



Family Forest Network

Ecological Forestry Pilot Project

Technical Note #1

Vegetation Type Selection

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Kevin Keys, PhD, RPF
FFN Project Scientist

Ryan Dickie
FFN Forest Operations Coordinator

Project Overview

Under the general guidance of ecological forestry recommendations contained in *An Independent Review of Forest Practices in Nova Scotia*,¹ the Family Forest Network (FFN) is working with partners and landowners to plan and conduct a series of harvest and silviculture treatments on small private woodlands across Nova Scotia. The objective of these treatments is to demonstrate and document the costs and benefits of implementing ecologically sensitive management on small private woodlands across a wide range of forest conditions. Results will be used to refine or develop management guidelines and tools, and to inform provincial policies related to silviculture funding.

For the purposes of this project, ecological forestry aims to:

Manage forests in a manner that promotes the development and/or restoration of stands to climax vegetation types appropriate to local landscape, ecosite, and soil conditions, and with consideration of climate change adaptation needs and objectives.

Consistent with the views of Palik and D'Amato,² our primary goal is to treat forests in ways that bring them closer (compared with traditional management approaches) in structure, function, and composition to healthy, natural forests at all stages of successional development. We aim to improve future growing conditions while taking ecosystem services, traditional and emerging economic opportunities, wildlife habitat, resiliency to natural disturbance, and carbon management into account.

As part of this 5-year pilot project, FFN is planning and conducting approximately 160+ ecological forestry treatments in a range of stand types across Nova Scotia. Building off the recently published *Nova Scotia Silvicultural Guide for the Ecological Matrix*,³ as well as the *Climate Adaptive Silviculture Decision Tree* developed by Community Forests International,⁴ the project will focus on applying a mix of irregular gap and continuous cover shelterwood treatments (both medium and high retention), modified as needed to meet site-specific restoration, climate adaptation, biodiversity, and carbon management objectives. A robust experimental design is being followed to ensure the validity of short-term and long-term data, and to facilitate research partnerships and ongoing monitoring.

¹ Lahey (2018)

² Ecological forestry: Much more than retention harvesting. *Journal of Forestry* 115(1): 51-53.

³ McGrath et al. (2021)

⁴ Davies and de Graff (2022)

Vegetation Type Selection

One of the first steps in implementing the FFN pilot project is selection of target vegetation types (VTs) for potential treatment. VTs refer to forest vegetation types described in Nova Scotia's *Forest Ecosystem Classification (FEC)* guide (Neily et al. 2013).⁵ This Technical Note outlines the approach taken to select target VTs for this project.

Criteria used in the selection process included:

- Does the VT have wide distribution or regional importance?
- Does the VT have ecological management challenges?
- Does the VT have significant climate change adaptation considerations?
- Does the VT have restoration opportunities or challenges?

To address the first criterion, a VT summary from forest inventory plots found on private land was obtained from the Nova Scotia Department of Natural Resources and Renewables (DNRR). Provincial Inventory plot locations are randomly selected and are intended to represent current forest conditions across the province. After removing plots associated with non-target forest groups (wet forests, floodplain, karst, open woodland), a total of 751 plots remained. This list was sorted by abundance and grouped into three relative coverage categories: High (>14 plots), Moderate (7-14 plots), Low (< 7 plots) (Table 1). In addition to inventory plot tallies, VT area estimates derived from predictive ecosystem mapping (PEM) classification (Basquill et al., in prep) were reviewed to see how well predicted forest type coverage matched inventory plot trends (data not shown).

With respect to management challenges, it is clear from discussions with project partners and landowners that shade intolerant hardwoods and mixed woods present the most challenges for management, both ecologically and economically.

To meet ecological forestry objectives that aim to represent or mimic natural disturbance patterns, management practices must integrate climate change adaptation into management planning and decision-making. This applies to management of all VTs regardless of successional stage. In addition, it is recognized that some VTs (like old field sites) offer unique opportunities and challenges for restoration within an adaptive management framework.

⁵ A revised version of this guide (Neily et al. 2023) is currently in production. This version contains some new VTs and changes to some older VT codes or names. Nomenclature used in this Technical Note refers to both the old and new guide as needed.

Table 1. Count of inventory plot vegetation types (VTs) found on small private woodland in Nova Scotia (source: DNRR). VT codes are from the original FEC guide (Neily et al. 2013).

VT Code	Inventory Plot Count	Percent of Total	VT Code	Inventory Plot Count	Percent of Total	VT Code	Inventory Plot Count	Percent of Total
MW2	63	8.4	IH3/IH5	14	1.8	TH1a	6	0.8
MW4	58	7.7	SP4	14	1.8	OF3	4	0.5
SH5/SH6	55	7.3	SH1	13	1.7	IH2a	3	0.4
TH1	50	6.6	IH1	12	1.6	IH6a	3	0.4
OF1	41	5.4	SP5	12	1.6	TH8a	3	0.4
SH4/SH4a	40	5.3	TH7	12	1.6	IH1a	2	0.3
TH8	40	5.3	IH7	11	1.5	SH7	1	0.1
IH6	38	5.0	SH10	11	1.5	SP1	1	0.1
SH8	21	2.8	MW1	10	1.3	SP1a	1	0.1
MW5	19	2.5	OF5	9	1.2	SP3	1	0.1
IH4	18	2.4	IH2	8	1.1	SP8	1	0.1
TH5	18	2.4	SP4a/b	8	1.1	TH6	1	0.1
MW3	17	2.3	MW2a	7	0.9	SP10	1	0.1
TH3	17	2.3	OF2	7	0.9			
OF4	16	2.1	SH2	7	0.9			
SP6	16	2.1	SH3	7	0.9			
SP9	16	2.1	SH9	7	0.9			
SP7	15	2.0						
High			Moderate			Low		

Results and Discussion

Based on assessment criteria outlined above, 25 VTs were selected for possible inclusion in the project (Table 2). To add flexibility to the site selection process, these VTs were combined into 14 groups representing similar conditions and management objectives.

