Contents

Introduction

Species Inventory Along an Ancient Portage Trail
McKay Brook- Gordon Meadow Brook Portage
Via a Partnership Between
Canoe Kayak New Brunswick and the Miramichi Naturalists' Club

Background:
Canoe Kayak New Brunswick (CKNB) initiated a project in February 2008 to restore 6 ancient portage trails in New Brunswick as a result of an initial meeting with Kevin Silliker, Tim Humes and Robert Doyle, all from the Miramichi area. Work on the ground began in 2010 on the McKay Brook-Gordon Meadow Brook portage. The three (3) kilometer McKay Brook-Gordon Meadow Brook portage connects the Miramichi and Nepisiguit watersheds. This portage trail, serving as a bridge between the watersheds, made it possible for the aboriginal peoples from Metepenagiag and Pabineau to have contact for hundreds of years, if not longer. Metepenagiag, via archeological work, demonstrates a history of 3,000 years.

The McKay Brook-Gordon Meadow Brook ancient portage is unique due to its connecting waterways. The 23 km Gordon Meadow Brook on the north end of the portage, bridges connection with the Nepisiguit River. The water/canoe route on the south end of the portage involves a number of connecting waterways: McKay Brook to Portage River to the Northwest Miramichi which in turn meets the Southwest Miramichi at Beaubears Island in the City of Miramichi.

Introduction:
As a result of the restoration work on the ground and in recognition of the portage trail itself being a part of the natural environment, a vision began to formulate whereby the ancient trail could become a resource for ecological education via a flora and fauna inventory. So much of New Brunswick history has evolved from its natural resources; that is, its waterways and forests. Consequently, the extended vision was to use this section of forest to provide a sample of the interconnectedness and inter-dependence in nature. An ancient portage is an almost perfect setting. An ancient portage trail is a bridge between waterways and people.

Canoe kayak NB (CKNB) approached and eventually partnered with the Miramichi Naturalists Club (MNC). The talented human resources from CKNB and MNC, armed with purpose and the much valued grant from the Wildlife Trust Fund (WTF) proceeded with the task to complete a species inventory.

In short, the species inventory has several general objectives:

- to value the natural world for itself
- to illustrate the importance of understanding the interdependency of species in the natural world and hence, the need for such knowledge when there is potential human intervention
- to make available a resource for experiential learning for the general public, visitors to the province and for provincial school districts. The goal of the public school system to employ the 'Enrichment Model' of teaching has an ideal fit with this resource.
- to entice people to employ 'feet on the ground' to experience the outdoors and hence, enhance active living for New Brunswickers
- to provide a foundation resource that will be dynamic; that is, to continue to grow and develop over time

The species inventory has and continues to be compiled by the dedicated work of Dave McLeod and Jim Saunders from the MNC. The quality of their work is not only evidenced by the work to date but also by their commitment to continually update the inventory.

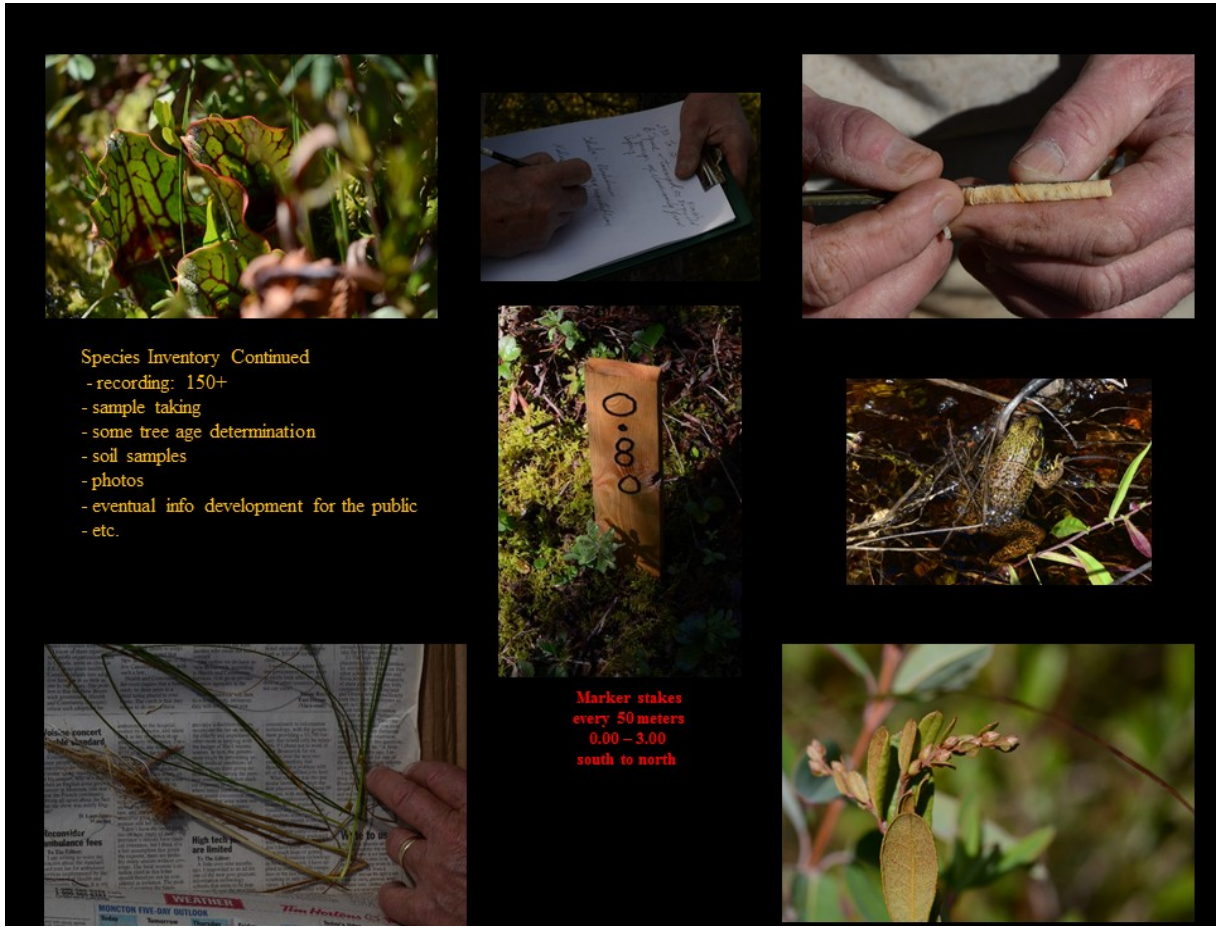
So far, the following six checklists have been produced for this portage trail; three for plant groups and three for vertebrate (with a backbone) animal groups as follows:

Plant Checklists (definitions of each type are provided with each list):

1. Vascular Plants - 142 species
2. Bryophytes (non-vascular) - 16 species
3. Lichens (non-vascular) - 20 species

Vertebrate Animal Checklists:

1. Birds - 24 species
2. Mammals - 9 species
3. Amphibians and Reptiles - 5 and 3 species respectively



Location and Access:

Access to this ancient trail can be made by water/canoe route or exclusively by land. Access by land is by paved roads, logging roads (dirt roads) and an old rail bed.

1. *From City of Miramichi*

Option 1-

From junction of route 430 and Newcastle Blvd

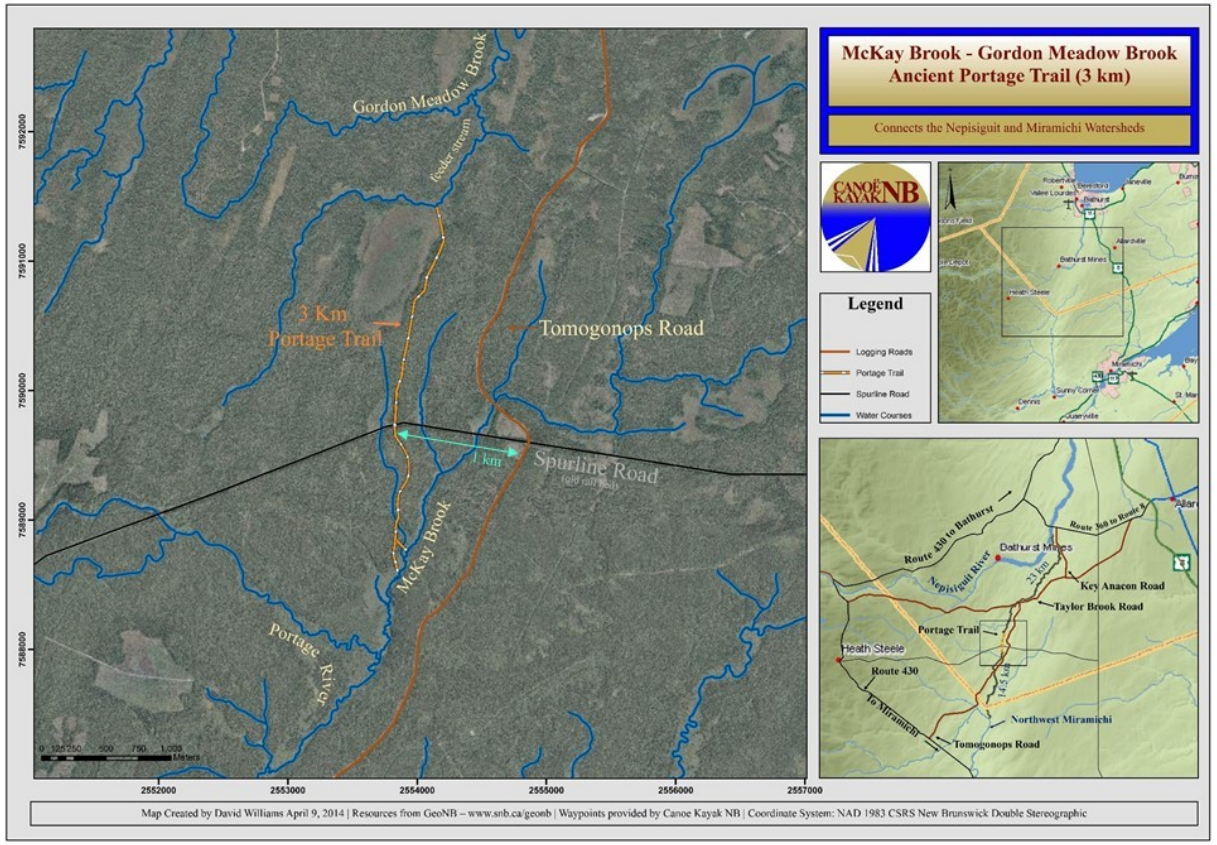
-to Wayerton, across the Northwest Miramichi River	23 km
-turn right onto the Tomogonops Road	9.6 km
(the Tomogonops Road is a logging road, **be prepared to meet logging trucks)**	
-turn left onto The Spurline (will cross 2 bridges on route)	18.5 km
-drive 1 km, park along shoulder area	1 km

Option 2 - (north section of the city)

-assuming arrival at Centennial Bridge, City of Miramichi (former Town of Chatham).

across or near the Centennial Bridge to route 8 to exit to Allardville	54.4 km
-turn left onto route 360 (stop sign)	
-turn left onto the Anacon Road (slow down to see exit)- a logging road	13.8 km
-turn right onto Taylor Brook Road	6.8 km
-turn turn left to Tomogonops Road	7.1 km
-turn right at The Spurline (old rail bed, now a Sentier NB route)	6.6 km
-drive 1 km, park on shoulder area	1 km

The portage trail is right angles to The Spurline: north of the Spurline, the portage trail continues 1.8 km to Gordon Meadow Brook; on the south side, 1.2 km to McKay Brook. (see map below)



Travel across these ancient portage trails is intended <u>only</u> for *foot* travel. The restored trail is maintained through the invaluable dedication of volunteers. Please respect care of the trail with only feet on the ground.

<u>Rewards:</u>

It certainly becomes clear as a living history why both the pole and paddle were proper instruments of travel, not to mention the beauty and simplicity of the canoe developed through the skill and knowledge of aboriginal peoples.

The trial exclusively offers an outdoor experience for an eclectic host of folks: historians, hikers, naturalists, recreationalists, paddlers, students, photographers, geocachers, etc. In short, an ancient trail is an exceptional active living experience. An ancient portage trail is a true link with the past. In today's electronic and speed driven world, travel by foot and/or canoe over these canoe/portage routes is indeed a milieu for thought, reflection and achievement. We invite the citizens of the province and visitors to the province to enjoy this valued resource and to be stewards of our waterways and forests.

Come and experience an ancient trail. Come and observe nature via a species inventory along the McKay Brook-Gordon Meadow Brook ancient portage trail.

Humbly submitted,

Tim Humes,
Co-leader with Kevin Silliker of the CKNB project,
Ancient Portage Trails of New Brunswick.
(506) *622-5050.*

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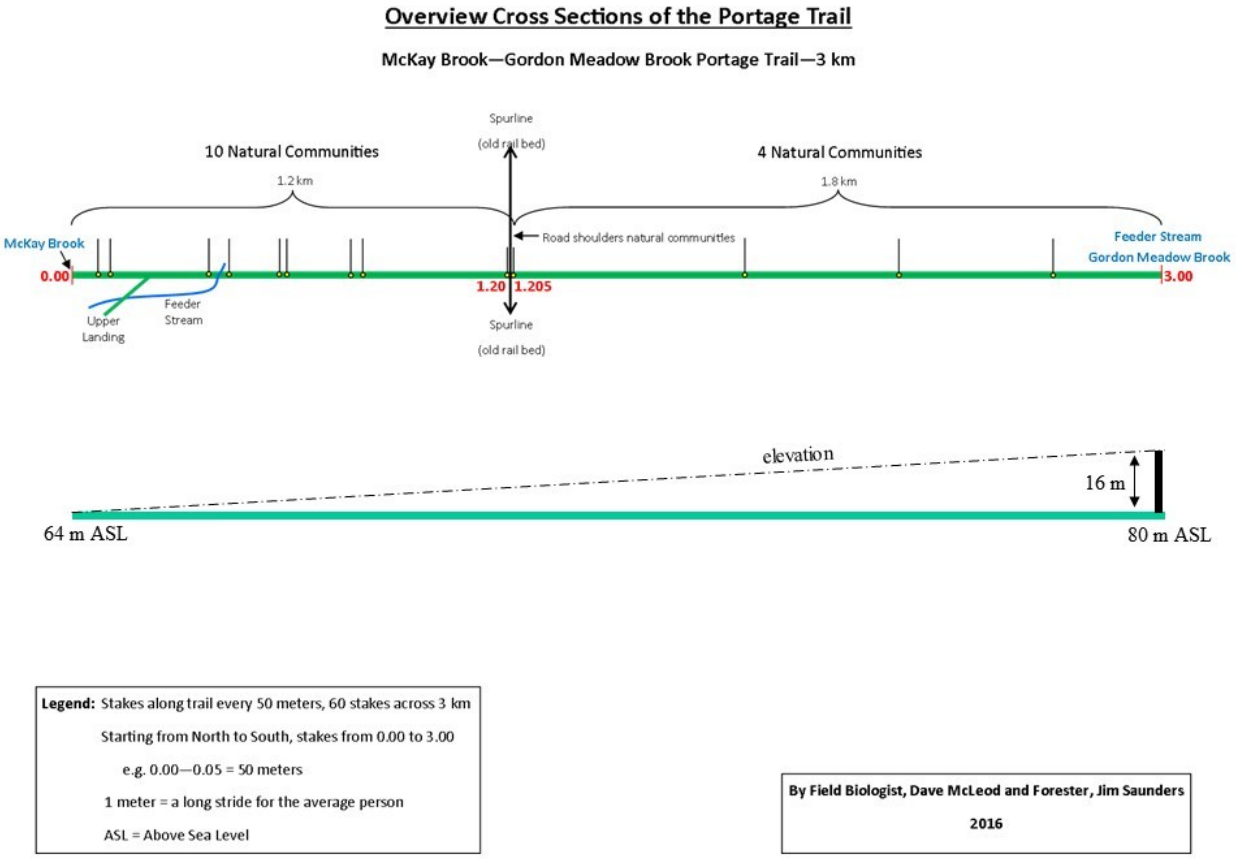
Natural Communities

"Natural Communities" refer to the fourteen (14) communities across the 3 km portage trail that separate sections and/or parts thereof from adjoining sections and/or parts thereof due to theirs more distinct species inventories. The 3 km ancient portage trail is assigned numbers ranging from 0.00 (on the south end of the trail) to 3.00 (north end of the trail). Each "Natural Community" has a distinct start and end measurement utilizing the 3 km distance. In addition, for the reader's convenience, each Natural Community is colour-coded plus given a distinct name indicating the uniqueness of that natural community. For example, "**Tall Shrub – Savannah**", **Natural Community 1**, begins at **0.00** km and ends at **0.073** km and **Transition to Boreal Black Spruce Forest Community 2**, begins at **0.073** km and ends at **0.104** km."



Natural Communities 1 to 10 and Natural Communities 11 to 14.

There are plant parts named in many of the photos linked to the spreadsheets. These plant part names in the photos, will be found in the Glossary. To access the Glossary, go to the top of the document and scroll down to Glossary.

In the top, right-hand corner of each spreadsheet is a table listing the Natural Communities. The Natural Communities' names are color-coded and their colors and their sequence in the table match the colors and the sequence, from left to right, of the Natural Communities in the line labeled "Community locations".

Community locations	1	2	3					4	5		6	7	8	9									10
End of Community (km)	0.073		0.104					0.376	0.435			0.574	0.591		0.760	0.800						0.120	1.205
Start of Community (km)	0.000	0.073	0.104					0.376	0.435			0.574	0.591		0.760		0.800						1.200	
50 meter Section numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
50 m Section ends at	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000	1.050	1.100	1.150	1.200	1.250
50 m Section begins at	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000	1.050	1.100	1.150	1.200
COMMON NAME																									
ASTER FAMILY																									
American Burnweed																									1
Coltsfoot																									1
Common Dandelion																									1
Flat-topped White Aster	1	1										1	1												
Gall-of-the-earth																1									
Grass-leaved Goldenrod																									1
Large-leaved Aster											1														
Pearly Everlasting																									1
Rough-stemmed Goldenrod								1	1																1
Sweet Coltsfoot									1								1								
Tall Hawkweed																									1
Whorled Wood Aster								1		1			1												

Natural Communities
1 - Tall Shrub - Savannah
2 - Transition to Boreal Black Spruce Forest
3 - Boreal Black Spruce Forest 1
4 - Riparian Zones
5 - Boreal Black Spruce Forest 2
6 - Water Receiving Area
7 - Boreal Black Spruce Forest 3
8 - Water Receiving Area
9 - Poor Site Boreal Upland Black Spruce with Jack Pine
10 - Road, Ditches and Shoulders

FLOWERING TIME	SCIENTIFIC NAME
	ASTERACEAE
ISA	*Erechtites hieracifolia*
Sp	*Tussilago farfara*
SpSA	*Taraxacum officinale*
ISA	*Aster umbellatus*
ISA	*Prenanthes trifoliolata*
ISA	*Euthamia graminifolia*
ISA	*Aster macrophyllus*
SA	*Anaphalis margaritacea*
ISA	*Solidago rugosa*
SpeS	*Petasites frigidus var. palmatus*
SeA	*Hieracium piloselloides*
lSeA	*Aster acuminatus*

The "50 meter Section numbers" row provides a number for every 50 meters across the 3 km trail starting from 0.00 on the south side to 3.00 on the north side. The reason is simply to assist a trail visitor because there are numbered stakes indicating one's location every 50 meters.

