



Family Forest Network

Ecological Forestry Pilot Project

Technical Note #2

Site Selection and Survey Protocols

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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.

FFN Technical Note #1 outlined how target vegetation types (VTs) were selected. This Technical Note outlines protocols for trial site selection and follow up surveys.

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)

Site Selection

Research trials will be following a before-after-control-impact (BACI) experimental design, with a minimum sample size of five (5) sites for each VT/treatment combination. Therefore, relative uniformity and sufficient area of target VT/ecosite conditions at each site is critical. There can be some variation within a proposed site (i.e., changes in VT and/or ecosite), but this must be mappable so that pre- and post-treatment assessments can target the same conditions within each population of sites. Because of unavoidable variation, it's possible that only a portion of a given trial site will be used for ecological data comparison between sites, but that other measures (e.g., harvest productivity measures) would cover the entire treatment area.

The minimum trial site size is 5 ha to allow for adequate assessment of harvest operations. Within this trial site area, there must be a minimum of 3 ha of “uniform” target conditions for ecological data collection. This 3 ha does not need to be contiguous, but each section must be a minimum of 1 ha in size.

Partners should conduct a reconnaissance survey of proposed sites to determine if minimum uniform areas of target VT/ecosite combinations can be found (see FFN Technical Note #1 for details on target VT/ecosite combinations). Candidate sites must be approved by FFN staff before additional pre-treatment assessment (PTA) work is conducted to ensure we are meeting sample size goals for each population.

Survey Protocols

Once a candidate site has been approved, pre-treatment data collection is required for mapping and prescription development. Dedicated Survey123 and QuickCapture (ArcGIS) apps have been created to collect and compile required data, and these apps must be used by Partner organizations conducting PTA surveys. Access to these surveys and related training will be provided through FFN. In addition to data collection, Partners must provide detailed mapping of trial sites based on FEC and site feature information to facilitate treatment prescription and layout. At all stages, data must be reviewed and approved before each new stage is started (see Table 1 and Figure 1).

Because this is an applied research project, it should be recognized that the main purpose of PTA data collection is to characterize and map each site for prescription development and layout – PTA does not provide all the pre-trial data that is needed to assess treatment outcomes and measures of success. To aid post-treatment analyses, we need to collect additional data after prescriptions have been finalized, but before treatments begin. This will involve establishing plots and transects in targeted

sections of trial sites that can be reassessed after treatment. This extra survey work will be mainly carried out by Mersey Tobeatic Research Institute (MTRI) staff in collaboration with FFN staff.

Biodiversity Assessment

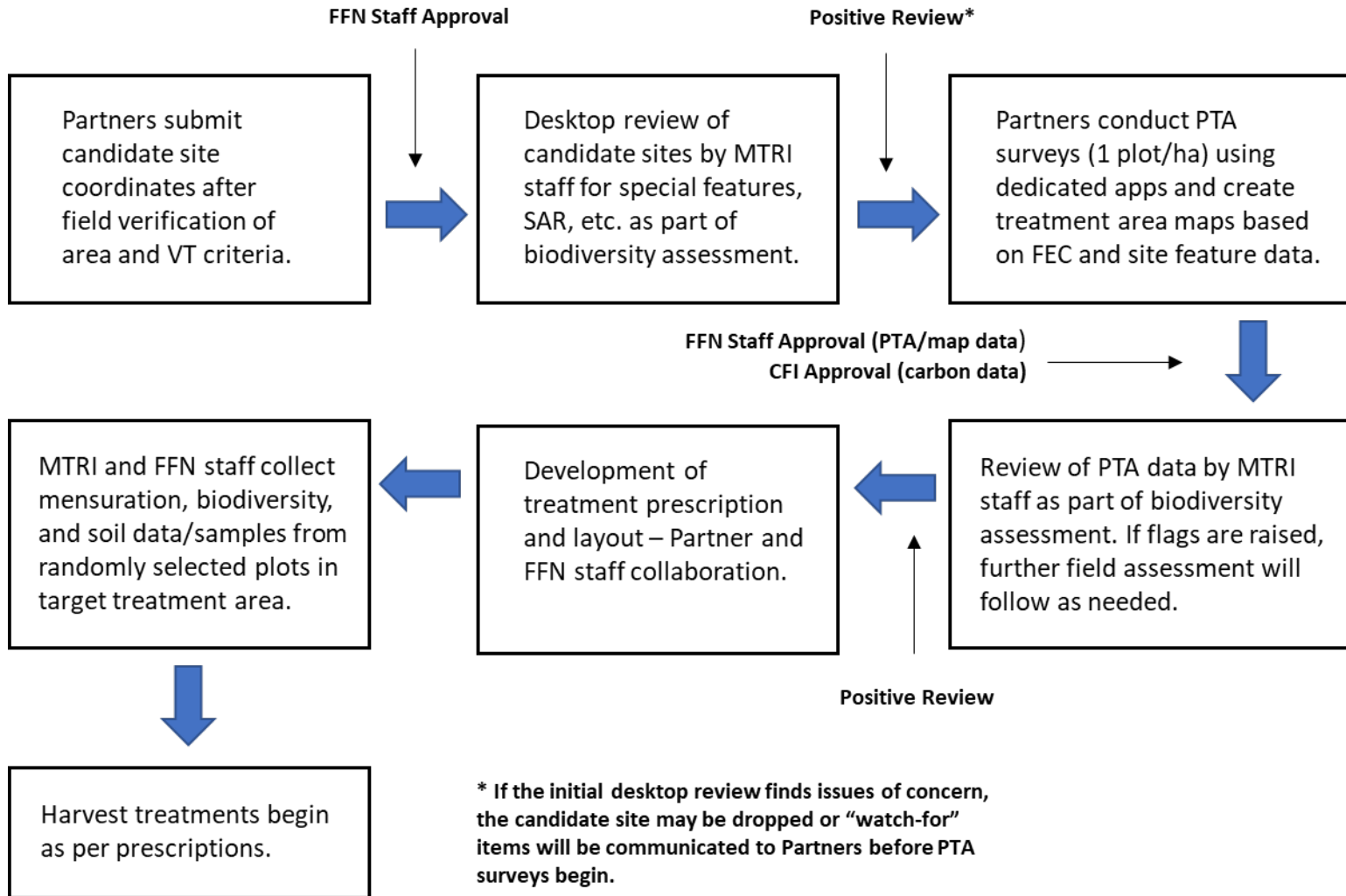
Maintenance or enhancement of biodiversity is a fundamental goal of ecological forestry. For this project, biodiversity assessment is being integrated into all levels of planning and analyses (Figure 1).

