



Otter Ponds Demonstration Forest Summary of Activities 2010-2020

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1.0 Introduction

This report documents the first ten years of the Otter Ponds Demonstration Forest project, from its creation in 2010 to 2020. The Otter Ponds Operating Agreement ([Ref. 1](#)) between the Nova Scotia Department of Lands and Forestry (previously the Department of Natural Resources), the Company (Northern Pulp Nova Scotia Corporation), and the NSWOOA- Otter Ponds Demonstration Forest Division states that the project may be reviewed after the first ten years in order to extend it by an additional five years.

Otter Ponds Operating Agreement, Section 34:

“The initial term of this Agreement is for 25 years, commencing on the date of signing this Agreement. After the initial 10 years and each subsequent 5 year period following the initial 10 years, the Agreement may be subsequently reviewed and through unanimous agreement, the expiry date may be extended for a further 5 years, so that the Project may continue uninterrupted. NSDNR and the Company agree that in the spirit of this agreement, they shall not unreasonably withhold their agreement to extend the term on each anniversary, provided the Mission and Objectives of the Project are being met.”

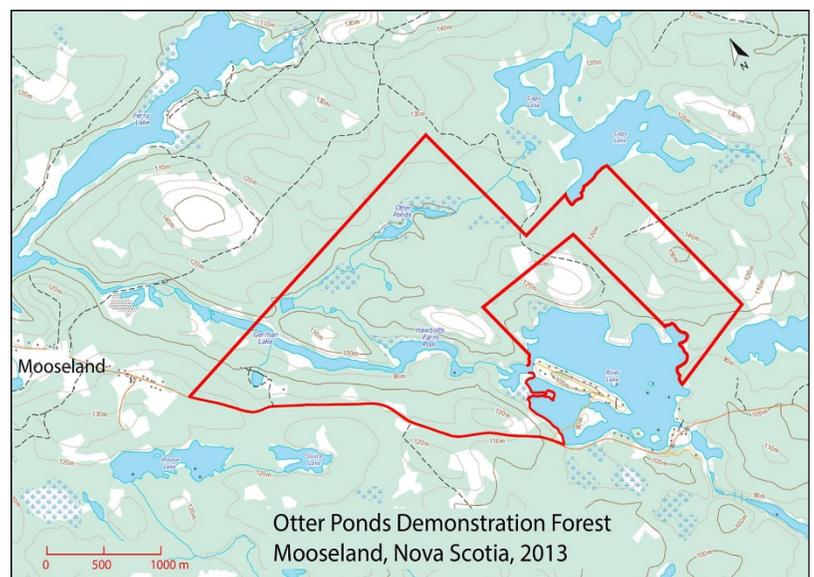
2.0 What is OPDF?

2.1 Background

Operated as a division of Nova Scotia Woodlot Owners and Operators Association (NSWOOA), the Otter Ponds Demonstration Forest (OPDF) is a place for all Nova Scotians to learn about forest ecology and the sustainable management of our native Acadian Forest. OPDF is a living laboratory that shows how timber production can be compatible with the protection of the full range of other forest values and services. It provides opportunities for woodlot owners, elementary and high school groups, university students and researchers, non-profit organizations, and individuals to visit an outstanding example of working forestland.

Otter Ponds demonstrates the philosophy, science, and practice of uneven-aged management in the Acadian Forest. It produces timber for market using the best forest practices presently known, while protecting wildlife habitat and the Tangier River watershed, respecting the ecosystem services provided by the parcel, and enhancing the social and cultural value of the forest.

OPDF is managed by a unique partnership that includes four non-governmental organizations (NSWOOA, the Ecology Action Centre, Eastern Shore Forest Watch, and Mooseland and Area Community Association), a forestry company (Northern



Pulp Nova Scotia Corp.) and the Nova Scotia Department of Lands and Forestry. The partners jointly manage a 500-hectare (1,200-acre) Crown parcel near Mooseland, within the Halifax Regional Municipality. The partnership agreement was signed June 22, 2010.

The project is meant to demonstrate the full potential for sustainably managed working woodlots in the Acadian Forest. Therefore, education and public outreach are essential parts of OPDF’s mission.

2.2 Forest of OPDF

2.2.a Forest Ecosystem Classification

As shown in **Table 1**, 388.6 hectares is classified as operable forest land, which equates to 80% of the total forest land occupied by OPDF. Operable land refers to forest land that is workable and productive enough to receive benefit from forestry efforts.

Five forest cover type groups constitute this operable area: Mixedwood (MW), Spruce Hemlock (SH), Tolerant Hardwood (TH), Intolerant Hardwood (IH), and the previous clearcut/established plantation group (CC/Plantation). In addition, there are 57.5 hectares of wet forest groups, including Wet Coniferous (WC) i.e. black spruce, balsam fir, tamarack larch, and Wet Deciduous (WD) i.e. red maple.

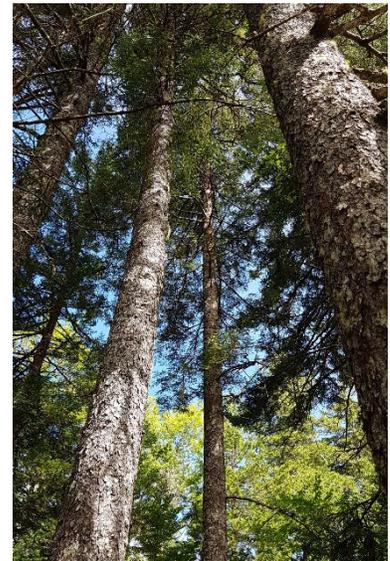


Photo credit: Christie Verstraten

Table 1. Land Classification of OPDF

Land classification	Area (ha)
MW Forest Group	51.17
SH Forest Group	245.47
TH Forest Group	62.03
IH Forest Group	1.13
CC/Plantation	28.77
WC Forest Group	56.06
WD Forest Group	1.43
Wetlands	39.57
Water	131.85
Industrial (non-forest)	28.0
Total	645.5
Total wetlands & water	171.4
Total forest land	485.6
Total wet forest groups	57.5
Total operable forest land	388.6

Note: The ‘operable forest land’ total includes all land in the MW, SH, TH and IH forest groups and the CC/Plantation category, but not the wet forest (WC and WD forest groups), wetlands, water or industrial (non-forest) categories.

2.2.b Allowable Annual Harvest

Harvest levels (**Table 2**) incorporate a precautionary reduction to allow for the ongoing recruitment of deadwood. This recognizes the critical role of dead and dying wood in forest ecosystems. A 30% reduction was chosen because coarse woody material and standing deadwood is lacking in many areas of OPDF. These areas would benefit from increasing levels of coarse woody material and maintenance of partial shade due to the rapid drainage and coarse-to-medium textured characteristics of the soil. Please note that the area of the Forest Groups in **Table 2** differ from those in **Table 1** because geographical hazards have been removed from the operable area total. These hazards are mostly old mine shafts and pits from early gold mining exploration, and total approximately 48 hectares of the Mixedwood (MW), Spruce Hemlock (SH) and Tolerant Hardwood (TH) Forest Groups.

Table 2. Annual growth and harvest levels

Forest Groups	Area (ha)	Growth capability (LC) ranges (m3/ha/yr)		Total SWD	Total HWD	SWD	HWD
		SWD	HWD	Annual growth	Annual growth	AAC*	AAC*
				(m3/yr)	(m3/yr)	(m3/yr)	(m3/yr)
MW Forest Group	26.47	5.0 - 6.0	2.75 - 3.0	70.2	57.9	49.1	40.5
SH Forest Group	227.97	5.0 - 5.5		1168.8		818.2	
TH Forest Group	56.03		2.75 - 3.0		166.6		116.6
CC/Plantation	28.77	5.0 - 5.5	2.75 - 3.0	76.7	41.9	53.7	29.4
Totals	339.24			1315.7	266.4	921.0	186.5

2.3 Values and Goals

Our 2011 forest management plan ([Ref. 2](#)) notes that the project objectives require that traditional silvicultural systems be adapted to address the ecological complexities of restoring the Acadian Forest. OPDF provides an ideal place to develop and test new strategies to determine what methods are most appropriate and yield the best results to restore forest health while being economically feasible.

The principles of maintaining shade (for moisture), shelter (for support and stability) and seed (for natural regeneration) underlie all harvest activity that occurs within OPDF. Some of the restoration strategies include:

- Promoting growth and quality development of the best trees to increase end value.
- Managing sunlight through manipulating canopy cover to create favourable conditions for desired species and help control competition.
- Favouring any species that are lacking or known to be rare within OPDF, for instance healthy beech, any hemlock or white ash; even sugar maple on some of the heavily disturbed drumlins.
- Minimizing ground disturbance. This is key to limiting negative effects to site productivity.
- Minimizing the number of main trails and extraction trails through OPDF.
- Balancing economic and ecological values. There should be reasonable value for effort.
- Utilizing available silviculture subsidies to help offset cost involved with implementing proper tending and regenerating activities (OPDF Forest Management Plan, p. 21).

2.4 Health & Safety

2.4.a General Safety

Directors have developed a policy statement on health and safety issues at OPDF, along with a pre- and post-visit safety checklist and a hazard action sheet. The policy and checklists are used to ensure that OPDF maintains a safe environment for workers and visitors.

2.4.b Road/Bridge Spring Safety Checklist

OPDF has an in-depth checklist for use during annual spring infrastructure and safety checks conducted by volunteers. The checklist includes road and bridge checks for every developed area of the project, including questions about ditches, culverts, bridge sills, treads and railings, and many other considerations. This checklist is meant to be filled out every spring after the roads dry up to identify work to be done during spring and fall clean-up days, and then filed with staff and the secretary.

