FORESTRY TRANSITION TEAM

VIRTUAL FORESTRY MISSION

SWEDEN, MAINE, FINLAND

REPORT

DECEMBER 2020

NOVA SCOTIA

NOVA SCOTIA FORESTRY TRANSITION
VIRTUAL FORESTRY MISSION

FORESTRY MISSION EXECUTIVE SUMMARY

The virtual forestry mission to Finland, Sweden and Maine took place during August and September 2020. Representatives from the Nova Scotia forestry sector, government, and research and development institutions participated along with the Minister of Lands and Forestry, in order to:

- Expand Nova Scotia's knowledge of forestry best practices and to explore innovative technology applications.
- Explore opportunities to expand Nova Scotia's forestry product exports in new and established markets.
- Build relationships with research and development institutions and organizations for further collaborative partnerships and innovative approaches to challenges.
- Expand Nova Scotia's knowledge of landowner dynamics, motivations, and silviculture choices.

These countries were chosen based on their success and innovation in forestry. During the mission, the Nova Scotia delegation gained a broader understanding of Finland and Sweden's innovative business solutions, partnership approaches, and forestry practices, as well as Maine's forest management and silviculture practices.

Key observations include:

- Effective engagement of woodlot owners is central in promoting better stewardship and wood supply.
- Economic motivations of landowners impact silvicultural choices.
- How citizens value the forest is a key driver in forestry being accepted as an economic engine.
- Forests are an important contributor to addressing climate change.
- Swedish and Finnish governments promote wood construction and wood bio energy.
- New forest sector products can double the value-added of the forest sector.
- Innovation partnerships are critical for the successful commercialization of research.

The Nova Scotia participants continue to discuss, learn, and share with representatives from Finland, Sweden, and Maine to build stronger partnerships and opportunities for Nova Scotia.

We are grateful to the following individuals for participating in the virtual mission and for sharing their expertise so generously.

SWEDEN

- Magnus Kindbom, Forest Director LRF- private forest owner's association
- Gustav Melin, CEO Swedish Bioenergy Association, Svebio
- Torgny Persson, Director of Research and Innovation, Swedish Forest Industries Federation
- Sverker Danielsson, Director, Mistra Digital Forest
- Anna Wiberg, Program Director, Bio Innovation
- Pratima Rao, Senior Trade Commissioner, Embassy of Canada to Sweden
- Maria Stenberg, Trade Commissioner, Embassy of Canada to Sweden

MAINE

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- Jessica E. Leahy, Ph.D., Professor, Human Dimensions of Natural Resources, School of Forest Resources, University of Maine
- Robert (Bob) Seymour, Professor Emeritus of Silviculture, School of Forest Resources, University of Maine

FINLAND

- Seppo Vihersaari, Trade Commissioner, Embassy of Canada to Finland
- Tuomas Nirkkonen, Manager, International and EU Forest Affairs, Finnish Forest Industries Federation
- Karolina Niemi, Finnish Forest Industries Federation
- Dr. Lauri Sikanen, Principal Scientist, Group Manager, LUKE
- John Kettle, Director for Customer solutions and International Relationships, LUKE
- Tapio Eerikäinen, Senior Specialist, LUKE
- Antti Arasto, Technology Manager, Energy, VTT Technical Research Centre of Finland Ltd.
- Seppo Tossavainen, Senior Advisor, Canada, Business Finland

KEY LEARNINGS

Effective engagement of woodlot owners is central in promoting better stewardship and wood supply.