Ten (10) target VTs represent early to mid-successional intolerant hardwood and mixed wood stand types that pose questions and challenges for ecological and economic management. These VTs cover a range of ecosites and are either common across the province or are regionally important. Three (3) common old field VTs are also included as they have both restoration opportunities and challenges.

The remaining twelve (12) VTs represent mid to late-successional and/or softwood dominated stand types. These were included because they are common VTs that currently pose management challenges related to invasive pests (hemlock dominated SH1/SH3 group), climate change adaptation (black spruce dominated SP5/SP7 group; dry, poor MW11/MW12 group; white spruce and fir dominated SH6; birch dominated TH7/TH8 group), and sugar maple re-establishment (TH1/TH2/TH9 group).

Table 2. Overview of target vegetation types (VTs) for the FFN pilot project. VT codes and names are from the revised FEC guide (Neily et al. 2023).

Group	VT Code	New VT Name	FEC Ecosite	Successional Stage	Geographic Region	Number of Treatments	Inventory Plot Count	PEM Coverage	Comment
1	MW2	Red spruce – Red maple – White birch / Goldthread	AC10/11(+)	Mid	West/Central	10	High	High	Province wide coverage
	MW6	White spruce – Red maple (White birch) / Starflower / Schreber’s moss	AC10/11(+)	Early-Mid	East	5			
2	IH4	Trembling aspen / Wild raisin / Bunchberry	AC10/11	Early	Central	6	High	High	Regionally important VT
3	IH6	White birch – Red maple / Sarsaparilla – Bracken	AC10/11	Early	All	15	High	High	Province wide coverage
4	OF1	White spruce / Aster – Goldenrod / Shaggy moss	AC13/14	Early	Central/East	6	High	Low-High	Regionally important VTs with
	OF3	White pine – Balsam fir / Shinleaf – Pine-sap	AC13/14	Early-Mid	West	6			restoration focus
	OF4	Balsam fir – White spruce / Evergreen wood fern – Wood aster	AC13/14	Early-Mid	Central/East	6			
5	MW7	Balsam fir – Red maple / Wood-sorrel – Goldthread (old MW4)	AC10/11	Early-Mid	Central/East	10	High	High	Regionally important VTs
	MW8	White birch - Balsam fir / Starflower (old MW5)	AC10/11	Early	East	5			
6	MW9	Black spruce - Red maple / Bracken - Sarsaparilla (old SP6)	AC6/7	Early-Mid	West/Central	6	High	High	Common VT with CC adaptation considerations
7	TH1	Sugar maple / Wood fern – Hay-scented fern	AC13/14	Late	All	5	High	High	Common VTs with sugar maple
	TH2	Sugar maple / New York fern – Northern beech fern	AC13/14	Mid-Late		5			re-establishment problems
	TH9	Red maple – Sugar maple / Hay-scented fern – Evergreen wood fern	AC13/14	Mid-Late		5			
8	SH1	Hemlock / Needle carpet	AC10/11	Late	West/Central	5	Moderate	Low-High	Regionally important with HWA
	SH3	Red spruce – Hemlock / Wild lily-of-the-valley	AC10/11	Mid-Late	West/Central	5			adaptation considerations
9	SH6	White spruce – Balsam fir / Broom moss (old SH10)	AC10/11	Mid	East	6	Moderate	High	Regionally important VT with mgmt challenges
10	SP5	Black spruce / Feathermoss	AC6/7	Mid-Late	All	8	Moderate	Moderate	Common VTs with CC adaptation
	SP7	Black spruce / Lambkill – Wild raisin – Mountain holly	AC6/7	Mid-Late		8			considerations
11	MW10	Black spruce - Aspen / Bracken - Sarsaparilla (old SP8)	AC6/7	Early	West/Central	5	Low	Moderate	Regionally important VT with mgmt challenges
12	TH7	Yellow birch - White birch / Evergreen wood fern	AC13/14	Mid	East	5	High	Low-High	Regionally important VT
	TH8	Red maple – Yellow birch / Striped maple	AC13/14	Mid-Late	All	8			Province wide coverage
13	MW11	Red oak - White pine / Teaberry (old SP9)	AC5/6	Mid-Late	West	5	High	Low	Regionally important VTs with mgmt
	MW12	Red maple - White pine / Velvet-leaf blueberry / Bracken	AC5/6	Early-Mid		5			challenges
14	IH3	Large-tooth aspen / Christmas fern – New York fern	AC13/14	Early	West	5	Moderate	Low	Regionally important VTs with mgmt
	IH5	Trembling aspen – White ash / Beaked hazelnut / Christmas fern	AC13/14	Early-Mid	Central/East	5			challenges

In addition to target VTs shown in Table 2, there may be opportunities to include extra sites in central and eastern Nova Scotia that were severely impacted by post-tropical cyclone Fiona in fall, 2022. It is of interest to see how common VT/ecosite combinations respond to different levels of salvage harvesting after wind disturbance since these stand-level disturbance events are predicted to be more frequent and/or severe in future. These opportunities will be assessed on a site-by-site basis, depending in part on the availability of pre-disturbance and/or pre-treatment data.

Literature

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