2.4.c NSDLF to Fill in Abandoned Mine Shafts

The NS Department of Lands & Forestry announced in 2015 that would begin filling in the various abandoned mine shafts in Mooseland and other historic mining communities. There are many old pits on OPDF land which present hazards for contractors and visitors alike. In December 2016, six old mine shafts near the gate were filled in.

2.4.d NSDLF Occupational Health and Safety Audit

Contractors who are engaged on OPDF work are expected to conform to all safety and operational policies, standards and procedures stipulated for Crown Lands. On November 20th, 2020, a full real-time safety and forestry audit of the harvest operation was conducted by Regional and district staff of the Department of Lands and Forestry. The audit found no issues to be addressed.



NSDLF regional staff, Conform Ltd. staff and Otter Ponds Directors and staff on site during 2020 Occupational Health and Safety Audit.

Photo credit: Christie Verstraten

3.0 Infrastructure

3.1 Forest Roads

All forest roads constructed in OPDF are Class D as required for crown land. Access from the public highway at Mooseland is by way of 2.5 km of Class D road over three private properties. In 1985, 300 metres of road was built from the adjacent private land to facilitate mineral exploration on the Project area. It is from this point that OPDF's road access development program began.

The NSWOOA – OPDF Division concluded an agreement with the three private landowners to establish guidelines for access to OPDF from the public highway.

The initial phase of establishing road access to OPDF was conducted in the spring and summer of 2011. Six hundred metres of right-of-way was cleared and 550 metres of roadway was constructed by Hawes Excavating Limited.

In 2012, a 5-metre span bridge was constructed over Otter Ponds Brook (see **Section 3.3**), and another 250 metres of gravel roadway was built on the east side of the bridge followed by a levelled and graveled area for events. This opened the core of the Project area for harvesting operations and other Project objectives. Prior to this, the area was last accessed by horse and sled on winter sled roads during harvest operations in the 1940s. The roadway constructed in 2011 was also graveled at this time.

In 2012, the OPDF Board hired Picea Forestry Consulting to prepare a complete road and silviculture plan for the project ([Ref. 3](#)). Timber was cut in the winter of 2012-2013 to open up rights-of-way for new road sections. OPDF contracted with ABL Timber Ltd. of New Glasgow, to build 850 metres of roads to reach timber stands on Hawboldt's Farm Hill and also eastward toward Powderhorn Hill. The roads were built entirely with material found on-site. Bateman returned in 2014 to complete these sections.



Marshall Bateman of ABL Timber Ltd. works on a section of Hawboldt Farm Hill Road in December 2013 with OPDF Directors Wade Prest and Kate Campbell present. *Photo credit: Dan Hutt*

The extension of Powderhorn Hill Road, which begins at the visitor shelter landing and goes east toward Powderhorn Hill, continued in 2015. Two 4-metre span bridges were constructed over intermittent drainages. A total of 700 metres were added to the road, with the work being done by B&P Enterprises from East Ship Harbour. Work continued on Powderhorn Hill Road with another 550 metres of right-of way cut in late 2017 and constructed by ABL Timber Ltd. in January 2018. An additional 500 metres of right-of-way was cut in December 2018, followed by 480 metres more road constructed by ABL Timber in 2019. Powderhorn Hill Road is now approximately 2.1 km long.

In August of 2020, local pit run material was hauled onto sections of the Powderhorn Hill and Hawboldt's Farm Hill roads to improve surface drainage and facilitate road grading. At this point, all of the 3.25 kilometres of road constructed by the project are useable year-round with the exception of spring breakup.



Section of Powderhorn Hill Road completed by ABL Timber Ltd. in February 2018. *Photo credit: Dan Hutt*

3.2 Access Gate



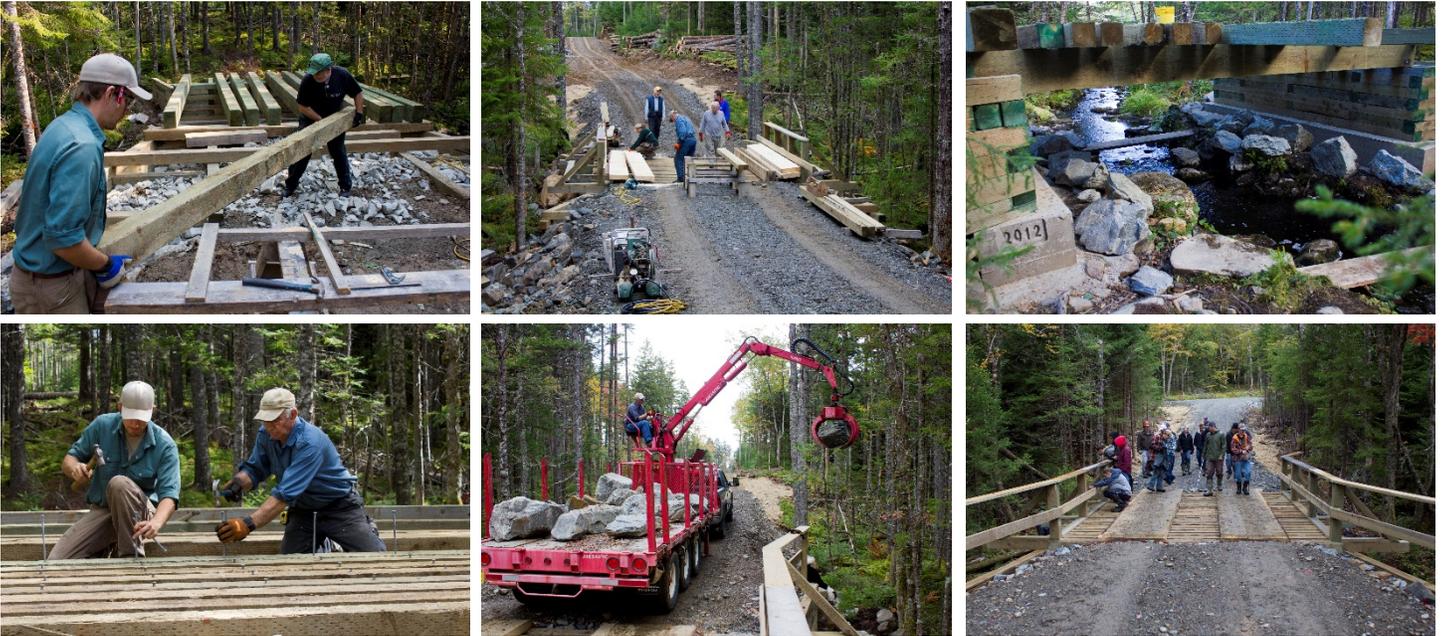
Access gate. *Photo credit: Dan Hutt*

Eastern Fence Erectors of Dartmouth installed a double-swing steel gate on the access road at the boundary of the project lands in 2013. The intent is not to prevent public access, but rather to limit vehicles during active harvest operations, muddy road conditions, and to protect against vandalism. To conform with Crown lands requirements, volunteers painted the gate bright orange and erected warning signs on each side of it. The gate was repainted again in 2018 by a volunteer.

3.3 Bridges and Water Crossings

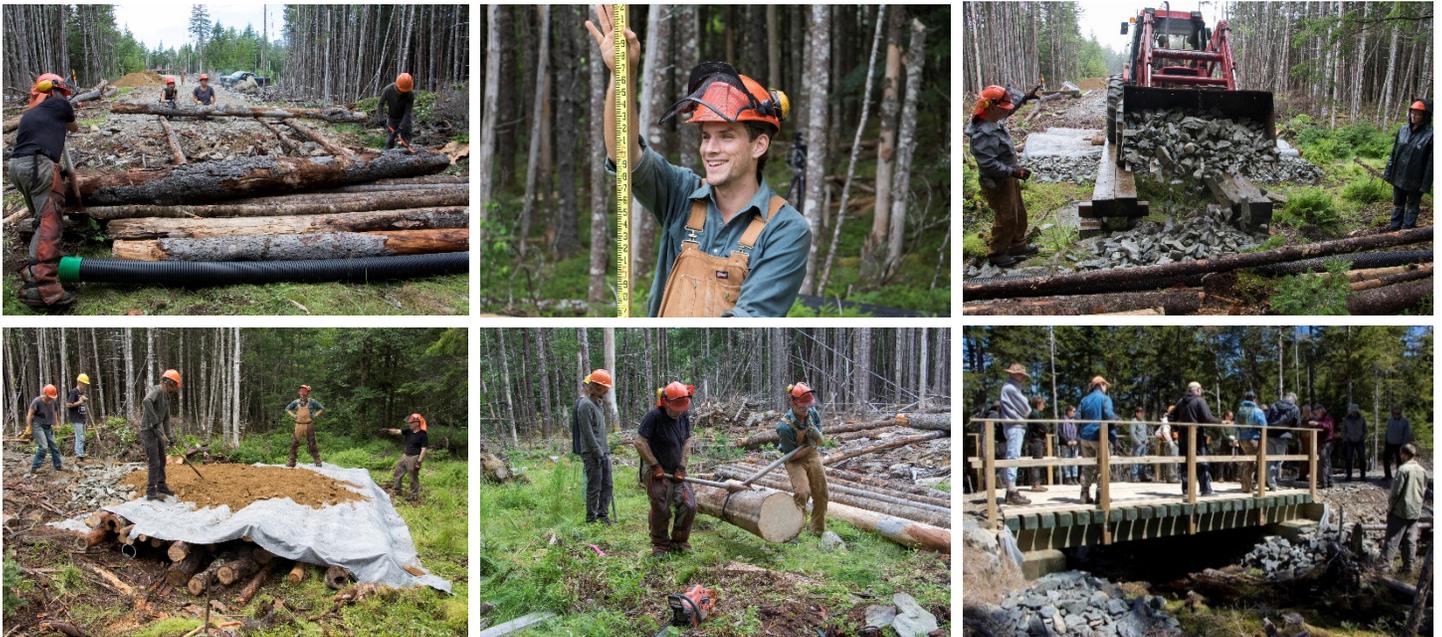
Volunteers built the first bridge in OPDF over the Otter Ponds Brook in 2012. Building a timber-crib bridge was a big undertaking for a small organization and a point of pride for the many volunteers involved. It is 18 feet long and 16 feet wide. The concrete footings on either side of the stream are 30 inches thick, 30 inches tall, and 18 feet long. The timber crib abutments are 3 feet high and were filled with 100 cubic metres of field stone. Eight stringers, each 8" x 12" x 20', are topped with 6" x 6" x 16' decking. All the crib, stringers, and decking are pressure treated eastern hemlock. The large planks on top of the bridge are 4 inches thick, 16 inches wide, and 18 feet long. They were all milled from a single red spruce that was felled while cutting the right-of-way for the main road into the parcel. Railings were installed when the bridge was completed.