- There are different motivations for owning land, ranging from lifestyle, to financial, to estate planning (i.e. inheritance). How landowners make decisions is not always predictable or consistent. Ongoing woodlot owner engagement is essential as crown land becomes more restricted.
- It is important to pay attention to and encourage special populations of landowners, including women, visible minorities, small-scale landowners, low-income and beginning or new landowners. For example, limited resource landowners (or those not receiving accurate advice) are cutting too soon due to their financial situation resulting in landowners cutting wood before the tree is fully developed for maximizing production.
- A true triad approach requires a longer-term view. Consideration could be given to providing funding support or loans in these circumstances.
- In the Nordic countries, economic motivations do not always drive participation. Sweden's forest policy is 'freedom with responsibility'. There are relatively few legal requirements placed on landowners, the landowner decides his/her business, but the state expects the forest owner to contribute to sustainable use.
- In Finland, there is close collaboration with forest owners in sustainable forest management. Coniferous wood flow from privately owned forests is essential to successful business. In Finland - 67% of the wood comes from private forests. There is also free access for everyone for recreation.
- Forest co-ops play a large role in the Nordic countries. In Sweden, 50 percent of woodlot owners belong to co-ops versus 10 percent in Nova Scotia.
- In Maine there is a state-wide non-profit run by and for private landowners - Maine Woodland Owners. This is a member-supported organization that advances stewardship of Maine's small woodland resources through the encouragement of good forest management. There are 86,000 woodland owners owning from a few, to a few thousand acres. The organization is focused on helping landowners achieve their objectives. Their work is aided by a national woodlands owner survey which is done every 5-10 years. This provides a long-term view of how objectives shift over time.
- Maine has a network of district service foresters who refer landowners to professionals to help them with harvesting.

- TELE (Tools for Engaging Woodlot Owners Effectively) is a US-based web resource that provides a practical set of tools to help conservation and forestry professionals reach more landowners with effective stewardship messages that align with their needs and values as landowners. TELE is a project of the Sustaining Family Forests Initiative (SFFI) a collaboration of universities, government agencies, industry, conservation organizations, certification systems, with the primary goal of gaining and disseminating knowledge about family forest owners to improve stewardship of private forests. Currently, SFFI is a collaboration between the Yale School of Forestry & Environmental Studies, the U.S. Forest Service, and the Center for Non-Profit Strategies, and it provides a more comprehensive set of services to support good land stewardship.

The economic motivations of landowners impact silvicultural choices.

- Doing ecological forestry properly means that landowners need to see Ecological forestry as an investment. This can make the economics of forestry difficult with degraded stands. Outcomes need to be assessed long term – for multiple silvicultural options, over multiple metrics, and for each forestry ecosystem and based on site productivity. Financial outcomes improve if managed for the long term through the "Ecological Matrix".
- In Finland, this long-term approach has led to increased forest resources every year. It is important to recognize the differenced in the forests among various jurisdictions (Maine and NS are similar).
- Less than 1% of the forest is harvested every year in Sweden in a 100-year long rotation.
- Species and structure of the forests influences options for achieving objectives.

How citizens value the forest is a key driver in forestry being accepted as an economic engine.

- Sweden is a 'forest nation' - 50% of the forest is privately owned. In Sweden, the forest industry and research community agree that forestry and forest industrial research should contribute to:
  1. Increased growth in sustainably managed forests.
  2. Enhanced competitiveness for existing processes and products.
  3. Development of new biobased products.
  4. Increased timber construction.
- Multi-functionality is a key driver in Finnish forestry: biodiversity, diverse use of forests, landscape management, and water protection. Forest destruction has been prohibited by law since 1886.
- More than half of the forest industry personnel in Finland have technical education.
- Sense of pride in the forest encourages participation.
- The Swedish forest sector drives sustainable growth in the global circular bioeconomy. For this growth and development to continue, competitiveness in the forest industry is critical.
- The Government has adopted a national strategy for a circular economy that sets out the direction and ambition for a long-term and sustainable transition of Swedish society. Sweden's goal is to become the world's first fossil-free welfare nation.

Forests are an important contributor to addressing climate change.

- A managed forestry can be carbon neutral, but there are many variables affecting neutrality. For Nova Scotia, there is an understanding that the Ecological Forestry Matrix contributes a net gain over time in carbon sequestration while harvesting forest products for the traditional markets.
- The forest industry is an important contributor to meeting Finland's climate neutrality target by 2035.
- In 2018, 37.7% of Swedish energy use came from bioenergy and it is expected to increase over time. There is no fossil fuel industry in Sweden.
- Sweden introduced a carbon tax in 1991 which has been increased to reach $850 CND/ton. There is a heavy focus on large and small biomass heating as a way to replace all fossils in the heat sector, create jobs and reduce emissions. Successful conversions have taken place in businesses like laundries, breweries, steel production, etc. The biomass is mainly residues – chips, bark, sawdust, low-quality and rotten wood.

