each species using the scale:

P	(less than 1%)
+	(1 to 5%)
1	(6 to 15%)
2	(16 to 25%)
3	(26 to 35%)
4	(36 to 45%)
5	(46 to 55%)
6	(56 to 65%)
7	(66 to 75%)
8	(76 to 85%)
9	(more than 86%)

- species cover-abundance was estimated in the following strata:
  - main canopy & dominant trees
  - secondary trees
  - tall shrubs (2-10m)
  - low shrubs (0.5 to 2m)
  - dwarf shrubs (<0.5m)
  - broadleaf herbs and graminoids
  - mosses & lichens

The SOIL data sheet consisted of standard soil description information including:

- horizon designation (depth, thickness, texture, colour, mottle colour)
- soil moisture regime
- soil drainage class
- coarse fragment estimation
- seepage and watertable indications
- mode of deposition/accumulation
- forest humus form
- soil classification

3.0 Results and Discussion

A total of one hundred plots were sampled (Figure 1), representing 25 V-Types and 18 S-Types. The maximum number of plots from a particular V-Type was 10. If this threshold was attained, sampling of that type was discontinued. This ensured that the widespread community types were not oversampled.

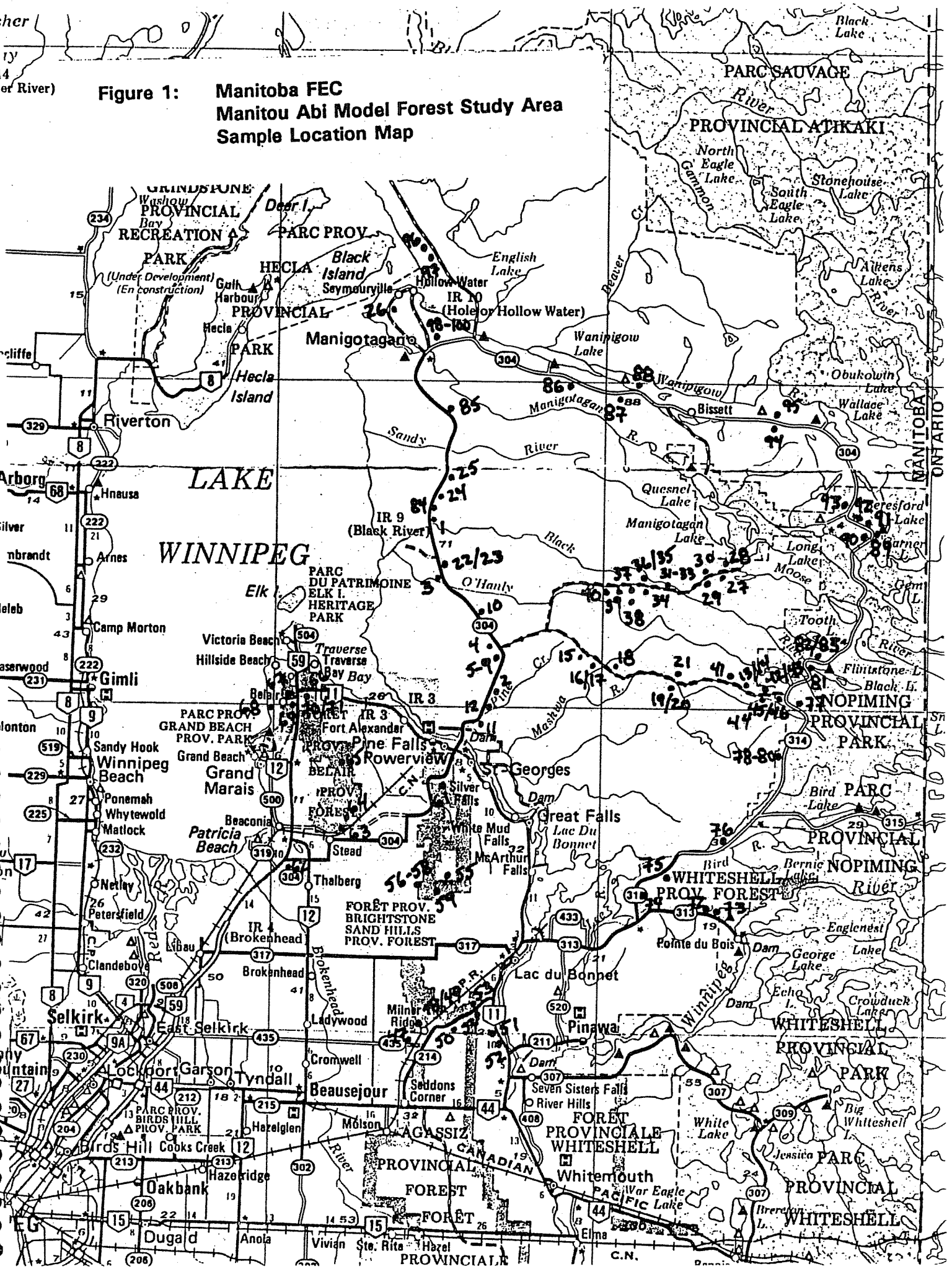
Approximately one quarter of the plots were sampled in the southwestern portion of the Model Forest, where agriculture plays an important role, with the remainder located in the central and northern portions, which are most suited for forestry and recreational pursuits.

