

Otter Ponds Demonstration Forest

Summary of Activities and Accomplishments

24 March 2015



Background

The Otter Ponds Demonstration Forest is a unique partnership that includes four non-governmental organizations, a forestry company and the province. The partners collaboratively manage a 686-hectare Crown parcel near Mooseland, Nova Scotia, within the Halifax Regional Municipality.

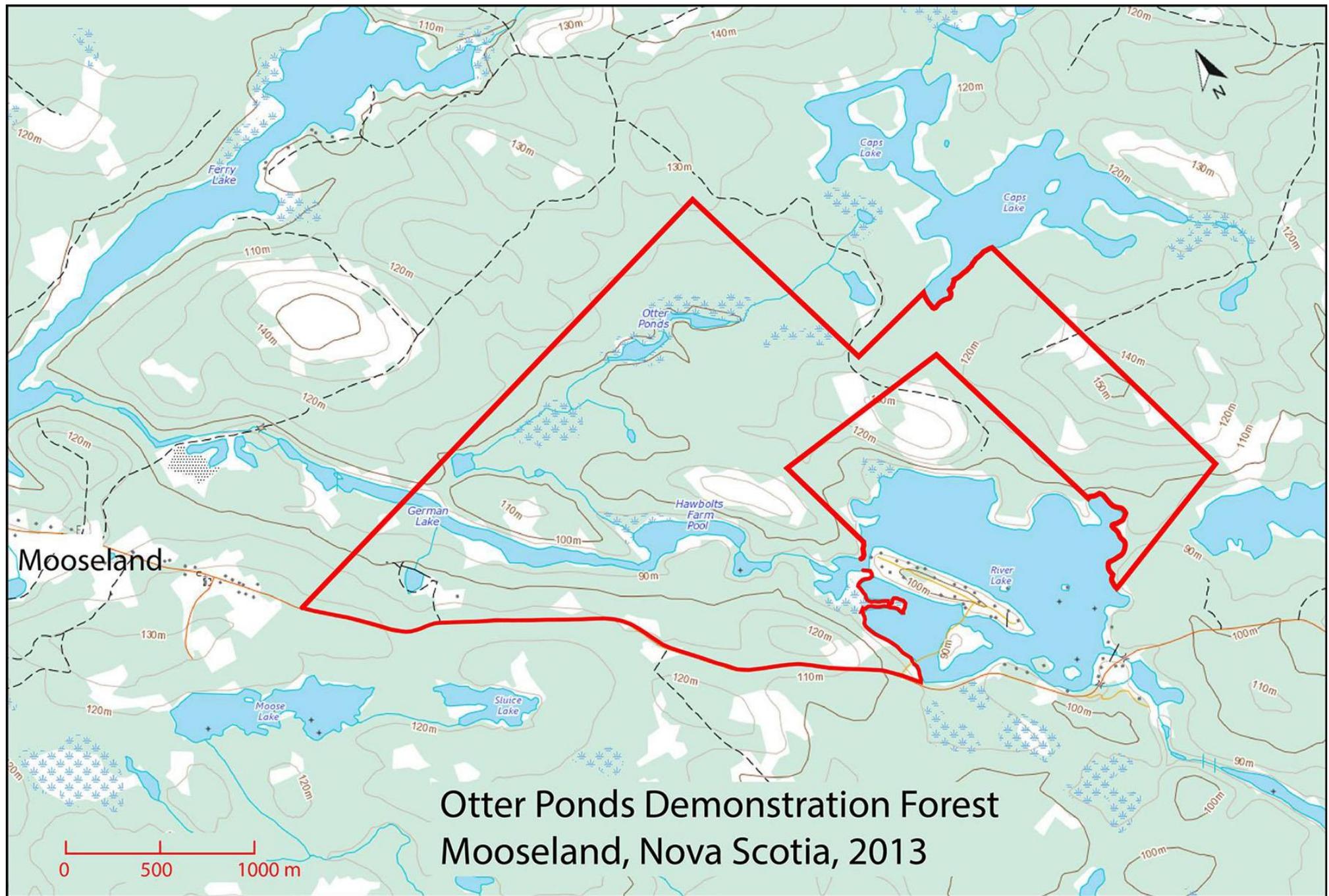


Otter Ponds brings together the Nova Scotia Woodlot Owners and Operators Association, Eastern Shore Forest Watch, Ecology Action Centre, and the Mooseland and Area Community Association, along with Northern Pulp Ltd. and the Nova Scotia Department of Natural Resources. The operating agreement was signed on 22 June 2010.

