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NORTHERN HARDWOODS RESEARCH INSTITUTE'S QUARTERLY NEWSLETTER

# THE LEAFLET

HARVEST KNOWLEDGE, PROMOTE GROWTH

## CLIENT-DRIVEN APPLIED RESEARCH

**NHRI's Novel Approach to Applied Research**

*Getting results for clients through effective partnerships!*

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Institut de recherche sur les feuillus nordiques Inc.  
Northern Hardwoods Research Institute Inc.



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## CLIENT DRIVEN RESEARCH

### THE BUSINESS OF APPLIED FORESTRY RESEARCH

*Getting results for clients through effective partnerships!*



The Northern Hardwoods Research Institute's novel approach to research is anchored in its' very foundation. Our organization was created to fulfill an urgent need to conduct applied research related to the management of northern hardwoods and mixed forests of Eastern North America. In 2012, forest industry companies, governments and academia came together to fill that void, and an innovative partnership was born. The NHRI was created with very specific objectives which can be boiled down to working with our academic, government and industry partners to develop, or improve, knowledge, methods and harvesting techniques aimed at increasing volume and value of the northern hardwoods resource. In a nutshell, the NHRI was created to bring immediate, user friendly, and field-tested solutions for foresters, contractors, woodlot owners and forest workers, with boots on the ground and eyes on the canopy. For our team this means that all research and field work must be focused exclusively on that end.

To achieve this, we have had to spend considerable energy and resources to the task of flipping the traditional research center model on its head. Instead of having a highly qualified research team sit in a lab and think of interesting research questions, we work with various stakeholders to identify the real issues happening in the forest and turn them into applied research projects. We essentially took a top-down model and flipped it into a bottom-up approach. The objective being to ensure that our partners and clients have access to applied research results that are useful, practical, and aligned with their needs.

Our boots on the ground approach to research, and our close relationship with the stakeholders, has allowed us to position ourselves not only as knowledge producers, but more importantly as knowledge mobilizers. Knowledge transfer and practical in the field training are an important component of our work at NHRI. Our research is not meant to be published and stacked on a shelf. Our team devotes considerable resources to ensure that our work is useful and used by the people who need it. Knowledge mobilization is at the forefront of our mission.



## MISSION

Our mission is to produce and mobilize the knowledge and tools required by forest stakeholders to manage northern hardwoods and mixed forests optimally; in terms of resource growth, harvest volumes, timber value and long-term sustainability.

## CLIENT DRIVEN RESEARCH

### THE BUSINESS OF APPLIED FORESTRY RESEARCH

*Getting results for clients through effective partnerships!*



The work environment at the NHRI is fast paced, client focused and result driven. Over the years we have implemented a Lean/Six-Sigma type management system where key processes are standardized to improve efficiency. This approach to our work has allowed us to continuously improve, but more importantly, it has pushed us towards a tighter alignment with our clients, and by the same token, enabled our team to better meet the needs of industry.

Our team's efforts have proven effective, and the NHRI is in a better position today than ever before. Since our humble beginnings we have had the privilege of working collaboratively with over 60 businesses, research institutions, and government agencies, not the mention the hundreds of amazing like-minded people we have met along the journey. Based on these experiences our team has gained precious know-how when it comes to delivering results to clients through effective partnership management.

We are particularly proud of the beachhead we have established in the emerging field of forest operations optimization through digitalization and connectivity. Our dedicated team has managed to gain the trust, and establish productive working relationships, with several key businesses operating in the field of ICT forestry technology and services.

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**Forus  
Research**



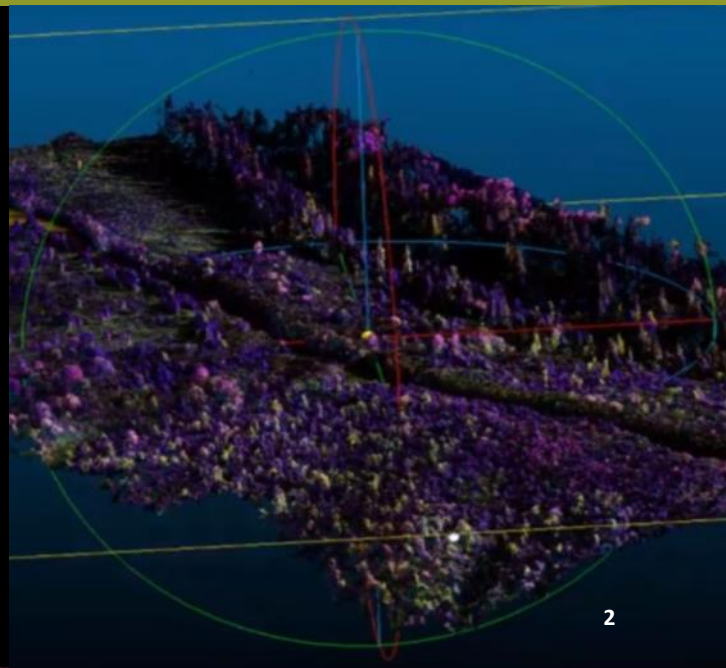
## CLICK COMPANY LOGOS !

LEARN ABOUT OUR WORK WITH ICT SME's  
A FEW EXAMPLES.



## CLIENT DRIVEN.

We take great pains to ensure that our clients' needs are understood and elevated to priority number one. All activities within our walls start and end with fulfilling the needs of our clients. Our research is client centric and aims to find solutions for various forest management stakeholders.