The majority of plots represented forests from the conifer (66 plots) and hardwood group (25 plots), while 9 plots were sampled in conifer mixedwoods. The most common types included:

• Mainly Hardwoods	Trembling Aspen/Balsam Poplar (V1) Black Ash bottomland (V2) Trembling Aspen (V5)
• Conifer Mixedwoods	Jack Pine/Trembling Aspen (V17, V18)
• Conifer	Tamarack swamp (V23) Jack Pine/Feathermoss (V29) Jack Pine/Lichen (V30) Jack Pine-Black Spruce/Feathermoss (V32) Black Spruce/Labrador Tea/Feathermoss (V34) Black Spruce/Sphagnum muskeg (V38)

Approximately 75% of the S-Types can be defined by four texture regimes. Twenty percent of the soils were classified as S1 and S2 (Dry/coarse sandy and Fresh/fine sandy). These are typically brunisols on upland sites, associated with stands of jack pine, white birch, bur oak, and

Figure 1: Manitoba FEC
Manitou Abi Model Forest Study Area
Sample Location Map



trembling aspen. Fifteen to 20% are classified as Moist/silty-silt loamy to Moist/fine loamy-clayey (S9 and S10) found mainly in low-lying mineral soils categorized as luvisols or gleysols with minor brunisols. These soils are associated with black ash, balsam poplar, trembling aspen and black spruce communities. A full 25% of sampled sites were organic soils (S12F and S12S). These represent very poorly drained lowland black spruce, tamarack or black ash stands. Finally, 12% of the sites consisted of exposed bedrock knobs with little to no soil development. These are considered to be S-Type SS1 (discontinuous organic mat on bedrock) and are marked by open jack pine stands with abundant lichens and mosses on bedrock.

Table 1 provides a preliminary listing of the vegetation types and soil types sampled in the study area. It can be noted that some of the plots have been assigned double V-Types. They are the cases where the Manitoba key criteria differed from the Ontario's and these will be looked at more closely with the aim to fine-tune the identification key.

In conclusion, the survey of forest communities in the Model Forest area has fulfilled its two major objectives. The data collected have significantly supplemented the literature information. Further data on the Manitoba V-Types already included in the draft guide and also information on new V-Types, not included in the guide, have been sampled. Thus, additional information was gathered on tamarack, trembling aspen and balsam poplar, lowland black spruce and a whole range of jack pine forests. Also, the survey confirmed the presence of black ash stands, not previously included in the key because of a lack of supportive data, and indicated the existence of bur oak forests which, being exclusive to Manitoba, will have to be added to the key, along with a new factsheet description.

As for the second objective of the survey, the key performed well under field conditions. The vast majority of the forest communities keyed out well to their correct V-Types. Still, some changes will be made, with respect to the inclusion of new V-Types, choice of indicator species and improved V-Types descriptions.