Otter Ponds produces timber for market using the best forest management 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. 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 the mission.

Project Objectives

- To manage and operate the Otter Ponds Demonstration Forest as a working woodlot that produces an annual or periodic yield of timber, forest values, and ecosystem services.
- To certify the Demonstration Forest to the Forest Stewardship Council Maritime Standard, and to promote, through demonstration, the benefits of woodlot certification to the forest, to landowners, and to society as a whole.
- To demonstrate the philosophy, science, and practice of uneven aged forest management in the Acadian Forest.
- To carry out uneven aged silvicultural treatments, to develop and field test technical criteria for existing and new treatments, to develop techniques for forest restoration.
- To demonstrate that timber production is compatible with protection of other forest values and provision of ecosystem services by providing opportunities for woodlot owners, school children, public organizations, and individuals to experience a working woodlot situation.



Otter Ponds Demonstration Forest
Mooseland, Nova Scotia, 2013

Accomplishments

Capacity Building

- The total operable forested area of OPDF is approximately 389 hectares. Water, wetlands and old mining sites occupy another 256 ha.
- The relatively small size of the demonstration forest and the large expanse of water and wetlands significantly increase the difficulty of accomplishing all five project objectives simultaneously. Furthermore, the project area has limited frontage on public roads and, when the MOU was signed, had virtually no interior roads or extraction trails. The construction of roads, bridges and extraction trails needed to access timber resources on the project lands has been the directors' first priority.
- Liquidation of timber resources could have generated sufficient income to cover the infrastructure costs, but would also have made it impossible to achieve the required objectives. Therefore, directors have focused on a gradual expansion of the road and trail network as funding allows, consistent with maintaining the capacity to produce future income from uneven-aged management while protecting other forest values and providing opportunities to teach the public.
- Several OPDF directors have long experience with uneven-aged management, but we have needed to build capacity on the project lands and among our board and staff to support meaningful educational programs. We have worked with Dave Taylor at NREC in Middle Musquodoboit to identify audiences that complement – rather than compete with – NREC's traditional focus on primary- and middle-school groups. All current members of the project's Education Committee have taken or will soon complete Project Wild training.
- OPDF has also worked with Terry Amirault, staff engineer at NSDNR, to successfully permit an alternative system for human waste disposal. In addition to serving the needs of the demonstration forest, it may provide a low-cost alternative to NSDNR for waste disposal at remote sites (more below).

Management Planning

In 2011, Picea Forestry Consulting completed a management plan for the OPDF lands. 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.



Land use 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 the OPDF.

Operable land refers to forest land that is workable and productive enough to receive benefits from efforts.

Five forest cover type groups constitute this operable area- the Mixedwood (MW) forest group, the Spruce Hemlock (SH) forest group, the tolerant hardwood (TH) forest group, the Intolerant hardwood (IH) forest group and the previous clear cut / established plantation group (CC/Plantation).

In addition, there are 57.5 ha. of wet forest groups, including Wet Coniferous (WC) i.e. black spruce, balsam fir, tamarack larch, and Wet Deciduous (WD) i.e. red maple.

Table 1. Land Classification of the 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

Wood volume

The 2011 management plan includes an inventory that was derived from 2003 aerial photography interpretations before Hurricane Juan and subsequent storms, which have caused various degrees of damage through wind-fallen trees. Growth also has occurred during the last 8 years.

Thus, the volumes outlined in this table are not fully representative of current 'on the ground' conditions, The total operable area outlined here includes the wet forest groups.

Table 2. 2003 merchantable wood volume information per forest group for the OPDF.

Forest Group	Area (ha)	SWD VOL (m3)	HWD VOL (m3)	Total Swd + Hwd (m3)
MW Forest Group	64.87	4,900.6	2,790.5	7,691.1
SH Forest Group	245.47	23,116.5	1,072.6	24,189.1
TH Forest Group	62.03	1,073.0	5,890.9	6,963.9
IH Forest Group	1.13	0.0	0.0	0.0
CC/Plantation	28.77	0.0	0.0	0.0
WC Forest Group	61.06	5,067.2	222.0	5,289.2
WD Forest Group	1.43	0.0	0.0	0.0
Total	464.76	34,157.3	9,976.0	44,133.3
Total Operable	402.27	29,090.1	9,754.0	38,844.1

Allowable Annual Harvest

Harvest levels 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 remains lacking in many areas of the OPDF. These areas would benefit from increasing levels of coarse woody material and maintenance of partial shade due to the well - rapid drainage and coarse - medium textured characteristics of the soil.