With the extension of Powderhorn Hill Road in 2015, it was necessary to build two additional water crossings over intermittent streams. These streams are seasonal, with running water only during spring run-off and after particularly heavy rains. The main stream beds were about 6 to 9 feet wide, but with wet areas on either side, the required span of each crossing was up to 40 feet. The two crossings were designed by OPDF director Wade Prest and an engineer from the Nova Scotia Department of Environment (NSE) who visited the sites in 2013. There are two main parts to the water crossing design: a low, 12-foot span bridge over the main stream bed, and another 12 to 20 feet on either side of a combination of corduroy and 6-inch plastic culverts. The corduroy and culverts were also covered with geotextile and fill to bring these sections level with the bridge. The load capacity is 40 tons, and the cost of machines and materials was approximately \$7500 per water crossing. To minimize labour costs, the bridges were built by volunteers.



Construction of bridge over Otter Ponds Brook in 2012 by volunteers. *Photo credit: Dan Hutt*

The first of the Powderhorn Hill Road water crossings was built in August 2015. We hired videographer Jason Headley to make an instructional video of the construction. He produced a video with construction footage and volunteer interviews that explains the steps of the bridge construction, which can be found on YouTube ([Ref 4](#)). A time-lapse video of the entire day's work was also recorded by OPDF director Dan Hutt and can be viewed on the OPDF Facebook page. The second water crossing was constructed in September 2015. For a more in-depth description of bridge materials and construction see Dan Hutt's article in the September 2015 issue of Atlantic Forestry Review ([Ref. 5](#)).



Construction of first water crossing on Powderhorn Hill Road in 2015 by volunteers. *Photo credit: Dan Hutt*

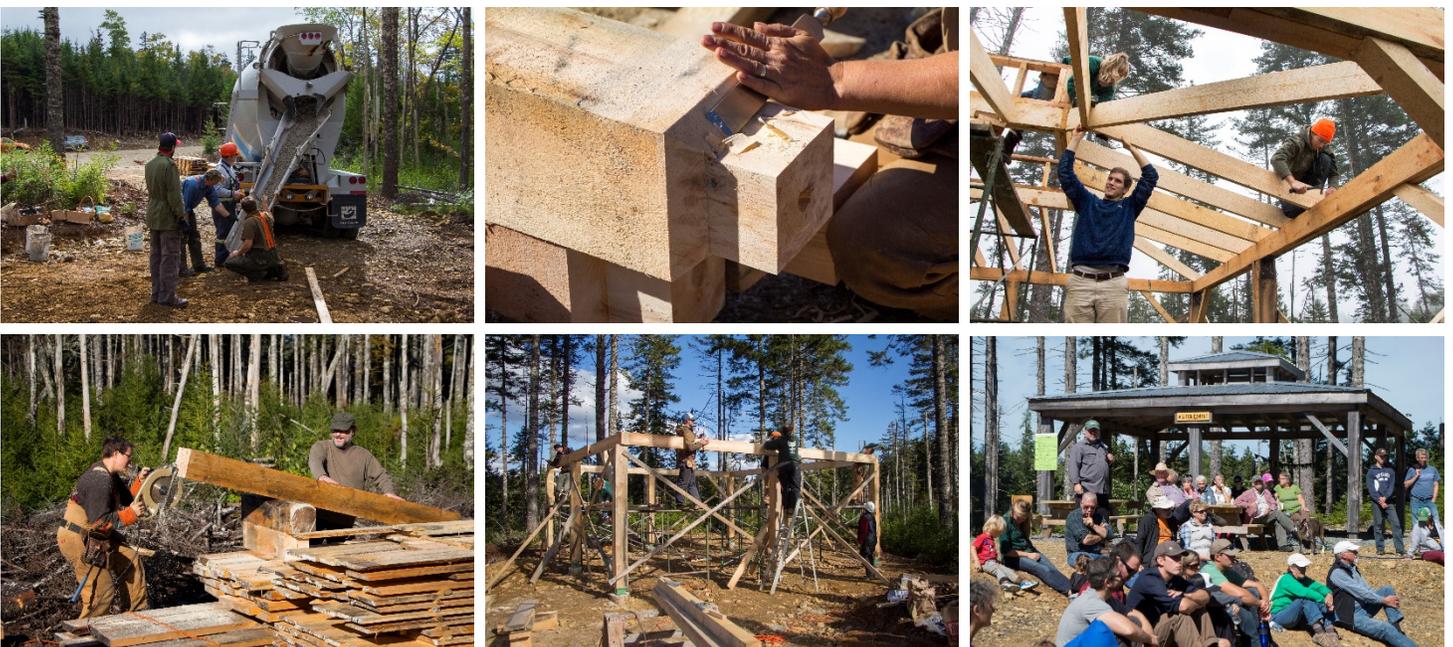
In November 2016, OPDF director Kate Campbell built and installed railings along the two new water crossings. Later, NSE indicated that the water crossings required more narrowly spaced tread planks than originally designed. Kate Campbell added the new correctly-spaced tread planks in May 2017.

3.4 Visitor Shelter and Picnic Area

Construction of the visitor shelter and picnic area began in September 2013 with the installation of eight sonatubes and filling them with concrete. This volunteer effort would extend over many weekends throughout the autumn until the project was overtaken by snow in early December. It was a team-building exercise that brought together more than 20 board members and volunteers. The shelter was designed by OPDF director Kate Campbell, a carpenter, who also oversaw its construction. Measuring 20 feet by 20 feet, the shelter was built mostly from lumber harvested and sawn at Otter Ponds. In a pinch, it could keep about 40 people out of the rain. The total cost was covered by the NSWOOA as part of its provincially funded program to help small landowners and the public to learn more about forest management. The visitor shelter was completed in 2014, as well as a picnic area with an amphitheatre, fire pit, and arboretum. Picnic tables were purchased from the Department of Lands and Forestry's sign shop.

In the spring of 2018, a tree fell onto the north edge of the shelter causing some minor damage to the metal roofing and wood trusses. OPDF director Dan Hutt replaced the damaged boards and removed the damaged section of steel roofing, which was later replaced.

Unfortunately, when volunteers checked for storm damage after Hurricane Dorian in 2019, it was discovered that a large red spruce tree had blown over and landed on the middle of the visitor shelter. Sadly, the structure was completely destroyed, and the wreckage was dismantled and cleared. We were able to salvage a small amount of lumber and steel roofing, and the cement footings are still intact. Luckily, only one of the picnic tables was damaged, and it can be easily repaired. The Board is considering incorporating a small bunkhouse into one corner of the new shelter design rather than building a separate scaler's hut as previously planned. In December of 2020, trees presenting a hazard to the gathering area were removed during the harvest in adjacent stands.



Visitors shelter construction in 2013/2014 by volunteers (photos 1-5) and completed visitors shelter used for 2016 Fall Field Day (bottom right).
Photo credit: Dan Hutt

3.5 Humanure Toilet

In 2014, OPDF staff worked with Terry Amirault, staff engineer at NSDLF, to obtain a permit for an alternative toilet. In addition to meeting the needs of visitors to the demonstration forest, the “humanure” system may offer NSDLF a low-cost alternative to the pre-fabricated composting toilets that the province has been obligated to install at remote locations like Cape Split, at a cost of about \$10,000 each.



Volunteers constructing humanure toilet in 2015. *Photo credit: Dan Hutt*

The OPDF composting toilet was constructed through a series of volunteer work parties in June-October 2015. The structure is designed with two chambers, with only one in use at a time. When the first chamber fills up with waste and sawdust it is closed off for 3-4 years and left to decompose while visitors use the second chamber. By the time the second chamber is full, the material in the first should be fully decomposed and available to use on site as compost, thus freeing it up for use again.

The first step was to decide on the structure’s orientation, and then to place and level the concrete blocks on which it sits. Then came the chambers, the main walls and the roof. The final day was spent sheathing, building the doors and stairs, and cutting out the holes. The pine lumber used was cut and milled on-site at Otter Ponds and was leftover from construction of the visitor’s shelter. Some additional work was done in 2018 to complete the inside divider, put up the battens on the front and install some wire mesh around the top.