Swedish and Finnish governments actively promote wood construction and wood bio energy.

- There are advanced technologies that are commercially viable in Sweden and Finland. There are also several technologies under development that hold potential for the forestry sector.
- Organizations like Luke and VTT in Finland offer good opportunities for R&D collaborations, and potential introductions to commercially viable companies looking to expand into North America. There are both trade agreements and MOUs in place that strengthen the value proposition for these opportunities.
- Innovation requires investment in all areas and stages of commercialization.
- Sweden focuses on:
  - Bio Innovation long term commitment between public and private sectors
  - Focus on Construction Design – Build with wood prefab housing and mass timber
  - Energy and Lignin
  - Commitment to increase Bio Energy use in sustainable ways.
- A strong research agenda is critical. In Sweden, the research agenda is linked to UN Sustainability objectives, including, affordable and clean energy, sustainable cities and communities, climate action and responsible consumption and production.

New forest sector products can double the value-added of the forest sector.

- Global markets for forest industry products are expanding. Growth is increasingly driven by new products. Next generation of forest-based value chain, multi-product bio-refineries will have a central role in increasing value. Global trends affecting forestry:
  - Fast development of digital tools
  - Possibilities of generating high resolution data and data handling
  - Circularity and bioeconomy
  - Sustainable forestry
  - Active debate about forest management
  - Traceability
- Novel cellulose materials can compete against plastics with high performance and functionality in products like films and yarns.
- Digitization boosts biomass supply and reduces environmental impacts.
- In Finland, the fibre for new products is all sourced from sustainably harvested forests.

Innovation partnerships are critical for the successful commercialization of research

- The Nordic countries focus on how to maximize outputs of forests and forestry operations and try to focus on value-add operations and products. There is a culture where business and institutions are partners towards the collective impact and they collaborate to ensure secure access to feedstock.
- Their goal is to create the best possible conditions for added value and competitiveness in the bio-based sector.

FORESTRY SECTOR BACKGROUND – SWEDEN, MAINE, FINLAND

SWEDEN'S FORESTRY INDUSTRY

- Sweden holds less than 1 percent of the world's commercial forest areas, but provides 10 percent of the sawn timber, pulp and paper that is traded on the global market.
- Swedish forests have high rates of productivity and low rates of natural disturbances, thus allowing for large transfers of carbon.
- After decades of political debate about the declining state of Swedish forests, the first *Forestry Act* was passed in 1903, requiring owners to replant after harvesting. The *Forestry Act* has been updated several times since then, and today it balances economic, ecological, and social interests. In 1993, Sweden changed its forest policy to integrate ecological considerations with modern forestry practices.

- Sweden's forest is mostly made up of Boreal Forest which is relatively simple whereas Nova Scotia has primarily a more complex Acadian Forest with potentially higher value fibre.
- Scots pine and Norway spruce are the dominant tree species in Sweden (nearly 80% of the forest composition) while in Nova Scotia Spruces (Red/White/Black), Balsam fir, Eastern Hemlock, pines (White/Red), maples and birches comprise a more complex forest structure.
- Both Sweden and Nova Scotia are approximately 75 percent forested, though Sweden produces nearly 4 times more forest products per hectare of forest than Nova Scotia (3.46m3/ha/yr compared to 0.83m3/ha/yr).
- After World War II, an even-aged stand management system, consisting of final felling followed by planting or natural regeneration, became the most widespread forestry practice.
- The forests growing stock in Sweden has been increased by about 85 percent from the time of the first National Forest Inventory in 1923 due to intensive and ongoing silviculture practices.
- Forest ownership is 56 percent private, 25 percent companies, 19 percent state.
- All landowners, including private, are required to reforest their lands after harvest.
- No silviculture subsidies are available to landowners for any silviculture treatments; landowners are responsible for all costs.
- Forestry certification in Sweden takes place under two systems: the Forest Stewardship Council (FSC) system and the Program for the Endorsement of Forest Certification (PEFC) system. More than 60 percent of forest areas are certified, and some forest lands are certified under both FSC and PEFC.

