Bluff Trail Stewardship Program

Five Bridge Lake Wilderness Protected Area:

Unique Forests Assessment Project

A Report by Mike Lancaster

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Contents

Overview

The following is a report that details the mission, assessments and findings of a forest-based research expedition within suspected old deciduous-dominant stands located within the Five Bridge Lakes Wilderness Protected Area.

As an extension of the Woodens River Watershed Environmental Organization-St. Margaret's Bay Stewardship Association partnership project, The Bluff Trail Stewardship Program, this expedition occurred from July 17th to the 19th, 2017 – two nights and three days. The expedition was conducted in an effort to catalog and characterize some of the unique northern red oak-dominated forests that are present within the Five Bridge Lakes Wilderness Protected Area and to search out and assess candidates for the designation of old growth forest.

This research will help to further establish that the Five Bridge Lakes Wilderness Protected Area is home to uncommon forest and ecosystems when compared to the rest of Nova Scotia.

This study aims to build upon the research and findings of David Patriquin and Nick Hill in 2009 and 2011 (see http://versicolor.ca/forest/article.html for more details) and relied upon expert and historical consultation with Beth McGee and Ralph Wheadon.

Terminology

Basal Area (of a stand): The area of a cross section at DBH (diameter at breast height) of the stems in a hectare of a particular stand. This is measured in meters per hectare (m/ha)

Crown Closure: The percentage of available overstory space occupied by the crowns of the trees, or, collectively, canopy.

Climax Acadian Species: The Acadian forest types species that are generally associated with late successional, or old, forests. They are generally the longest living the forest type and are also the most shade tolerant species. As defined by Nova Scotia's Department of Natural Resources these species include red spruce, sugar maple, yellow birch, eastern white pine, eastern hemlock and American beech. Some suggest that Northern red oak should be included in this list as this study does. In nutrient or opportunity-limited ecotypes (such as bogs, areas with thin soils, high winds, etc.) species that are generally not associated with the 'Climax Acadian' forest type can sometimes constitute an 'old' or 'old growth' forest. These species are red maple, black spruce and balsam Fir.

D.B.H.: Acronym for diameter at breast height. As 'breast height' is subjective, this is generally classified as 1.3 m from the low side of where the bottom of the tree trunk, or root system, whichever is exposed, meets the soil layer.

Mature Climax: This generally refers to a forest stand wherein 30% or more of the basal area is composed of trees that are between 80 - 125 years old, crown closure is at a minimum of 30%, and at least half of the basal area is composed of climax species.

Immature Climax: This generally refers to a forest stand wherein 70% or more of the basal area is in trees younger than 80 years old, at least 50% of the basal area is composed of climax species, and crown closure is at least 30%.

Old Growth: As defined by the Nova Scotia Department of Natural Resources, Old Growth refers to "A forest stand where 30% or more of the basal area is in trees 125 years or older, at least 15 half of the basal area is composed of climax species, and total crown closure is a minimum of 30%." It should be noted that Old Growth forest are generally considered to be composed of multiple canopy layers with a mosaic of different age classes where old trees have died, opened up holes in the canopy and allowed for regeneration of young trees.

The Team

Our team of four forest-finders (an intentional alliteration) was composed of:

1. **Mike Lancaster**
   Stewardship Coordinator for the St. Margaret's Bay Stewardship Association and Program Coordinator for the Bluff Trail Stewardship Program. With 9 years of experience as an arborist and forester, Mike coordinated the expedition and directed the team as they conducted their assessments.
2. **Paul Berry**
   Co-chair of the Woodens River Watershed Environmental Organization (WRWEO). With a strong passion for The Bluff Wilderness Hiking Trail (The Bluff Trail) and the Five Bridges Lake Wilderness Area, Paul has been involved with WRWEO for over 10 years and has donated hundreds, if not thousands, of hours of his time to the stewardship efforts of The Bluff Trail and greater Wilderness Area.
3. **Jayden Gross**
   Board member of WRWEO and Bluff Trail Steward, Jayden has fully embraced the initiatives of WRWEO and the Bluff Trail Stewardship Program and has donated many hours to the efforts in his relatively short time of involvement. Jayden also functioned as the chief documentarian, snapping the majority of the photos that were taken during the course of the expedition.
4. **Zach Feener**
   An avid outdoorsman and explorer, Zach has spent many a-day hiking The Bluff Trail and joined the expedition to help complete the crew and contributed to the on-site assessments.