# CLIENT DRIVEN RESEARCH

## THE BUSINESS OF APPLIED FORESTRY RESEARCH

*Getting results for clients through effective partnerships!*



Working with businesses that are at the cutting edge of these emerging technologies has also pushed us to develop some impressive research partnerships, which has allowed us to be involved in projects we otherwise could not have delivered alone. Some of these key research partners include:

**Eric R. Labelle**, Université Laval

**Nicholas Coops**, University of British Columbia

**Richard Fournier**, Université de Sherbrooke

**Michel Soucy**, Université de Moncton

**Thom Erdle**, University of New Brunswick

**John Kershaw**, University of New Brunswick

**Van Lantz**, University of New Brunswick

**Tom Beckley**, University of New Brunswick

**Charles Bourque**, University of New Brunswick

**Jasen Golding**, University of New Brunswick

**Paul Arp**, University of New Brunswick

**Marie-Andrée Giroux**, Université de Moncton

**Jeffrey Dubis**, University of Maine, Fort Kent

**Nicole Rogers**, University of Maine, Fort Kent

**Aaron Weiskittel**, University of Maine, Orono

**Mathieu Varin**, CERFO

**Chris Hennigar**, DNRED, Government of New Brunswick

**Jean-Martin Lussier**, Canadian Wood Fibre Centre

**Atlantic Forest Research Collaborative**, University of New Brunswick

**Integrated Remote Sensing Studio (IRSS)**, University of British Columbia

**WATCH VIDEO!**  
NHRI & IRSS COLLABORATION



Our current involvement in several very important applied research initiatives, at the provincial, regional, and federal levels is a testament to our continued efforts. The Northern Hardwoods Research Institute is now a recognized innovation hub and agent of change in the way northern hardwoods and mixed forest management are conducted. Our aim is to leverage our position to encourage more partners from industry (forestry and ICT), academia and government to come together to find tangible solutions to today's most pressing forest management issues.

Amongst the chaos, confusion and exhilaration that is associated with the trials and tribulations of establishing NHRI's place in the forestry innovation ecosystem, we remain focused on, and driven by, the needs of our clients and the realities of people in the field. When the dust settles, we regroup, focus and remember why, and for who, we are doing all this. Our northern hardwood forests are essential to our economy, our ecosystems, and our people. Those tasked with the very important responsibility of managing these forests need the right tools for the job, and we are wholly dedicated to helping them vet, test and implement these tools. For our team, that is what it means to be in the business of applied forest research!

## NHRI PRODUCTS AND SERVICES

*What does NHRI have to offer to businesses, governments, research institutions and NGO's?*

NHRI's research and innovation capacity, which includes our in-house research team, research partners, and private sector players, combined with the boots on the ground expertise of our Precision Silviculture Team (PST) allows NHRI to offer a variety of forest management and applied research services. We are equipped with a flexible and practical applied forestry capacity that delivers effective and timely solutions for our clients. Our team also has the required experience to manage result-driven partner relationships so that our clients can benefit from a network of forestry experts and practitioners. We also have extensive knowledge of the various innovation funding programs, and an excellent track record, when it comes to leveraging these financial incentives to offer cost effective solutions to our clients and partners.

### INDUSTRIAL FOREST MANAGERS

*Forest companies and governments*

Large industrial forest managers and government departments always have research and development needs, but seldom have the necessary time or resources to manage such projects on a daily basis. Our team can be part of the solution by doing the research work so they can strictly focus on using the results effectively. Whether it be sifting through mountains of data, running pilot field tests to validate operational hypothesis, or managing a project for start to finish, we have the required expertise and experience to deliver the results you need. NHRI offers a variety of services to large forest managers:

- Management of research and development Initiatives.
- Technical service contracts.
- Pilot projects and field trials
- Data capture, management, and analysis.
- Training and knowledge mobilization activities.



### INDUSTRIAL CLIENTS

**Our team has worked with...**



## FIND OUT MORE...

*Read about one of our projects with an industrial client!*



## NHRI PRODUCTS AND SERVICES

*What NHRI offers to businesses.*



### FORESTRY SME's

*Woodlot owners, contractors, equipment suppliers and forestry consultants*

Forestry SME's are focused on sales, operations, logistics, and timeliness. That is how it should be if you are to run a successful forestry business! However, the daily grind can sometimes make it difficult to manage initiatives aimed at continuous improvement; like, testing and vetting new processes, implementing new management systems, and leveraging the benefits of emerging technologies. Our research staff, coupled with the field capacity of NHRI Precision Silviculture Team, has what it takes to support you in those initiatives. By working with your team, and leveraging the know-how of our network of partners, we can help your business improve without bogging you down in the nitty gritty of managing those initiatives. You can focus on the present task of running your business while we help you set up for a more efficient and cost-effective future. NHRI offers a variety of services to forestry SME's:

- Forest management services.
- Technology transfer.
- Forestry operations training.
- Applied forestry R&D management and/or support.

**READ MORE!**

OUR WORK WITH FORESTRY SME's  
ONE EXAMPLE.



### INFORMATION AND COMMUNICATIONS TECHNOLOGY (ICT) SME's

*Technology designers, equipment providers and software developers*

ICT has revolutionized many economic pillars and our team believes the forestry sector is poised to benefit greatly from some of these game-changing technologies. A logistics revolution is about to unfold in the North American forest sector and NHRI is smack in the middle of it. We are currently working on several very promising ICT related projects aimed at optimizing forest operations through digitalization and connectivity. Our team is involved from precision forest inventories using remote sensing and UVA's, to improving the bucking process, and analyzing on-board harvester computer data, all the way to logistics and leveraging AI in forestry operations. Whether you are an established company already operating in forestry, a company looking to push an existing technology within the sector or a start-up in the embryonic stages, our team can become your forest operations experts. More importantly the NHRI is often a gateway to the forestry sector, a great place to get your products in the hands of clients so you can reap the benefits of our AGILE approach to applied forestry research. NHRI offers a variety of services to ICT SME's:

- Forestry expertise.
- Field testing for pre-commercial product validation.
- Expertise in product improvement and customization.
- Development and delivery of training for new products.