The families are in alphabetical order on the Species Spreadsheets and in taxonomic order in Appendix I – "Vascular Plants of Gordon Meadow Brook / McKay Brook Portage Trail". The Natural Communities 1 to 10 lie on the south side of the Spurline rail bed while the natural Communities 11 to 14 lie to the north side of the Spurline rail bed.

If you wish to see the vascular plants that have been found in any of the 14 Natural Communities, open either of the links Natural Communities 1 to 10 or Natural Communities 11 to 14.

If you would like to look at the entries for Natural Community 9, "Poor Site Boreal Upland Black Spruce with Jack Pine", Click on the link to Natural Communities 1 to 10 above. Scroll down to see where 1's have been entered in the rows under the red bar at the top with number 9 in it. In those rows where either a 1 or 1's are found, scan to the left to see the common names and to the right to see the flowering times and the scientific

names. A “1” entered in a square indicates that at least one plant of that particular species was found in the 50 meter section. For example, Sweet Coltsfoot was found in the first 50 meter section of this community, section number 17 and Painted Trillium was found in sections 17, 18, 19 and 20.

For more information on each species go to Appendix I where you will find :

F - **F**lowering season as defined by the following symbols:

- **Sp** - **Sp**ring (April to June 21)
- **S** - **S**ummer (June 21 through August)
- **A** - **A**utumn (September to early November)
- **Y** - throughout the **year** (applies only to the non-flowering vascular spore-bearing club-mosses and a few fern species that retain evidence of spores in any season)
- **e** - **e**arly (used as a prefix with any of the three seasons)
- **l** - **l**ate (used as a prefix with any of the three seasons)

I - **I**ntroduced or non-native plant

N – **N**ative plant

subsp. – subspecies

var. – variety

x – hybrid (placed directly before a species name as in **x***triploidea*)

Note that fruit can be seen after the flowering times given, and in some cases will even persist over winter.

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Is it important for non-professional nature enthusiasts to know the names of organisms they encounter in the field?

And if so, why or in what way(s) does it matter?

It's obviously important for list-recording birdwatchers to know the names of birds, but are there other watchers of birds who are not interested in identifying them? And what about less popular subjects such as non-vascular plants, or molluscs, or types of galls (an abnormal growth formed in response to the presence of insect larvae, mites, or fungi on plants), or fossils, etc.? How about inanimate nature such as rocks, weather phenomena, or astronomical objects? Is it possible to not care about the names of things and still be considered a nature enthusiast?

Robert Bateman has lamented that young people today can recognize more than a thousand corporate logos but would be hard-pressed to name a small number of birds or other species of wildlife.
http://cwf-fcf.org/en/discover-wildlife/resources/magazines/canadian-wildlife/so2012/robert-bateman.html
From the same article, Mr. Bateman recalls being dismayed upon hearing his students talk about a tree whose identity they didn't know and didn't care to learn.

In the Roger S. Keyes poem, "Hokusai says" it states, in part:
It doesn't matter if you draw, or write books. It doesn't matter if you saw wood, or catch fish. It doesn't matter if you sit at home and stare at the ants on your veranda or the shadows of the trees and grasses in your garden.

It matters that you care.
It matters that you feel.
It matters that you notice.
It matters that life lives through you.

… and so we pose that the "why" question is worth considering in connection with this species inventory documentation with its identification of various species of flora and fauna.

Note: This is an abridged version of an article written by Robin McLeod, that appeared on page 37 of "The Cardinal, No. 240, Aug. 2015", the quarterly magazine published by Nature London, the McIlwraith Field Naturalists of London, Ontario, Inc.

Motivation

It all begins with the curiosity about the diversity of life with which we share the world.

It then follows with a desire to share one's experience and discoveries with others.

This usually also results in a desire to leave a record for posterity of one's discoveries in the form of photos, specimens destined for a museum, and field notes or databases.

PURPOSES OF IDENTIFICATION

To give a unique name to something perceived to be different from similar-looking objects.

To communicate with others by using either a common or scientific name.

STEPS IN THE IDENTIFICATION PROCESS FOR SCIENTIFIC PURPOSES

Invention of a way to recognize how one organism differs from all other organisms by ranking within a hierarchical system.

Invention of a standardized method of naming each unique organism.

Fortunately, both inventions have already been made. The resulting process is known as *classification*, which involves both ranking and naming systems.

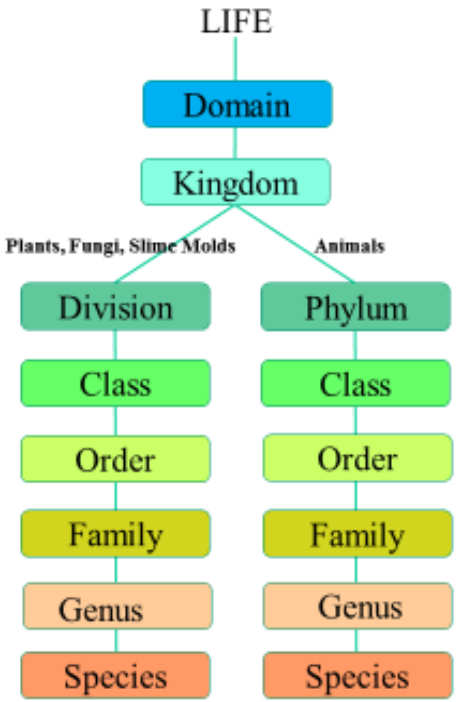
CLASSIFICATION

It's a system of giving every organism a unique status and name that involves placing it in each taxon (scientific term concerned with classification; pl. taxa) of 8 ranks and providing it with a two-part name.

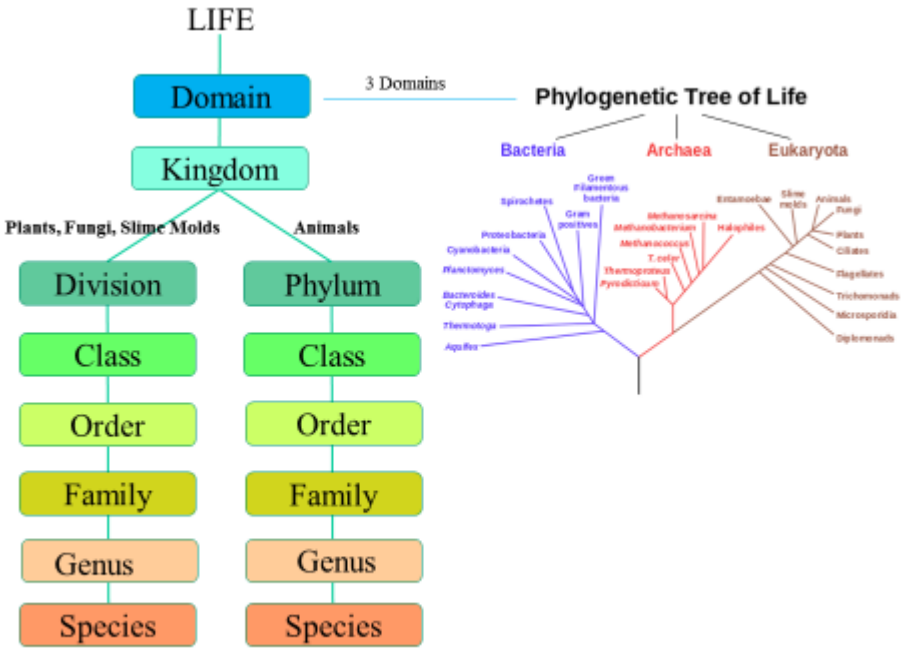
TAXONOMIC ORDER

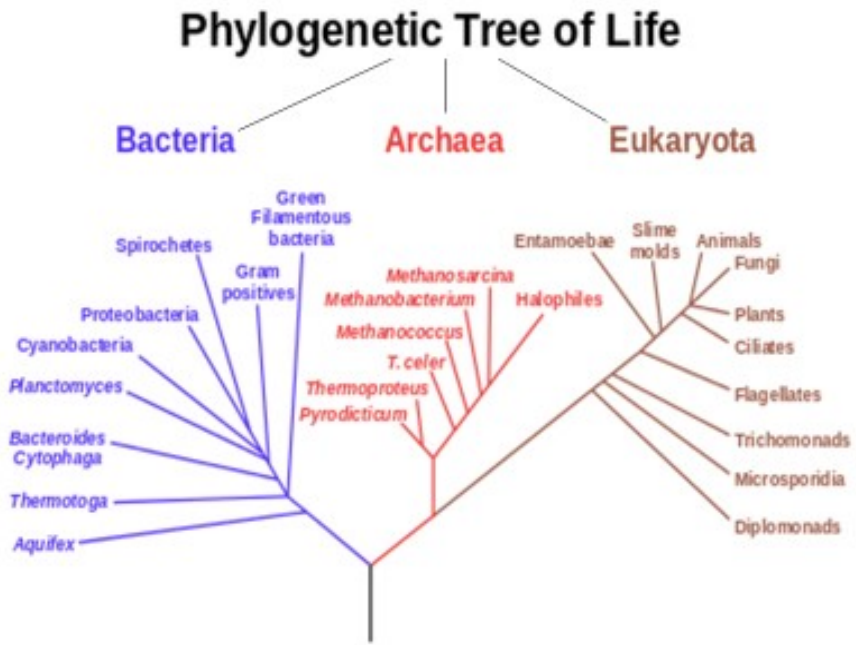
Under the category of all living things (organisms), "Life" has now been divided into 8 ranks or levels (taxa) as shown in the following diagram:

Note the term "Phylum" used for the third-highest rank or level of taxa for Animal Kingdom while "Division" is used Plants, Fungi and Slime Molds.



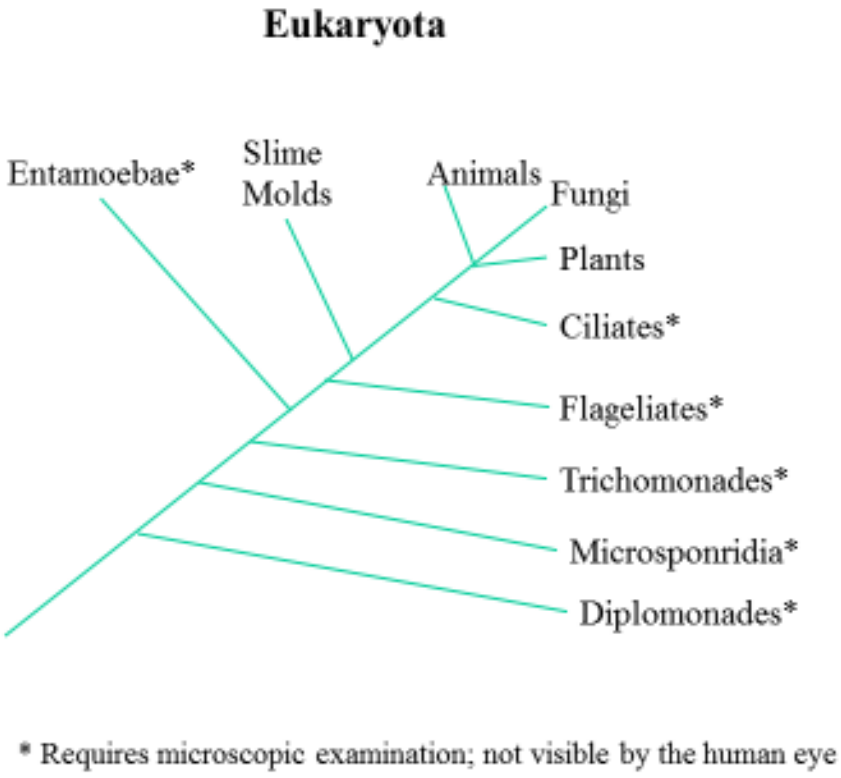
The following three domains (first level or highest rank) are now recognized as shown in the diagram below:





<u>Note:</u> the only domain in which the average naturalist would be interested, is the Eukaryota which contains the four (4) kingdoms: Plants, Fungi, Animals, and Slime Molds.

The 'Plants, Fungi, Animals, and Slime Molds' kingdoms, are the only ones that have macroscopic dimensions and can be seen by normal human vision without the aid of higher powered microscopes during the course of a field outing.



Binomial Nomenclature

The formal introduction of this system of naming species is credited to Swedish natural scientist, Carl Linnaeus, effectively beginning with his work *Species Plantarum* in 1753.

It is a formal system of naming species of living things by giving each a name composed of two parts, both of which use Latin grammatical forms though they can be based on words from other languages. Such a name is called a **binomial name** (which may be shortened to just “binomial"), or a **scientific name**; more informally it is also called a **Latin name**.

The first part of the name identifies the genus to which the species belongs; the second part identifies the species within the genus.

For example, humans belong to the genus, *Homo,* and within this genus to the species, *Homo sapiens*.

Binomial Nomenclatural Rules

Because scientific names are unique species identifiers, they ensure that there is never any confusion as to which organism a scientist may be referring. Additionally, there are some important rules that must be followed to keep all binomial names standardized:

The entire two-part name must be written in italics (or underlined when handwritten).
The genus name is always written first.
The genus name must be Capitalized.
The specific epithet is never capitalized.

Note that these rules were followed in the above example of *Homo sapiens*.

INFORMATION SOURCES

WEBSITES
BOOKS
REGIONAL CHECKLISTS
DICHOTOMOUS KEYS

Websites:

- Insects and Arachnids http://bugguide.net/node/view/15740
- Moths http://mothphotographersgroup.msstate.edu/
- Birds http://birdingnewbrunswick.ca/
- Vascular Plants http://unbherbarium.ca/quicksearch
- http://plants.usda.gov/gallery.html
- Atlantic Canada Conservation Data Centre http://www.accdc.com/

Books:

- Field Guides for various groups for different regions
  - "Birds of Canada" (Godfrey, 1986)
  - "The Butterflies of Canada" (Layberry *et al.*, 1998)
  - "Flora of New Brunswick, Second Edition" (Hinds, 2000)
  - "The Sibley's Guide to Birds, Second Edition" (Sibley, 2014)
  - "The Insects and Arachnids of Canada" 14 + Parts, various orders by various authors
  - "Dragonflies and Damselflies of the East" (Paulson, 2011)
  - "Lichens of North America" (Brodo *et al*. 2001)
  - "Breeding Birds of the Maritime Provinces" (Erskine, 1992) (The latest atlas should be available soon.)
  - "Land Mammals of New Brunswick" (Dilworth, 1984)
  - "The Mammals of Canada" (Banfield, 1974)
  - "Introduction to Canadian Amphibians and Reptiles" (Cook, 1984)
  - "Moss Flora of the Maritime Provinces" (Ireland, 1982)
  - "Wildflowers of New Brunswick" (Todd Boland, 2015)

Regional Checklists:

- "Checklist of Beetles of Canada and Alaska" (Bousquet, 1991)
- "New Brunswick Birds" (NB Bird Records Committee, 2011)
- "The Inventory of the Flora and Fauna of the French Fort Cove Nature Park" (F. F. C. Development Commission, 2005)
- "Check List of the Lepidoptera of America North of Mexico" (Hodges *et al*., 1983)
- "Species Inventory : McKay Brook-Gordon Meadow Brook Ancient Portage Trail" (McLeod and Saunders, 2016)

SUGGESTION

If you have not identified a particular species before, be sure to check the normal range of occurrence and the rarity of that species in the area before settling on that determination. If it turns out to be rare or when it is beyond the known range, it would be best to check with someone else with more experience or a known expert in that group.

Dichotomous Keys:

Most of the previously-mentioned books contain dichotomous keys that provide two mutually exclusive choices at each step on the way to a final identification.

- a pictured-key "How to Know" nature series for a vast array of taxonomic groups of North America, from tapeworms and trematodes (parasitic flatworms), to aquatic plants, fungi, mosses and liverworts, beetles, birds, mammals, etc. by various authors, are useful. The series is published by Wm. C. Brown. A Google search will find many of them available from most booksellers.

Photographers' Tips to Aid Identification

1. When photographing inanimate or slow-moving objects like plants or caterpillars, try to include a scale of some kind (like a coin) that will allow an actual length calculation of the object.
2. For birds, it's helpful to show other species of known identity with the unknown one that will indicate its relative size, as is often possible at a feeder or with a mixed flock of gulls standing on ice. If not a video, it's also useful information to note the bird's behaviour (fly-catching, probe feeding, etc.), and any conspicuous body motion such as tail pumping, wagging, or flicking, hopping versus walking, neck stretching, wing motion upon landing, etc.
3. Several views of the same bird, mammal, etc., from different directions are always helpful and will reveal more clues to its identity, age, and sex in some cases, than just a single photo will.
4. When photographing plants, in addition to taking a shot of the entire plant, try to get several shots of the different parts of the same one, including the flower from above and the side, both stem and basal leaves (if present), and the stem itself to see how the leaves are attached and the type of hairs (if any) that are present.
5. Note the habitat type (deciduous, coniferous, or mixed forest, swamp, bog, open field, shrubby area, freshwater or saltwater shore, etc.) and whether the site is wet, moderate or dry. This is often critical information that will help to clinch an identification.
6. If the names of some of the associated plants are known, it's helpful to record them, because the common associates can often be clues. For example, if the photo is of a fungus such as a bolete species (non-gilled mushroom with spores on the underside of the cap), some are restricted to growing only under certain species of trees.

The following examples of various species found at the Gordon Meadow Brook - McKay Brook Portage Trail are provided, showing the higher six ranks (taxa) that precede the last two ranks of genus and species that constitute the binomial name:

PLANT KINGDOM

(T. Humes photo)

Multi-stemmed Moss (*Dicranum polysetum*)

Domain:	Eukaryota	
Kingdom:	Plantae	(Plants)
Division:	Bryophyta	(Subdivision – Musci or Mosses)
Class:	BRYOPSIDA	(Subclass – BRYIDAE)
Order:	DICRANALES	(Dicranum Families)
Family:	DICRANACEAE	(Dicranum and Allies)
Genus:	Dicranum	(Fork Mosses)
Species:	polysetum	(Multi-stemmed)

("poly" = multi or many; "setum" = stalk or stem supporting capsules)

Note: Seven stalks (seta) with capsules ascending from top of leafy stem in centre of photo.