Table 3. Annual growth and harvest levels

Forest Groups	Area (ha)	Growth capability (LC) ranges (m ³ /ha/yr)		Total SWD	Total HWD	SWD	HWD
		SWD	HWD	Annual growth (m ³ /yr)	Annual growth (m ³ /yr)	AAC* (m ³ /yr)	AAC* (m ³ /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

Management Strategies

The 2011 management plan notes that the project objectives specified in the operating agreement 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 the 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 conditions favourable to encourage 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 the OPDF.

- Balancing economic and ecological values. There should be reasonable value for effort involved.

- Utilizing available silviculture subsidies to help offset cost involved with implementing proper tending and regenerating activities.

Forest Certification

OPDF is certified to the Forest Stewardship Council's Maritimes Standard. OPDF is part of the Acadian Forest Keepers group.

The demonstration forest was chosen by Smartwood to participate in the annual audit of Picea Forestry Consulting in 2012. The auditor was satisfied with the activities of both the demonstration forest and Picea.





Deadwood Policy

Otter Ponds Demonstration Forest recognizes the essential role that deadwood and appropriate forest cover play in the conservation of biodiversity and the protection of proper ecosystem functions and processes. Directors have established a policy on retention and recruitment of coarse woody debris, snags and legacy trees. A few of the policy guidelines are noted below:

- 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.

Road and Silviculture Plan

Directors hired Picea Forestry Consulting to prepare a complete road and silviculture plan for Otter Ponds Demonstration Forest in 2013. To fully access manageable forest stands, the plan envisioned a network of roads that extends approximately 3.3 km from the main access road, which was completed in 2012. To date, about 850 meters has been constructed.

The plan also discusses silviculture activities that may be pursued once access is available. It is intended to help OPDF board of directors' plan and execute annual silviculture work. The specific areas and timing of work depends on when suitable access becomes available. Therefore, the silviculture plan was developed in conjunction with the access plan.



Roads and Bridges

The long-term effort to reach operable portions of the project lands began with the construction of a 500-meter main access road from an existing private road near the boundary of the project to Otter Ponds Stream in 2011. The following year, a small army of volunteers from all four partner organizations spent hundreds of hours building a timber-crib bridge over the stream to allow access to the project lands for visitors and the transportation of wood products.



The bridge is 18 feet long and 16 feet wide. Concrete abutments on either side of the stream are 30 inches thick, 30 inches tall and 18 feet long. The timber cribs (now hidden by the road bed) were filled with 100 cubic metres of field stone.



Roads and Bridges (cont.)



Once the bridge was finished, OPDF built another 250 metres of gravel roadway, extending the access road begun in 2011 to the main landing area for logs and the planned site of a visitor shelter, toilets and other amenities for the public.

In late 2013, OPDF contracted with Marshall Bateman, owner of 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 Powder Horn Hill. The roads were built entirely with material found on-site. The new roads create opportunities for stand improvement work and selection harvesting in several areas that were previously inaccessible. Marshall returned in 2014 to complete the job.

As the road network expanded, good management required that directors consider ways to maintain public access while protecting OPDF's infrastructure.

NSDNR staff met with OPDF directors to discuss the issue of controlled access. It was decided that a gate would help to manage unsupervised use. Otter Ponds contracted with Eastern Fence Erectors of Dartmouth to install a double-swing steel gate with lock box in the spring of 2013, on the access road at the boundary of the project lands. The intent is not to prevent public access, but rather to limit vehicles during active harvest operations, muddy road conditions, and (if necessary) to protect against vandalism.

Directors have also adopted a set of procedures to manage access to the project lands. The procedures are to address and limit liability associated with:

- The safety of visitors and woods workers
- The protection of property assets (roads, structures)
- Seasonal fire control

Access Control



Health and 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 will be used to ensure that OPDF maintains a safe environment for workers and visitors.

On another safety-related issue, the Mineral Resources Branch of NSDNR has been unable to commit resources to the remediation of geological hazards that have been identified at OPDF. These are shallow pits and shafts left over from previous gold mining activities in the project area. The demonstration forest has been working to address the matter since 2011 and will continue its attempts to secure funding for the work in 2015.