**READ MORE!**

OUR WORK WITH ICT SME's  
ONE EXAMPLE.



## NHRI PRODUCTS AND SERVICES

*What NHRI offers to research institutions.*



*“If you are involved in fundamental research, and looking to gain access to industry players and data, or a solid partner to complete specific field work or expert analysis, our team has the know-how required to help you within your broader research initiative.”*

### RESEARCH INSTITUTIONS

*Universities and research centers*

For universities and research centers embarked in projects aimed at advancing fundamental knowledge, it can sometimes prove difficult to convince companies and practitioners to invest resources now for benefits that will only be felt in 3-5 years. This can also make it a challenge to access the necessary field data, and input, to test a research hypothesis. Our team has access to, and experience working with, a variety of forest managers, small, medium, and large. We also have experience in negotiating access to very large data sets, and the required processes to reassure data providers that their data will remain protected and well managed. Our team is also used to working on a specific deliverable within larger research initiatives. If you are involved in fundamental research, and looking to gain access to industry players and data, or a solid partner to complete specific field work or expert analysis, our team has the know-how required to help you within your broader research initiative. NHRI offers a variety of services to research institutions:

- Expertise in applied research related to the management of northern hardwood and mixed stands.
- Access to forests, forest data and forestry end-users.
- Service provider within larger research initiatives.
- Support in organizing knowledge mobilization events.





## NHRI PRODUCTS AND SERVICES

*What NHRI offers to NGO's.*



Atlantic Forest  
Research  
Collaborative

### NON-GOVERNMENTAL ORGANIZATIONS

*Industry and special interest NGO's*

Through the years our team has had the privilege of working, and building relationships, with some very well established non-governmental organizations. We are often called upon to deliver workshops, conferences and training. We also work closely with some of these partners to leverage our communications channels for promotional and knowledge transfer purposes. Our expertise in northern hardwoods silviculture is also called upon as a sounding board, or to validate information. If you are looking for a partner to help organize an event, build up your training capacity, get sound advice on forest management, or simply to help spread the word, the NHRI team is here to help.

- Training and knowledge mobilization services.
- Organization of forestry workshops and presentations.
- Expertise in applied research and northern hardwoods.
- Access to our communications channels.



## ERIC R. LABELLE: PEOPLE IN THE SPOTLIGHT

### Optimizing forest operations through digital connectivity!

Eric Labelle's ties with NHRI go all the way back to our inception in 2012. In fact, he was the very first person hired to be part of our team. His time spent at NHRI would bring with it the establishment of one of our organization's most important research partnerships. From these well established roots many promising, and forward looking projects, have spurred, developed, and are now bearing fruit.

For this edition of People in the Spotlight we interviewed Eric Labelle to learn more about his groundbreaking work and his flourishing research partnership with NHRI.

#### ***How did your research partnership with NHRI come about?***

I have somewhat unique ties with the NHRI seeing that I was hired as the lead researcher in forest operations (2012-2014). During my tenure at the NHRI, we directed our focus on operationalizing multi-treatment approaches in mixed wood and deciduous-dominated stands and assessing the influence of tree form on harvesting productivity and product yield. Both main projects lead to technical notes, scientific articles, and field knowledge transfer activities.

During my time at the Technical University of Munich, I also coordinated an internship for Mr. Jakob Unger (German bachelor student) at the NHRI. His experience was exceptional and rewarding.

#### ***Give us a brief overview of your current research collaborations with the NHRI team.***

I currently have three projects in close collaboration with the NHRI. Two of these projects will lead to senior research reports and the other one will lead to the publication of a PhD thesis.

The first research project led by Joseph Moffet (Université Laval) is entitled: *Reconstructing hardwood stems from harvester on-board computer data: solutions and challenges*. This project aims at identifying problems and potential solutions when trying to reconstruct the product basket of hardwood trees while using harvester data. Findings from this senior report will be important building blocks for the doctoral project of Caroline Bennemann (see below).

***"All of our initiatives with the NHRI have the same overarching goal: how do we improve efficiency in mechanized forest operations through better and continuous use of digital information."***

**LEARN MORE !**   
**Eric R. Labelle's research.**





**ERIC R. LABELLE: PEOPLE IN THE SPOTLIGHT****Optimizing forest operations through digital connectivity!**

The second research project, *Using unmanned aerial vehicles to monitor the success of silvicultural treatments performed in partial cuts* is led by Louis-Philippe Fortin (Université Laval). Louis-Philippe is working with digital imagery to try to evaluate the success of silvicultural treatments. In a nutshell, he is reconstructing the impacts of silvicultural treatments on the release of residual trees, creation of regeneration microsites, and trail pattern, through the use of high-resolution aerial imagery.