Left to right: Zach Feener, Jayden Gross, Paul Berry, Mike Lancaster

The Mission

In an effort to increase the likelihood of finding the potential northern red oak dominant and old growth forests that we sought consultations with experts David Patriquin, Beth McGee and Ralph Wheadon were conducted. Using their suggestions, along with the use of satellite imagery, four stands were targeted for sample plots and the subsequent site assessments.

The sites that were selected were all in relative close (500 m – 1.5 km) proximity to Big Five Bridge Lake and ranged from the western and southern regions of the lake.

In order to reach these remote sample sites it was determined that canoeing in would be the easiest mode of transportation. Thus, we began our excursion on the northern shore of Hubley Big Lake with the intention of canoeing to Paradise Cove, in the lakes southern end, and then portaging to Upper Five Bridge Lake. Once the 800 m portage was completed we then paddled across Upper Five Bridge Lake, heading north-to-south. The next leg of the journey is our second portage. Of equal distance to the first, this portage connects Upper and Middle Five Bridge Lake. After navigating through these relatively small lakes, the next step is our third and final portage. Luckily, the third portage is roughly half of the distance of the two prior. Finally, we reach Big Five Bridge Lake and then take our time, navigating the lake and its shores, in search of a suitable site upon which to camp; a site where we can have the lowest impacts for the compaction of vegetation and one that is close to the Sample Sites.

After a night's rest, we set out to conduct the assessments during the course of the day.

A large red oak from Stand #3

Assessment Methodology

Assessments were conducted using a modified version of the Nova Scotia Department of Natural Resources “Old Forest Score Sheet” system (see appendices for an example of score sheet). The assessments of this research project deviate from the normal protocol in the following ways:

1. Size class assessments were not performed – size class would have been incorporated into the findings if stands had scored high enough to receive classification but no stands reached this outcome.
2. Core samples were not removed – though they arrived after the fact, the required permits for extractive research had not yet been acquired upon the departure date for the expedition. As such, estimates were based off of exterior estimates.
3. Northern red oak was considered to be a climax Acadian forest type species

Stands were assessed using the following criteria:

1. Estimated Age
2. Primal Forest Value
3. Diameter
4. Deadwood
5. Crown Closure
6. Stand Structure

Assessments were conducted using a 2 BAF prism.

Mike Lancaster using his 2 BAF prism to assess Stand #2

Assessments: The Stands

Stand #1

Coordinates (UTM, Nad83): 434069 493677

# of Plots for Stand: 1

Total Trees/ha >40 cm: 60

Total Trees/ha >50 cm: 7

Total Trees/ha >60cm: 7

Percent Climax Species: 87

Primal Value Description: Suspected or light human disturbance

Overstory Crown Closure: Small canopy openings

Understory Structure: Multiple layers - balsam fir, red maple, red oak, red spruce

Forest Community (*Crown Lands Forest Model-2005*): HTHw – Tolerant hardwood (THw >60% of Hardwood BA

Old Growth Score Summary

Age: 10

Primal Value: 10

Diameter: 15

Deadwood: 3

Crown Closure: 5

Stand Structure: 5

Total Score: 48

A white birch in Stand #1

Stand #2

Coordinates (UTM, Nad83): 434042 4936746

# of Plots for Stand: 1

Total Trees/ha >40 cm: 42

Total Trees/ha >50 cm: 0

Total Trees/ha >60cm: 0

Percent Climax Species: 89

Primal Value Description: Suspected or light human disturbance

Overstory Crown Closure: Small canopy openings

Understory Structure: Multiple layers – red oak, white birch, red spruce

Forest Community (*Crown Lands Forest Model-2005*): HTHw – Tolerant hardwood (THw >60% of Hardwood BA)

Old Growth Score Summary

Age: 10

Primal Value: 10

Diameter: 0

Deadwood: 5

Crown Closure: 5

Stand Structure: 5

Total Score: 35

Paul Berry measuring diameter

Stand #3

Coordinates (UTM, Nad83): 433979 4937419

# of Plots for Stand: 2

Percent Climax Species: 73

Total Trees/ha >40 cm: 10

Total Trees/ha >50 cm: 10

Total Trees/ha >60cm: 0

Primal Value Description: Suspected or light human disturbance

Overstory Crown Closure: Small canopy openings

Understory Structure: Multiple layers – red oak, red maple, balsam fir, white birch, black spruce