Wildlife & Habitat

Although a comprehensive inventory of wildlife has not been carried out at OPDF, field observations made during the preparation of the management plan noted signs of black bear, white tailed deer, snowshoe hare, red tail hawk, spruce grouse, porcupine, squirrel, numerous songbirds; as well as a few snakes and common amphibians. Songbirds were more prevalent in areas that offered multiple structures because of uneven forest layers.



A few stick nests were observed on top of German Lake Hill and Hawbolt's Farm Hill. Stick nests are platforms of sticks and twigs used by large birds for nesting. Eagles, osprey, herons, owls and hawks all use stick nests. Nests are often used repeatedly by the birds that build them. Numerous cavity trees were also observed. Cavity trees are dead or dying trees that have one or more holes on the trunk or main branches. They are either excavated by woodpeckers, or created by decay and broken branches. For more than 50 wildlife species in the Maritime Provinces, cavity trees are vital for nesting, rearing young, roosting, feeding, storing food, escaping and/or hunting predators, and hibernating.

Wildlife & Habitat (cont.)

Mast trees are trees whose fruit (seeds) are important sources of food for wildlife. Cherry, oak, beech and ironwood are important mast species. There were a few mature beech trees, relatively clear of canker disease, on German Lake Hill and Hawbolt's Farm Hill. It is critical that any remaining mast trees be left.

Various sized deadwood on the forest floor provides habitat for a variety of small, medium and large-sized mammals, insects, amphibians, etc. Large-sized trees are particularly important – and increasingly rare in some areas. As restoration activities commence it will be essential to continually allow some larger trees to fall to the forest floor and rot – contributing to wildlife habitat, as well as moisture retention and nutrient enrichment. In some areas where windfalls have occurred the amount of deadwood is sufficient, but in other areas larger sized deadwood is lacking.

With the help of volunteers from the Halifax Field Naturalists, OPDF will conduct a “bio-blitz” on the project lands in 2015 to fully catalogue the species that are present.



Harvesting



In accordance with the 2011 forest management plan, OPDF carried out its first harvest in 2012-13. The operation began 30 August, when Picea Forestry Consulting 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 and harvest layout for an 8.5-hectare softwood area beyond the bridge across Otter Ponds Stream.

One goal was to clear rights of way for two roads that would allow access to a large part of the forest. Another was to build our capacity to plan and conduct harvests that demonstrate the highest standards of uneven-aged forest management.

Picea prepared a tender for the harvest, which was sent to 23 contractors in the region on 10 October 2012. OPDF staff and Picea conducted a one-day site visit for four contractors who had expressed interest in the work. Three bids were received by the 26 October tender deadline.

Harvesting (cont.)

The offers were reviewed by Picea, which recommended that Forestex Ltd. of Mooseland be awarded the work. Amos Cameron of Popes Harbour was contracted to truck the harvested saw logs.

Ultimately, about 416 tonnes of wood were harvested and sent to three Nova Scotia sawmills, including a small amount of red spruce tonewood which was purchased by Windhorse Farm.



Harvesting (cont.)

The first harvest wrapped up in early 2013. Picea conducted a post-treatment assessment of the completed harvest on 6 February and submitted a claim for silviculture payment to the Crown. In addition to our harvest during the winter of 2012-13, some timber was cut later in 2013 to open up rights-of-way for other new roads.

Wade Prest will provide more details on harvesting later this afternoon.