(J. Saunders photo)

Round-leaved Sundew (*Drosera rotundifolia*)

Domain:	Eukaryota	
Kingdom:	Plantae	(Plants)
Division:	Spermatophyta	(Seed plants)
Class:	Angiospermae	(Flowering Plants)
Order:	Rosales	(Rose Order and Allies)
Family:	Droseraceae	(Sundew Family)
Genus:	Drosera	(Sundews)
Species:	rotundifolia	(Round-leaved)

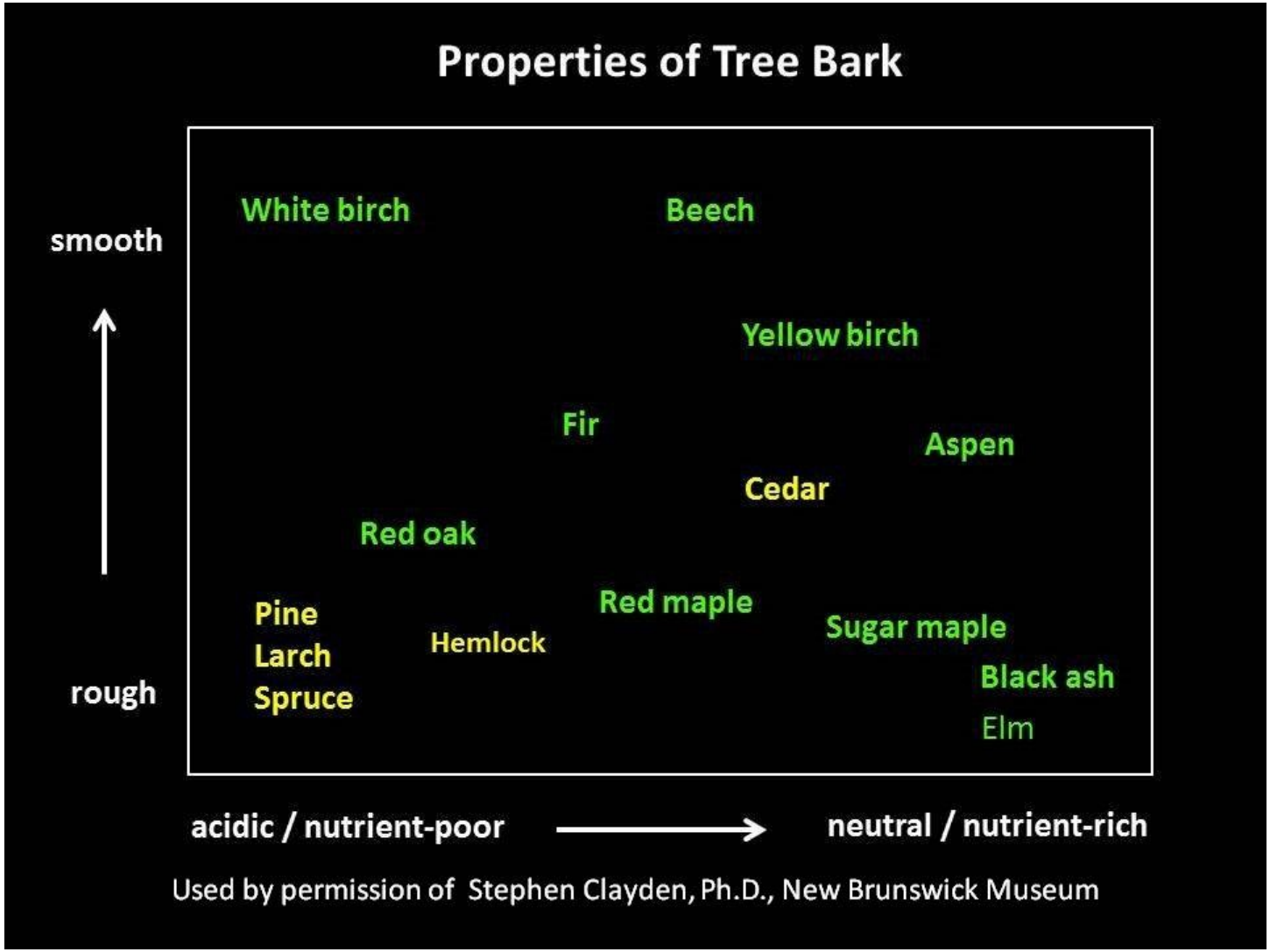
(J. Saunders photo)

Black Spruce (*Picea mariana*)

Domain:	Eukaryota	
Kingdom:	Plantae	(Plants)
Division:	Spermatophyta	(Seed Plants)
Class:	Conopsida	(Gymnosperms)
Order:	Pinales	(Conifers)
Family:	Pinaceae	(Pines)
Genus:	Picea	(Spruce)
Species:	mariana	(of Maryland)

Note: Sometimes the common name (Black Spruce) doesn't correspond with the scientific name which would be Maryland Spruce in this case. This usually happens when the species name is a geographical location that does not reflect the true, more widespread range of the species and so is ignored when creating the common name.

Spruce trees are sometimes confused with other evergreens like **pine** and **fir** trees. **White Pine needles** are longer than even those of the **Jack Pine**. Both **pine** and **fir** needles tend to be gentler on your fingers than **spruce** needles when you approach from the tips. **Spruce needles** can feel sharp to the touch. The **needles of a spruce tree** are arranged all around the **twig**.



You will see from the above chart "Properties of Tree Bark" that the main tree species along the Portage trail, Pines, Black Spruce and Larch, have acidic / nutrient-poor bark. Leaching from the bark and subsequent run-off down the stem and drip from the branches, helps maintain the acidity of the soil.

ANIMAL KINGDOM

(J.Saunders photo)

Canadian Tiger Swallowtail (***Papilio canadensis***) nectaring on ***Clintonia borealis*** (Bluebead-lily)

Domain:	Eukaryota	
Kingdom:	Amimalia	(Animals)
Phylum:	Arthropoda	(Arthropods)
Class:	Insecta	(Insects)
Order:	Lepidoptera	(Butterflies & Moths)
Family:	Papilionidae	(Parnassians & Swallowtails)
Genus:	Papilio	(Swallowtails)
Species:	canadensis	(Canadian Tiger)

(T. Humes photo)

Green Frog (*Rana clamitans*)

Domain:	Eukaryota	
Kingdom:	Animalia	(Animals)
Phylum:	Chordata	(subphylum – Vertebrata)
Class:	Amphibia	(Amphibians)
Order:	Anura	(Frogs, Toads & Treefrogs)
Family:	Ranidae	(True Frogs)
Genus:	Rana	(incl. Green, Mink, etc. Frogs)
Species:	clamitans	(Latin for “loud calling”)

Note: This is another case where the common name differs from the Latin species name. This time “Green Frog” was chosen to reflect the overall colour of the species instead of naming it the “Loud-calling Frog”.

(T. Humes photo)

Spruce Grouse (*Falcipennis canadensis*) male

Domain:	Eukaryota	
Kingdom:	Amimalia	(Animals)
Phylum:	Chordata	(subphylum – Vertebrata)
Class:	Aves	(Birds)
Order:	Galliformes	(Fowl-like, Scratching Ground Birds)
Family:	Phasianidae	(Pheasants, Grouse, Quail and Allies)
Genus:	Falcipennis	(Spruce Grouse)
Species:	canadensis	(Canadian)

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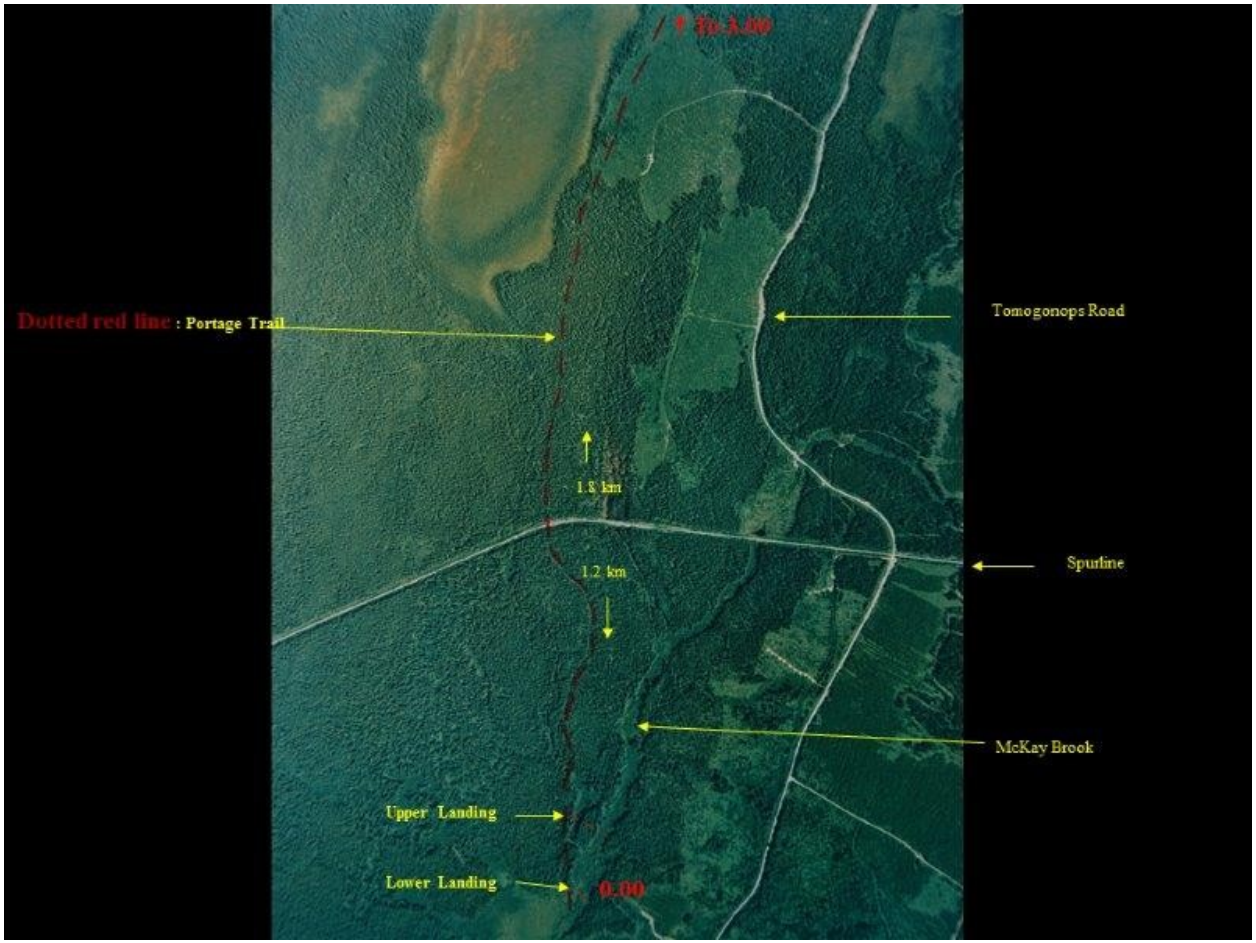
Overview of the Portage Trail Forest

New Brunswick's forests are in the transition zone between the Hardwood forests of the North Eastern United States and the global circumpolar Boreal forest . They are a mixture of Boreal forest types and transition hardwood forests. The McKay and Gordon Meadow Brooks ancient Portage is found in a Boreal Forest (1) portion of the Acadian Forest (1) which is the name that has been given to the larger transition zone.



Compiler Tim Humes

Aerial View of Portage Trail Location and Other Major Features in the Vicinity

The McKay and Gordon Meadow Brooks ancient Portage trail forest consists mainly of the common Canadian Boreal Forest (1 2 3) softwood species Black Spruce (1 2 3) along with other boreal species: Jack Pine (1 2), Larch , Balsam Fir (1 2 3 4), and Trembling Aspen (1 2 3) in decreasing amounts respectively. White Pine (1 2 3) is also found in the area.

A somewhat mixed softwood forest, of variable height, diameter and density in places, consisting mainly of Black Spruce along with lesser amounts of the other species mentioned above (except Trembling Aspen), is found from McKay Brook to the Spurline.

The Black Spruce is uneven-aged in places due to regeneration over the years from seeding and layering. Layering is a process whereby green limbs come into contact with the substrate, take root and eventually grow vertically to become trees. If a Black Spruce that regenerated by layering is cut off at ground level after it has grown upright, a lot of dark colored reaction wood will be seen. This dark colored wood is formed as the tree branch curves from a horizontal to a vertical growth position.

There are mainly two environments in which layering will happen, wet mossy and dry mossy. In the wet mossy environment, the mosses are more likely to be Sphagnum species that grow quickly in height and consequently over time the branch is buried deeper than in the dry, mossy environment where Schreber's moss is more likely to be growing. Layering on rotting woody material is not as common.

Black Spruce seedlings can become established on rotting wood and stumps, compacted moss or rotting woody material, in places where the litter layer (the surface layer of the forest floor, consisting of leaves and twigs and other debris) has been wholly or partially removed and on mineral soil. Rotting, woody material is an excellent seedbed that facilitates the natural regeneration of a Black Spruce forest. The Red Squirrel is an unwitting participant in this process due to the many seeds that are dropped when it takes cones apart.

The following three photos were taken a short distance into the forest near 0.80 km at the south end of the boardwalk in Natural Community 8, a Water Receiving Area. The stump is visible when standing on the boardwalk. Nine Black Spruce seedlings were counted growing on this stump. The small seedlings further up on the fallen stem in the second photo are not doing very well. However, the seedling in the third photo which is growing near the top of the rotting Fir is doing well and should grow to be a vigorous tree.

Photo by Jim Saunders

Nine Black Spruce seedlings were found on a broken Balsam Fir stump along with Black Spruce cone scales

Photo by Jim Saunders

Black Spruce seedlings and cone debris found further up on the rotting Fir stem

Photo by Jim Saunders

A Black Spruce seedling found near the top of the rotting Balsam Fir

There is a significant number of broken Black Spruce stems and wind thrown Black Spruce trees in the southern part. Wind throw or blow down, from November, 2014 (see photo below) is visible on the east side shortly before the Riparian Zones.

Photo by Jim Saunders

Black Spruce blow down, November, 2014

This is one of the natural events that ensures the renewal of the forest over the very long-term. It can perpetuate an uneven-aged character of the forest assuming there is not a complete loss of trees due to harvesting, fire or insect infestation.

In the mineral soil exposed by the uprooting, tree seedlings along with herbaceous plants, lichens and bryophytes will become established. Over a very long time period, the soil and organic material will accumulate on the forest floor and create a mound. Large blow down areas show what is called "pit and mound" topography.

Over time the stem of the tree will gradually come closer to the forest floor and after contact, the decay process will speed up due to the increased moisture, and insect and fungal activity. As was seen earlier on the trail, the decaying stem will become a seedbed for Black Spruce which will enhance the uneven-aged composition of the forest. This will be an interesting place to visit each year and to see over time the species that germinate and become established.

Photo by Jim Saunders

Trees down because of stem breakage and uprooting

As you look about in some places you will notice that there are variable amounts of Balsam Fir regeneration but not many large Fir trees. Most of the large Firs in this part have died and fallen down. Some variable quality Firs are still standing. Where the Firs once were, the understory (see P. 33) is dominated by Fir regeneration. Dead Balsam Fir and broken trees that have left variable height dead stubs can be seen by looking up for dry, needleless crowns or dead, broken stems. There is a Fir stub on the west side of the trail at 0.442 km in Natural Community 5. At 0.765 km in Natural Community 6 near the short boardwalk, there is a fallen Fir to the west of the trail, lying parallel to it and about 5 meters distant. Standing dead and fallen Fir can be seen also in Natural Community 11 from 1.450 km to 1.550 km.

As one travels northward towards the Spurline, a change in the character of the forest beyond the boardwalk at 0.80 km will be quite evident as the trail rises and the forest becomes drier (1 2) until shortly after crossing the Spurline. Consequently the Black Spruce are not as tall nor as large in diameter as those previously encountered. The Jack Pines that are present can tolerate the dry condition better and are larger than the

Black Spruce. It is wetter for some distance shortly past the Spurline as the water table has risen because of the plugging of the culvert under the Spurline by beavers.

In Natural Community 9, **"**Poor Site Boreal Upland Black Spruce with Jack Pine**"**, the tufted top which is characteristic of older Black spruce is commonly seen. Below the tuft are dead branches with a variety of lichens growing on them.

Photo by Jim Saunders

Tufted top of Black Spruce

Much of the forest north of the Spurline up to the 2.275 km point is similar to that south of the Spurline. Up to the 2.275 km point, it consists of Natural Community 11, "Boreal Black Spruce Forest" and Natural Community 12, "Poor Site Boreal Black Spruce Forest with Jack Pine". Natural Community 11 consists mainly of Black Spruce, along with some Jack Pine, Balsam Fir and Larch. Throughout the area there are scattered Black spruce with long, lower dry limbs which indicates that these trees were growing under other trees for many years. During that time, the limbs grew horizontally into sunlit openings. Once the larger trees were harvested approximately 60 years ago, the trees began growing in height again.

From 2.275 km to the beginning of the boardwalk at the edge of the Sloping Bog the Portage trail traverses an area consisting mainly of Black Spruce that regenerated after the harvest. There are points along the Portage trail in this Black Spruce Forest that are either close to or within what are now patches of older forest. The trees in these patches weren't large enough to harvest sixty years ago. West of the Portage trail in

the north end of the Immature Black Spruce Boreal Forest are Black Spruce trees that have been killed or prevented from reaching a large size by the parasite Dwarf Mistletoe. A 60 year old forest, consisting mainly of Black harvesting,.

Snags and blow down are not plentiful in the part with the older Black Spruce but that which is present is being used as a food source and nesting sites by Woodpeckers, Black-capped Chickadees and Red-breasted Nuthatches. The regenerated forest is not yet producing a great amount of large snags and blow down.

A change similar to that after 0.80 km south of the Spurline will begin north of the Spurline (2) at 1.65 km where the trail rises and becomes drier. At 2.7 km the elevation decreases until the edge of the Sloping Bog with Lagg Zone, Natural Community 14.

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Understory

"One of the first characteristics one may notice when entering a forest of eastern North America is the diverse array of low-growing plants comprising numerous species and life forms, including spring ephemeral flowering plants, herbaceous perennials, small shrubs and seedlings of trees. In the past several years there has been a growing awareness among ecologists, conservationists and forest managers that this herbaceous layer serves a special role in preserving the functional integrity of forest ecosystems. Because of this importance, the herb layer has been the focus of many studies in eastern forests, and we have learned much concerning the ecological dynamics of the herbaceous layer in these forest ecosystems."[1]

Not specifically mentioned in the above but of no less significance are mosses, liverworts (1) (Three-lobed Bazannia in the previous photo link is a Liverwort) and lichens and fungi.

Some of the spring ephemerals that will be seen on the Portage trail are Clintonia, Pink Lady's Slipper, Painted Trillium (1), Twinflower, Wild Lily-of-the-valley, Goldthread and Bunchberry.

Pink Lady's Slippers

Photos by Jim Saunders

Swallowtail Nectaring on Clintonia

As one becomes more familiar with the make-up of the herbaceous layer it will be evident that it is a multi-layered environment in which certain plants, such as mosses, can grow at the bottom while others such as Clintonia, Tall Meadow-rue, Bracken Fern and Rhodora can't. Lichens can become established on bare soil and at the tops of the tallest trees.