**Caroline Bennemann**, PhD student at Université Laval and NHRI intern, is also working on a thesis entitled: *Creation of value through the improvement of bucking techniques for cut-to-length mechanized forest operations performed in deciduous-dominated stands*. This project is financed by a **Mitacs Accelerate** PhD Scholarship with the NHRI as an active research and financial project partner. Caroline's PhD is co-supervised by Dr. Jean-Martin Lussier from the **Canadian Wood Fibre Center**. The objectives of the 4-year project are to:

- Characterize hardwood trees and current mechanized harvesting systems in the Acadian Forest Region of New Brunswick:
  - ⇒ Tree architecture (distribution of species, DBH, Form and Risk categories);
  - ⇒ Evaluate the current state of mechanized processing of hardwood trees in New Brunswick (systems description, productivity, limitations, and opportunities for improvements).
- Redesign bucking algorithms tailored for hardwood commercial trees to improve: i-value, ii-supply and iii-productivity:
  - ⇒ Establish field trials to quantify the technical performance of optimized bucking and make comparisons to current working conditions (manual bucking);
  - ⇒ Create a new bucking process for hardwoods (that is different than the current taper-based process borrowed from the softwood approach).
- Perform a field validation of redesigned bucking process and recommendations:
  - ⇒ Assess the performance of the newly created bucking process during live forest operations;
  - ⇒ Provide recommendations for improving current practices and processes.

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# THE LEAFLET

**PAST ISSUES****HARVEST KNOWLEDGE, PROMOTE GROWTH**

## ERIC R. LABELLE: PEOPLE IN THE SPOTLIGHT

### Optimizing forest operations through digital connectivity!

***Why are your research collaborations with NHRI relevant and important for the forest sector?***

All of our initiatives with the NHRI have the same overarching goal: how do we improve efficiency in mechanized forest operations through better and continuous use of digital information. Projects are applied science that tailor operational solutions to the forestry sector. The decisions we make during the processing of hardwood trees can have significant economic impacts and if not done correctly can be very difficult to compensate for at subsequent steps. Profit margins can be quickly made or lost. Obtaining information from harvester on-board computers, enhanced forest inventories, active sensors, etc. should allow for better on-the-fly decision making, ultimately leading to increased revenues.

***How do you foresee the future of your research collaborations with the NHRI?***

The provincial border (whether between QC and NB or another province/jurisdiction) has little to no importance for me. It is true that regional context is often needed to fully understand a problem, but forest science has no boundaries. For the most part, we are experiencing similar operational challenges. That being said, the possibilities for collaborations between my team and the NHRI are only limited by our imaginations. Knowing the Director of the NHRI, this could render the possibilities almost limitless...

In a world of forestry 4.0, we are commonly faced with connectivity issues. We are striving to improve the connection between machines, systems, machines/humans, etc. but until we can make sense of all the data being collected, we will remain idle in our progress. Within the next 12 months, I would like to join forces with the NHRI to apply for another **Mitacs Accelerate** project or similarly funded program. The goal would be to use AI such as deep learning to collect and learn from all the big data streams coming from EFI, digital harvesting operations, off-road timber transportation and trucking to mill gate. For large enterprises, a systems approach could allow for a comprehensive and holistic understanding of how resources/systems can be optimized within the entire supply chain, while offering the benefits of flexibility.

## CREDENTIALS

### Who is Eric R. Labelle?

#### CURRENT OCCUPATION

**Associate Professor**, Digital forest operations, Université Laval (2019-present).

#### EDUCATION

**Forest technician diploma**  
La Cité Collégiale (Ontario)

**Certified Scaler**  
Ontario Ministry of Natural Resources

**BScF** Université de Moncton

**MScFE** University of New Brunswick  
*Assessing soil disturbances caused by forest machinery.*

**PhD in forestry**,  
University of New Brunswick  
*Evaluating load distribution exerted by forest machines and establishing best management practices for off-road timber transportation.*

#### EXPERTISE

- Increasing productivity of mechanized harvesting systems through enhanced use of on-board computer data.
- Developments in machine and soil interactions within a forestry context.
- Physical protection of forest soils during high-impact forest operations.



**LEARN MORE !**  
Eric R. Labelle's research 



## PROMISING PARTNERSHIP

### RMUS: CANADIAN LEADER IN REMOTELY PILOTED ARIAL SYSTEMS

NHRI is pleased to announce a technology partnership with **Rocky Mountain Unmanned Systems (RMUS) Canada** to promote and grow Remotely Piloted Aircraft Systems (RPAS) and Aerial LiDAR use in Canadian and Global forestry applications. The partnership will allow NHRI to test world class RPAS in a forest operations context, and analyze the data collected, with the underlining objective of showcasing the benefits of these technologies to our clients and research partners. These research and knowledge mobilization activities will ensure our team remains at the cutting edge when it comes to the commercial applications of RPAS. NHRI's work will benefit RMUS by offering their team the opportunity to test and showcase the uses and benefits of their products and services within the forest industry.

RMUS Canada is the Canadian leader in RPAS and Aerial lidar technology. Founded in 2016, RMUS was one of the first commercial RPAS technology providers in North America, partnering with industry leaders like DJI, Emesent, GreenValley, Wingtra, Parrot, Pix4D and Autel. The company supports applied research at leading institutions like DND Canada, DRDC, University of Toronto, University of Ottawa, Waterloo University, Ontario Ministry of the Environment, and Natural Resources Canada.

"As providers of new technologies, we are very excited about partnering with an organization like NHRI that embraces innovation in a field that effects all Canadians. Deploying the first SLAM LiDAR solution for mid canopy mapping in Canada will be an exciting milestone for Canadian forestry and is a great example of NHRI's leadership." **Kevin Toderel**, General Manager, RMUS Canada.