Contractor Survey

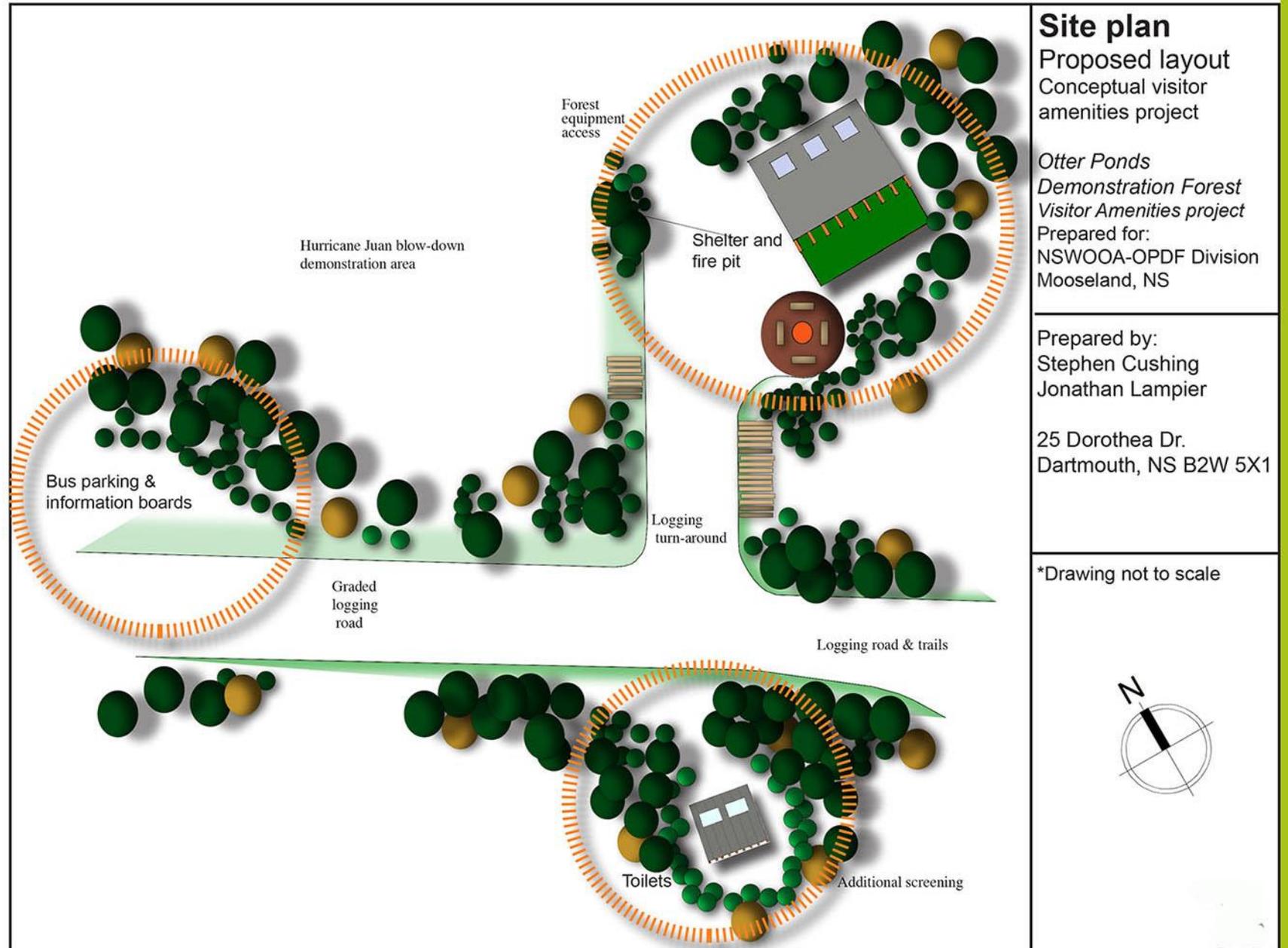
OPDF directors were unsatisfied with the response to the tender for the 2012-13 harvest, and they wanted to learn more about the perceived challenges that local contractors face when bidding on work at the demonstration forest. So, they asked staff to survey the 23 harvesting contractors that were sent copies of the first tender.

Ultimately, 20 of the 23 were contacted. 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.

Landscape Plan

Landscape architects Stephen Cushing and Jonathan Lampier of Dartmouth were hired to prepare a landscape plan to guide the development of public amenities at Otter Ponds, including a shelter for visitors, a fire ring and toilets.





Visitor Shelter and Other Amenities

Construction of the new visitors' shelter began with eight holes that were filled with concrete on 27 September 2013. It was the start of a volunteer effort that would extend over many weekends throughout the autumn until the project was overtaken by snow in early December. The shelter was completed and an amphitheatre, fire pit, and arboretum were constructed in 2014.

Like the bridge over Otter Ponds Stream, the visitors' shelter became much more than a construction project. It was a team-building exercise that brought together more than 20 board members and volunteers. The timber-frame shelter was designed by OPDF President Kate Campbell, a carpenter, who also oversaw its construction. The shelter, which measures 20 feet by 20 feet, was built mostly from low-grade, unmerchantable white pine that was harvested and sawn at Otter Ponds. In a pinch, it can keep about 40 people out of the rain.



Visitor Shelter and Other Amenities (cont.)

Our harvest during the winter of 2012-13 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 in the visitors' shelter and other projects at OPDF, substantially reducing our costs for purchased lumber.