The herbaceous layer is growing mainly under shrubs and tree regeneration but in some instances the height reached by some members of the herbaceous layer in a growing season can greatly exceed the current heights of some shrubs and regeneration. Two examples are Tall Meadow-rue and Flat-topped White Aster which can grow up to 1.5 meters in height. Both species can be seen in the Riparian Zones.

In this forest the aforementioned Ericaceous plants are characteristic and are found throughout. Some plants are found only in small and medium sized Natural Communities on the trail and not throughout the forest, e.g., Natural Community 4 – Riparian Zones, Natural Community 6 – "Water Receiving Area" and Natural Community 8 – also a "Water Receiving Area". The distinguishing features of the small Natural Communities confined to the Portage trail are increased moisture and fertility, and most south of the Spurline have a boardwalk (2 3) associated with them. All of the Ferns except for Bracken Fern are found in these moist habitats. Cinnamon Fern is found in the moist to wet "Water Receiving Areas", "Riparian Zones" and "Sloping Bog with Lagg".

In the Boreal Black Spruce forest "After canopy closure (when the tree crowns come together) most of the changes on the forest floor are associated with bryophytes (mosses and liverworts) (1) and lichens (1), while the community composition of vascular plant species does not change much."[1] "(Taylor et al., 1987) hypothesized that these changes are related to the self-thinning in Black Spruce stands, which leads to an increase in soil moisture content." [2] "A consequence of the resulting decrease in evapotranspiration, is the slow replacement of moss species (feather mosses (Schreber's moss in the linked photo is a feather moss), broom mosses (1 2) and hairy cap mosses) by Sphagnum species (l). However the dominant component of the understory throughout the *Picea mariana* (Black Spruce) successional sequence is Ericaceous species." [2]

The species inventory reflects the above. The following Ericaceous species, Sheep Laurel, Blueberry, Wintergreen, Rhodora and Mayflower were found in 56, 56, 53, 49 and 44 sections out of 60 sections respectively. This is in keeping with what would be expected in a Boreal Black Spruce forest. Mayflower wasn't found after the 2.65 km mark. Rhodora had some gaps in its occurrence but it can be said that it is common along the 3 km Portage trail.

Rhodora in flower **Photo by Jim Saunders**

Photo by Jim Saunders copyright

Wintergreen in flower

In the older part of the Black Spruce, Jack Pine and Larch forest, Common Green Sphagnum was found consistently up to the 0.80 km mark but only in a few depressions in Natural Community 9. After Natural Community 9, it reappeared in Community 11, wasn't recorded in the dry Community 12 and reappeared in Communities 13 and 14.

Rowe (1983) identified five major groups of species in boreal forest ecosystems based on their reproductive strategies. The Ericaceous species mentioned above are classified as "endurers" or species that are able to re-sprout from buried vegetative organs after a fire. Approximately 30 % of the vascular plants found during the inventory employ this strategy. We take advantage of this strategy when we pick blueberries in a regenerating burned forest. The blueberry stems and leaves can be burned but new plants sprout from the unburned, underground parts. Interestingly another Ericaceous species, the delicate Creeping Snowberry is not able to do this and is classed as an "avoider". An "avoider" is defined by Rowe as "a late successional species more common in unburned areas and not adapted to maintain themselves in the context of recurrent fires". Creeping Snowberry forms a leafy mat whose stems creep mainly over Sphagnum moss, rotting stumps, rotting woody debris and hummocks. Also included in the "avoider" group are Pink Lady's Slipper which was recorded from three locations on the Portage trail and Indian Pipe which was recorded from only one location.

Photo by Jim Saunders

Indian Pipe

The understory of the Boreal Black Spruce forest consists of three layers, one of which has an upper boundary whose level varies over space and time. This uppermost layer consists of tree regeneration such as Black Spruce, Balsam Fir, White Pine, Larch and Red Maple which over time, move from the lower herbaceous layer and up through the shrub layer.

Mountain Holly, Wild Raisin, Speckled Alder, Mountain Ash, Beaked Hazel and Willows make up the shrub layer between the upper and lower layers. Beaked Hazel (1) is found only in scattered locations in the northern part. There are parts with substantial colonies of Rhodora. Herbaceous plants make up the lower layer.

Wildlife is one of the main benefactors of understory growth because it provides food (1 2 3 4), cover for hiding from predators and niches for nesting. It also mitigates the extreme effects of climatic agents such as sunshine, wind, rain and snow.

Photos by Jim Saunders

Wintergreen in flower and fruit

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Natural Community 1 – Tall Shrub - Savannah – 0.000 to 0.073 km – 28 Species

At the McKay Brook end of the portage from 0.00 km to 0.073 km is the "Tall Shrub – Savannah", Natural Community 1, which consists of a savannah forest in which mainly large Larch and a few scattered Black Spruce are present along with a shrubby understory that consists mainly of scattered Speckled Alders, Red Maple regeneration and some scattered Black Spruce and Larch regeneration.

Meadowsweet, Red-osier Dogwood, Sweet Gale and Wild Raisin. Mountain Fly Honeysuckle and Common Elder are also present.

Photo by Jim Saunders

Tall Shrub – Savannah

Blue-joint Grass is the most abundant species in the herbaceous layer especially in the open area near McKay Brook. Two of the shrubs, Mountain Fly Honeysuckle and Common Elder are struggling to get above it. An Ericaceous shrub, Leather-leaf and an herbaceous plant, Northern St. John's-wort are growing on micro-sites along the bank and on the mud between the bank and the water, respectively.

This is the only natural community in which the shrub, Red-osier Dogwood is found. It is easily recognized by its many red stems. Leather-leaf will not be seen again until Natural Community 14, the "Sloping Sphagnum Bog with Lagg Zone" at the northern end of the trail.

It is almost impossible for Black Spruce and Larch to regenerate in the thick growth of Blue-joint Grass. However, on a rotting log on the east side about 6 meters from the beginning of the Portage Trail, are found Black Spruce and Larch seedlings along with Grey Reindeer Lichen and Balsam Fir. Also where the grass becomes more shaded and less vigorous, Black Spruce and Larch are able to regenerate.

The Ericaceous shrubs, Sheep Laurel and Rhodora, which are characteristic of boreal Black Spruce forests, are found in the "Tall Shrub-Savannah", but will be found in greater abundance beginning at 0.104 km as the land begins to rise. Another shrub, Wild Raisin and an herbaceous plant, Flat-topped White Aster are also found in the "Tall Shrub-Savannah" Natural Community.

Photo by Jim Saunders

Sheep Laurel

Photo by Jim Saunders

Rhodora

The moss, Common Green Sphagnum, is found in the Tall Shrub-Savannah community. It is found in moist areas as well as in isolated patches in shallow depressions along the trail, north and south of the Spurline. Once it gets established, its capacity to capture moisture from fog, mist, rainfall, snow and surface run-off, ensures its survival.

The first sedge, the Tussock Sedge or Stiff Sedge, which is the most common sedge in Eastern North America, is also found in Natural Community 1, "Tall Shrub – Savannah". Sedges are often mistaken for grasses but this plant has the diagnostic triangular stem of most sedges. Its windborne seeds are eaten by birds and small mammals.

After an appearance at the end of the "Transition to Black Spruce Boreal Forest", Natural Community 2, the Tussock Sedge won't show up until the "Riparian Zones", Natural Community 4, on either side of the unnamed brook. After that it will not be seen again until the "Sloping Sphagnum Bog with Lagg Zone", Natural Community 14, at the north end of the Portage trail.

Photo by Jim Saunders

Common Elderberry in fruit

The Larch is approximately 100 years old. This area will transition from its savannah-like appearance to a more forested area over the next one hundred years. When travelling the Portage trail in the autumn, you will notice that the Larch needles that fall will cover the Sphagnum where it occurs. These needles will disappear the following summer as the growing Sphagnum envelops them.

Before the 0.050 marker on the west side of the Portage trail, you will notice a Larch branch approximately 3 meters from the ground that has grown to an approximate length of 6 meters into the open area.

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Natural Community 2 – Transition to the Boreal Black Spruce Forest – 0.073 to 0.104 km – 23 Species

From 0.073 km to .104 km you will travel through the "Transition to the Boreal Black Spruce Forest" (1 2 3), Natural Community 2. At the end of the transition community a denser forested section will be encountered. As you will notice, it has a significant percentage of Larch that declines to scattered occurrences after 0.520 km in Natural Community 5. Dead standing Larch frequently accompany the live Spruce and Larch from 0.100 to 0.520 km. Goldthread, Bunchberry, Creeping Snowberry, Lowbush Blueberry, Twinflower, Overlooked Serviceberry ,Starflower and Drooping Woodland Sedge make their first appearance in Natural community 2. Two other shrubs, Speckled Alder and Wild Raisin are present.

Drooping Woodland Sedge in fruit

Photos by Jim Saunders

Reddish bases of Drooping Woodland Sedge's stems

Blue Flag Iris makes its second and last appearance in Natural Community 2. It is an Iris of moist to wet habitats that will blossom in late June. From http://www.illinoiswildflowers.info/wetland/plants/blueflag.htm:

"The blue-violet flowers are up to 3½" across, consisting of 3 sepals, 3 petals, 3 stamens, 3 style-branches with stigmata, and a green ovary that is elongated and angular. The petaloid sepals are oblanceolate in shape and spread outward from the center of the flower; they are blue-violet with prominent patches of yellow and white with fine purple veins (more visible in the right photo).The sepals are without tufted hairs. Extending directly above the sepals, are the shorter petaloid style-branches; they are blue-violet and oblong in shape with upturned tips, forming open tubular structures with the sepals. The ascending petals are blue-violet and oblanceolate in shape with darker purple veins." The blue-violet "petaloid style-

branches" with the curled tips are visible in the photo below, left. In the photo on the right, they have been removed and the beautiful pattern of yellow and purple on the "petaloid sepals" below them is visible. The purpose of the "shorter petaloid style-branches" seems to be to protect the anthers and to force pollinators to go between them and the "petaloid sepals". In doing so, the pollinator rubs against the anthers in order to get to the nectar and therefore gets some pollen on its body that can be transferred to the next Blue Flag that it visits.

Photos by Jim Saunders

Intact Blue Flag Iris flower **Petaloid style branches removed**

Photo by Jim Saunders

Lowbush Blueberry

Another plant was found in Natural Community 2 during a visit to the area in August, 2016. Both the common and scientific names will be given since Appendix I and "Using the Species Spreadsheets" will be updated at a later date. It is the Marsh St. John'-wort (*Triadenum fraseri*) of the St. John's-Wort family (Clusiaceae). From https://www.minnesotawildflowers.info/flower/frasers-marsh-st.-johnswort : "It is a rare event to find Marsh St. Johnswort with open flowers. It is more commonly identified by the leaves and the maroon fruit, which might be mistaken for flower buds."

Photos by Jim Saunders

Marsh St. John's-wort with open flower

Maroon fruit of Marsh St. John's-wort

The Marsh St. John's-wort was also found at the boardwalk to the Upper Landing, at the Upper Landing, in the Riparian Zones and at the Spurline in Natural Community 10.

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Natural Community 3 – Boreal Black Spruce Forest – 0.104 to 0.376 km – 37 Species

In the "Boreal Black Spruce Forest", Natural Community 3, Mayflower, Bracken Fern, Dewdrop, Wintergreen, Three-seeded Sedge, Prickly Tree Club Moss, Labrador-tea (in sections 3 and 4), Large-leaved White Violet, Reed Meadow Grass, Rough Mountain Rice, Green-flowered Wintergreen , Crested Wood Fern and Stair-step Moss are seen for the first time. Labrador Tea won't be seen again until north of the Spurline in the "Sloping Bog with Lagg Zone", Natural Community 14. Labrador-tea's second occurrence in section 4 is in a small depression.

Photo by Jim Saunders

Reed Meadow-grass or *Glyceria grandis* with large inflorescences

Even though Stair-step Moss is not a vascular plant, it is reported because it is ”often an indicator (1) of stable, late stages of succession in stands dominated by white spruce (*Picea glauca*) or black spruce (*P. mariana*).”

Photo by Jim Saunders, July, 2016

Stair-step Moss with the 2016 step at the top

Bluebead Lily (Clintonia), Painted Trillium and Wild or False Lily-of-the-Valley, the three members of the Lily family that are found south of the Spurline, are present in all five sections of this Community.

The shrub, Alternate-leaved Dogwood makes its first and only appearance on the Portage trail in Natural Community 3. Other shrubs that are seen for the first time are Mountain Holly, and American Mountain-ash. Mountain-ash can grow to small tree size but Moose browsing keeps it

at shrub size in most cases along the Portage trail. Likewise for Red Maple which is found in 20 of 24 sections along the trail. Red Maple, however, can grow to large tree size. At 0.325 km Overlooked Serviceberry is found near a rotting stump.

Mayflower and Wintergreen will be seen consistently until the end of Natural Community 9 along with Rhodora, Sheep Laurel, Lowbush Blueberry and Creeping Snowberry. Also, Three-seeded Sedge makes its first appearance along with White Pine and Jack Pine.

From 0.300 to 0.350 km, Larch snags and downed stems are present. At 0.370 km, shortly before the end of Natural Community 3, recent blow down of Black Spruce is visible on the east side. Also in this Community, from 0.350 to 0.376 km, large live and dead Larches are found to the east of the trail near McKay Brook.

This was the only forested Natural Community in which White Birch was recorded. It was also found in Natural Community 10 at the Spurline. Both "Appendix I" and "Using the Species Spreadsheets" will be updated at a later date to include this occurrence. It is found on the east side of the trail at the 0.110 km point about 2 meters from the trail. A search of the area to the west for a seed tree wasn't successful. The seed tree is probably a great distance away and a seed was blown over the snow and dropped into a Moose's hoof print.

A single, regenerating White Birch has a great risk of being eliminated from a forest because it is not only a favored winter browse of Moose but also a favored summer browse. It has a better chance of becoming a tree in the forest if there are clumps of them because one of them may be ignored by the Moose at the right time and subsequent height growth will put it beyond the Moose's browsing range.

Browsed White Birch regeneration

Tall White Birch beyond browsing range

Photos by J. Saunders

Dead White Birch

The photo in the middle above shows a regenerating White Birch that is now beyond the reach of a browsing Moose. It is surrounded by heavily browsed and shorter White Birch. However Moose will straddle taller browse trees and break them to get at the higher browse. The photo on the right is of a White Birch that is dead because of heavy winter and summer browsing.

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Trail to Upper Landing

At the 0.274 km point, a trail branches off to the east to the Upper Landing. This landing can be utilized as an alternate exit/entry for McKay Brook by canoe when the water is high enough to access vs. the Lower Landing (See the Aerial Photograph above for Upper Landing location). The vegetation on and near the Upper Landing trail (1 2 3 4) and in the forested parts is much the same as on the main Portage trail in Natural Communities 1, 2, 3, 5 and 7. In the wet areas, the vegetation (1 2 3) is similar to that of the Riparian Zones. There is a more vigorous growth of Common Elder along the trail to the Upper Landing than that which was found in Natural Community 1.

Photo by Jim Saunders

Vigorous growth of Common Elder

The five sharply serrated leaflets of the compound leaf of the Common Elder are visible in the mid-upper right of the above photo. Common Elder usually has 5 to 9 leaflets on each compound leaf.

Photo by Jim Saunders

Green fruit and flat-topped cyme of Common Elder

The flowers have fallen to reveal not only the green fruit but also the structure of the cyme which can be “flat-topped (as it is in this instance) or domed, mostly with more than 3 main branches near the base” (Flora of New Brunswick, Hinds, 2000).

Photo by Jim Saunders

Browsed Mountain-holly seen during visit on August 11, 2016

Also the photo above from the trail to the Upper Landing, shows that the top leaves have been recently browsed off of a Mountain-holly. This is another species that is browsed by Moose in winter and summer.

During a visit to the Portage trail on August 11, 2016, the American Bugleweed, *Lycopus uniflorus*, was found at the boardwalk on the trail to the Upper landing and also in the Riparian Zones. These are the first observations for this species and both its common and scientific names are given since “Appendix I” and “Using the Species Spreadsheets” will be updated at a later date.

The photo below is an overhead view of the American Bugleweed showing the opposite pairs of serrated leaves and flowers which grow in the axils of the leaves (Photo by Jim Saunders).

Photo by Jim Saunders

Flowers in leaf axils of American Bugleweed

Photo by Jim Saunders

American Bugleweed with flowers in the leaf axil

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Natural Community 4 - Riparian Zones – 0.380 to 0.435 km – 36 Species

The "Riparian Zones" (1 2 3 4 5), 0.380 to 0.435 km are on either side of the small, unnamed brook that overflows its banks annually and feeds into McKay Brook. The source of this stream is the Sloping Bog at the north end of the Portage trail.

Tall Meadow-rue, Rough-stemmed Goldenrod, Red Raspberry, Crested Wood Fern, Spinulose Wood Fern, Glandular Wood Fern, Cinnamon Fern, Turtlehead, Wood Horsetail, Bristly or Swamp Currant and Large-leaved White Violet, which are new species for the trail, are found on the moist alluvial soil in the "Riparian Zones". Spinulose Wood Fern and Triploid Wood Fern were found only in this Community. Triploid Wood Fern is a hybrid classed as uncommon "but usually found wherever the parent species occur together in rich rocky or swampy woods" (Flora of New Brunswick, Hinds, 2000). The parents are the Glandular Wood Fern and the Spinulose Wood Fern.

Photos by Jim Saunders

Glandular Wood Fern with bottom pinnae attached to stem (left) and bottom pinnae removed from stem (right)

The above left photo shows what you would see when you look at the two bottom, opposite pinnae of the Glandular Wood Fern while still attached to the stem. The above right photo shows the same pinnae after they have been removed from the stalk. It is now easier to see that the first lower pinnule on either side of the stalk is shorter than the second pinnule. This contrasts with the Spinulose Wood Fern whose first lower pinnules on either side of the stalk are mostly longer than the second pinnule.

Photo by Jim Saunders

Bumblebee exiting Turtlehead flower

Swamp Red Raspberry makes its second appearance. Two members of the Lily family, Painted Trillium and False Lily-of-the-valley are present.

Green-fruited Bur-reed, an aquatic plant, is found in the brook just south of the bridge. This is the only occurrence of this plant on the trail. Some of the largest Black Spruce, Larch and Balsam Fir trees along the trail are found in the riparian zones.

Shrubs present are Speckled Alder, Spiraea and Wild Raisin. This is the third Natural Community in which Bluejoint Grass was found.

Photo by Jim Saunders

Wild Raisin in flower

Photo by Jim Saunders, July, 2016

Wild Raisin in fruit

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Natural Community 5 – Boreal Black Spruce Forest - 0.435 to 0.574 km – 30 Species

In this Natural Community there is a noticeable increase in the abundance of Bracken Fern as the land rises. New species that are found here are Sweet Coltsfoot, Large-leaved Aster, Sarsaparilla and Brownish Sedge.

