Improving harvest schedules in PCT stands

Our team has been collaborating actively with Groupe Savoie's forestry department for several years now to develop and implement tools aimed at improving forest operations. Since 2019 we have been working with their team on precision inventories that combine field timber cruises with remote sensing to assign silviculture prescriptions, set harvest productivity and sawlog recovery targets. Operational results are then compared to inventory-based forecasts to ensure follow-up and continuous improvement. This work has allowed our teams to collaborate on the design of a robust process aimed at determining harvester productivity and pay rates.

Armed with what we have learned so far, and the models and processes our teams have developed, our work together is now moving forward to use that acquired knowledge to reduce operational cost. Groupe Savoie's management team wants to have the required tools to face the challenges associated with effectively mobilizing limited field resources. The company has mandated NHRI with designing a tool that will leverage existing precision forest inventory data to make predictions for harvester productivity and operational costs.

"The partnership with NHRI is a key element of this initiative. Their technical support, expertise and experience in forest inventory and precision tools are an important advantage for us. Beyond the obvious sustainable forestry objectives, we seek the same goals, control wood supply costs, stop contractor turnovers, make better decisions, and ease the whole wood supply process."

A Saint-Quentin native, Yves O'Brien is Vice President of Procurement at Groupe Savoie Inc.

The team at NHRI already has considerable experience in building such tools and a significant body of knowledge related to the complex relationships between precision forestry variables and wood chance/machine productivity. Using a variety of machine learning techniques, we are confident in our ability to build a working prototype in the short term.

The new tool will function in a simple machine learning environment, draw from existing precision forest inventory data such as EFI and predict harvester productivity for 20 m X 20 m pixels. The company may decide to amalgamate that data into larger operational units for the sake of practicality.

The data needed for that task exists in vast quantities (provincial EFI data and other forestry inventory information) but is too complex to process for models built using normal statistical methods. Our team will be building on relationships between site factors and harvester productivity to construct a machine learning tool that can use data associated with a potential harvest area and predict machine productivity.

MACHINE LEARNING AND OPERATIONAL COSTS
Promising partnership with Groupe Savoie Inc.

Key Steps of the Project

1. Revision of the company's current wood chance logic.
   New determination key for wood chance and productivity.

2. Development of relationships between inventory variables and machine productivity rates
   List of factors that influence harvester productivity and their weights.

3. Build AI model to assign harvester productivity using precision forest Inventory variables.
   Running model to predict machine productivity and wood chance that uses precision forestry variables as inputs.

4. Produce early predictions for company's actual operating plan with operational polygons.
   Detailed maps that show productivity for individual harvest blocks.

5. Validation with actual field productivity data in company's operations.
   Corrected predictions of wood chance.
   Revised model.

6. Build management system around the new process.
   Workflow and process map.
   Workshop and staff training.
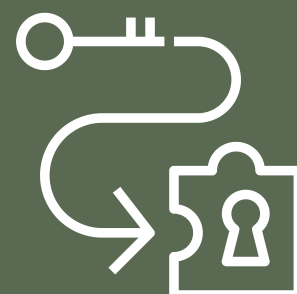
Benefits to the company

- Reduction in planning cost.
- Reduction of harvest cost.
- Reduction of complaints and grievances from harvesting contractors.
- More time available from operational staff to optimize operations.

This type of project is where we put the beta versions of our tools to the test and get feedback from end users. At NHRI we always strive to advance knowledge and tools by following the principles of Agile design and development. This project is perfect for such an approach. It allows us to work with partners to test out new technologies and processes with the objective of improving productivity. By setting out ambitious objectives, we force ourselves and our partners to focus on solutions and always think in terms of continuous improvement.

MORE THAN A THEORETICAL CONCEPT...

NHRI-IRFN

CONTACT US TO CREATE SOLUTIONS

HARVEST KNOWLEDGE | PROMOTE GROWTH

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