- Preliminary desktop assessments are being conducted on candidate sites.
- Several biodiversity related measures are being integrated into the PTA survey (in keeping with new requirements for Crown land PTA surveys) – see Appendix 1 for details.
- Compiled PTA data are being reviewed with a biodiversity lens prior to prescription development.
- Biodiversity measures related to coarse woody material, ground vegetation, stand structure, ecological growing stock, and soils are being collected before and after treatment at each trial location. Some locations will also have bird data collection.

Table 1. Summary of site selection, survey, approval, and planning responsibilities for FFN project sites.

Project Component	Details	Party Responsible	Approval
Candidate site selection	Must meet size, VT/ecosite, and uniformity conditions	Partners/FFN staff	FFN staff
Candidate site biodiversity assessment	Initial desktop assessment based on available map and dataset layers	MTRI	MTRI/FFN staff
PTA survey	Site survey using dedicated apps	Partners/FFN staff	FFN staff (PTA and map data) CFI staff (carbon related data)
Biodiversity assessment of PTA data	Review of approved PTA data	MTRI	MTRI/FFN staff
Treatment prescription development	Collaboration between Partners and FFN staff	Partners/FFN staff	FFN staff
Research plot data collection	Mensuration, biodiversity, and soil data	MTRI/FFN staff (Partners as available)	FFN staff

Fig. 1. Flowchart overview of site selection, survey, approval, and planning protocols for FFN project sites.



Literature

Davies, G. and M. de Graaf. 2022. *Managing forests for climate change: Climate change resilience and carbon storage silvicultural prescriptions for the Wabanaki-Acadian Forest Region*. Community Forests International.

Lahey, W. 2018. *An independent review of forest practices in Nova Scotia: Executive summary, conclusions, and recommendations*.

McGrath, T., M. Pulsifer, R. Seymour, L. Doucette, G. Forbes, R. McIntyre, R. Milton, L. Cogan, M. Retallack, and T. Crewe. 2021. *Nova Scotia Silvicultural Guide for the Ecological Matrix*. Nova Scotia Department of Lands and Forestry.

Palik, B.J. and A.W. D'Amato. 2016. Ecological forestry: Much more than retention harvesting. *Journal of Forestry*, 115(1), 51-53.

Appendix 1

Biodiversity related feature assessments integrated into PTA survey apps. These data are (or can be) collected at plot locations and/or at feature points anywhere in the survey area.

1. Ecological Growing Stock (EGS) – Tree assessment compliment to acceptable (AGS) and unacceptable (UGS) growing stock:

Mast tree	Cavity/Den tree	Seed Source tree
Diversity tree	Legacy tree	Tree with > 70cm dbh
Super Canopy tree	SAR tree	

2. Maturity class and canopy class of plot trees:

Regenerating/Sapling	Super Story
Immature/Pole	Dominant
Mature (Seed Bearing)	Co-Dominant
Senescent	Intermediate
All-Ages	Suppressed

3. Snag Data

4. Forest Health Data: Insect/Disease/Die-back/Vigour/Physical damage/Other Cause and Extent

5. Vegetation Features (non-tree):

Invasive species	Mast shrub
SAR species	Regen patch

6. Wildlife Features:

SAR species observed	Cavity tree species observed
Large stick nest	Beaver dam/lodge
Den	Occupied bird nest
Moose sign	Cave
Banks with swallow nests	Wildlife trail
Other	

7. Hydrology Features:

Watercourse > 50 cm	Watercourse < 50cm	Seep/Spring
Vernal pool	Pond	Riparian zone
Ephemeral stream	Treed/shrub swamp edge	Marsh edge
Other wetland edge		

8. FEC Transition (VT and/or ST)