Whorled Wood Aster and Green-flowered Wintergreen make their second appearance and Flat-topped White-aster makes its third appearance. All of the Ericaceous species except Leatherleaf and Labrador Tea are present here.

Mountain Holly, Speckled Alder, Overlooked Serviceberry and Wild Raisin, common shrubs along the Portage trail are present along with the American Mountain Ash which can reach small tree size. However along the Portage trail it is heavily browsed by Moose and generally doesn't reach a great height.

Photo by Jim Saunders

Finely serrated Forgotten Serviceberry leaves with broadly cuneate bases

Photo by Jim Saunders

Serrated Forgotten Serviceberry leaf with broadly cuneate base

Photos by Jim Saunders

Terminal bud of Forgotten Serviceberry (August 16)

Forgotten Serviceberry showing some early color (August 16)

Blue-joint grass makes its last appearance on the Portage trail in this Community.

Photo by Jim Saunders

Bluejoint Grass

Photos by Jim Saunders

Flat-topped White Aster

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Natural Community 6 – Water Receiving Area – 0.574 to 0.591 km – 25 Species

Natural Community 6 is a moist to wet "Water Receiving Area", approximately 17 meters in length from 0.574 to 0.591 km in section 12. The moisture loving Silvery Sedge is found here but it isn't found again until the "Sloping Sphagnum Bog with Lagg Zone", Natural Community 14 at the end of the Portage trail. The Brownish Sedge makes its second of four appearances south of the Spurline. It wasn't found north of it.

Photo by Jim Saunders

Looking South to Natural Community 6 - "Water Receiving Area"

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Natural Community 7 – Boreal Black Spruce Forest – 0.591 to 0.760 km – 40 Species

In this Community Pink Lady's Slipper makes its first appearance. Wood Horsetail , Whorled Wood Aster and Glandular Wood Fern makes their last appearances south of the Spurline. Flat-topped White Aster makes its last appearance on the Portage trail. Shrubs present are Mountain Holly, Wild Raisin, Speckled Alder, Overlooked Serviceberry and American Mountain-ash. Bracken Fern is present along with Interrupted Fern which makes its first appearance south of the Spurline. Northern Short-husk Grass is present and it will not be seen again for its second and final time at the Spurline.

Photo by Jim Saunders

Interrupted Fern

Natural Community 8 – Water Receiving Area – 0.760 to 0.800 km – 31 Species

This “Water Receiving Area” consists mainly of section 16 (0.750 to 0.800 km) traversed by a boardwalk.

Photo by Jim Saunders

Gall-of-the-earth makes its first appearance south of the Spurline in this Natural Community. Shrubs consisting of Speckled Alder, Mountain Holly (last occurrence south of the Spurline), Overlooked Serviceberry, Meadowsweet and Wild Raisin are present. The two photos of Gall-of-the-earth below, show two of the most common architectures encountered mainly along forest roads and in open woods. The architecture of the specimen on the left which was growing along the side of a woods road in full sunlight is not as common as that of the one on the right which was growing among competition.

Photos by Jim Saunders

Gall-of-the-earth

Also in this Community we see the last occurrence south of the Spurline of Sarsaparilla, Twinflower, Wild Lily-of-the-Valley, Swamp Red Raspberry, American Starflower, Dewdrop, Interrupted Fern, Cinnamon Fern and Bracken Fern.

The Brownish Sedge makes its last appearance on the Portage trail and the Northern Sedge and Three Seeded Sedge make their last appearances south of the Spurline. Three Seeded Sedge will be seen again in Natural Community 14, “Sloping Bog with Lagg Zone”.

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Natural Community 9 – Poor Site Boreal Upland Black Spruce with Jack Pine - 0.80 to 1.20 km – 23 Species

The “Poor Site Upland Boreal Black Spruce with Jack Pine” Natural Community extends from 0.800 to 1.200 km. In the transition zone from Natural Community 8 to Natural Community 9 we find Painted Trillium (sections 17, 18, 19 and 20), Wild Raisin (sections 17 and 18), Bluebead Lily

(section 17), Mountain Holly (section 17), Speckled Alder (section 17), Green Flowered Wintergreen (section 17) and Goldthread (sections 17 and 20).

Overlooked Serviceberry is found in sections 17, 18 and 20. Sweetfern which is adapted to dry, nutrient poor soil, is found in this Natural Community south of the Spurline in sections 19, 21 and 22.

Creeping Snowberry is found in 6 out of the 8 sections in Natural Community 9 but it is confined to Sphagnum mounds, rotting stumps and rotting woody material on the forest floor where there is more moisture available.

One species, Cow-wheat, is found only in section 24 of Natural Community 9 in association with Jack Pine. Cow-wheat (1) is often found growing with Jack Pine and is closely associated with ants.

Photo by Jim Saunders, Copyright

Cow-wheat

Balsam Willow is found in sections 21, 22, 23 and 24, probably because seeds blew in from the Spurline from Balsam Willow that got established there.

There is a Sphagnum mound at 0.852 km, 3 meters from the trail on the west side. There is another Sphagnum mound at 0.958 km. Observation will show that the trail goes slightly uphill, North and South of the mound at 0.958 km. The slope from the south is quite shallow but it is enough to hold water at the location of the Sphagnum mound. This has allowed moisture to accumulate and facilitate the establishment and growth of the Sphagnum.

The mound at 0.958 is slowly enveloping Sheep Laurel, Blueberry, Mayflower, Rhodora sprouts and Bunchberry. Goldthread is also present. Creeping Snowberry is doing well since it is growing and spreading on top of the mound. Painted Trillium is present on the south side of the mound. Overlooked Serviceberry is present between the mound and the 0.950 km marker as well as in sections 17 and 18 or from 0.800 to 0.900 km.

On the east side of the trail In the vicinity of the second mound, there is a granite rock covered with Reindeer Lichen, Schreber's and Broom Mosses, Sheep Laurel, a Liverwort and Black Spruce regeneration. A Snowshoe hare trail is quite close to this point.

At 1.022 km there is another Sphagnum mound approximately 1.5 meters in diameter and about 2 meters to the west of the trail. At this mound, Sheep Laurel and Blueberry are being enveloped by the Sphagnum moss while Creeping Snowberry and Wintergreen are doing well. However the Sphagnum has gained considerably on the Wintergreen as witnessed during a visit to the site in August, 2016. Black Spruce seedlings and one White Pine seedlings are present.

Increasing elevation and dryness are apparent as one travels farther from Natural Community 8 towards the Spurline. As a result the species diversity declines. It is even too dry for Bracken Fern. The Jack Pine which can tolerate the increasing dryness better than the Black Spruce are much taller and larger in diameter than the Spruce.

In this Community there are 26 species. In the eight previous Natural Communities, there are 119 species. The number of species per 50 meter section decreases from an average of 36 in the previous 8 Natural Communities to 17 species per 50 meter section in Community 9.

However, as expected, the Heath Family or Ericaceous species, which are characteristic of Boreal Black Spruce Forests, maintain their presence, i.e. Sheep Laurel, Wintergreen, Creeping Snowberry, Mayflower, Rhodora and Blueberry. Rhodora becomes more robust near 1.059 km where the shrubs are taller with more flowers.

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Natural Community 10 – Road, Ditches and Shoulders – 1.200 to 1.205 km – 37 Species

Natural Community 10, the Spurline, "Road, Ditches and Shoulders" is a man-made or disturbed habitat on which are found plants that, for the most part, are found neither north nor south of the Spurline. It consists of the road surface, shoulders, slopes down to the ditches and the ditches. Before being converted to a road, it was a Canadian National spur line that originated at Bartibog Station. Its main purpose was to transport ore concentrate to the Canadian National main line and then on to Belledune.

Go to the top of Natural Communities 1 to 10 and click on column headed "AA". Where 1's are recorded in this column:

- scan to the left to see the common names of the species found here.
- scroll down and you will see than most of the plants and shrubs in Natural Community 10 are found only here.

The column on the far right gives the scientific names.
Left-clicking on the common names will allow you to view either a photo or a line drawing of the plants.

Community locations	1	2	3					4	5		6	7	8	9										10		
End of Community (km)	0.073		0.104					0.376	0.435			0.574	0.591		0.760	0.800							0.120	1.205		
Start of Community (km)	0.000	0.073	0.104					0.376	0.435			0.574	0.591		0.760		0.800							1.200		
50 meter Section numbers	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25		
50 m Section ends at	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000	1.050	1.100	1.150	1.200	1.250		
50 m Section begins at	0.000	0.050	0.100	0.150	0.200	0.250	0.300	0.350	0.400	0.450	0.500	0.550	0.600	0.650	0.700	0.750	0.800	0.850	0.900	0.950	1.000	1.050	1.100	1.150	1.200		
COMMON NAME																										**FLOWERING TIME**	**SCIENTIFIC NAME**
ASTER FAMILY																											**ASTERACEAE**
American Burnweed																									1	ISA	*Erechtites hieracifolia*
Coltsfoot																									1	Sp	*Tussilago farfara*
Common Dandelion																									1	SpSA	*Taraxacum officinale*
Flat-topped White Aster	1	1										1	1													ISA	*Aster umbellatus*
Gall-of-the-earth																1										ISA	*Prenanthes trifoliolata*
Grass-leaved Goldenrod																									1	ISA	*Euthamia graminifolia*
Large-leaved Aster											1															ISA	*Aster macrophyllus*
Pearly Everlasting																									1	SA	*Anaphalis margaritacea*
Rough-stemmed Goldenrod								1	1																1	ISA	*Solidago rugosa*
Sweet Coltsfoot									1								1									SpeS	*Petasites frigidus* var. *palmatus*
Tall Hawkweed																									1	SeA	*Hieracium piloselloides*
Whorled Wood Aster								1		1			1													ISeA	*Aster acuminatus*

Natural Communities

1 - Tall Shrub - Savannah
2 - Transition to Boreal Black Spruce Forest
3 - Boreal Black Spruce Forest 1
4 - Riparian Zones
5 - Boreal Black Spruce Forest 2
6 - Water Receiving Area
7 - Boreal Black Spruce Forest 3
8 - Water Receiving Area
9 - Poor Site Boreal Upland Black Spruce with Jack Pine
10 - Road, Ditches and Shoulders

Out of a total of thirty-seven (37) species, only six (6) species, Speckled Alder, Bunchberry, Rough-stemmed Goldenrod, Northern Short-husk Grass, Swamp Red Raspberry and Balsam Willow are found in the forested areas north and south of the Spurline. The following three flowering plants were found in the south ditch on August 11, 2016 but have not been identified as of today, August 22. As previously mentioned, Marsh St. John's-wort was also found here on August 11. "Appendix I" and "Using the Species Spreadsheets" will be updated at a later date.

Photos by Jim Saunders

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Natural Community 11 – Boreal Black Spruce Forest – 1.205 to 1.850 km – 39 Species

Natural Community 11 begins on the North side of the Spurline and ends at 1.850 km. Natural Community 7, south of the Spurline, begins at 0.591 and ends at 0.760 km. There are 40 species recorded for Natural Community 7, a Boreal Black Spruce Forest, and 39 species recorded for Natural Community 11, also a Boreal Black Spruce Forest. However there are only 21 species that are common to both communities.

Species common to both Communities include the Heath family species, most tree species, Tree Club Moss, Bracken Fern, shrubs and small tree species such as Mountain Holly, Speckled Alder, American Mountain Ash, herbaceous flowering plants such as Goldthread, Bunchberry, Rough Mountain Rice, Creeping Snowberry, Twinflower, Wild Raisin, Blue-bead Lily, Trillium, Wild Lily-of-the-Valley, Starflower and Green-flowered Wintergreen.

Many of the species that are unique to Natural Community 7 are associated with higher moisture than that found in Natural Community 11.These include 5 Sedges and 2 Ferns along with the moisture-loving Woodland Horsetail. Five of the species recorded in Natural Community 11 are in the Rose Family, e.g. Red Raspberry, Overlooked Serviceberry, Wild Strawberry and Common Blackberry, whose seeds may have been distributed by birds.

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Natural Community 12 – Poor Site Boreal Upland Black Spruce with Jack Pine- 1.850 to 2.275 km – 31 Species

In Natural Community 12, “Poor Site Boreal Upland Black Spruce with Jack Pine”, 31 species were found. This Community isn’t as inhospitable as Natural Community 9 of the same name, south of the Spurline since Bracken Fern is found throughout it.

Of the 31 species found in Natural Community 12, 13 of them are found near the common boundary of Natural Communities 12 and 13. They are Northern Bush-honeysuckle, Twinflower, Blue-bead Lily, Painted Trillium, Wild Lily-of-the-Valley, Dewdrop, Overlooked Serviceberry, Swamp Red Raspberry, Large-leaved White Violet, Prickly Club Moss, Goldthread, Wild Sarsaparilla and Rough Mountain Rice. These species may not be as particular about their moisture requirements compared to Gall-of-the-earth, Large-leaved Aster, Sweet Coltsfoot and Whorled Wood Aster which are found within the boundaries of Natural Community 13, down slope from Natural Community 12 in locations with more moisture.

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Natural community 13 – Sixty Year Old Boreal Black Spruce Forest - 2.275 to 2.700 km – 55 Species

In the “Sixty Year Old Boreal Black Spruce Forest”, Natural Community 13, which consists mainly of Black Spruce, 54 species were found. The diversity in this Community is due to the presence of seeps which are sources of moisture. Plants that are indicative of riparian zones are often found in seeps. Glandular Wood Fern, Whorled Aster, Wood Horsetail and Swamp Red Raspberry which were also found in Natural Community 4, “Riparian Zones”, south of the Spurline, are found here. Rose Twisted-stalk was found only in this Community in Section 50 (2.45 to 2.50 km).

It can be seen that Bunchberry along with Twinflower, Dewdrop and Wintergreen can become established in low light conditions beneath the thick growth of Spruce. Bracken Fern occurs in openings in the immature Spruce stand.

At 2.440 km, there is a large rock or “glacial erratic” on the east side of the trail with three Black Spruce trees growing on it, one of which is about to 5 meters in height. On the east side of the rock you will see that roots have grown over the top and down the side to reach the organic layer and mineral soil. A Black Spruce stump in this section indicates an age of 60. The Northern Sedge makes its second and last appearance in this Community.

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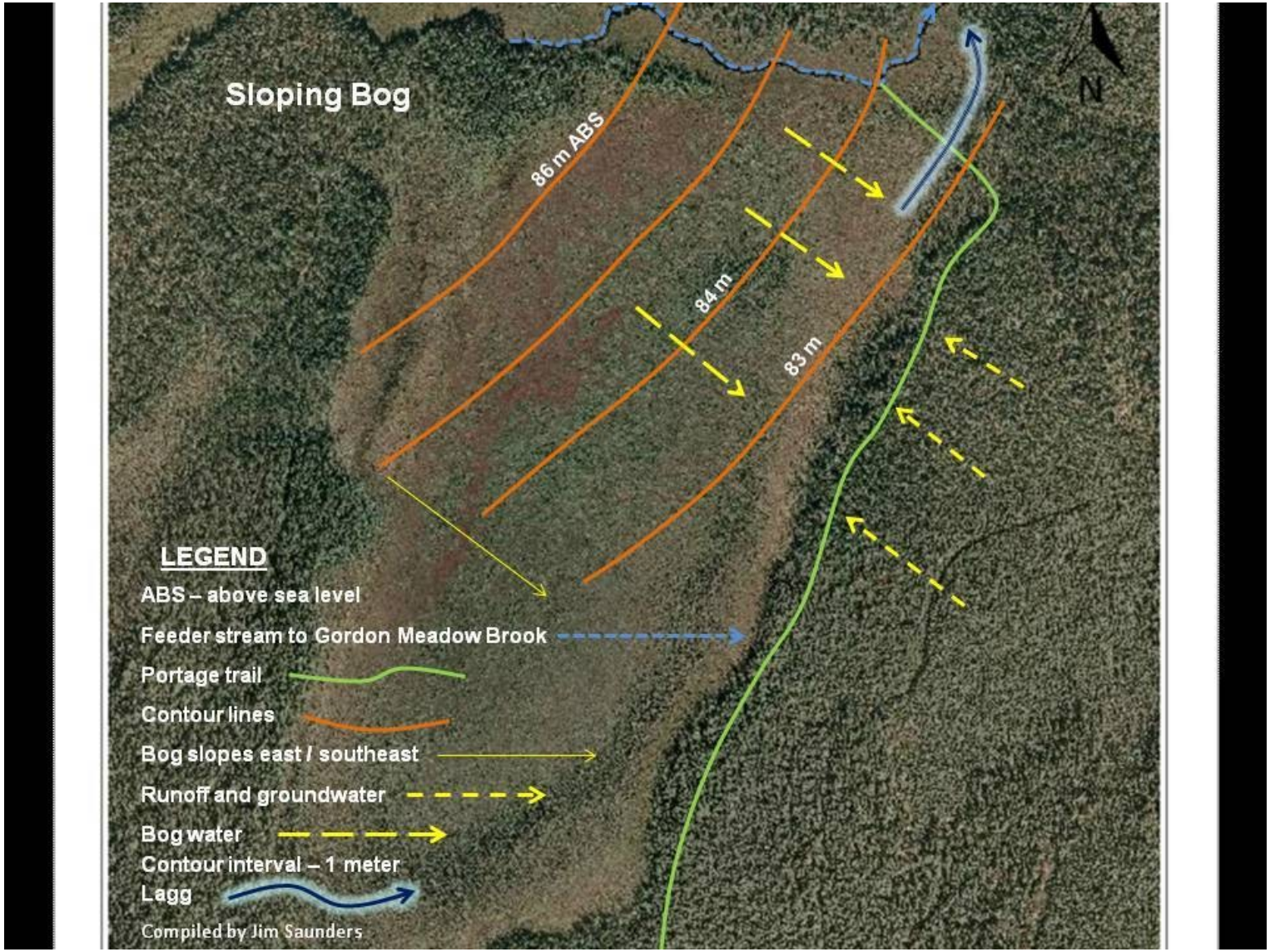
Natural Community 14 – Sloping Sphagnum Bog with Lagg Zone – 2.700 to 3.000 km – 45 Species

In Natural Community 14, “Sloping Sphagnum Bog with Lagg Zone”, 45 vascular species were recorded. Of these, 14 were recorded only in this Community. Included in these are three Cotton grasses, Alpine, Tawny and White or Tall Cotton Grass; three Sedges, Boreal Bog, Few-flowered and Few-seeded Sedge. The others are Wild Calla, Narrow-leaved Willow-herb, Bog Laurel, Bog Rosemary, Indian Pipe, Three-leaved False Solomon’s Seal, Pitcher Plant, Round-leaved Sundew and Bog Cranberry.