During the partnership RMUS will provide Emesent Hovermap and GreenValley test unit, appropriate aircraft for deployment, and a licensed pilot to NHRI for testing and process development. Wingtra One Aircraft will also be made available. The company will also arrange for full technical support and data review between NHRI technical partners and the engineering teams of their technology suppliers.

**"Deploying the first SLAM LiDAR solution for mid canopy mapping in Canada will be an exciting milestone for Canadian forestry and is a great example of NHRI's leadership."**

**Kevin Toderel**  
General Manager, RMUS Canada



## PROMISING PARTNERSHIP

### RMUS: CANADIAN LEADER IN REMOTELY PILOTED ARIAL SYSTEMS

The NHRI team will work closely with the RMUS team to document and publish testing results and datasets. Both teams will work closely to ensure proper feedback, based on testing results, is provided to aircraft and sensor manufacturers with the objective of improving product performance in the context of forest operations deployment.

The field work, data capture and analysis and operational feedback will be accomplished by our precision forestry team, and led by **Pamela Hurley Poitras** (*Silviculture specialist and drone pilot*). **Bastien Vandendaele** (*Post graduate student*) will also be conducting research related to pushing the limits of these new technologies in terms of their potential for forest operations.

Finally, both teams will work together to showcase the technology and transfer the acquired knowledge to RPAS users in the form of articles, white papers, and training videos.

“Our team’s partnership with RMUS is very promising and will bring about considerable opportunities for our forest industry clients and research partners. Working with an industry leader like RMUS will ensure that our team remains at the cutting edge of technology. More importantly, the partnership will allow NHRI to test and showcase RPAS technologies, and processes, so that our forest industry partners can benefit from its immense potential in terms of optimizing forest operations.” **Gaetan Pelletier**, *Executive Director, NHRI*.

This partnership should produce very useful and field-tested results for both partners. More importantly, the partnership will help showcase the potential benefits for companies and research institutions interested in using RPAS to optimize forest operations. Stay tuned to see the results!



**Learn more about the RMUS team !** 



**Read past issues !**

**THE LEAFLET**



## JP HOLDCO INC.: WORKING WITH LARGE WOODLOT OWNERS

### MOBILIZING NHRI'S TOOLS TO IMPROVE FOREST OPERATIONS

JP Holdco Inc. owns and manages over 3000 hectares of forest in the Upper-Madawaska region of northwestern New Brunswick. The team manages their woodlots and operates their own harvest equipment and crews. They also own and manage a very considerable maple syrup production operation. Basically, a great example of managing mixed forests stands of the Acadian Forest.

The owner of the company, Jean-Paul Ouellet, is a very well-known businessman and philanthropist in the region. Mr. Ouellet built one of Canada's largest poultry business from the ground up. He has a reputation for being very entrepreneurial, having an impressive business mind and great flare for making solid deals. Considering his extensive business background, he has always been very aware of the fact that to successfully manage such a large track of land, his forest operations needed to be financially viable. More importantly, Mr. Ouellet wanted to ensure that his land will gain value, both financially and from a sustainability standpoint. He made it very clear to us that his main objective was to leave behind a more productive and sustainable forest.

His management team was doing a great job of attaining these objectives based on their extensive experience in forest operations and solid boots on the ground knowledge of what it takes to regenerate a quality stand. However, being focused on continuous improvement, and realizing that they were in a very competitive market, they wanted to bring their forest management capacities to the next level. This meant establishing forest management systems and integrating cutting-edge tools. This would allow them to manage their land as a whole and to make clearer yearly harvest decisions, based on factors like species composition, stand vigour, tree quality, regeneration potential, etc.

We met with the JP Holdco Inc. team back in 2019 to discuss avenues for working together. Always living by our motto to "under promise and over deliver", we decided to start a small project to showcase our precision forestry tools. We would complete a precision inventory for one of their woodlots and based on the results make silvicultural recommendations using the [NHRI's Silviculture Prescription System](#). This approach is what we call the NHRI Precision Block Planning System.



Jean-Paul Ouellet, owner of JP Holdco Inc.

**"Mr. Ouellet wanted to ensure that his land would gain value, both financially and from a sustainability standpoint. He made it very clear to us that his main objective was to leave behind a more productive and sustainable forest."**



## JP HOLDCO INC.: WORKING WITH LARGE WOODLOT OWNERS

### MOBILIZING NHRI'S TOOLS TO IMPROVE FOREST OPERATIONS

The NHRI Precision Block Planning System can be divided into three distinct stages. The first step is to observe, analyze and stratify the area under study by using remote sensing and precision forestry technology.