MAINE'S FORESTRY INDUSTRY

- The economic impact of Maine's forest products industry was $8.5 billion in 2016, 5% of the state's GDP.
- In 2013, Maine introduced the Forest Practices Act, designed to promote sustainable forestry to protect forest management, forest industries and rural communities in Maine. This Act mandates that landowners have regeneration of tree species within 5 years of harvest.
- Both Maine and Nova Scotia are comprised of the New England-Acadian forest. Maine's dominant tree types include maple/beech/birch, spruce/fir, aspen/birch, and white/red/jack pine.
- Maine's forests contain a wide variety of tree species with over 55 species. The dominant tree species in terms of number of trees is the balsam fir, accounting for 36% of the tree stems in the state. The ten most dominant tree species account for 85% of the forest composition.
- 89% of Maine is covered by forests, whereas 75% of Nova Scotia is covered by forests.
- Approximately 50% of Maine's working forests is certified as sustainably managed by independent auditors of the Sustainable Forestry Initiative (SFI), Forest Stewardship Council (FSC), and American Tree Farm System (ATFS).
- Maine ownership of forested land: 90.7% private, 8.1% state and local, 0.3% U.S. Forest Service, and 0.9% other federal agencies.
- Maine has the largest contiguous, privately owned working forest in the U.S. at 16.3 million acres.
- Ninety-five percent of the forest land in Maine is classified as timberland, meaning that it exceeds a minimum level of productivity and is not legislatively reserved from timber harvesting.
- Maine introduced the Tree Growth Tax Law in 1972, a current use property tax program. Purpose is to tax all forest lands according to their productivity, to encourage forest landowners to retain and improve their holdings of forests lands, and to promote better forest management.
- Maine could sustainably produce 13 million tons of wood per year.

FINLAND'S FORESTRY INDUSTRY

- Wood products account for over 20% of Finland's export revenue and 4% of Finland's GDP.
- Finland partakes in a circular economy.
- Wood-based fuels account for 80% of all the renewable energy sources used in the country.
- Finland introduced policy surrounding sustainable forestry harvesting in the 19th century. The predecessor of today's Metsähallitus which is a forest management institution was created in 1859. A Forest Act to protect forests from destruction was passed in 1886. In the 1920s, farmers were able to buy forests, which was the start of family woodlot ownership. In the 1990s sustainable forestry was redefined, with the requirements of sustainability included. A recent reform in the early 2010s increased the competitivity of the forestry sector through regulation revisions.
- Finland is Europe's most heavily forested country, covering 74.2%, or 23 million hectares, of the land area.
- Finland's forest is in the Boreal forest region. The topography of the country includes low hills and numerous lakes, with warm air from the Gulf stream and low wind exposure. Nova Scotia differs as it is almost entirely in the Acadian forest region, has highly exposed, hilly terrain and experiences common high wind events.
- The dominant species in Finland are the Norway spruce, scots pine and silver birch.
- Ownership of forested land is 60% private, 26% state, 9% companies, 5% other entities.
- In 2000 the forests covered 19.63 million hectares of Finland, while in 2018 the forests covered 21.52 million hectares. Over the course of these 18 years, the coverage has increased by 10%.
- Finland has experienced over 40 years of silviculture practices which has contributed to a significant surplus in forest growing stock.
- Compared to Nova Scotia, at the per hectare level, Finland produces nearly 5 times the export revenue, harvests 3 times more timber volume, plants 2.5 times more trees and creates twice as many forestry jobs.
- The trade-off to achieve these impressive numbers has been reduced biodiversity across the landscape. Though large areas are now protected from harvest, they are predominantly located in the northern region of Finland only, while there are significant conservation gaps in the southern part of the country.
- Finland's National Forest Programme 2010 aims are directed towards securing employment based on forestry, assuring the diversity and health of forests, and allowing for recreation and leisure particular to forests.
- Two global certification systems are used in Finland, the Forest Stewardship Council (FSC), and the Program for the Endorsement of Forest Certification (PEFC). 85% of Finnish forests that are for commercial use are PEFC certified.