Photo by Jim Saunders

Bog Cranberry



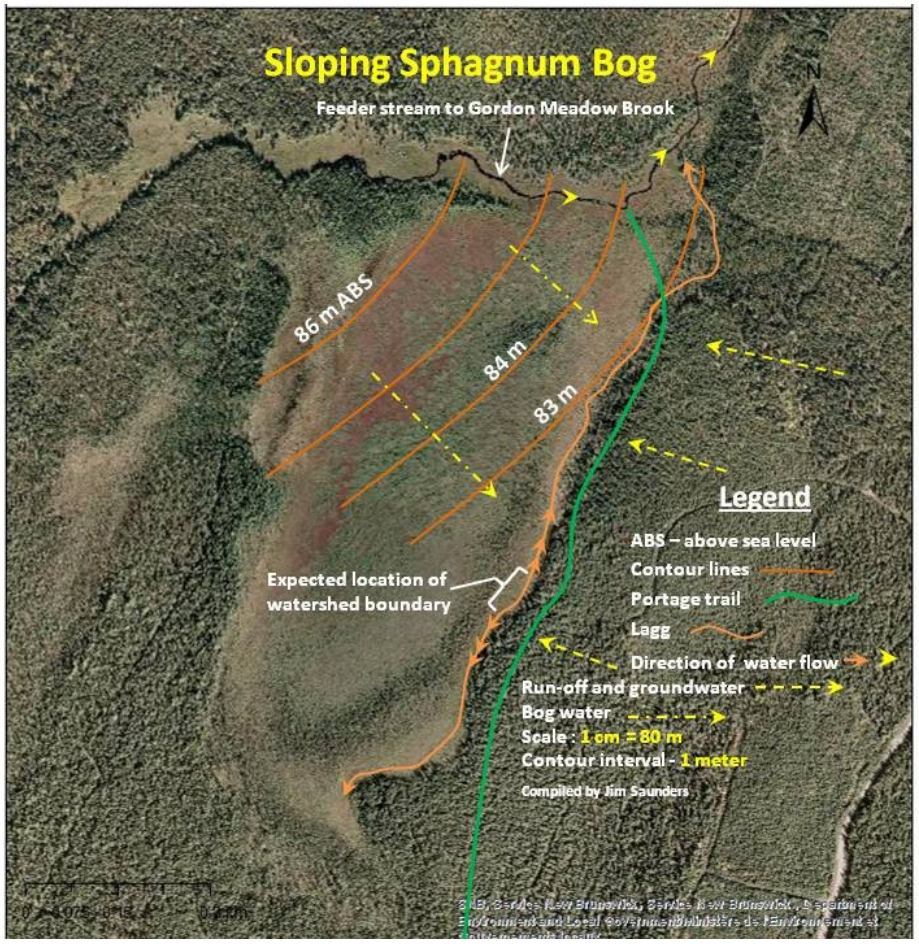
Sloping Sphagnum Bog

In this Natural Community plants have evolved to survive and thrive in what is described as a hostile environment. It is interesting to note, however, that 45 species were recorded in this Natural Community making it the third most diverse vascular plant community along the Portage trail. Natural Community 12 had 55 species recorded and the Riparian Zones have 46 species recorded.

The Bog slopes ever so gently from northwest to southeast. If one ventures into the forest west of where the boardwalk begins, a stream that is a short distance from the edge of the bog can be seen flowing toward the boardwalk. At the end of the boardwalk there is a feeder stream to Gordon Meadow Brook.

The channel becomes dispersed among the shrubs and herbaceous vegetation as the water flows toward and then under the boardwalk. The water flow can be confirmed by standing on the boardwalk a few meters from its beginning, looking down at the water and watching it flow under it. It eventually flows northward along the lagg edge of the bog to the feeder stream and then into Gordon Meadow Brook which drains into the Nepisiguit River.

The line connecting the locations of the heights of land, from which water drains in two directions, is called a "watershed boundary". A part of this boundary at which water flows north and south is estimated to be near the southern limit of the bog.



Map showing expected location of watershed boundary at the lagg

At the watershed boundary, bog water, ground water and surface run-off water make their way south into the large pond on the north side of the Spurline and to the North towards Gordon Meadow Brook. The pond at the Spurline resulted from Beavers damming the culvert under it. The overflow follows a channel to McKay Brook which crosses the Portage trail at 0.408 km. Water eventually flows into the main Southwest Miramichi

River. Water flowing from McKay Brook to Portage River to the Northwest Miramichi River, finally meets water from the Main Southwest Miramichi at the confluence of the Main Southwest and the Northwest at Beaubears Island in the City of Miramichi.

The lagg stream is carrying a mixture of ground water, nutrient rich water from the upland forest, and nutrient poor, acidic bog water. Plants such as the Three-leaved False Solomon's Seal and Narrow-leaved Willow Herb are found in the lagg stream near the boardwalk.

One of the most interesting plants found in the bog is the insectivorous Pitcher plant. Due to slow decomposition of organic matter in a bog environment, the Pitcher plant has evolved so that it can get its nitrogen from insects in the bog. It accomplishes this by attracting them to the liquid in the leaves in which they are dissolved. The leaves are circular in cross section and about 10 to 15 centimeters deep.

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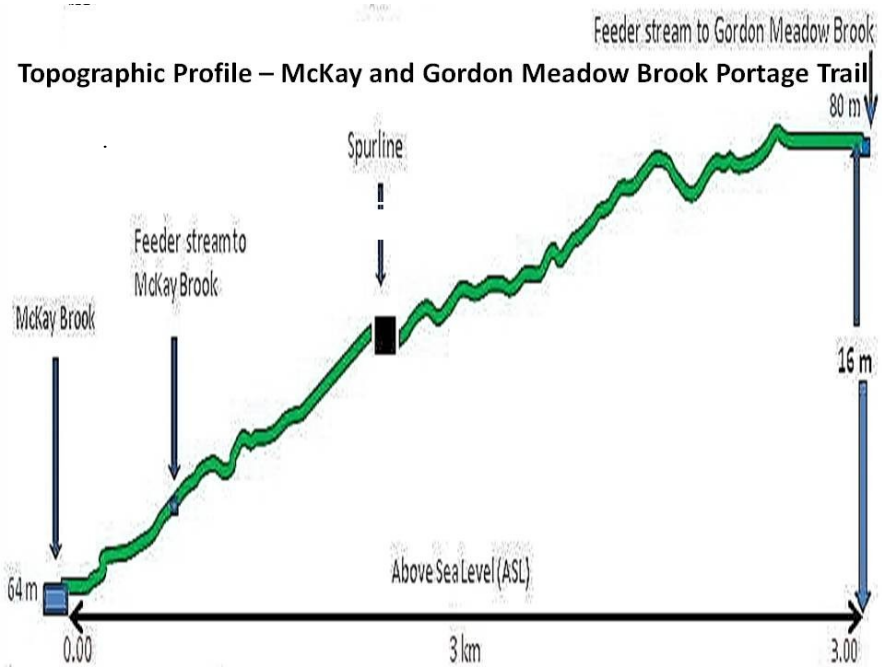
Diversity of Plant Species on the Portage Trail

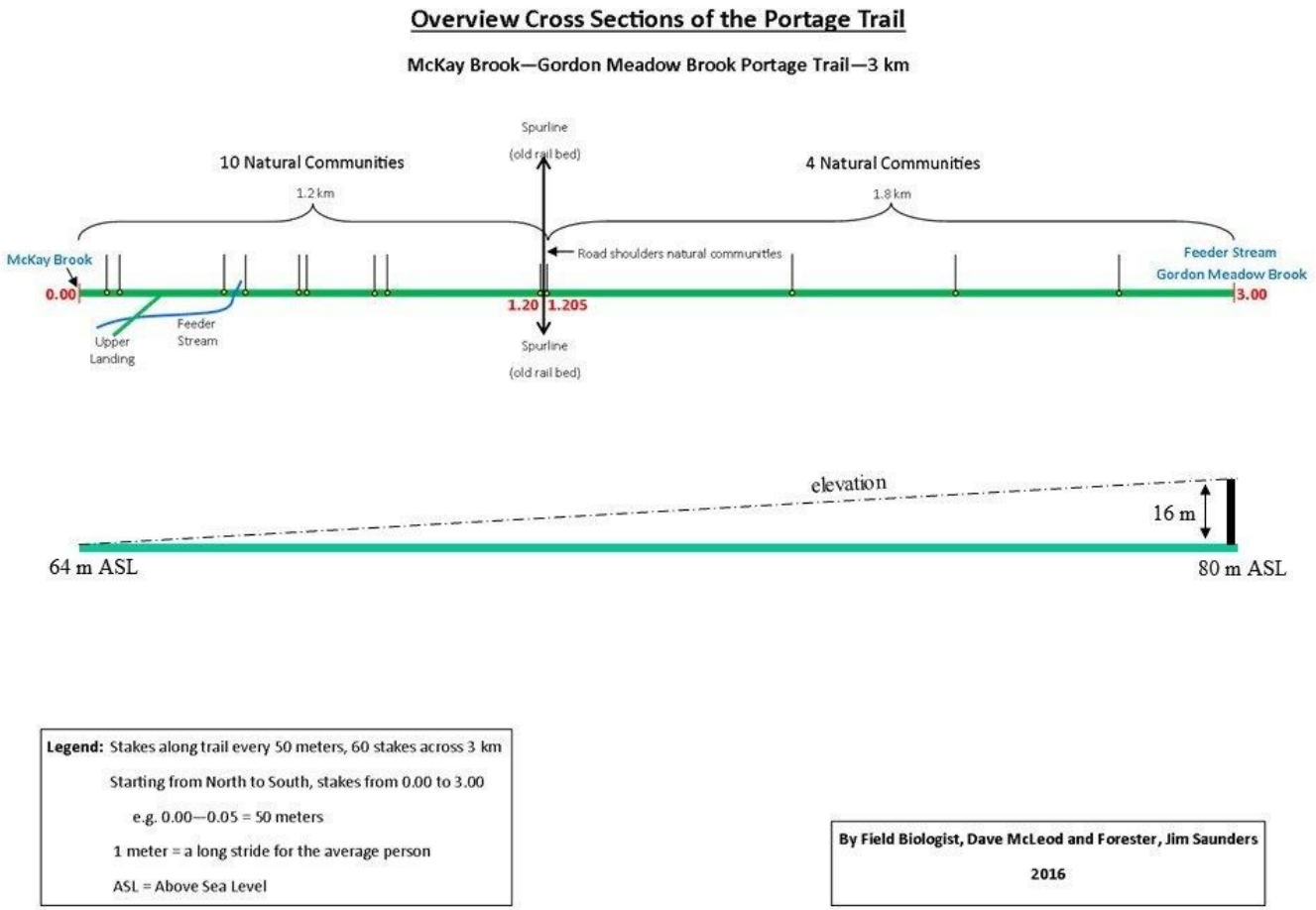
An examination of the species inventory shows that there is significant diversity of plant species on the Portage trail. To help illustrate this, links to topographic profiles of the Portage trail showing the locations of **some** plant families are provided. The linked charts will also show the Natural Communities in which the recorded species of each family can be found.

There is a 16 meter increase in the trail elevation from McKay Brook (South end) to the feeder stream of Gordon Meadow Brook (North end). The topographic profile is greatly exaggerated in the vertical in the following chart because of the great difference in scales.



The horizontal scale in the chart above is 1 cm equals 200 meters. If the same scale were used on the change in elevation of 16 meters over the length of the Portage trail, the height rather than being 9 cm on the above diagram would only be 0.08 cm or less than a millimeter. The vertical exaggeration reveals the rolling and slowly rising topography that would not be apparent in the chart if the vertical line was only 0.08 cm (less than 1 millimeter) in height. One has to keep in mind that this is a vertical exaggeration and therefore not be misled into thinking that the trail is steep.

"Natural Communities" refer to the fourteen (14) communities across the 3 km portage trail that separate sections and/or parts thereof from adjoining sections and/or parts thereof due to their distinct species inventories. The 3 km ancient portage trail is assigned numbers ranging from 0.00 (on the south end of the trail) to 3.00 (north end of the trail). Each "Natural Community" has a distinct start and end measurement with reference to the 3 km distance. In addition, for the reader's convenience, each Natural Community is colour-coded plus given a distinct name indicating the uniqueness of that natural community. For example, "**Tall Shrub – Savannah**", **Natural Community 1**, begins at **0.00** km and ends at **0.073** km and **Transition to Boreal Black Spruce Forest Community 2**, begins at **0.073** km and ends at **0.104** km**.**



The numbers of species in the Natural Communities are as follows:

Link to text			Link to Spreadsheet
Natural Community 1	–	28 species	Natural Communities 1 to 10
Natural Community 2	-	23	Natural Communities 1 to 10
Natural Community 3	-	36	Natural Communities 1 to 10
Natural Community 4	-	36	Natural Communities 1 to 10
Natural Community 5	-	30	Natural Communities 1 to 10
Natural Community 6	-	25	Natural Communities 1 to 10
Natural Community 7	-	40	Natural Communities 1 to 10
Natural Community 8	-	31	Natural Communities 1 to 10
Natural Community 9	-	23	Natural Communities 1 to 10
Natural Community 10	-	37	Natural Communities 1 to 10
Natural Community 11	-	39	Natural Communities 11 to 14
Natural Community 12	-	31	Natural Communities 11 to 14
Natural Community 13	-	55	Natural Communities 11 to 14
Natural Community 14	-	45	Natural Communities 11 to 14

Most of the unique species are at the ends of the trail (Communities 1 and 14) which have 22 of an overall total of 30 unique species.

Those plants that are called unique could be called “rare” in the context of the Portage trail. However in the bigger picture, such as the county or the province, most of these “unique” species wouldn’t be classified as rare except for two which have been given a designation of “S3” in “The Flora of New Brunswick, Hinds, 2000”. From the same source, a plant designated as “S3” is described as “rare to uncommon with 21 to 100 known occurrences in the province and it may be susceptible to extirpation due to large-scale disturbances”.

The numbers of species that are found in only one Natural Community are as follows:

- Natural Community 1 – 8 Species: Red-osier Dogwood, Rattlesnake Grass, Common Elder, Mountain Fly Honeysuckle, Swamp Candles, Inflated Sedge, Ovoid Spike Rush and Northern St. John’s-wort
- Natural Community 2 – 0 species
- Natural Community 3 – 1 species: Alternate-leaved Dogwood
- Natural Community 4 – 4 species: Green-fruited Bur-reed, Turtlehead, Triploid Wood Fern and Bristly or Swamp Currant
- Natural Community 5 – 0 species
- Natural Community 6 – 0 species
- Natural Community 7 – 0 species

- Natural Community 8 – 0 species
- Natural Community 9 – 0 species
- Natural Community 10 – 31 species
- Natural Community 11 – 2 species: New York Aster and Common Blackberry
- Natural Community 12 – 0 species
- Natural Community 13 – 1 species: Rose Twisted-stalk
- Natural Community 14 – 14 species: Alpine, Tawny and White or Tall Cotton Grass, three Sedges, Boreal Bog, Few-flowered and Few-seeded Sedge, Bog Laurel, Bog Rosemary, Indian Pipe, Three-leaved False Solomon's Seal, Pitcher Plant, Wild Calla, Narrow-leaved Willow-herb and Round-leaved Sundew

The top ten herbaceous and shrub species found on the trail are:

- Sheep Laurel in 57 sections out of a total of 60 sections
- Blueberry in 52 sections
- Wintergreen in in 53 sections
- Rhodora in 52 sections
- Bunchberry in 48 sections
- Wild Raisin in 48 sections
- Mayflower in 44 sections
- Bracken Fern in 42 sections
- Mountain Holly in 40 sections
- Goldthread in 39 sections

The Spurline total was excluded because it doesn't reflect the native forest species composition. Of the 37 species on the Spurline, 11 are introduced or not native to New Brunswick and only 6 were found in the forested areas north and south of it. These figures will change when the new records of August 11, 2016 are added at a later date.

Common to most of the Natural Communities are the characteristic Boreal Black Spruce Forest Heath family plants:

- Sheep Laurel
- Rhodora
- Lowbush Blueberry
- Wintergreen
- Mayflower and
- Creeping Snowberry

Sheep Laurel and Rhodora are the two Heath shrubs that can tolerate a range of moisture conditions as indicated in the species spreadsheets.

Additional Heath family plants are found mainly in the "Sloping Sphagnum Bog with Lagg Zone". They are:

- Leather-leaf
- Bog Laurel
- Bog Rosemary
- Labrador Tea and
- Small or Bog Cranberry

However there is an appearance of Labrador Tea in Natural Community 3 (sections 3 and 4), and at the bank of McKay Brook, there is an appearance of Leather-leaf, a wet habitat Heath family species.

The topographic and Community locations and of the species of some of the larger families can be viewed at the following links:

- Rose Family
- Lily Family
- Sedge Family
- Grass Family
- Fern Family
- Heath Family

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1. Herbaceous Layer in Forests of Eastern North America edited by Frank S. Gilliam and Mark R. Roberts, Oxford University Press, 2003, from the Preface by Frank S. Gilliam and Mark R. Roberts.

2. The Herbaceous Layer in Forests of Eastern North America, edited by Frank S. Gilliam and Mark R. Roberts, Oxford University Press, 2003. *Composition and Dynamics of the Understory Vegetation in the Boreal Forests of Quebec*, Louis de Grandpre, Yves Bergeron, Thuy Nguyen, Catherine Boudreault, Pierre Grondin

Glossary

Amphibians – frogs, toads, newts, and salamanders are cold-blooded, four-limbed animals with a backbone. They inhabit a wide variety of habitats with most species living within terrestrial, underground, treed or freshwater aquatic ecosystems. Amphibians typically start out as larvae living in water, but some species have developed behavioural adaptations to bypass this. The young generally change from larva with gills to an adult air-breathing form with lungs. Amphibians use their skin as a secondary respiratory surface and some small terrestrial salamanders and frogs lack lungs and rely entirely on their skin. With their complex reproductive needs and permeable skins, amphibians are often ecological indicators and in recent decades there has been a dramatic decline in amphibian populations for many species around the globe.

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Anther – see **Flower Parts** → **Stamen** → **Anther**

Anthocyanin – in photosynthetic tissues (such as leaves and sometimes stems), anthocyanins have been shown to act as a "sunscreen", protecting cells and tissues from high-light damage and stress by absorbing blue-green and ultraviolet light.

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Awn – either a hair or bristle-like appendage on a larger structure like a glume or lemma of a grass floret, or in the case of the Aster Family (Asteraceae), a stiff needle-like element of the pappus.

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Bifurcated –forked or divided into two parts or branches, as the Y-shaped stigmas of certain flowers.

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Bryophytes – a traditional name used to refer to all land plants that do not have true vascular tissue, i.e. mosses, liverworts (Three-lobed Bazzania in the photo is a liverwort) and hornworts, and are therefore called "non-vascular plants". Some bryophytes do have specialized tissues for the transport of water; however, since these do not contain lignin which reinforces the cell walls, they are not considered to be true vascular tissues.

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Calyx – see **Flower Parts** → **Sepals** → **Calyx**

Carbon sink – a natural or artificial reservoir that accumulates and stores some carbon-containing chemical compound for an indefinite period.