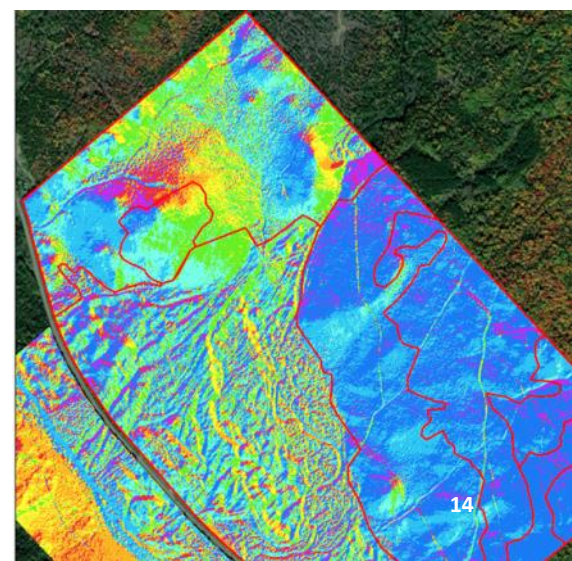
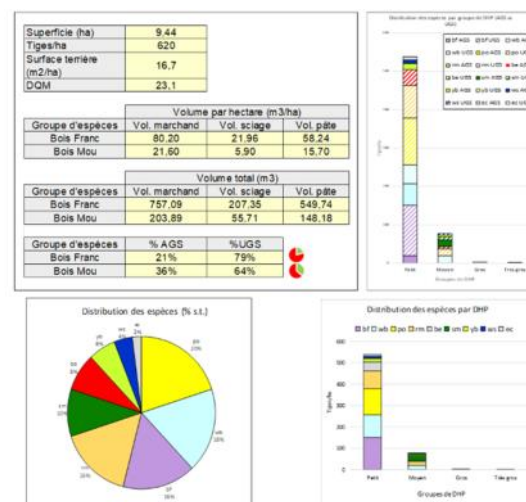
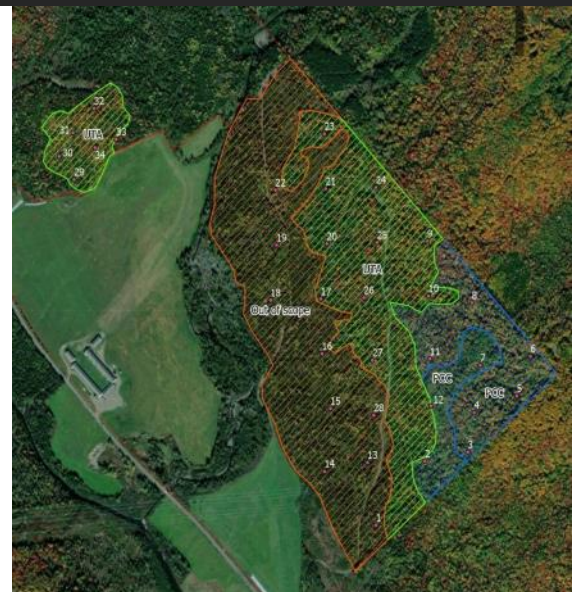
Remote sensing with the help of GIS software is also used to describe topography, hydrology, soils, and other ecological criteria. This work also makes it possible to design the maps necessary for the next step, namely, the field inventory. Once the stratification is done, the sampling plan is developed.

The field inventory allows the team to collect precise data, essential for the silviculture diagnosis. The NHRI field inventory method is done by establishing a variable radius plot where data for the diameter at breast height (DBH) and tree quality (risk and form) are collected. In addition, the total height as well as the height of the crown base is taken from one tree in five.

The **NHRI Silviculture Prescription System (NHRI SPS)** is then used to allocate a prescription to each plot. The silvicultural diagnosis, the preparation of the prescription and the projection of the harvest volumes, together, consist of the last step. This work is then compiled into a report containing all the maps, data, and potential harvest volumes per species.

After seeing the results, the JP Holdco Inc. team saw value in our work for the company so it was decided that we would embark on a much larger project that would ultimately see them build the in-house capacity needed to use these systems, technologies, and tools to manage their forests. The objective was now to bring support to them in building management systems and integrating the required tools. To finance a part of NHRI's work the company applied for funding through **NBIF's Innovation Voucher Fund**. NBIF recognized the project's potential for innovation and awarded funding to cover part of the applied research work done by our team.

Even though ICT companies, like **Remsoft Inc.**, are actively working to adapt their tools to smaller operations, as it stands today, there are very limited off the shelves options for forest owners like JP Holdco Inc. Existing forest management systems are geared more towards very large industrial landowners with teams of foresters and forest management services provider.



**READ MORE!**

**NHRI'S WORK WITH**

**REMSOFT®**

*Tailoring forest management solutions for forestry SME's!*



## JP HOLDCO INC.: WORKING WITH LARGE WOODLOT OWNERS

### MOBILIZING NHRI'S TOOLS TO IMPROVE FOREST OPERATIONS



The goal of this on-going project is to support JP Holdco in integrating these tools and to build a simple forest management system that is tailored to their needs in terms of their silvicultural objectives. What our team aims to do, in collaboration with the company, can be broken down into 6 objectives:

- Introduce the firm to state-of-the-art forest inventory tools and processes.
- Produce a digital precision forest inventory of the woodlots that include key information to make sound business decisions.
- Create a custom GIS-based database to incorporate in the company's management system.
- Develop a long-term management plan for the land.
- Implement an adaptive management process to increase productivity, reduce costs and improve profitability.
- Transfer the capacity to the business by ensuring they have training related to operating the developed tools and maintaining the established processes.

NHRI is also working with the JP Holdco Inc. team to run testing pilots for technologies that are on the verge of being commercialized. Most notably, we are currently running a pilot testing SceneSharp's **fuze go® AI** technology in a forest management setting. SceneSharp's flagship technology, improves the quality of any image from any source whether it be from satellite, drone, or security camera by revealing the data behind the picture. The AI model is applied to the image, enhancing the data, and bringing it to life. This means better data is available through machine learning to support effective planning, management and decision making. NHRI is working with **SceneSharp Technologies**, a New-Brunswick based company, to enhance their species determination capabilities, build a forest stand vigour assessment tool and explore other technology solutions for forest managers. Leveraging remote sensing and machine learning, the research collaborative will yield predictions at the 10-metre resolution level.