Completed humanure toilet. *Photo credit: Christie Verstraten*

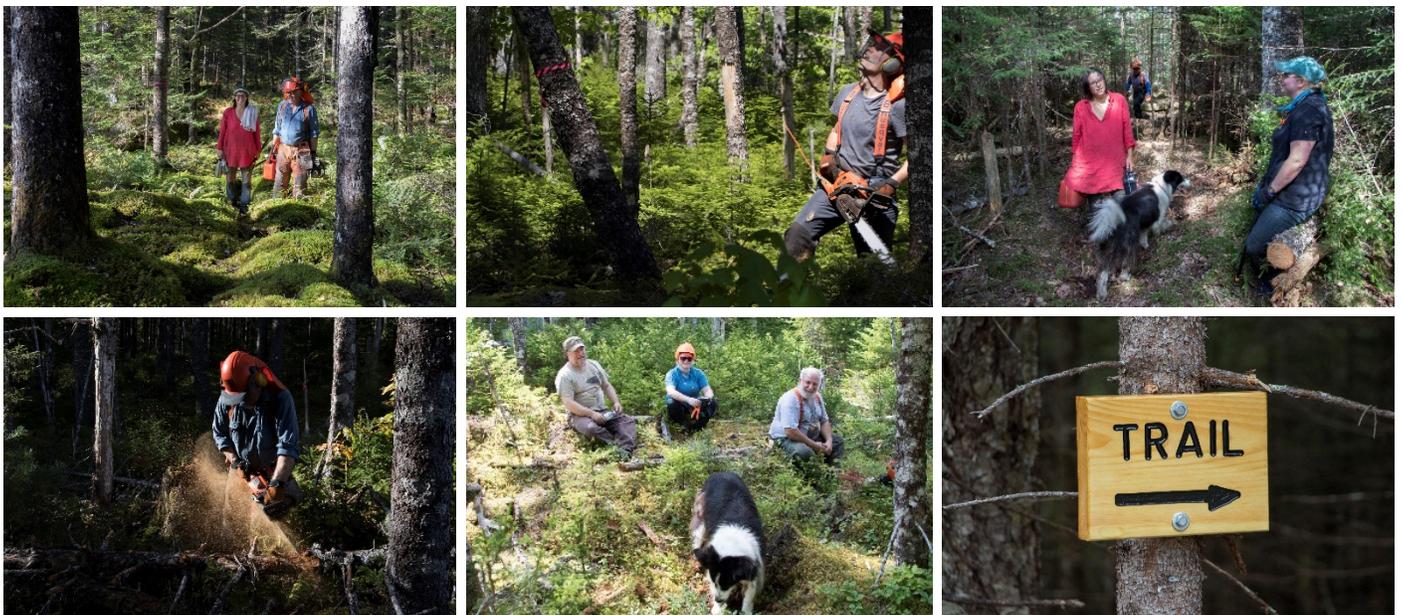
During the 2019 Spring Clean-Up event, several volunteers built steps from the road to the trail head to increase accessibility, finished installing the wire mesh around the top to keep out wildlife, and installed a new light inside. Rather than going for a light powered by battery or photovoltaic cells, a passive solar design was used with good results. The components of the passive solar light are a 2L clear plastic pop bottle, water, some bleach, metal flashing and caulking. A hole was cut in the ceiling for the pop bottle to sit in, then the bottle was filled with water and a bit of bleach to keep anything from growing inside it. The bottle was then placed in the hole and sealed with flashing and caulking to prevent water from dripping into the building. The result is a nice amount of natural light with negligible cost. The water is removed from the light in winter so it does not expand and crack the bottle.

3.6 Trail Network

Volunteers laid out and cut the first section of the OPDF walking trail system, German Lake Hill Trail, in 2012. The 800-metre segment begins at the main bridge and follows Otter Ponds Stream before rising onto a hardwood ridge and passing an old prospector's pit frequently used for educational tours.

In 2015, OPDF directors, staff and volunteers worked to identify possible locations for a trail system through the project. A workshop was held at Otter Ponds in May 2015 for trails consultants and professionals. These experts looked at our initial plan, assessed on-site conditions, and offered valuable advice and suggestions on how to approach the construction of a trail network to best complement OPDF's education and outreach mandate.

In September 2015, Mountain Equipment Co-op's Community Investment Fund awarded OPDF \$7200 to hire a trail consultant to develop a detailed Trail Master Plan and host a workshop to teach volunteers how to construct the trails. After a call for proposals, the trail consultant contract was awarded to Community Forests Canada. Work on the Trail Master Plan began in January 2016 and ended with a trail building workshop at the end of June. The final version of the OPDF Trail Master Plan was submitted to the OPDF Board in September 2016 ([Ref. 6](#)).



Volunteers working on the trail network. *Photo credit: Dan Hutt*

Between 2017 and 2020 nearly 20 volunteer work parties were held to build and maintain the trail network. To date, the following trails have been completed: Otter Ponds Marsh Loop (585 metres), North Pond Bluff Trail (1700 metres), Otter Ponds Brook to Hawboldt's Farm Hill Trail (675 metres), a small section of Hawboldt's Farm Hill Trail (~250 metres), and most of Hawboldt's Farm Hill Shortcut (~500 metres). Two additional trails that weren't previously included in the trail plan were also completed. A loop on the top of Hawboldt's Farm Hill was constructed to facilitate tours for the Tolerant Hardwood Management Workshop in October 2017. The short loop is approximately 1 km in length and goes through stands where the Northern Hardwood Research Institute are experimenting with hardwood management techniques. The other additional section was a shortcut near the beginning of Otter Ponds Marsh Loop to make a shorter, more accessible trail option for visitors.

In September 2019, Hurricane Dorian blew through Nova Scotia leaving a lot of destruction in its wake. Otter Ponds unfortunately suffered many blowdowns and significant damage to key infrastructure, including trails. All new trail construction was put on hold in order to focus on repairing the damage to existing trails. Volunteer work parties in September and October were held to work on clearing the trails in time for fall tours and activities, but it was only possible to fully clear North Ponds Bluff Trail and Otter Ponds Brook to Hawboldt's Farm Hill Trail. The other trails remain closed to visitors until we are able to finish clearing debris and downed trees that make them hazardous.

In October 2019 volunteers constructed a pedestrian bridge over the brook by the beaver dam on the North Pond Bluff Trail which goes from the main entrance road to Powderhorn Hill Road. Avid hikers were generally able to cross the stream when the water was low, but not during the spring and after heavy rain events. To improve accessibility for everyone year-round, a bridge was deemed necessary. Equipment and building materials were carried 700 metres from the Powderhorn Hill trail head to the beaver dam. The bridge was constructed using three 2" x 8" x 16' boards that had been sawn the previous month from the downed trees around the visitor shelter landing, and held together with sections of 2" x 4". Large rocks were arranged at the lower end of the bridge for about 15-20 metres for hikers to use as stepping stones when the stream overflows into the floodplain.



Volunteers building a foot bridge on North Pond Bluff Trail in 2019. Photo credit: Christie Verstraten



Selection of trails constructed at Otter Ponds. Photo credit: Christie Verstraten

Due to COVID-19 restrictions, there were no volunteer work parties in 2020. Trail work will resume in 2021 with a focus on getting the rest of the existing trails cleared of blowdowns and hazards, and safe for recreational use once again.

3.7 Other Infrastructure Projects

3.7.a Sidney Prest Memorial Bench

The Board of Directors decided to install a bench in honour of Sidney Prest, long time OPDF volunteer and champion, who passed away in December 2015. The bench was built by Kate Campbell in 2017 out of OPDF wood with a metal memorial plaque and placed on site near one of our hiking trails. Its eventual home will be on a ridge nearby overlooking the Otter Ponds Brook.

3.7.b Signage

At the beginning of the Project, the Nova Scotia Department of Transportation and Infrastructure Renewal's (NSDTIR) sign shop made about 20 wooden signs with directions to OPDF, a welcome sign and signs to identify major features on Project land such as brooks and roads. The signs are in the same style as those use in Nova Scotia's Provincial Parks – very professional and attractive.

When the access gate to OPDF was initially constructed along the main road into the project in 2013, large, metal 'Gate Ahead' signs had been erected on either side as a precaution. At some point, likely in 2017 or 2018, one of them disappeared, probably stolen. A new sign was sourced in 2019 from the NSDTIR's sign shop and put it up later that year.



Sign marking where road crosses north project boundary.
Photo credit: Christie Verstraten

Before Hurricane Dorian destroyed the visitor shelter, four 8"x6" aluminum sponsor signs had been ordered to acknowledge the groups that have supported OPDF with grants and donations. The sponsor signs will be displayed on the new visitor shelter once it is re-built.

4.0 Forest Management

4.1 OPDF Management Plan

In 2012, Picea Forestry Consulting completed a management plan for the OPDF lands ([Ref. 2](#)). The document serves as a framework to help the OPDF board of directors meet the project objectives and to practice responsible stewardship. The plan also provides the means to meet the Forest Stewardship Council certification standards for Small and Low Intensity Forests in the Maritime Region. The document is considered to be a continual work in progress. As more knowledge and information becomes available, it is incorporated into future management decisions to develop appropriate implementation plans. The management plan will be updated every 10 years.

4.2 Picea Memorandum of Understanding

In fall 2015, the OPDF Board approved an MOU with Patricia Amero of Picea Forestry Consulting and Woodlot Services to oversee harvesting and silviculture work done on project lands based on Board objectives, the OPDF budget, and relevant management documents, including the 2011 Forest Management Plan ([Ref. 2](#)) and the 2013 Proposed Access Network and Silviculture Plan ([Ref. 3](#)). The term of the MOU is five years, from fall 2015 to 31 December, 2020, and may be extended on the agreement of both parties.

According to the MOU, Picea will be responsible for “road layout, pre- and post-harvest assessments, silviculture and harvest block layout, hiring silviculture and harvest contractors, supervision of contractors, and administration involved with completion of such activities.” The MOU outlines specific tasks and deadlines for both Picea and OPDF.