Table 1: Manitoba FEC - Vegetation and Soil Types

Sample No.	Vegetation Type	Soil Type
001	lowland BS/feathermoss (V34)	Mesic Fibrisol (S12F)
002	lowland BS/feathermoss (V34)	Fibrisol (S12F)
003	JP-BS/feathermoss (V32)	Eluviated Dystric Brunisol (SS3)
004	Tamarack lowland swamp (V23)	Typic Mesisol (S12F)
005	JP/feathermoss (V32)	Eluviated Dystric Brunisol (SS3)
006	JP on rock (V31) *(V30)*	nonsoil - bedrock (SS1)
007	lowland BS/feathermoss (V34)	Terric Fibric Humisol (S12F)
008	mesic Aspen shrub/herb rich (V5)	Gleyed Gray Luvisol (S10)
009	JP/feathermoss on rock (V32)	nonsoil - bedrock (SS1)
010	lowland BS/Lab.tea (V37 or 38)	Terric Humisol (SS9)
011	BP-BA-shrub rich (V1)	Gleyed Gray Luvisol (S9)
012	bottomland BA (V2)	Orthic Luvic Gleysol (S10)
013	JP/feathermoss (V32)	Eluviated Dystric Brunisol (S1)
014	JP/lichen on rock (V30)	nonsoil - bedrock (SS1)
015	bottomland BA (V2)	Terric Mesisol (S12S)
016	lowland BS muskeg (V38)	Typic Mesisol (S12S)
017	lowland BS muskeg/swamp (V38)	Terric Fibric Mesisol (S12S)
018	lowland BS swamp (V36)	Humic Mesisol (S12S)
019	WS-BF/feathermoss (V25)	Eluviated Dystric Brunisol (S3/4)
020	upland BS-JP/feathermoss (V32)	Eluviated Dystric Brunisol (S4/6)
021	TA-BP-JP/shrub rich (V1)	Orthic Gray Luvisol (S6)
022	TA-BP-BF (V1)	Gleyed Dystric Brunisol (S10)
023	mixedwood TA-BF/shrub rich (V7)	Eluviated Dystric Brunisol (SS3)
024	TA-BP hardwoods/shrub rich (V1)	Gleyed Dark Gray Luvisol (S10)
025	BS/feathermoss (V34)	Gleyed Dystric Brunisol (SS8)
026	JP/feathermoss (V18)	Eluviated Dystric Brunisol (S1)
027	BS muskeg (V38)	Terric Humic Mesisol (S12S)
028	JP/feathermoss (V29)	nonsoil - bedrock (SS1)
029	JP-BS/feathermoss (V32)	Gleyed Eluviated Dystric Brunisol (S7)
030	JP/moss lichen on rock (V32) *(V30)*	nonsoil - bedrock (SS1)
031	cnf mxwd/shb pr/feathermoss (V18)	Gleyed Gray Luvisol (S10)
032	JP/feathermoss (V17)	Eluviated Dystric Brunisol (S2)
033	JP/lichen on rock (V30) parkland	nonsoil - bedrock (SS1)
034	JP/feathermoss (V32)	Gleyed Eluviated Dystric Brunisol (S9)
035	JP/lichen on rock (V31) *(V30)*	nonsoil - bedrock (SS1)
036	BS/feathermoss (V34)	Cumulic Dystric Brunisol (SS5/SS9)
037	BS muskeg (V38)	Fibric Humisol (S12S)
038	JP/feathermoss (V30)	Typic Folisol (SS8)
039	JP/feathermoss (V34) *(V32)*	Gleyed Eluviated Dystric Brunisol (S7)
040	Tamarack swamp (V23)	Fibric Humisol (S12S)
041	TA/shrub rich/herb rich (V5)	Eluviated Gleyed Gray Luvisol (S8)
042	JP/feathermoss (V32) *(V29)*	Eluviated Dystric Brunisol (S2)
043	JP/lichen-feathermoss (V31) *(V30)*	nonsoil - bedrock (SS1)
044	BS/feathermoss (V34)	Orthic Luvic Gleysol (S10)
045	WS-BF/feathermoss (V25)	Gleyed Dystric Brunisol (SS8)
046	JP-BS/feathermoss (V29) *(V33)*	nonsoil - Folisol on bedrock
047	BS/shrub-herb rich (V34)	Terric Mesisol (S12S)

Manitoba FEC - Vegetation and Soil Types (con't...)