It is obvious that the project we are working on with JP Holdco is a win-win for everyone involved. The company gains precious tools and expertise that will ensure they are better equipped to manage their land profitably and sustainably. Our team and research partners gain a very attractive testing ground, and more importantly, the opportunity to better understand the needs of SME's operating in the forestry sector so we can develop useful, and tailored, tools that will help them implement effective forest management solutions. We appreciate the trust the company has placed in our team and we are working hard to make sure we meet their needs. Stay tuned to follow the evolution of the project.





## GETTING THE WORD OUT!

### NHRI'S GROWING COLLABORATION WITH ATLANTIC FORESTRY REVIEW



Over the last two years the NHRI team has been working collaboratively with [Atlantic Forestry Review](#) to get the word out about managing northern hardwoods in a manner that delivers good financial returns for landowners and forest managers and long-term sustainability for the forest. This important collaboration has been very strategic for us and allows the magazine to share important information to their readers—based on the results of our various applied research initiatives. Below you will find links to the articles NHRI has produced collaboratively with AFR over the last two years. We encourage you to give them a read and give us some feedback.

**RECRUITMENT DRIVE:** Hardwood management must reverse encroachment by low-value species.

Atlantic Forestry Review, January 2019, p.17.

**GAELIC POETRY FOR DEAF SEAGULLS?** A case study in making sure applied research is useful, and actually used!

Atlantic Forestry Review, September 2019.

**THE TIME FOR ADAPTIVE MANAGEMENT HAS COME:** What can we do now to ensure our forests thrive in a changing climate?


Atlantic Forestry Review, November 2019.

**SEVEN SILVICULTURE PRINCIPLES:** Fundamental concepts to guide treatments in mixed and hardwood forests.

Atlantic Forestry Review, May 2020.

**COMMITMENT ISSUES:** Do your homework before hiring a harvest contractor.

Atlantic Forestry Review, January 2021.

[Click on titles to read the full articles](#) 

The future of our collaborative work with Atlantic Forestry Review is bright. Over the course of the next year we will be working on a series of articles dealing with game changing technology that is on the verge of having field applications. The publications will bring light to the very promising applied research that is currently happening in the field of forest operations optimization through digital connectivity. Forestry is poised to benefit from the many advancements brought forward by the ICT sector (Information Communication Technology). Stay tuned to find out how harvester on-board computer data, UAV's, LiDAR, satellite imaging, logistics software and AI—to name a few—are all about to come together to revolutionize the way forest operations are conducted today.

Having publications like [Atlantic Forestry Review](#) within the forestry community is imperative to the future development of the sector. Their work serves as a platform through which ideas, best practices and success stories can be shared and appreciated within our community. The value of their work cannot be overstated. If you operate in the forestry sector and you do not have a subscription to Atlantic Forestry Review, we urge you to do so; for your own benefit and the benefit of the Atlantic forestry community.



**SUBSCRIBE NOW!**





## MUST WATCH!

### SUSTAINING OUR HARDWOODS *Produced by NHRI*



Produced and directed by Gaetan Pelletier (Executive Director of NHRI), and featuring our team of experienced foresters and scientists, “Sustaining our Hardwoods” delves into the important subject of sustainably managing the northern hardwoods of the Acadian Forest region.

In eastern North America, the Acadian Forest region is prominent and encompasses the Canadian Maritime provinces, areas of southern Quebec, as well as the northern New England states. This forest region is closely related to the Great Lakes - St. Lawrence forest to the west and the Boreal Forest to the north. The hardwood-dominated portion of the Acadian forest is of particular importance. Besides providing critical ecosystem services such as fixing carbon from the atmosphere and regulating water, it is also a great provider of traditional and non-traditional forest products.

Much of these hardwood-dominated stands are considered part of the working forests. Whether on public or private lands, they are the subject of silvicultural treatments and harvesting to extract goods and products for human consumption. To produce timber, hardwood stands must be composed of the right species, possess the right quality attributes as well as being healthy and vigorous.

When conducted properly, the practice of silviculture is highly sustainable and in addition, even promotes extra benefits such as the sequestration of carbon from the atmosphere. The creation of new cohorts of trees of desired species and quality is essential to ensuring that the cycle is maintained. However, to do so, silviculturists need a solid framework imbedded in the concepts of adaptive management. This is especially true in the context of a changing climate. Retrospective examination of treated stands reveals that unless explicit measures are taken to create the right conditions to regenerate the next cohort of trees, the likelihood of sustaining quality hardwood stands in the future is low. “Sustaining our Hardwoods” explores the required conditions, and more importantly, the silvicultural work that needs to be implemented today so that our northern hardwood forest keeps providing for future generations.



## Sustaining our Hardwoods

*Video documentary* produced by NHRI





**MUST WATCH!****OUR FOREST AT RISK: UN PAYSAGE EN TRANSITION** *Produced by NHRI*

The 25-minute video documentary delves into the subject of climate change, its potential effects on our forests, and what can, and should be done to adapt. The documentary is based on interviews with many well-respected forestry researchers and professionals. Through their interviews an interesting storyline emerges. The story is based on finding solutions in terms of climate change adaptation and mitigation. More importantly, the storyline highlights the fact that forest management can be one of the most promising and cost-effective solutions available today. The main message of the documentary is that forest and forest management are undoubtedly crucial elements and potential solutions to mitigating the environmental and socio-economic effects of climate change. If you haven't seen it yet click below and watch it for free on YouTube.