With the help of many OPDF volunteers, he milled about 2.5 cords of unmerchantable white pine logs into timbers and boards.

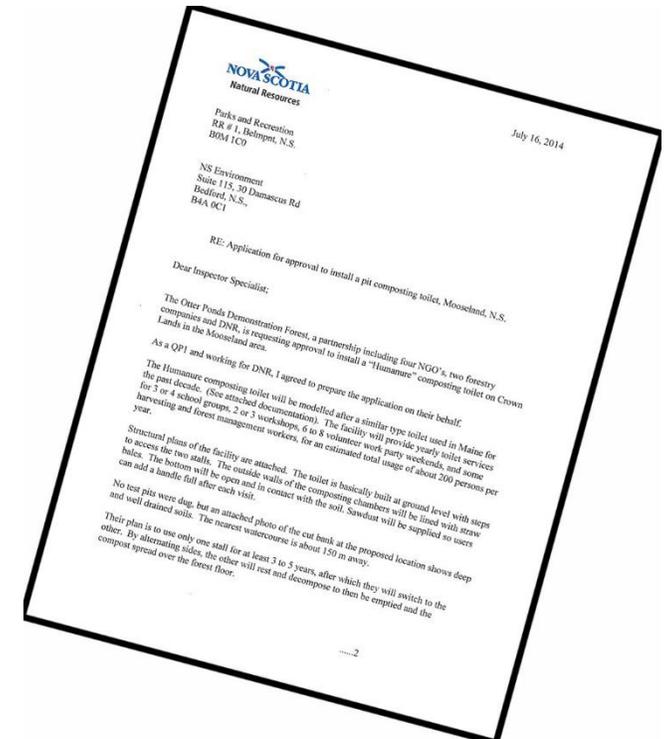




Alternative Toilet

Also in 2014, OPDF staff worked with Terry Amirault, staff engineer at NSDNR, 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 NSDNR 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.





Hiking Trails

Volunteers had laid out and cut the first section of the walking trail system at OPDF in 2011. The 800-metre segment begins at the bridge site and follows the stream before rising onto a hardwood ridge and passing an old gold-mining site. The trail was an essential first step in the creation of education programmes for students, woodlot owners and others.

OPDF is investigating an expansion of the walking trail system. It has invited trails consultants and contractors from government and the private sector to a meeting at OPDF in May:

- The workshop will introduce the project to consultants who may wish to bid on the job and get recommendations and advice from them and the other participants.
- After a brief presentation in the morning to go over our trail plans and map, the participants will spend the rest of the day walking proposed trails, which could ultimately extend for 7.4 kms.

Education and Outreach

Otter Ponds Demonstration Forest is meant to demonstrate the potential of well-managed forests to provide economic and ecological benefits to human and natural communities. Therefore, education and public outreach are primary goals of the project.

OPDF hosted its first two school groups in early October 2012, after the bridge over Otter Ponds Stream was completed. More than 20 students

from Forest Heights Community School in Chester Basin, and an even larger group of master's degree candidates from the School for Resource and Environmental Studies at Dalhousie University, visited the demonstration forest.

The programmes were well received and largely effective in telling the story of sustainable forest management at OPDF, but President Kate Campbell met with David Taylor of the DNR's natural resources education centre in Middle Musquodoboit to discuss ways to create synergy with existing programmes while improving our own offerings.



Education and Outreach (cont.)

Early in 2013, Kate Campbell purchased dip nets, hand lenses, a safety kit and other equipment to be used during school tours. On April 26, members of the OPDF Education Committee spent a day in the woods with Dave Taylor discussing what the demonstration forest can offer to visitors.



- In May, OPDF and Clean Nova Scotia hosted a visit by science teacher Carl Glawson and 25 students from Duncan MacMillan High School in Sheet Harbour. It was the first of several visits by school groups during 2013. The program included a discussion of forestry, natural history and water quality, and a dip-net survey of aquatic species in Otter Ponds Stream.
- In mid-September 2013, members of the international Community Conservation Research Network visited Otter Ponds. CCRN is a network of academic researchers and community, aboriginal and governmental leaders at 11 study sites around the world. The group included participants from as far away as Thailand, South Africa and Chile.



Education and Outreach (cont.)