4.3 Boreal Felt Lichen Survey

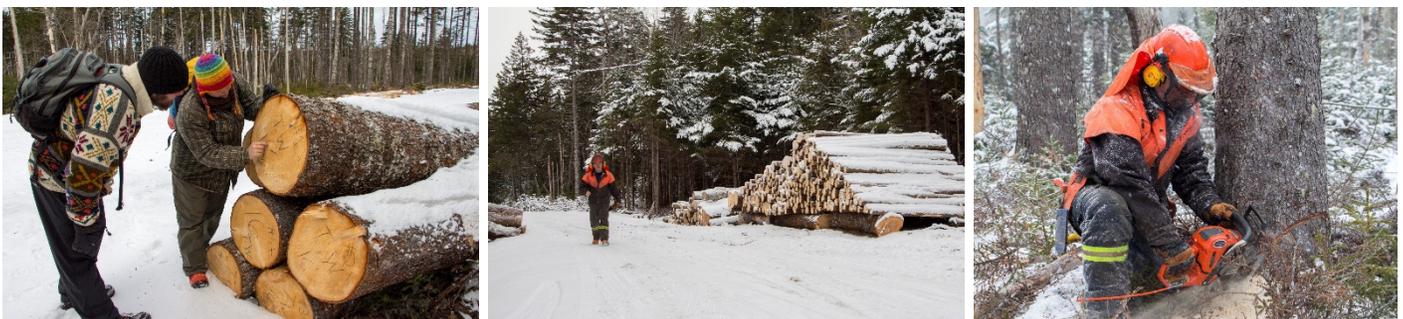
Prior to conducting a harvest on crown land, a Boreal Felt Lichen survey is mandatory to determine if the species at risk is present and if a buffer zone is needed. We hired lichen expert Chris Pepper to do the survey, which he conducted in September and October of 2019. Pepper surveyed all of the potential habitat within OPDF as identified by NSDLF. No Boreal Felt Lichen was found, but there were four occurrences of Blue Felt Lichen, each of which requires a 100-metre buffer zone where no harvesting can take place. It will not impact our operations in a significant way. Pepper also reported a great diversity of lichen species in the area, and has provided us with a list of species observed as well as shapefiles for our records.

4.4 Harvests and Silviculture

4.4.a First Harvest

In accordance with the forest management plan ([Ref. 2](#)), OPDF planned and carried out its first harvest in the fall and winter of 2012-13. The operation began August 30th, when Picea Forestry Consulting & Woodlot Services of West Northfield started to lay out selection harvests and mark trees in both softwood and hardwood stands. The directors ultimately decided to postpone the hardwood harvest (which was planned for German Lake Hill, the first drumlin east of the Tangier River), but moved forward with a pre-treatment assessment of a softwood area beyond the new bridge across Otter Ponds Brook.

One goal was to clear rights-of-way for three timber extraction roads (Main Access Road, Hawboldt’s Farm Hill Road and Powderhorn Hill Road) that would allow access to a large part of the parcel. Another was to build our capacity to plan and conduct harvests that demonstrate the highest standards of uneven-aged forest management.



First Otter Ponds Harvest, 2012-2013. Photo credit: Dan Hutt

Picea prepared a tender for the harvest, which was sent to 22 contractors in the region on October 10th, 2012. Nine days later, OPDF staff and Picea conducted a one-day site visit for four contractors who had expressed interest in the work. Directors were disappointed with the turnout, and commissioned a survey of the contractors that received the tender to learn more about what barriers there were to bidding on the job (see [Section 7.1](#) for survey results). Three bids were received and reviewed by Picea, which recommended that Forestex Ltd. of Mooseland be awarded the work. Forestex began cutting a short time later, and about 416 tonnes of wood were harvested and sent to three Nova Scotia sawmills, including a small amount of large-diameter, high-value red spruce tonewood (used in making musical instruments) which was purchased by Windhorse Farms. This generated approximately \$20,000 in gross revenue from timber sales.

This harvest produced a small amount of rough pine for which there was no good market. OPDF hired Rob Risser of Middle Musquodoboit to turn the logs into building material for use on site. In late August 2013, Risser came to OPDF with his Wood-Mizer portable sawmill. With the help of many OPDF volunteers, he milled about 2.5 cords of white pine logs into timbers and boards to be used in the visitor shelter and other infrastructure projects at OPDF, substantially reducing costs to OPDF for lumber.



Rob Risser uses his Wood-Mizer portable sawmill to mill up pine logs with OPDF volunteers helping to stack lumber, 2013. *Photo credit: Dan Hutt*

4.4.b Right-of-Way Harvesting

The only harvesting completed in 2015 was a right-of-way cut to extend Powderhorn Hill Road. The harvest took place from September to November yielding approximately 200 tonnes. Mechanical harvesting was done by Conform Limited and manual harvesting was completed by Forestex Limited. Frank Higgins brought his portable saw mill to OPDF in October 2016 to saw up seven spruce logs from this harvest. The logs were milled into 16-foot, 2" boards needed as tread planks for the three bridges at Otter Ponds. He milled about 800 board feet of high quality 2" x 10" boards and a season's worth of scrap wood for the Otter Ponds camp fire.

Conform cut 550 metres of right-of-way in 2017, and an additional 500 metre section was cut by Forestex in December 2018 to extend Powderhorn Hill Road. Work was almost completed before weather turned bad for trucking, so this work was finished in spring 2019.

A total of 728 tonnes was cut from the right-of-way from the second bridge to the end, which was a distance of 1.8 km.

4.4.c Northern Hardwood Research Institute Tolerant Hardwood Treatments



Logs harvested for 2017 Tolerant Hardwood Management Workshop. Photo credit: Christie Verstraten

In 2017, OPDF partnered with the Northern Hardwood Research Institute to demonstrate treatments recommended by their hardwood silviculture prescription system. Three stands on Hawboldt's Farm Hill were mapped out, two of which will receive different treatments with one left as a control. The silviculture treatments have not yet been carried out, but eight hardwood trees (various species) were cut and taken to a landing area for the Tolerant Hardwood Management Workshop in October. The logs were used as part of a hardwood log utilization presentation by Groupe Savoie.

4.4.d Silviculture Treatments

A Northern Pulp crew did approximately 46 hectares of pre-commercial thinning in 2019 in the section of project land that was previously clearcut west of the Tangier River. Directors met with the crew prior to the treatment to discuss optimal species distribution and spacing. The board was pleased with the work done.

4.4.e Perkins House Museum Restoration Project

OPDF was contacted in the Spring of 2019 by a contractor for the Nova Scotia Department of Transportation and Infrastructure Renewal about procuring logs for a restoration project at the Perkins House Museum in Liverpool, NS. Built in the 1760s, the museum has a timber frame with load-bearing vertical plank sheathing. The vertical planking had become rotten and needed to be replaced. The original planks were sawn with a vertical, water-powered mill. NSTIR wanted to replicate the saw tooth pattern on the planks, and partnered with the Sherbrooke Village Museum to use their water-powered mill to saw the logs. OPDF Director Wade Prest worked with NSTIR to figure out the final dimensions required and calculated how many logs would have to be cut to fill the order. The logs (scaled at 4908 board feet in total) were harvested by Forestex in the summer, cut on one side with a portable mill so they would fit in the water-powered mill, and trucked to Sherbrooke Village by Michael Baker of Liscombe.



Harvest for Perkins House Museum order, 2019. Photo credits: Wade Prest (left), Mike Murray (centre, right)

4.4.f Hurricane Salvage

In 2019, Forestex Limited cleared the tree that destroyed the visitor shelter as well as several others that had blown down around the landing and posed safety hazards. They were milled onsite with Frank Higgins' portable sawmill. The lumber will be used in rebuilding the shelter and for other infrastructure. There were several significant patches of blow-down on the project lands.



Photo credit: Wade Prest

During the spring and summer of 2020, pre-treatment assessments and an Old Growth Forest Survey were completed to prepare for a substantial harvest operation. Approval was obtained for selection harvesting on 85 hectares in the core of the Project area. The objectives of the harvest were: 1) to establish a forwarder trail network in the target stands, 2) to salvage patches of blowdown from Hurricane Dorian, 3) to remove overstory trees from areas with well-established regeneration, and 4) to do a light commercial thinning along trails where stocking was dense.

Conform was engaged to carry out the harvest under supervision by the Executive. Forestex was hired to lay out trails and provide direction to operators, monitor daily activity, and track roundwood shipments.

Despite wet conditions, the harvest was completed without undue ground disturbance, and the harvest objectives were met. About 40% of the approved area was covered and approximately 2000 tonnes were harvested: 60% sawlogs, 30% studwood, and 10% firewood. Additional harvesting and precommercial thinning will be completed under the same block approvals.



2020 harvest completed by Conform Limited. Photo credit: Christie Verstraten

5.0 Research

5.1 Nature Day Biota Survey

In June 2015, Otter Ponds held its first public biota survey. The Nature Day was styled after the popular 'BioBlitz' format being used increasingly in other provinces. The goal of the event was to get people out for a day in the woods while also collecting baseline flora and fauna population data at Otter Ponds. Naturalists, ecologists, woodlot owners, families and anyone interested were invited for a full day at Otter Ponds with a barbecue lunch. Four main survey areas were targeted: the Northern Boundary Line (mature red spruce, Otter Ponds Brook, open wetlands); German Lake Hill (hardwood drumlin, Tangier River, mixedwood, softwood); Hawboldt's Farm Hill (hardwood drumlin); and an area east of the established section of Powder Horn Hill Road (climax softwood forest, open wetlands). The event was covered in an article in Rural Delivery magazine ([Ref. 7](#)).

The Nature Day was very successful and many participants expressed an interest in attending similar events in the future. For future events, the board decided to host smaller, more targeted biota surveys like bird or fungi surveys. Smaller surveys with a narrower focus allow us to plan events at specific times of year, such as spring for birds, fall for fungi. For more information on this and the research projects below, visit <https://www.otterponds.ca/research-projects.html>. A list of scholarly articles from research completed at Otter Ponds can be found in [Appendix B](#).