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Chlorophyll – the molecule that absorbs sunlight and uses its energy to make carbohydrates from carbon dioxide (CO_2) and water (H_2O). This process is known as photosynthesis.

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Corolla – see **Flower Parts** → **Petals** → **Corolla**

Corymb – see **Inflorescence**

Cyme – see **Inflorescence**

Fen – a peat-forming wetland that receives nutrients from sources other than precipitation; usually from upslope sources through drainage from surrounding mineral soils and from groundwater movement. Fens differ from bogs because they are less acidic and have higher nutrient levels. They are, therefore, able to support a much more diverse plant and animal community. These systems are often covered by grasses, sedges, rushes, and wildflowers.[1]

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Filament – see **Flower Parts** → **Stamen** → **Filament**

Fauna and Flora – fauna is all of the animal life of any particular region or time. The corresponding term for plants is flora. Flora, fauna and other forms of life such as fungi are collectively referred to as biota.

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Flower Fertilization – When a pollen-grain lands on a stigma, usually transported by insects or wind, it sprouts a tube that grows down the style, thus creating a passageway for the pollen-grain's liquid contents, containing two male gametocytes (sperm cells), to eventually reach the ovary. After entering the ovule through an opening called the micropyle, the tube ruptures and the two sperm cells are released.The union of one sperm cell and the egg cell will subsequently form a plant embryo.The other fuses with the polar nuclei to form the endosperm which is a food source for the seedling while it is developing to the point when it can make enough food by photosynthesis to survive.

Endosperm is a tissue produced inside the seeds of most flowering plants around the time of fertilization. It surrounds the embryo and provides nutrition for it in the form of starch, though it can also contain oils and protein.

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Flower Parts

Petals – modified leaves that surround the reproductive parts of flowers. They are often brightly colored or unusually shaped to attract pollinators.

Corolla – petals of a single flower collectively.

Sepals – are found below the petals. Some flowers do not have petals, in which case the sepals may be big and colorful.

Calyx – sepals of a single flower collectively.

Perianth – corolla and calyx collectively. It surrounds the reproductive parts of the flower.

Tepals – a term referring collectively to the petals (corolla) and sepals (calyx) that are indistinguishable in size, shape and colour as in the Lily Family (Liliaceae).

Stamen – the male reproductive part of a flower that it made up of the anther and filament.

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Anther – this oval to oblong-shaped pollen-producing structure is found at the tip of the filament.

Pollen – a collection of fine, yellowish dust (pollen-grains) from a seed-producing plant, which appears when released from the anther and carried to stigmas mainly by insects and wind. Under magnification the outer surface of each pollen grain exhibits a pattern unique to that species.

Filament – the stalk of the stamen that bears the anther.

Pistil – the female reproductive part of the flower that consists of a stigma, style and ovary.

Stigma – the part of the pistil to which pollen-grains adhere because of its sticky or papillose (covered with short, pimple-like or nipple-like protuberances) surface.

Style – the part of the pistil that connects the stigma to the ovary and functions as a conduit between the two. After entering the ovule through an opening called the micropyle, the tube ends its journey once it attaches itself to the embryo-sac wall.

Ovary – contains the ovules or female gametocytes.

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Frond – large, divided leaves of Ferns. Fronds can have different appearances by individual species. Examples: Bracken Fern consists of one frond and Cinnamon Fern and Interrupted Fern consist of many fronds.

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Frond (fertile **and** sterile) – in some species of Ferns, there is virtually no difference between the fertile and sterile fronds, such as in the genus *Dryopteris*, other than the presence of the sori or fruit-dots, on the back of the fertile fronds. Sori begin appearing in summer.

Some ferns of the genus *Osmunda*, have the fertile pinnae on a portion of the frond only (e.g. the Interrupted Fern). Still others, such as The Cinnamon Fern of the Flowering Fern Family, or plants of the family *Onocleaceae*, for example the Sensitive Fern, have fertile fronds that are completely different from the sterile fronds.

Photo by Jim Saunders

Sensitive Fern fronds are sensitive to frost

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Glacial erratic

Herbaceous – describes a plant with leaves and stem(s) that fall(s) down prior to the next growing season. It has no persistent woody stem above ground. Herbaceous plants may be annuals, biennials or perennials.

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Inflorescence – the complete flowering structure.

Corymb – a flower cluster whose lower stalks are proportionally longer so that the flowers form a flat or slightly convex head, e.g. Flat-topped White Aster.

Photo by Jim Saunders

Flat-topped White Aster with a convex flower head

Cyme – a usually flat-topped or convex flower cluster in which the main axis and each branch end in a flower as in Common Elder.

Photo by Jim Saunders

Photo shows the compound leaf in the lower left and the flower arrangement of the Common Elder

Raceme – an inflorescence or a complete flowering structure, having stalked flowers arranged singly along an elongated, un-branched stem. The flowers at the bottom open first.

Panicle – a compound raceme (see definition above) or branched cluster of flowers

Single – an inflorescence consisting of a single, un-branched, terminal flower.

Spike – a simple inflorescence with sessile or nearly sessile flowers arranged on an elongated axis.[2]

Umbel – an inflorescence which consists of a number of short flower stalks (called pedicels) which spread from a common point, somewhat like umbrella ribs.

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Lagg – a transition zone or eco-tone at the margin of a bog that receives water from both the bog and the surrounding mineral ground. The primary sources of water for the bog may be precipitation and/or groundwater. A more familiar example of an eco-tone is the transition zone between an abandoned field and a forested area.

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Leaves – simple or compound, depending on how their blades (or lamina) are divided. In a simple leaf, the blade can be undivided (e.g. White Birch) or formed of lobes (e.g. Red Maple) where the gaps between the lobes do not reach to the mid-vein. In a compound leaf, the leaf blade is divided, forming leaflets that are attached to the middle vein, but have their own stalks.[4]

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Lenticel

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Nectar – a sugar-rich liquid and the raw material for honey that is produced by plants in glands called nectaries. Common nectar-consuming pollinators include bees, butterflies, moths, hummingbirds, and bats.
Nectar secretion increases as the flower is visited by pollinators. After pollination, the nectar is frequently reabsorbed into the plant.

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Nematodes – or roundworms are a diverse animal group inhabiting a very broad range of environments. Nematode species can be difficult to distinguish, and although over 25,000 have been described, of which more than half are parasitic, the total number of nematode species has been estimated to be about 1 million.

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Ovary – see **Flower Parts** → **Pistil** → **Ovary**

Panicle – see **Inflorescence**

Peat – an accumulation of partially decayed vegetation or organic matter that is unique to natural areas called peat lands. The peat land ecosystem is the most efficient carbon sink on the planet because peat land plants capture the CO_2 which is naturally released from the peat, thus maintaining equilibrium. In natural peat lands, the "annual rate of biomass production is greater than the rate of decomposition", but it takes "thousands of years for peat lands to develop the deposits of 1.5 to 2.3 m, which is the average depth of the boreal peat lands". One of the most common components is *Sphagnum* moss, although many other plants can contribute. Soils that contain mostly peat are known as histosols. Peat forms in wetland conditions, where flooding obstructs flows of oxygen therefore slowing rates of decomposition.

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Perianth – see **Flower Parts → Perianth**

Pistil – see **Flower Parts → Pistil**

Parasitic – living in or on a host for an extended period. The parasite benefits at the expense of the other organism, the host. Parasites typically do not kill their host and are generally much smaller than it. The parasitic Dwarf Mistletoe is very small in comparison to the sizes of the trees it parasitizes. This non-mutual symbiotic (see **Symbiosis**) relationship between species is called parasitism**.**

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Pollen – see **Flower Parts → Stamen → Anther → Pollen**

Raceme – see **Inflorescence**

Reptiles – comprising today's turtles, crocodilians, snakes, lizards and tuatara, their extinct relatives, and some of the extinct ancestors of mammals. The study of reptiles, historically combined with that of amphibians, is called herpetology. Reptiles are creatures with a backbone that either have four limbs or, like snakes, being descended from four-limbed ancestors. Unlike amphibians, reptiles do not have an aquatic larval stage.

Riparian – (1, 2)

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Seep

Sessile – attached directly by its base without a petiole, stalk or peduncle.

Sloping Bog – a bog that has water flow derived from groundwater and precipitation which flows down slope through vegetation communities more commonly associated with bogs.[3]

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Spike – see **Inflorescence**

Spikelet – a small or secondary spike, characteristic of grasses and sedges, bearing one or more florets and usually subtended by one or two bracts.

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Stamen – see **Flower Parts** → **Stamen**

Stigma – see **Flower Parts** → **Pistil** → **Stigma**

Stolon – a slender stem that grows horizontally along the ground, giving rise to roots and aerial (vertical) branches at specialized points called nodes. A stolon is often called a runner.

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Style – see **Flower Parts** → **Pistil** → **Style**

Symbiosis – a close and often long-term interaction between two or more different biological species that can be either beneficial to both species (e.g. pollinating insects and flowering plants, ants and aphids) or to one species only (e.g. spider) using a leaf for a hiding place). Other insects can benefit from a mutually beneficial symbiotic between two others.

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Vascular and non-vascular plants – relating to plants that can conduct water, sap, and nutrients throughout the organism (i.e. vascular) or cannot conduct such liquids (i.e. non-vascular). Vascular plants form a large group of plants (club mosses, horsetails, flowering plants, ferns and fern allies, hardwoods and conifers) that have reinforced tissue called xylem for conducting water and minerals throughout the plant. They also have a specialized non-reinforced tissue in the bark called the phloem to conduct products of photosynthesis. These features allow vascular plants to evolve to a larger size than non-vascular plants (mosses, liverworts and hornworts), which lack these specialized conducting tissues and are therefore restricted to relatively small sizes.

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Witch's broom – a disease or deformity in a woody plant, typically a tree, where the natural structure of the plant is changed. A dense mass of shoots grows from a single point, with the resulting structure resembling a broom or a bird's nest. Witch's broom may be caused by many different types of organisms, including fungi, water molds, insects, mistletoe, dwarf mistletoes, mites, nematodes, or viruses. The broom growths may last for many years, typically for the life of the host plant. Human activity is sometimes behind the introduction of these organisms, for example, by failing to observe hygienic practice and thereby infecting the tree with the causative organism, or by pruning a tree improperly, and thereby weakening it.

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Tepal – see **Flower Parts** → **Perianth** → **Tepals**

1. http://water.epa.gov/type/wetlands/fen.cfm

2. Flora of New Brunswick, Hinds, H.R., 2000

3. Hydropedology: Synergistic Integration of Soil Science and Hydrology, edited by Henry Lin

4. Boundless. “Leaf Form.” *Boundless Biology*. Boundless, 03 Jul. 2014. Retrieved 19th Mar., 2015

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Appendix I – Vascular Plants of Gordon Meadow Brook / McKay Brook Portage Trail

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Vascular plants include those generally referred to as club-mosses, horsetails, ferns, trees, shrubs, vines, grasses, sedges, rushes and wildflowers, because these plant groups all have a vascular system composed of vessels or ducts (bundles) that carry growth-sustaining fluids like sap throughout the plant like a plumbing system. On the other hand, vascular plants can also be described as **not** plants which are referred to as non-vascular, with the latter including fungi, mosses, liverworts, lichens, and algae.

A total of 142 vascular plant taxa (species, subspecies, varieties, hybrids) has been recorded along the trail: 140 within 10 meters of the trail, plus an additional 2 species (Trembling Aspen and Bog Twayblade) beyond the 10 meters.

Nomenclature and taxonomic order follow Flora of New Brunswick (Hinds, 2000). Common names and introduced versus native status were taken from Hinds.

Notations:

F - **F**lowering season as defined by the following symbols:
Sp - **Sp**ring (April to June 21)

S - **S**ummer (June 21 through August)
A - **A**utumn (September to early November)
Y - throughout the **year** (applies only to the non-flowering vascular spore-bearing club-mosses and a few fern species that retain evidence of spores in any season)
e - **e**arly (used as a prefix with any of the three seasons)
l - **l**ate (used as a prefix with any of the three seasons)

I - **I**ntroduced or non-native plant

N – **N**ative plant

subsp. – subspecies

var. – variety

x – hybrid (placed directly before a species name as in **x***triploidea*)

Note that fruit can be seen after the flowering times given, and in some cases will even persist over winter.

Scientific Name	Common Name	I/N	F	Trail Sections ( ) – number of
LYCOPODIACEAE	**CLUB-MOSS FAMILY**			
Huperzia lucidula (Michx.) Trevisan	Shining Club-moss	N	Y	47 (1)
Lycopodium annotinum L.	Bristly or Stiff Club-moss	N	Y	46 (1)
Lycopodium clavatum L.	Common or Running Club-moss	N	Y	47, 51 (2)
Lycopodium dendroideum Michx.	Prickly Tree Club-moss	N	Y	3, 5-8, 10, 12-14, 16, 20, 31, 45-51, 53 (20)
EQUISETACEAE	**HORSETAIL FAMILY**			
Equisetum arvense L.	Common Field Horsetail	N	Sp	25 at road (1)
Equisetum sylvaticum L.	Wood Horsetail	N	Sp	8, 9, 13, 49, 54 (5)
OSMUNDACEAE	**FLOWERING FERN FAM.**			

Osmunda cinnamomea L.	Cinnamon Fern	N	S	9, 16
Osmunda claytoniana L.	Interrupted Fern	N	Sp	49, 50, 52 (3)
DENNSTAEDTIACEAE	**HAY-SCENTED FERN FAM.**			
Pteridium aquilinum (L.) Kuhn	Bracken	N	SpS	4- 16, 28-56 (42)
DRYOPTERIDACEAE	**WOOD FERN FAMILY**			
Athyrium filix-femina (L.) Roth *ex* Mertens var. *angustum* (Willd.) Lawson	Lady Fern	N	SpS	46 (1)
Dryopteris carthusiana (Vill.) H.P. Fuchs	Spinulose Wood Fern	N	Y	9 (1)
Dryopteris cristata (L.) Gray	Crested Wood Fern	N	Y	7 (1)
Dryopteris intermedia (Muhl.) Gray	Glandular Wood Fern	N	Y	1, 2, 8, 9, 47, 48, 49 (7)
Dryopteris xtriploidea Wherry	Triploid Wood Fern	N	Y	9 (1)
Onoclea sensibilis L.	Sensitive Fern	N	Y	25 at road (1)
PINACEAE	**PINE FAMILY**			
Abies balsamea (L.) Mill.	Balsam Fir	N	SpeS	3-15, 17-20, 22, 25, 27-35, 37-40, 45-53, 55, 56 (43)
Larix laricina (Du Roi) Koch	Tamarack or American Larch	N	SpeS	1-9, 17, 22, 23, 30, 33-35, 39, 44-46, 50, 56-60 (26)
Picea glauca (Moench) Voss	White Spruce	N	SpeS	47 (1)
Picea mariana (Mill.) BSP.	Black Spruce	N	SpeS	1-60 (60)
Pinus banksiana Lamb.	Jack Pine	N	SpeS	6, 7, 19-46, 49, 53, 55, 56 (34)
Pinus strobus L.	White Pine	N	SpeS	22, 23, 25, 27, 38, 39, 41, 52, 54-56 (11)
CUPRESSACEAE	**CYPRESS FAMILY**			
Thuja occidentalis L.	Eastern White Cedar	N	SpeS	13, 33 (2)
RANUNCULACEAE	**CROWFOOT (BUTTERCUP) FAM.**			
Clematis virginiana L.	Virgin's-bower	N	SeA	25 at road (1)
Coptis trifolia (L.) Salisb.	Goldthread	N	lSpeS	2-17, 20, 26, 30-34, 45-56 (35)
Ranunculus acris L.	Common Buttercup	I	SpSeA	25 at road (1)
Thalictrum pubescens Pursh	Tall Meadow-rue	N	S	1, 8, 9, 47 (4)
MYRICACEAE	**WAX-MYRTLE FAMILY**			
Comptonia peregrina (L.) Coult.	Sweet-fern	N	Sp	19, 21, 22, 25, 29, 33, 34, 37, 41, 52 (10)
Myrica gale L.	Sweet Gale	N	Sp	1, 60 (2)
BETULACEAE	**BIRCH FAMILY**			
Alnus incana (L.) Moench subsp. *rugosa* (Du Roi) Clausen	Speckled Alder	N	Sp	1-5, 7-13, 15-17, 25, 28, 46-50, 53, 55-57, 60 (27)
Betula papyrifera Marsh.	White, Canoe or Paper Birch	N	Sp	25 at road (1)
Corylus cornuta Marsh.	Beaked Hazel	N	eSp	47, 49-51, (4)
Scientific Name	**Common Name**	**I/N**	**F**	**Trail Sections**
CLUSIACEAE	**ST. JOHN'S-WORT FAM.**			
Hypericum boreale (Britt.) Bickn.	Northern St. John's-wort	N	SeA	1 (1)
Hypericum perforatum L.	Common St. John's-wort	I	SeA	25 at road (1)

SARRACENIACEAE	**PITCHER-PLANT FAMILY**			
Sarracenia purpurea L.	Pitcher-plant	N	SpS	57-60 (4)
DROSERACEAE	**SUNDEW FAMILY**			
Drosera rotundifolia L.	Round-leaved Sundew	N	SA	56 (1)
VIOLACEAE	**VIOLET FAMILY**			
Viola blanda Willd.	Large-leaved White Violet	N	eSp	8, 9, 47, 48, 50-54 (9)
SALICACEAE	**WILLOW FAMILY**			
Populus balsamifera L.	Balsam Poplar	N	Sp	25 at road (1)
Populus tremuloides Michx.	Trembling Aspen	N	Sp	47 (1) (20m+ from east side of trail)
Salix bebbiana Sarg.	Bebb's or Livid Willow	N	Sp	25 at road (1)
Salix humilis Marsh.	Prairie or Upland Willow	N	Sp	38 (1)
Salix pyrifolia Anderss.	Balsam Willow	N	Sp	21-25, 55 (6)
ERICACEAE	**HEATH FAMILY**			
Andromeda polifolia L.	Bog-Rosemary	N	lSp	58-60 (3)
Chamaedaphne calyculata (L.) Moench	Leather-leaf	N	Sp	1, 56-60 (6)
Epigaea repens L.	Mayflower or Trailing Arbutus	N	eSp	4-8, 10-42, 44-46, 49, 51, 53 (44)
Gaultheria hispidula (L.) Muhl.	Creeping Snowberry, Snowberry-wintergreen	N	lSp	2-15, 17, 19-23, 29-33, 45, 46, 48, 51, 55, 56 (31)
Gaultheria procumbens L.	Wintergreen	N	S	3-47, 49-56 (53)
Kalmia angustifolia L.	Sheep Laurel or Lambkill	N	eSp	1-49, 51-53, 56-60 (57)
Kalmia polifolia Wangenh.	Pale or Bog Laurel	N	lSp	58-60 (3)
Rhododendron canadense (L.) Torr.	Rhodora	N	lSpeS	1-6, 11-45, 52, 54-60 (49)
Rhododendron groenlandicum (Oeder) Kron & Judd	Labrador-tea	N	lSpeS	3, 4, 56-60 (7)
Vaccinium angustifolium Ait..	Lowbush Blueberry	N	SpeS	2-56 (55)
Vaccinium oxycoccos L.	Small or Bog Cranberry	N	SpeS	57-60 (4)
PYROLACEAE	**PYROLA FAMILY**			
Orthilia secunda (L.) House	One-sided Pyrola	N	lSpS	32, 49, 50 (3)
Pyrola chlorantha Sw.	Green-flowered Wintergreen	N	lSpS	8, 10, 11, 13, 17, 29-32, 48, 49, 56 (12)
MONOTROPACEAE	**INDIAN PIPE FAMILY**			
Monotropa uniflora L.	Indian-pipe	N	S	56 (1)
PRIMULACEAE	**PRIMROSE FAMILY**			
Lysimachia terrestris (L.) BSP.	Swamp Loosestrife, Swamp-candles	N	S	1 (1)
Trientalis borealis Raf.	American Starflower	N	lSp	31, 32, 34, 45-51, 53, 55, 56 (13)
GROSSULARIACEAE	**GOOSEBERRY FAMILY**			
Ribes lacustre (Pers.) Poir.	Bristly or Swamp Currant	N	Sp	9 (1)
ROSACEAE	**ROSE FAMILY**			