Sample No.	Vegetation Type	Soil Type
048	WB/shrub rich (V4)	Eluviated Dystric Brunisol (S2)
049	bottomland BA (V2)	(fera) Humic Gleysol (S8)
050	TA/shrub rich (V5)	Eluviated Dystric Brunisol (S2)
051	lowland Tamarack (V23)	Terric Fibrisol (S12F)
052	BP (V1)	Orthic Humic Gleysol (S10)
053	bottomland BA (V2)	Terric Mesisol (S12F)
054	Tamarack/shrub herb rich (V23)	Terric Humisol (S12F)
055	JP/rich shrub and herb (V28)	Eluviated Dystric Brunisol (S1)
056	BS/feathermoss (V34)	Terric Mesisol (S12F)
057	Tamarack (V23)	Orthic Gleysol (S8)
058	TA-BP/shrub herb rich (V1)	Gleyed Gray Luvisol (S10)
059	TA (V5)	Eluviated Dystric Brunisol (S1)
060	JP/feathermoss (V29)	Eluviated Dystric Brunisol (S1)
061	lowland Tamarack (V23)	Mesic Fibrisol (S12F)
062	lowland BS/shrub rich/sphag (V36)	Terric Humisol (S12F)
063	JP/Shrub rich/feathermoss (V29)	Eluviated Dystric Brunisol (S1)
064	TA (V5)	Orthic Gleysol (S7)
065	JP/feathermoss (V29)	Orthic Dystric Brunisol (S1)
066	WB-BF-WS/shrub rich (V6/14/8)	Calcareous black Chernozem (S10)
067	WS-BF mixedwood (V15)	Calcareous Black Chernozem (S2)
068	Bur Oak forest (V???)	Eluviated Dystric Brunisol (S1)
069	WB hardwoods (V4)	Eluviated Dystric Brunisol (S2)
070	JP/lichen (V30)	Eluviated Dystric Brunisol (S2)
071	JP/feathermoss (V29)	Eluviated Dystric Brunisol (S2)
072	TA/shrub rich *(V1)*	Gleyed Eluviated Dystric Brunisol (S5)
073	JP/shrub rich (V28)	Orthic Dystric Brunisol (SS6)
074	WS/shrub rich (V24)	Gleyed Gray Luvisol (S6)
075	TA-WS/shrub rich (V8)	Orthic Gleysol (S10)
076	BA (V2)	Fera Humic Gleysol (S8))
077	BS/feathermoss (V33)	Orthic Dystric Brunisol (SS3)
078	BS muskeg (V38)	Mesic Humisol (S12S)
079	BS/Lab Tea/feathermoss-sphag (V36)	Humisol (S12S)
080	Tamarack (V23)	Mesic Humisol (S12S)
081	BS/feathermoss (V33)	Orthic Luvic Gleysol (S7)
082	JP/feathermoss (V29)	Eluviated Dystric Brunisol (SS5)
083	JP/lichen (V30)	nonsoil - bedrock (SS1)
084	bottomland BA (V2)	Orthic Gleysol (S10)
085	bottomland BA (V2)	Terric Mesisol (S12F)
086	mixed JP-TA/feathermoss (V18)	Gleyed Gray Luvisol (S10)
087	JP/feathermoss (V29)	Orthic Brunisol (SS5)
088	BS mixedwood/shrub rich (V19)	Orthic Gleysol (S10)
089	TA mixedwood/shrub rich (V8)	Orthic Gleysol (S10)
090	JP/lichen-feathermoss (V30)	nonsoil - bedrock (SS1)
091	JP/feathermoss (V32)	Eluviated Dystric Brunisol (SS7)
092	JP-BS-TA/feathermoss (V17/18)	Gleyed Brunisolic Gray Luvisol (S1)
093	Tamarack-BS/sphag (V23)	Fibric Mesisol (S12S)
094	JP/feathermoss (V29)	nonsoil - bedrock (SS1)

Manitoba FEC - Vegetation and Soil Types (con't...)

Sample No.	Vegetation Type	Soil Type
095	BS/feathermoss (V34)	Fera Gleysol (S12F)
096	Tamarack/shrub rich/sphag (V23)	Humic Mesisol (S12S)
097	JP/lichen (V30)	nonsoil - bedrock (SS1)
098	JP/shrub poor (V28)	Gleyed Dystric Brunisol (S1)
099	JP-TA/shrub herb rich (V17)	Cumulic Regosol (S5/S8)
100	TA (V5)	Gleyed Gray Luvisol (S10)

BA - black ash
BF - balsam fir
BP - balsam poplar
BS - black spruce
JP - jack pine
TA - trembling aspen
WS - white spruce
WB - white birch

V-types in italics indicates *Ont FEC key* vs. Man FEC key