Nature Day Biota Survey, 2015. Photo credit: Dan Hutt

5.2 Owl Nesting Boxes

OPDF is a research site for a study into the breeding and migration of the Boreal Owl and Northern Saw-whet Owl. In November 2017 Dan Hutt helped St. Francis-Xavier University researcher Randy Lauff, and his assistant Chad Brazier install eight owl nesting boxes at Otter Ponds in the hopes that some of them will be homes to owl families in the spring. Much of the day was spent looking for just the right location: lots of canopy cover, but fairly open below so the owls can fly around easily and can see their prey of mice, voles and shrews. They prefer quiet areas away from noisy burbling brooks which mask the sounds of prey. Volunteers check the boxes annually in early spring for nests. Four years later in June 2021 Dr. Lauff and OPDF Board member Jacob Prest discovered the first nest of the project, a Northern Saw-whet owl.



Top row: Randy Lauff and Dan Hutt installing nesting boxes, 2017.
Photo credit: Dan Hutt

Bottom row: Randy Lauff measuring saw-whet owl found during spring nest box inspection, 2021.
Photo credit: Jacob Prest

5.3 Spring Bird Counts

The abundance and diversity of birds in a forest are good indicators of habitat quality. In the wee hours of June 4th, 2016 five bird enthusiasts set out to better understand the avian species at OPDF. Matt Miller and Clare Robinson (OPDF Board and Education Committee) were joined by experienced birders Donna Crossland (Parks Canada), Chris Pepper (NS Bird Society) and Kate Steele (NS Bird Society). Crossland shared a Forest Bird Monitoring Protocol designed for Parks Canada and helped establish six monitoring sites. Point count surveys of 10-minute duration were conducted in three habitat types: hardwood drumlin, lowland softwood, and softwood ridge.

The bird count revealed that OPDF is home to many North American migrant songbirds – even a couple of species at risk: the endangered Canada warbler and the threatened Olive-sided flycatcher. Broad goals for OPDF’s bird monitoring project include: compilation of a habitat-specific baseline inventory of forest birds, description of temporal changes in relation to local and landscape habitat, and contribution to the understanding of population trends for forest birds in Nova Scotia. Migration-related data helps shed light on larger issues such as climate change. Monitoring programs in Nova Scotia typically occur in mostly mature, undisturbed forest. Monitoring at OPDF offers the opportunity to study trends in a forest undergoing uneven-aged management, where timber production is compatible with the protection of a full range of other forest values and services.

In 2017, OPDF was contacted by Dalhousie University bird researcher Cindy Staicer, who was interested in the data collected at the 2016 spring bird count. The board released the data to Dr. Staicer.

5.4 Tolerant Hardwood Management with Northern Hardwood Research Institute

Based in Edmunston NB, the Northern Hardwoods Research Institute (NHRI) is a partnership between governments, academia and the forest industry. NHRI conducts research on the management of northern hardwoods and mixed forests of Eastern North America. One of NHRI's projects is a silviculture guide to hardwood management in the Maritime Provinces, known as the Silviculture Prescription System (learn more at hardwoodsnb.ca/en). NHRI researchers came to Otter Ponds in August 2017 to demonstrate how their guide can be applied at Otter Ponds. In three locations three different management regimes were suggested: a Uniform Shelterwood Harvest; a Uniform Irregular Shelterwood Harvest; and a Continuous Cover Irregular Shelterwood Harvest. Each of these harvesting prescriptions came with a guide for foresters and forest technicians to lay out the work in the field and instructions for contractors to complete the treatments.

Otter Ponds hired Mary Jane Rodger, a qualified tree-marker from the Medway Community Forest Cooperative, to complete tree marking within each of the three treatment areas. This was followed by a field day for forestry professionals and woodlot owners at Otter Ponds in the fall of 2017 that saw over 50 participants and nearly 20 volunteers view the sites and hear NHRI researcher Gaetan Pelletier describe their Silviculture Prescription System and other services that NHRI provides. Other topics covered were: hardwood log value optimization by Groupe Savoie; applying NSDLF's Forest Ecosystem Classification and Pre-Treatment Assessment; and the success of the Nova Scotia Salmon Association's decade of lime dosing on the West River. The event was covered by Atlantic Forestry Review ([Ref. 8](#)).



Tolerant Hardwood Management Workshop held in partnership with the Northern Hardwood Research Institute, 2017.

Photo credit: Dan Hutt

5.5 Liming Trial

For the past few years, the Nova Scotia Salmon Association (NSSA), Dalhousie University, NS Department of Lands and Forestry, and other partners have conducted a trial whereby small catchments have been limed by helicopter to assess impacts on stream water quality for fish. This work is led by Dr. Edmund Halfyard and conducted in the West River watershed area northwest of Marinette (off Highway 224) where the NSSA had already been conducting in-stream lime dosing. The main objective was to see if partial catchment liming (mainly riparian areas) would lead to improvements in stream water chemistry by treating adjacent land/soils feeding the streams. Results to date have been positive. The next logical step was to expand liming to more upland areas to assess the impacts on forest soils and related tree growth/health, with the premise that liming of whole catchments could accelerate the long-term recovery of both soils and surface waters from the impact of acid deposition.

Along with more catchments in the West River trial area being treated in fall 2018, two small upland areas (about four hectares each) at OPDF were limed in October 2018 via helicopter. Otter Ponds sites were selected for this work because 1) they are close to existing trials, 2) they have similar soils as the West River sites, 3) they have desirable mature tree cover (both softwood and hardwood), 4) they have good access, and 5) the work is compatible with OPDF objectives.

The liming project is led by Dr. Kevin Keys, a soil scientist with NSDLF with the assistance of Master's student Caitlin McCavour who helped establish experimental plots and conduct pre- and post- treatment measurements and sampling of soils and tree tissue. McCavour's MSc project work was supervised by Drs. Shannon Sterling (Dalhousie), Edmund Halfyard (NSSA), and Kevin Keys. Although the MSc project is only scheduled for two years, the intent is to assess and sample these sites long-term (at the 5-year and 10-year marks at minimum) since the benefits of this type of restoration work can take many years to be fully realized. This additional monitoring will be coordinated by Dr. Keys. In addition to treated areas, control plots were also established for comparison purposes.



Top row: A helicopter spreads lime on a site at OPDF, 2018.
Photo credit: Shannon Sterling & Caitlyn McCavour

Bottom row: An aerial view of OPDF and a limed sample plot, 2018.
Photo credit: Edmund Halfyard

6.0 Education

6.1 Tours and Events

From 2012 to 2020, OPDF hosted 20 official tours with school groups (elementary to university), youth groups, community organizations, researchers, naturalists, recreationists, and many others totaling more than 320 participants. We also hosted several smaller informal tours for people interested in the project.

In addition to tours we held seven public events, including: several field days, a Nature Day biota survey ([Ref. 7](#)), spring bird count, mushroom foray, and a guided hike. These events had a combined attendance of over 350 participants. For a list of events held at OPDF, see [Appendix A](#).

Otter Ponds staff and volunteers also represented the project at 15 events hosted by other groups, including: conferences, field days, a Nature Blitz, and a screening of the award-winning film “Nature Play, Take Childhood Back”.



Images from a selection of field days and tours, 2012-2020. Photo credits: Dan Hutt (rows 1&2), Christie Verstraten (row 3)

6.2 Workshops and Training

Otter Ponds Demonstration Forest organized and hosted nine workshops, and hosted two workshops for the Mersey Tobeatic Research Institute. Workshop topics included: erosion control with native plants; old growth forest assessment; forest roads, trails and bridges; lichen identification; tolerant hardwood management; ecological forestry; and five boundary line maintenance workshops. OPDF also organized and hosted two three-day directional felling chainsaw training courses through the Forestry Safety Society of Nova Scotia. A total of approximately 200 people have attended OPDF workshops and training events so far. Articles about the boundary line maintenance workshops and old forest assessment event were published in Atlantic Forestry Review (Refs. [9](#), [10](#)). For a list of events held at OPDF, see [Appendix A](#).



Images from a selection of workshops and training events, 2012-2020. Photo credits: Dan Hutt (rows 1&2), Christie Verstraten (row 3)

6.3 Association of Science Teachers Conference & Curriculum Guides

OPDF staff and directors set up a display at the Association of Science Teachers Conference in 2014, 2015 and 2016 to recruit interested teachers to bring their students to visit Otter Ponds. In an effort to increase the relevance and effectiveness of school programs, staff researched and created packets linking projects and field trips at OPDF with the appropriate sections of the Nova Scotia school curriculums for Grades 4, 10 and 11-12 to hand out at these conferences. The documents created were: “Grade 4- A Day in the Woods”, “Field Trips to OPDF- Resources and Ideas for Grade 10” and “Grades 11/12 Research Projects at OPDF ([Ref. 11](#))”.

At the 2014 Association of Science Teachers Conference, we distributed 44 of the new curriculum packets and spoke with teachers from across the province. The conversations revealed that teachers are enthusiastic about field trips to Otter Ponds. They indicated that bus trips of 90-120 minutes each way were feasible. Based on that information, directors decided to focus on contacting science teachers at elementary and junior high schools within a 1.5-hour drive of OPDF, and at high schools within a 2-hour drive. Staff developed a list that includes 32 schools in the Primary-Grade 8 category and 70 schools in the Grades 9-12 category.



Association for Science Teachers Conference, 2017.
Photo credit: Christie Verstraten

7.0 Publications and Videos

7.1 Crown Land Contractor Survey

Following a somewhat unsatisfactory response to the tender for the 2012-2013 harvest, OPDF directors wanted to learn more about the perceived challenges that local contractors face when bidding on work at the demonstration forest. Staff were asked to survey the 23 harvesting contractors that were sent copies of the first tender. Ultimately, 20 of the 23 responded. The most significant challenges reported were: Distance (12 contractors); Low harvest volume (9 contractors); A short timeframe for completion (8 contractors); and Crown requirements (4 contractors). The information will be used when writing future tenders for work to be done at Otter Ponds.