Forest Community (*Crown Lands Forest Model-2005*): HTHw – Tolerant hardwood (THw >60% of Hardwood BA)

Old Growth Score Summary

Age: 5

Primal Value: 10

Diameter: 3

Deadwood: 0

Crown Closure: Small canopy openings

Stand Structure: 5

Total Score: 28

Zach Feener measuring tree diameter

Stand #4

Coordinates (UTM, Nad83): 433968 4937543

# of Plots for Stand: 1

Total Trees/ha >40 cm: 28

Total Trees/ha >50 cm: 8

Total Trees/ha >60cm: 8

Percent Climax Species: 70

Primal Value Description: Suspected or light human disturbance

Overstory Crown Closure: Small canopy openings

Understory Structure: Multiple layers – red oak, white birch, red maple

Forest Community (*Crown Lands Forest Model-2005*): HTHw – Tolerant hardwood (THw >60% of Hardwood BA)

Old Growth Score Summary

Age: 10

Primal Value: 10

Diameter: 15

Deadwood: 3

Crown Closure: 5

Stand Structure: 5

Total Score: 48

A large red oak from Stand #4 

Conclusions

Although none of the stands scored high enough to be classified as ‘old growth’ the uncommon attributes that these stands are composed of clearly delineate them as unique for the province of Nova Scotia. The assessed stands are all composed of a percentage of northern red oak that exceeded 70%. This alone allows these forests to be of interest.

Also noteworthy in this general region of the Five Bridge Lakes Wilderness Protected Area is the presence of the occasional residual white pine, red spruce or red oak that avoided the effects of both the large-scale fire that struck much of the area in the 1960s and the heavy levels of harvest that persisted in the area until recent decades. Often exceeding 60 cm in DBH, with the exception reaching 90 cm, these giants are reminders of what these forests are capable of and will someday reach as long as they remain protected.

All but one of the assessed stands would be classified as Mature Climax. Therefore, though not quite old growth yet, it is clear that these stands possess a comparatively high ecological significance for the province of Nova Scotia. As an under-represented forest type in Nova Scotia, climax and mature, deciduous-dominant forests are needed to help support many of our species at risk including the small, but established, population of mainland moose that are known to call the region home, frosted glass-whiskers, and both northern and southern flying squirrel. Although the later three do not have a confirmed presence in the region, protecting potential habitat should also be considered when strategizing the conservation efforts of species at risk.