**WATCH DOCUMENTARY!**  
*Produced by NHRI*





# JOIN OUR TEAM!

## NHRI IS LOOKING FOR INNOVATIVE PEOPLE...



The NHRI is launching a multi-year research and development initiative under the theme of “the digital transformation in the upstream portion of the forest products value chain”. The research will focus on leveraging harvester on-board computer data, remote sensing technology such as super-high point clouds and satellite and UAV data and, artificial intelligence (AI, machine learning) and other technologies to create solutions for our partners in the forest sector of eastern North America. We are looking to fill several positions for a minimum of 30 months in a very dynamic environment networking with private sector, the government of New Brunswick, the Canadian Wood Fibre Centre, Université Laval, Université de Sherbrooke, University of New Brunswick, Université de Moncton and several other organizations and private sector firms.

Please review the position postings below or forward them to people in your network who you think would be interested in joining our team. Do not hesitate to contact us should you have any questions.

Gaetan Pelletier, Executive Director : [gaetan.pelletier@hardwoodsnb.ca](mailto:gaetan.pelletier@hardwoodsnb.ca)



# JOIN OUR TEAM!

## NHRI IS LOOKING FOR INNOVATIVE PEOPLE...



# RECRUITING NOW!

## *GIS specialist or geomatics technician*



The Northern Hardwoods Research Institute Inc. is looking for a candidate to join our team as a GIS specialist or geomatics technician who enjoys working in a variety of projects and who is passionate about the field of geomatics. Reporting to NHRI's Management forester and working in close collaboration with the members of our team, this person will take care, among other things, of the creation of GIS databases, the development of analysis and decision support tools and the realization of spatial and statistical analyzes. It should be noted that the responsibilities will be adapted to the interests and capacities of the person hired and that NHRI attaches great importance to the development of its resources.

### REQUIRED QUALIFICATIONS AND SKILLS

- College or bachelor's degree in geomatics, cartography, surveying, geodesy or any other training deemed equivalent.
- Expertise in ArcGIS (ESRI).
- Knowledge of ArcGIS Pro (ESRI).
- Knowledge and / or experience in web mapping and other geomatics technologies is an asset.
- Great autonomy, initiative and concern to deliver validated and quality products.
- English / French bilingualism an asset.
- Rigour in the collection and processing of data.
- Capacity for organization and monitoring of projects.
- Knowledge of imaging, photogrammetry, remote sensing techniques is an asset.
- Knowledge of the principles of structuring geographic databases.



**JOIN OUR TEAM!**  
**NHRI IS LOOKING FOR INNOVATIVE PEOPLE...**



 **RECRUITING NOW!**

## ***Multimedia Content Creator***

We are seeking candidates to join our team as a Multimedia Content Creator. Reporting to the Manager of Knowledge Mobilization and Development, and working closely with our team members, partners and clients, this person will be responsible for transforming the NHRI's accumulated body of knowledge, and on-going work, into consumer-friendly multi-media content. The content created will be delivered in multiple formats and media platforms to a variety of users – in the form of internal communications, training, public relations, and advertising content.

### **REQUIRED QUALIFICATIONS AND SKILLS**

- College or university degree in communications, multimedia, graphic design, or equivalent work experience and/or skills.
- 2-3 years experience in multimedia content creation would be an asset. However, we are willing to work with candidates that have less experience; given that they are fast-learners, resourceful and willing to put in extra hours to learn quickly. Students that are on the verge of completing their training will also be considered.
- Bilingualism – French and English – would be an asset.
- Professional writing and communication skills.
- Good photography/video capture and editing skills.
- Skilled in the creation of professional quality digital and print content.
- Ability to manage and update website content.
- Strong skills in the digital space – across current and emerging digital platforms.
- Good understanding of the multimedia landscape – emerging platforms, tools, trends, etc.



## UPCOMING EVENTS



The Canadian Woodlands Forum **2021 Spring Meeting** will be a virtual event held on April 20th and 22nd. This annual event has become a 'don't want to miss' meeting and continues to attract 300 - 350 representatives from the major pulp and paper companies, sawmills, logging, trucking and silviculture contractors, consultants, government officials and woodlot owner organizations.

[MORE INFO](#)

The Atlantic Forest Research Collaborative is organizing a series of e-lectures during the winter of 2021. Be sure to register for these free educational webinars.

[MORE INFO](#)

Atlantic Forest  
Research  
Collaborative





## UPCOMING EVENTS



### **NHC 2021 NORTHERN HARDWOOD CONFERENCE** Bridging Science and Management for the Future

**Virtual Event**  
**June 15-16, 2021**

Northern hardwood forests occupy millions of hectares in the eastern United States and Canada, representing one of the most economically important and ecologically diverse forests in eastern North America. Northern hardwood silviculture is diverse and complex as well and has been the focus of extensive research for over 80 years. Today, managers continue to seek innovative sustainable management solutions to address the expanding challenges facing this forest type, including serious threats such as invasive species, inadequate tree regeneration and shifts in composition, degraded timber quality, herbivory, climate change, nitrogen deposition, and forest fragmentation. The 2021 Northern Hardwood Conference (NHC) will give researchers, academia, and forest managers from across the range a forum to learn, share, and discuss cutting edge science and innovative management practices to sustain healthy and productive northern hardwood forests.

**MORE INFO**







Institut de recherche sur les feuillus nordiques Inc.  
Northern Hardwoods Research Institute Inc.

**ADDRESS**

165, BOULEVARD HÉBERT  
EDMUNDSTON, N.-B.  
E3V 2S8

**PHONE**

1 506 737-4736

**FAX**

1 506 737-5373

**E-MAIL**

INFO@HARDWOODSNB.CA



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