7.2 Boundary Line Maintenance Guide

OPDF staff wrote a Boundary Line Maintenance Guidebook ([Ref. 12](#)) for participants of the annual Boundary Line Maintenance Workshops which is posted online for anyone interested in learning more about this topic. The guide was written with permission using information and images from John Delorey, a recently retired NSDNR surveyor. It was also read and approved by Britt Roscoe, a retired Nova Scotia Land Surveyor and NSWOOA board member.

7.3 Deadwood Policy

OPDF recognizes the essential role that deadwood plays in the conservation of biodiversity and the protection of ecosystem functions and processes. Directors established a policy on retention and recruitment of coarse woody debris, snags and legacy trees. A few of the key policy guidelines are:

- During on-the-ground layout, prior to harvest, clearly identify trees that will serve as future full-cycle trees. Future full-cycle trees should be greater than 25 cm dbh, should be of various species if possible, and should be left at a density of at least 8 per hectare with an optimum goal of 12 per hectare. A qualified tree marker should select these trees, ensuring an appropriate mix of species.
- If a native species is uncommon in the area, any representative of the species should be designated as a full-cycle tree regardless of whether it is acceptable or unacceptable growing stock and regardless of size.

- Leave components of unacceptable growing stock as a source to easily draw from for future selection of full-cycle trees. Begin at early tree development stages during pre-commercial and pole-stage thinning operations, leaving a portion of dominant poorly formed trees. (OPDF *Deadwood Policy Paper*, p. 8)

The full policy document (Ref. 13) can be found at: www.otterponds.ca/publications.

7.4 Educational Videos

7.4.a Bridge Construction Videos

OPDF created two videos in 2015, both of the first water crossing on Powderhorn Hill Road. The Board decided to document the construction of the water crossing both for educational purposes and for advertising. The first video was filmed and edited by one of our Directors, Dan Hutt, and was a time-lapse video of the water crossing being built in one day by volunteers in early August. This was very popular when posted on our Facebook page.



Still image from Dan Hutt's time-lapse video of water crossing construction, 2015.

The other video was done by professional videographer Jason Headley. Headley's video was an in-depth step-by-step guide for building the water crossing interspersed with more information about Otter Ponds and interviews with OPDF Directors Kate Campbell and Wade Prest. The 10-minute video was very well done and can be seen on YouTube (Ref. 4).

7.4.b Community Conservation Research Network Video

OPDF was approached by the Community Conservation Research Network in 2015 to take part in a project documenting rural community innovation all over the world. The CCRN chose the Eastern Shore of Nova Scotia as one of its project areas and wanted to include OPDF. CCRN representatives Sadie Beaton of the Ecology Action Centre and videographer Jessica Sypher visited Otter Ponds twice in 2015 to record video footage and talk to directors and staff about the project, once after the October Boundary Line Maintenance workshop and once during a Young Naturalists Club field trip. Due to some delays, the video wasn't completed until 2018.

8.0 Marketing and Promotion

8.1 OPDF Brochure

In an effort to increase public awareness of the demonstration forest, OPDF created a full-color brochure in 2014 that describes the project and its goals (Ref. 14). The brochure was distributed at several field days and other meetings of woodlot owners, and it was included in mailings to people who bought or inherited forestland in Nova Scotia during 2014, 2015 and 2016.

8.2 Website and Social Media

8.2.a OPDF Website

In the early years of the project, OPDF had an online presence through a website set up by a director. There was also a page dedicated to OPDF on the nswooa.ca website, which launched in 2014. Eventually, a better online presence was required and the project developed a new website: otterponds.ca. Staff started building this website in late 2016 and it was launched in early 2017. The site is updated regularly by staff, and gives OPDF a place to announce upcoming events and accept online registrations, as well as keep people up-to-date with research projects. Event announcements for Otter Ponds programs are also posted to nswooa.ca, and nswoods.ca as well as on the NSWOOA and OPDF Facebook pages for maximum visibility.

8.2.b Facebook

We launched a Facebook page for OPDF in August 2013, which can be visited at facebook.com/OtterPonds. The page is updated regularly by staff with forest-related articles, project announcements, and upcoming events at Otter Ponds. The page has increased significantly in popularity, with the number of page 'likes' climbing every year and reaching a total of 512 by the end of 2020. Our posts continue to engage our followers, with the most popular posts reaching more than 1400 people.

8.2.c iNaturalist

iNaturalist is an international, web-based platform and app where users can upload geo-tagged photo observations of organisms in nature and have other naturalists (professional and amateur) help identify them. It's a great tool for citizen scientists, researchers and curious nature enthusiasts alike. One of the useful functions the site has is the ability to create Project pages where you can view all the observations made in a specific geographic area. A Project page for OPDF was created in 2019 and now collects information on the types of organisms present on project lands. The Project page can be found at <https://www.inaturalist.org/projects/otter-ponds-demonstration-forest>.

8.3 OPDF in the Media

In 2015, OPDF director Dan Hutt wrote two articles on OPDF projects for local magazines. The first was an account of our Nature Day Biota Survey in June and the second documented the construction of the first water crossing on Powder Horn Hill Road in August. The Nature Day article appeared in the October issue of Rural Delivery ([Ref. 7](#)) and the water crossing account was featured in the September issue of Atlantic Forestry Review ([Ref. 5](#)). Hutt also had one of his photos—a shot of Otter Ponds Director Wade Prest demonstrating proper felling techniques at OPDF—on the cover of the January 2015 issue of Atlantic Forestry Review.

The December 2016 edition of Legacy, the monthly newsletter of NSWOOA, featured an article by staff member Christie Verstraten on Boundary Line Maintenance. The article mentioned the Boundary Line Maintenance workshops that had been put on over the previous two years and OPDF's plan to continue offering these workshops every one or two years, as well as some general guidelines woodlot owners can follow. The Boundary Line Maintenance workshops were also described by Dan Hutt in the February 2016 issue of Atlantic Forestry Review ([Ref. 9](#)). Additionally, Hutt covered an Old Forest Assessment workshop hosted at Otter Ponds and organized by the Mersey Tobeatic Research Institute in the October 2016 issue ([Ref. 10](#)).

Our 2017 Tolerant Hardwood Management Workshop was described in an article published in the November issue of Atlantic Forestry Review. The piece by Dan Hutt was entitled “The elusive hardwood sawlog” ([Ref. 8](#)).

9.0 Funding Partners

9.1 NS Department of Lands & Forestry Road Funding

Funding for road and bridge construction on the Crown Lands of the OPDF Project was provided by the Crown Lands Division and Outreach Programs of the Department of Lands and Forestry. Over the past ten years, DLF has contributed \$72,000 towards the construction of 3.3 kilometres of new access road and three bridges.

9.2 Ecology Action Centre

The Ecology Action Centre funded the temporary position of Forest Education Program Coordinator for one day/week for 26 weeks from November 2016 to May 2017 to help build the sustainability of OPDF’s educational tours and programming. Clare Robinson was hired to fill this role. Robinson worked closely with OPDF and NSWOOA staff and directors to pursue and secure funding for the development and continued delivery of education programs at OPDF.

There were four objectives for this contract: 1) establish audience or target groups; 2) build a program outline for funding proposals; 3) secure funding; and 4) develop a guide/trail map for the proposed trails network. For the first objective, Robinson determined that we should target local schools with our programs, with an eye toward building community around our project message. This conclusion stemmed from brainstorming sessions with OPDF Directors and NSWOOA staff, and discussions with partners, stakeholders and others offering similar forest-education programs in this region.

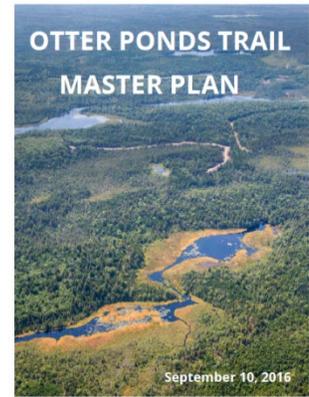
For the second objective, Robinson recommended the following projects:

- Target local schools and build a partnership with at least four teachers
- Work with individual teachers to develop a program based on curriculum outcomes (including a classroom visit and on-site tour)
- Assemble an OPDF ‘tickle trunk’ of items such as cruising gear, tree cookies, non-timber forest products, laminated pictures of the project lands, etc.
- Develop and purchase educational and promotional materials such as brochures, posters, maps and handouts
- Purchase tree seedlings and begin a tree planting program
- Further develop and maintain our online/social media presence.

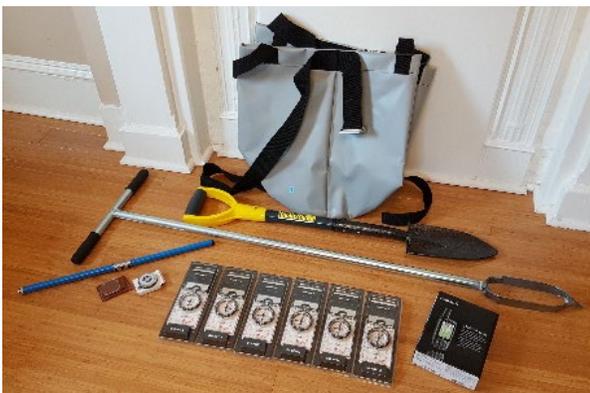
For the third objective, Robinson submitted three funding proposals on behalf of OPDF to: the HRM Community Grant; the MEC Community Investment Grant; and the WWF Go Wild Grant. She successfully secured an HRM Community Grant for \$2500 which provided funding for materials for education, outreach and promotion ([see Section 9.4](#)). Robinson also identified four other possible grants that OPDF could pursue in the future.