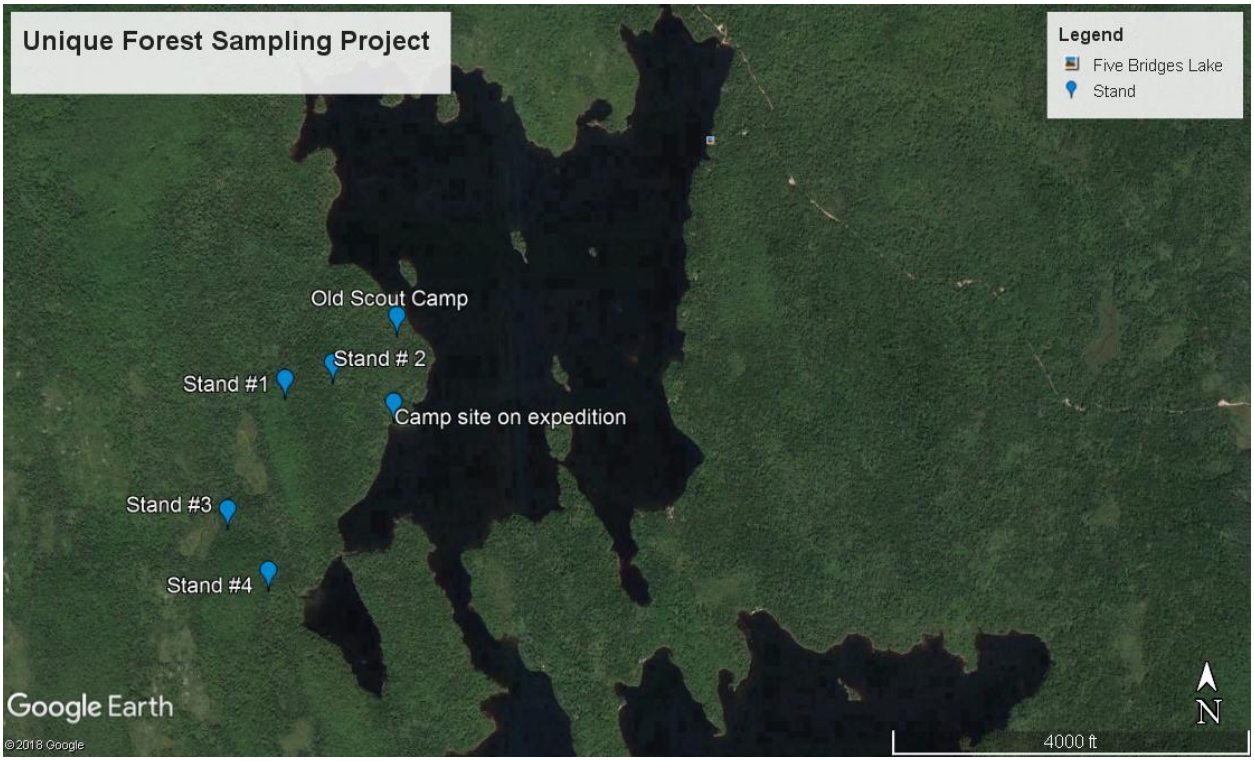
Stand #1
Mature Climax

Stand #2
Mature Climax

Stand #3
Immature Climax

Stand #4
Mature Climax

Map of Stand Locations



Appendix

OLD FOREST SCORESHEET

PART ONE

SPECIES AND AGE CRITERIA

Old growth Class 1

> 30% crown closure, >50% of basal area in climax species typical of the landscape and > 30% of the basal area > 125 years old.

Mature Climax Class 2

> 30% crown closure, >50% of basal area in climax species typical of the landscape and the oldest 30% of basal area is 80 to 125 years old.

Immature Climax Class 3

> 30% crown closure, >50% of basal area in climax species typical of the landscape and > 70% of the basal area in trees < 80 years old.

Non-Climax Class 4

<50% of basal area in climax species typical of the landscape

PART TWO: Stand Composition

Age of oldest 30% of the basal area:

60 - 80 years	Score 5 _____
80 - 100 years	Score 10 _____
101 - 125 years	Score 20 _____
126 - 175 years	Score 30 ____
> 175 years	Score 40 _____

Primal Forest Values

Past human disturbance evident (e.g. logging)	Score 0 _____
Past human disturbance suspected to lightly evident	Score 5-15___
Past human disturbance unlikely	Score 20 ____

Diameter of Living Trees

>50 trees per hectare have a diameter > 40 cm.	Score 3 ____
>70 trees per hectare have a diameter > 40 cm.	Score 6 ___
>100 trees per hectare have a diameter > 40 cm.	Score 9____
>20 trees per hectare have a diameter > 50 cm.	Score 12___
> 5 trees per hectare have a diameter > 60 cm.	Score 15___

Total Bole Length of Standing and Fallen Dead Trees

400 metres per hectare with diameter > 20 cm	Score 3 _____
200 metres per hectare with diameter > 30 cm	Score 5 _____
200 metres per hectare with diameter > 40 cm	Score 10 _____
200 metres per hectare with diameter > 50 cm	Score 15 _____

Stand Structure

One understory	Score 2 _____
Multiple layers in the understory	Score 5 _____

PART THREE: Size Class

< 15 hectares	Size Class 0 _____
15 - 50 hectares	Size Class 1 _____
51 - 100 hectares	Size Class 2_____
101 - 200 hectares	Size Class 3_____
201 - 500 hectares	Size Class 4_____
501 - 1000 hectares	Size Class 5_____
> 1000 hectares	Size Class 6_____

References

https://novascotia.ca/natr/library/forestry/reports/Old-Forest-Policy-2012.pdf

http://versicolor.ca/forest/article.html