Amelanchier x*neglecta* Egglest.	Overlooked Serviceberry	N	Sp	2, 4-7, 11, 13-18, 20, 29-33, 43,45,47,51,52, 54-56(26)
Dalibarda repens L.	Robin-run-away, Dewdrop	N	SeA	3-16, 45-56 (26)

Scientific Name	Common Name	I/N	F	Trail Sections
Fragaria virginiana Dcne.	Wild Strawberry	N	Sp	25 at road (1)
Potentilla norvegica L.	Rough Cinquefoil	I	S	25 at road (1)
Rubus allegheniensis Porter	Common Blackberry	N	SpeS	30 (1)
Rubus idaeus L. var. *strigosus* (Michx.) Focke	Red Raspberry	N	SpeS	8, 9, 25 at road, 26 (4)
Rubus pubescens Raf.	Swamp Red Raspberry	N	SpeS	1, 8, 9, 12, 16, 25 at road, 46, 47, 50, 52 (10)
Sorbus americana Marsh.	American Mountain-ash	N	lSp	3, 5-9, 11-15, 30-32, 46-49, 54, 56 (20)
Spiraea alba Du Roi var. *latifolia* (Ait.) Dippel	Meadow-sweet	N	lSpS	1-4, 8-10, 16, 60 (9)
FABACEAE	**PEA or BEAN FAMILY**			
Trifolium hybridum L.	Alsike Clover	I	S	25 at road (1)
ONAGRACEAE	**EVENING-PRIMROSE FAM.**			
Epilobium leptophyllum Raf.	Narrow-leaved Willow-herb	N	S	56
Oenothera biennis L.	Evening-primrose	N	SA	25 at road (1)
CORNACEAE	**DOGWOOD FAMILY**			
Cornus alternifolia L.	Alternate-leaved Dogwood	N	SpS	4 (1)
Cornus canadensis L.	Bunchberry	N	SpS	2-17, 20, 24, 25, 28-35, 43-56 (41)
Cornus sericea L.	Red Osier Dogwood	N	SpS	1 (1)
VISCACEAE	**MISTLETOE FAMILY**			
Arceuthobium pusillum Peck	Dwarf or Small Mistletoe	N	eSp	31, 56, 57 (3)
AQUIFOLIACEAE	**HOLLY FAMILY**			
Nemopanthus mucronatus (L.) Loes.	Mountain-holly	N	Sp	6, 10-16, 28-32, 34-40, 43-49, 51-57, 60 (35)
ACERACEAE	**MAPLE FAMILY**			
Acer rubrum L.	Red Maple	N	Sp	3-9, 12-14, 19, 22, 23, 28, 30, 33, 34, 44-57, 60 (32)
ARALIACEAE	**GINSENG FAMILY**			
Aralia nudicaulis L.	Wild Sarsaparilla	N	Sp	9, 16, 45-52, 54-56 (13)
APOCYNACEAE	**DOGBANE FAMILY**			
Apocynum androsaemifolium L.	Spreading Dogbane	N	SpS	49, 55 (2)
PLANTAGINACEAE	**PLANTAIN FAMILY**			
Plantago major L.	Common Plantain	I	SpSA	25 at road (1)
SCROPHULARIACEAE	**FIGWORT FAMILY**			

Chelone glabra L.	Turtlehead	N	SeA	9 (1)
Linaria vulgaris Mill.	Common Toadflax or Butter-and-eggs	I	SpSA	25 at road (1)
Melampyrum lineare Desr.	Cow-wheat	N	lSpeS	24 (1)
CAPRIFOLIACEAE	**HONEYSUCKLE FAMILY**			
Diervilla lonicera P. Mill.	Northern Bush-honeysuckle	N	lSpeS	46-55 (10)
Linnaea borealis L.	Twinflower	N	lSpS	2-13, 16, 30-34, 44-47, 49-56 (30)
Lonicera villosa (Michx.) J.A. Schultes	Mountain Fly Honeysuckle	N	SpeS	1 (1)
Sambucus canadensis L.	Common Elder	N	S	1 (1)
Viburnum nudum L. var. *cassinoides* (L.) T. & G.	Wild-raisin or Witherod	N	SpeS	1-18, 27-40, 43-49, 51-57, 60 (47)

Scientific Name	Common Name	I/N	F	Trail Sections
ASTERACEAE	**ASTER FAMILY**			
Anaphalis margaritacea (L.) Benth. & Hook. f.	Pearly Everlasting	N	SA	25 at road (1)
Aster acuminatus Michx.	Whorled Wood Aster	N	lSA	49 (1)
Aster macrophyllus L.	Large-leaved Aster	N	lSA	11, 46, 47, 49-53 (8)
Aster novi-belgii L. var. *novi-belgii*	New York Aster	N	lSA	30 (1)
Aster umbellatus Mill.	Flat-topped White Aster	N	lSA	1, 2, 12, 13 (4)
Erechtites hieraciifolia (L.) Raf. *ex* DC.	American Burnweed	N	lSA	25 at road (1)
Euthamia graminifolia (L.) Nutt. *ex* Cass.	Grass-leaved Goldenrod	N	lSA	25 at road (1)
Hieracium piloselloides Vill.	Tall Hawkweed, Glaucous King-devil	N	SeA	25 at road (1)
Petasites frigidus (L.) Fries var. *palmatus* (Ait.) Cronq.	Sweet Coltsfoot	N	SpeS	9, 17, 49, 50 (4)
Prenanthes trifoliolata (Cass.) Fern.	Gall-of-the-earth	N	lSA	47, 50-53 (5)
Solidago macrophylla Pursh	Large-leaved Goldenrod	N	lSeA	49 (1)
Solidago puberula Nutt.	Downy Goldenrod	N	lSA	53 (1)
Solidago rugosa P. Mill.	Rough-stemmed Goldenrod	N	lSA	8, 9, 25 at road (3)
Taraxacum officinale Weber subsp. *officinale*	Common Dandelion	I	SpSA	25 at road (1)
Tussilago farfara L.	Coltsfoot	I	Sp	25 at road (1)
ARACEAE	**ARUM FAMILY**			
Calla palustris L.	Wild Calla	N	eS	60 (1)
JUNCACEAE	**RUSH FAMILY**			
Juncus effusus L.	Soft Rush	N	SpS	1, 2 (2)
CYPERACEAE	**SEDGE FAMILY**			
Carex arctata Boott *ex* Hook.	Drooping Woodland Sedge	N	Sp	2, 8, 12, 13, 56 (5)
Carex brunnescens (Pers.) Poir. subsp. s*phaeostachya* (Tuck.) Kalela	Brownish Sedge	N	Sp	9, 12, 13,16 (4)
Carex canescens L.	Silvery Sedge	N	Sp	12, 57, 60 (3)
Carex deflexa Hornem.	Northern Sedge	N	Sp	49 (1)
Carex foenea Willd.	Copper or Dry-spike Sedge	N	Sp	25 at road (1)
Carex intumescens Rudge	Bladder Sedge	N	Sp	9 (1)
Carex lucorum Willd. *ex* Link	Forest Sedge	N	Sp	9 (1)
Carex magellanica Lam. subsp. i*rrigua* (Wahl.) Fern.	Boreal Bog Sedge	N	Sp	56-58, 60 (4)
Carex oligosperma Michx.	Few-seeded Sedge	N	Sp	58-60 (3)
Carex pauciflora Lightf.	Few-flowered Sedge	N	Sp	56-60 (5)
Carex stricta Lam.	Stiff Sedge	N	Sp	1-3, 8, 9, 56, 60 (7)

Carex trisperma Dewey	Three-seeded Sedge	N	Sp	3, 4, 8, 9, 12-14, 16, 56, 57, 59, 60 (12)
Carex vesicaria L.	Inflated Sedge	N	Sp	1 (1)
Eleocharis ovata (Roth) R. & S.	Ovoid Spike-rush	N	Sp	1 on muddy shore (1)
Eriophorum angustifolium Honck..	White or Tall Cotton-grass	N	SpeS	56-60 (5)
Eriophorum virginicum L.	Tawny Cotton-grass	N	S	56 (1)
Scirpus atrocinctus Fern.	Black-girdle Wool-grass	N	Sp	25 at road (1)
Trichophorum alpinum (L.) Pers.	Alpine Cotton-grass	N	Sp	58-60 (3)
POACEAE	**GRASS FAMILY**			
Agrostis scabra Willd.	Fly-away Grass	N	SA	25 at road (1)
Brachyelytrum septentrionale (Babel) G. Tucker	Northern Short-husk	N	SpS	13
Calamagrostis canadensis (Michx.) P. Beauv.	Blue-joint Grass or Blue-node	N	SpS	1, 2, 12 (3)
Danthonia spicata (L.) P.Beauv. *ex* Roem. & Schut.	Poverty Oat Grass	N	SpS	25 at road (1)
Glyceria canadensis (Michx.) Trin.	Rattlesnake Grass	N	SpS	1 (1)
Glyceria grandis S. Watson *ex* A. Gray	Reed Meadow Grass	N	SpS	3, 8, 9 (3)
Glyceria striata (Lam.) Hitchc. var. *striata*	Fowl Manna Grass	N	SpS	25
Oryzopsis asperifolia Michx.	Rough Mountain-rice	N	eSp	6, 12-15, 32-34, 45-55 (19)
Phleum pratense L.	Timothy	I	SpS	25 at road (1)
Poa compressa L.	Canada Bluegrass	I	SpS	25 at road (1)
Poa pratensis L.	Kentucky Bluegrass	I	SpS	25 at road (1)

Scientific Name	Common Name	I/N	F	Trail Sections
SPARGANIACEAE	**BUR-REED FAMILY**			
Sparganium emersum Rehmann	Green-fruited Bur-reed	N	SpS	9 (1)
LILIACEAE	**LILY FAMILY**			
Clintonia borealis (Ait.) Raf.	Bluebead-lily	N	Sp	3-17, 24, 29-34, 45-56 (34)
Maianthemum canadense Desf.	Wild or False Lily-of-the-valley	N	Sp	1-13, 15, 16, 29, 30, 32, 34, 45-48, 50-56 (30)
Maianthemum trifolium (L.) Sloboda	Three-leaved False Solomon's Seal	N	Sp	46, 57, 58, 60 (4)
*Streptopus lanceolatus (*Ait.) Reveal	Rose Twisted-stalk	N	SpeS	50 (1)
Trillium undulatum Willd.	Painted Trillium	N	lSp	3-16, 18-20, 28-34, 43, 46, 48, 49, 51, 54-56 (32)
IRIDACEAE	**IRIS FAMILY**			
Iris versicolor L.	Blue Flag Iris	N	SpeS	1, 2 (2)
ORCHIDACEAE	**ORCHID FAMILY**			
Cypripedium acaule Ait.	Pink or Stemless Lady's-slipper	N	Sp	14, 24, 52 (3)
Liparis loeselii (L.) Richard	Bog, Loesel's or Yellow Twayblade	N	lSpeS	49 (20m+ from west side of trail in wet area) (1)

Appendix II - Amphibians and Reptiles of Gordon Meadow Brook / McKay Brook Portage Trail

Five amphibians and 3 reptiles in 4 families have been recorded to date along the trail; 1 toad, I treefrog, 3 true frogs, and 3 snakes.

The taxonomic order and nomenclature follow Introduction to Canadian Amphibians and Reptiles (Cook, 1980). The species listed were observed and/or heard.

AMPHIBIANS

Scientific Name	Common Name	Notes

BUFONIDAE	**TOAD FAMILY**	
Bufo americanus	American Toad / Crapaud d'Amérique	trilling in Spring in bog; Sect. #60
HYLIDAE	**TREEFROG FAMILY**	
Hyla crucifer	Spring Peeper / Rainette crucifère	forest along trail; Sect. #55
RANIDAE	**TRUE FROG FAMILY**	
Rana sylvatica	Wood Frog / Grenouille des bois	forest along trail; Sect. #9, 47
Rana clamitans	Green Frog / Grenouille verte	roadside pond; Sect. #25
Rana septentrionalis	Mink Frog / Grenouille du Nord	roadside pond; Sect. #25

REPTILES

COLUBRIDAE	**SNAKE FAMILY**	
Thamnophis sirtalis subsp. *pallidula*	Maritime Garter Snake / Couleuvre rayée maritime (subspecies of Common Garter Snake)	forest along trail; Sect. #36
Storeria occipitomaculata	Redbelly Snake / Couleuvre à ventre rouge	forest along trail; Sect. #
Opheodrys vernalis	Smooth Green Snake / Couleuvre verte	on rotting stump; Sect. #1

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Appendix III – Birds of Gordon Meadow Brook / McKay Brook Portage Trail

A total of 23 species of birds have been recorded along the trail. This includes 15 families. The English and French common name as well as the scientific name are given for each species. Taxonomic order follows "New Brunswick Birds – Oiseaux du Nouveau-Brunswick" (2011).

Notations:

Breed. - This column refers to breeding status according to the following designations:

Poss. - Possible breeding. Single male and suitable habitat available.

Prob. - Probable breeding. Pair present, territorial behavior over a week or more (e.g. male singing), agitated behavior, etc.

Con. - Confirmed breeding. Nest found, adults carrying food, distraction display, or recently fledged young.

Common Name	Scientific Name	Breed.
PHEASANT, GROUSE and ALLIES FAMILY	PHASIANIDAE	
Spruce Grouse – Tétras du Canada	*Falcipennis canadensis*	Prob.
OSPREY, HAWK and EAGLE FAMILY	ACCIPITRIDAE	
Bald Eagle - Pygargue à tête blanche	*Haliaeetus leucocephalus*	Fly over
GOATSUCKERS	CAPRIMULGIDAE	
Common Nighthawk - Engoulevent d' Amérique	*Chordeiles minor*	Poss.
WOODPECKER FAMILY	PICIDAE	
Hairy Woodpecker - Pic chevelu	*Picoides villosus*	Prob.
Northern Flicker - Pic flamboyant	*Colaptes auratus*	Prob.
Pileated Woodpecker - Grand Pic	*Dryocopus pileatus*	Prob.
VIREO FAMILY	VIREONIDAE	
Red-eyed Vireo - Viréo aux yeux rouges	*Vireo olivaceus*	Prob.
JAY and CROW FAMILY	CORVIDAE	
Gray Jay - Mésangeai du Canada	*Perisoreus canadensis*	Prob.
Common Raven - Grand Corbeau	*Corvus corax*	Prob.
SWALLOW FAMILY	HIRUNDINIDAE	

Tree Swallow - Hirondelle bicolore	*Tachycineta bicolor*	Poss.
TITMOUSE and CHICKADEE FAMILY	PARIDAE	
Black-capped Chickadee - Mésange à tête noire	*Poecile atricapillus*	Prob.
NUTHATCH FAMILY	SITTIDAE	
White-breasted Nuthatch - Sittelle à poitrine blanche	*Sitta carolinensis*	Poss.
Red-breasted Nuthatch - Sittelle à poitrine rousse	*Sitta canadensis*	Prob.
KINGLET FAMILY	REGULIDAE	
Ruby-crowned Kinglet - Roitelet à couronne rubis	*Regulus calendula*	Poss.
THRUSH FAMILY	TURDIDAE	
American Robin - Merle d' Amérique	*Turdus migratorius*	Poss.
WAXWING FAMILY	BOMBYCILLIDAE	
Cedar Waxwing - Jaseur d' Amérique	*Bombycilla cedrorum*	Poss.
WOOD WARBLER FAMILY	PARULIDAE	
Northern Parula - Paruline à collier	*Parula americana*	Poss.
Common Yellowthroat - Paruline masquée	*Geothlypis trichas*	Prob.
EMBERIZINE SPARROW and ALLIES FAMILY	EMBERIZIDAE	
Song Sparrow - Bruant chanteur	*Melospiza melodia*	Prob.
Swamp Sparrow – Bruant des marais	*Melospiza georgiana*	Prob.
White-throated Sparrow - Bruant à gorge blanche	*Zonotrichia albicollis*	Prob.
Dark-eyed Junco (Slate-coloured) - Junco ardoisé	*Junco hyemalis*	Poss.
FINCH FAMILY	FRINGILLIDAE	
		Poss.
American Goldfinch – Chardonneret jaune	*Carduelis tristis*	

Appendix IV – Mammals of Gordon Meadow Brook / McKay Brook Portage Trail

Eight mammals have been recorded to date, representing 6 families.

Taxonomic order and nomenclature follow Land Mammals of New Brunswick (Dilworth, 1984). The list is based on either actual observations of living or dead individuals or on good secondary evidence (tracks, scats, *etc*.).

Scientific Name	Common Name
LAGOMORPHA	**PIKAS, HARES AND RABBITS**
LEPORIDAE	**RABBIT AND HARE FAMILY**
Lepus americanus Erxleben	Snowshoe or Varying Hare/Lièvre d' Amérique
RODENTIA	**RODENTS**
SCIURIDAE	**SQUIRREL FAMILY**
Tamiasciurus hudsonicus (Erxleben)	American Red Squirrel/Écureuil roux
CASTORIDAE	**BEAVER FAMILY**
Castor canadensis Kuhl	American Beaver/Castor
CARNIVORA	**CARNIVORES**
CANIDAE	**DOG FAMILY**

Canis latrans Say	Coyote
Vulpes vulpes (L.)	Red Fox/Renard roux
URSIDAE	**BEAR FAMILY**
Ursus americanus Pallas	American Black Bear/ Ours noir
ARTIODACTYLA	**CLOVEN-HOOFED MAMMALS**
CERVIDAE	**DEER FAMILY**
Odocoileus virginianus (Zimmermann)	White-tailed Deer/Cerf de Virginie
Alces alces (L.)	Moose/Orignal