9.3 Mountain Equipment Co-op

In fall 2015, OPDF staff submitted a successful grant application to Mountain Equipment Co-op's Community Investment Fund to obtain funds for a Trail Master Plan. The grant of \$7200 was used to hire a trail consultant to develop the plan and host one or two workshops to teach volunteers how to construct the trails. After a call for proposals, the trails consultant contract was awarded to Community Forests Canada. The contract ran from January-June 2016, with trail construction beginning with the trail-building workshop in June. The OPDF Trail Master Plan was submitted to the OPDF Board in September 2016 ([Ref. 6](#)).



9.4 HRM Community Grant



Equipment purchased with HRM Community Grant funding, 2018. *Photo credit: Christie Verstraten*

OPDF received a \$2500 grant from the HRM Community Fund in 2017 for equipment and materials for educational outreach (such as cruising gear, tree planting equipment, compasses and a GPS), as well as program promotion and delivery material (poster, educational material, brochures). In spring 2018, the funds were used to purchase the following: Cruising gear (increment borer, diameter tape, prism, and soil auger); Tree planting equipment (planting shovel and 2 planting bags); Navigational gear (GPS receiver and 6 compasses/clinometers); and promotional materials (updated OPDF poster and 1000 new brochures).

9.5 Halifax C&D Recycling

Another grant received in 2017 was a donation from Halifax C&D Recycling Ltd, a local company interested in supporting environmental causes including sustainable forestry practices demonstrated at Otter Ponds. The company contacted OPDF about donating, and the Project submitted a proposal to them to further develop our trail system, focusing on areas with difficult terrain and a short section of highly accessible trail. Halifax C&D Recycling generously donated \$5000 toward these efforts, which was used throughout the summer and fall of 2018 to hold nine trail work parties. Funds were also used to purchase two compound loppers, a small bow saw, two more hard hats, and some additional pairs of hearing protection for volunteer crews.



Equipment purchased with Halifax C&D Recycling donation, 2018. *Photo credit: Christie Verstraten*

9.6 NS Health Authority- Musquodoboit Harbour Community Health Board

The final grant received in 2017 was from the Musquodoboit Community Health Board Wellness Fund. The original application focused on further improvements to the OPDF trail system and hoped to leverage the \$5000 donation from Halifax C&D Recycling to request \$1834 for equipment rentals and materials. While the Community Health Board was very interested in our proposal, the selection committee was informed that they could no longer fund infrastructure projects. Rather than reject the application, they funded individual items from the proposed budget that were not infrastructure related, which resulted in a \$200 grant for refreshments and drinks for volunteer work parties. In February 2018, the board chair and staff attended an event at Oyster Ponds Academy to receive the grant.

9.7 Other Funding Sources

OPDF received \$300 from the Nova Scotia Woodlot Owners & Operators Association in 2019 as part of the Woodland Owners Mentorship Program for hosting one of their fall field days.

The Nova Scotia Woodlot Owners and Operators Association provides liability coverage for the Otter Ponds Project, including its Directors and Officers, at a cost of \$750 annually.

OPDF wishes also to thank the many supporters over the years for their generous donations to the project.

10.0 Conclusion

Over the past ten years, the Otter Ponds Demonstration Forest has worked to be an example of responsible, uneven-aged, multi-value forest management that provides ecological, economic and social benefits to the community and to Nova Scotia as a whole. Project members are proud to be a voice for forest stewardship and restoration and to have been able to provide educational opportunities to people of all ages and backgrounds within Nova Scotia, from other provinces, and internationally. With hundreds of visitors over the last decade we are pleased to have been an educational and recreational destination for woodlot owners, students, naturalists, forestry professionals, youth groups, nature enthusiasts, and anyone interested in learning more about ecologically-based forestry. We hope to continue to expand our infrastructure and programming to welcome even more people over the next ten years and look forward to what the future brings for this amazing forest.

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12. Verstraten, C., "Boundary Line Maintenance Guidebook", Oct. 2015 (<https://www.otterponds.ca/publications.html>)
13. Amero, P., "The role of standing dead trees & coarse woody material in maintaining & improving forest health & productivity at OPDF", June 2013
14. Otter Ponds Demonstration Forest Brochure, June 2014 (<https://www.otterponds.ca/publications.html>)

Appendix A: OPDF Events and Activities 2010-2020

2012

- **TOUR:** Forest Heights Community School, Chester Basin (20+ participants)
- **TOUR:** Master's degree candidates from the School for Resource and Environmental Studies at Dalhousie University, Halifax (20+ participants)

2013

- **TOUR:** Duncan MacMillan High School, Sheet Harbour (hosted by OPDF and Clean Nova Scotia), tour and dip-net survey of aquatic species in Otter Ponds Stream (25+ participants)
- **TOUR:** Community Conservation Research Network (15+ participants)
- **WORKSHOP:** Erosion Control with Native Plants
- **TOUR:** School for Resource and Environmental Studies at Dalhousie University (40+ participants)
- **TOUR:** Musquodoboit Valley Education Centre in Middle Musquodoboit

2014

- **TOUR:** School for Resource and Environmental Studies at Dalhousie University
- **TOUR:** Forest Heights Community School in Chester Basin (20+ participants)
- **TOUR:** Duncan MacMillan High School in Sheet Harbour
- **TOUR:** Musquodoboit Valley Education Centre, Middle Musquodoboit
- **FIELD DAY:** Open Forest Day (100+ participants)

2015

- **WORKSHOP:** Boundary Line Maintenance (spring)
- **WORKSHOP:** Boundary Line Maintenance (fall)
- **FIELD DAY:** Nature Day Biota Survey (BioBlitz)
- **TOUR:** Halifax Chapter of the Young Naturalists Club (15 participants)
- **TOUR:** South Colchester Academy, Brookfield (11 participants)

2016

- **WORKSHOP:** Boundary Line Maintenance (9 participants)
- **FIELD DAY:** Spring Bird Count (5 participants)
- **WORKSHOP:** Old Forest Assessment Workshop (10 participants)
- **FIELD DAY:** Fall Field Day, ~70 people
- **TOUR:** Girl Guide group from Birmingham, England (12+ participants)
- **TOUR:** Acadian Forest Keepers AGM
- **OUTREACH EVENT:** Spring Woodland Conferences
- **OUTREACH EVENT:** NSDNR Open Forest Day
- **OUTREACH EVENT:** Association for Science Teachers Conference
- **OUTREACH EVENT:** Nature Play Screening and Event Expo

2017

- **WORKSHOP:** Forest Roads, Trails and Bridges Workshop (20+ participants)
- **WORKSHOP:** Lichen Identification Workshop, organized by MTRI (20+ participants)
- **WORKSHOP:** Tolerant Hardwood Management Workshop (65+ participants)
- **WORKSHOP:** Boundary Line Maintenance Workshop (12 participants)
- **TOUR:** School for Resource and Environmental Studies at Dalhousie University (20+ participants)

- **TOUR:** Shore Active Transportation Association (10 participants)
- **OUTREACH EVENT:** Spring Woodland Conferences
- **OUTREACH EVENT:** NatureBlitz event in Dingle Park, Halifax, NS
- **OUTREACH EVENT:** Association for Science Teachers Conference

2018

- **TOUR:** Environmental Sciences Undergraduate Program at Dalhousie University (20+ participants)
- **TOUR:** McGill Alumni (16 participants)
- **TOUR:** Nova Scotian Institute of Science (12 participants)
- **FIELD DAY:** Nova Scotia Mycological Society's annual fall Mushroom Foray (80+ participants)
- **OUTREACH EVENT:** Spring Woodland Conferences
- **OUTREACH EVENT:** Maritime Forest Carbon Opportunity Conference

2019

- **WORKSHOP:** Boundary Line Maintenance Workshop (14 participants)
- **FIELD DAY:** Fall Field Day and Hike in partnership with Hike Nova Scotia (11 participants)
- **TOUR:** Halifax Chapter of the Young Naturalists Club (16 participants)
- **FIELD DAY/WORKSHOP:** Ecological Forestry Field Day (12 participants)
- **TRAINING:** Directional Felling Chainsaw Course (7 participants)
- **OUTREACH EVENT:** Spring Woodland Conferences

2020

- **TRAINING:** Directional Felling Chainsaw Course (5 participants)

Appendix B: Scholarly Research at OPDF

C. E. Gabriel (2019). Losses of carbon from mineral-associated soil organic matter pools in podzolic horizons following soil climatic changes associated with forest clear-cut harvesting. PhD thesis, Dalhousie University. <https://dalspace.library.dal.ca/handle/10222/76739>

C. E. Gabriel, L. Kellman & D. Prest (2018). Examining mineral-associated soil organic matter pools through depth in harvested forest soil profiles. PLOS ONE. https://www.researchgate.net/publication/329053920_Examining_mineral-associated_soil_organic_matter_pools_through_depth_in_harvested_forest_soil_profiles

C. McCavour, S. Sterling, K. Keys, E. Halfyard & L. Plug (2020). The effects of dolomitic limestone application on forest soil and tree nutritional status on two acidic sites in Nova Scotia, Canada. Journal of the Atlantic Geoscience Society, Atlantic Geoscience Society Abstracts: 46th Annual Colloquium & General Meeting 2020. <https://www.erudit.org/en/journals/ageo/1900-v1-n1-ageo05281/1069314ar.pdf>

D. Prest, L. Kellman & M. B. Lavigne (2014). Mineral soil carbon and nitrogen still low three decades following clearcut harvesting in a typical Acadian Forest stand. Geoderma. https://www.researchgate.net/publication/259089747_Mineral_soil_carbon_and_nitrogen_still_low_three_decades_following_clearcut_harvesting_in_a_typical_Acadian_Forest_stand