Also in 2013, Otter Ponds held a workshop on “Erosion Control with Native Plants,” featuring horticulturalist Jim Turner (left). Jim showed participants how to collect and use native ferns, sedges, shrubs and other plants to stabilize soil at stream sides, along roads and paths, and on slopes. He also discussed ways to propagate them. Participants planted several species around and beneath the bridge over Otter Ponds Stream.

- School visits continued in 2014, with stops by the School for Resource and Environmental Studies at Dalhousie University, the high schools in Chester Basin and Sheet Harbour, and the grammar school in Middle Musquodoboit.
- An “open forest” held in May 2014 drew more than 100 adults to OPDF. The goals and accomplishments of the project were discussed, and separate walking tours that focused on forest management and biodiversity were offered throughout the day.

Directors want to sharply increase the number of students and adults who visit OPDF. In 2014, they asked staff to take on a number of projects toward achieving that goal ...

Schools and curriculum development

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.

- Grade 4- 'Projects for a Visit to OPDF'
- Grade 10- 'Field Trips to OPDF' and 'Additional Resources to Supplement Field Trips'
- Grades 11/12- 'Long-Term Projects at OPDF'

Atlantic Science Teachers Conference

OPDF directors and staff distributed 44 of the new curriculum packets and spoke directly with teachers from throughout the province during the Atlantic Science Teachers conference in late October 2014. The conversations revealed that teachers are enthusiastic about field trips to the demonstration forest. They indicated that bus trip of 90-120 minutes each way were feasible.

Reaching out

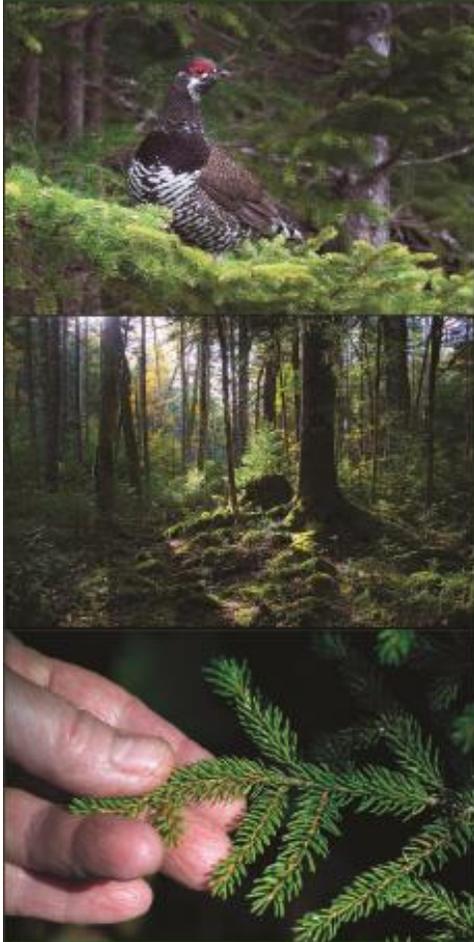
Based on information from the October conference, directors decided to focus on contacting science teachers at elementary and junior high schools within a 1.5-hour drive of OPDF, and at high schools within a 2-hour drive. Staff developed a list that includes:

- 32 schools in the Primary-Grade 8 category; and
- 70 schools in the Grades 9-12 category.



Curriculum packets will be mailed to these teachers in 2015, with follow-up calls to encourage teachers to work a visit to OPDF into their lesson plans. In addition, directors and staff have begun to contact other youth programs, including scouts and cadets; 4-H clubs; and young naturalist groups.

Otter Ponds Demonstration Forest



Demonstrating the science, practice
and philosophy of uneven-aged
management in the Acadian Forest

Marketing and Promotion

OPDF Brochure

In an effort to increase public awareness of the demonstration forest, OPDF created a four-color brochure in 2014 that describes the project and its goals. The brochure has already been distributed at several field days and other meetings of woodlot owners, and it was included in a mailing to 1,600 people who bought forestland in Nova Scotia during 2014.

Facebook and Website

OPDF has also enhanced its presence on the Internet. A Facebook page was launched in August 2013. It can be viewed at www.facebook.com/OtterPondsDemoForest.

In addition, the NSWOOA website includes an Otter Ponds page at www.nswooa.ca/otterponds.



Diversification of Funding Sources

Directors are keenly interested in ways to obtain new funding for the operation of OPDF. In the last few months, staff has:

- Researched grant opportunities for OPDF activities, infrastructure, and programs
- Paid special attention to funding available for expansion of the walking trail network

Questions?



Photos courtesy of Dan Hutt