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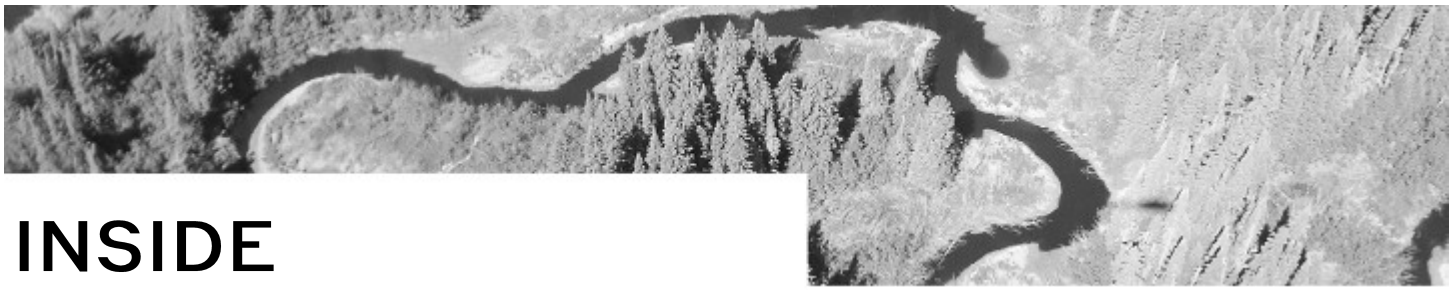
Innovations and Emerging Technologies

Photo credit: Ryan Wilkie

ALSO INSIDE



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THIS ISSUE

EVERY ISSUE

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Testing the MicaSense Dual – Drone Mounted Imaging System for Forestry Applications

Ryan Wilkie, MScF, R.P.F. in Training

This spring Lakehead University Centre for the Application of Resources Information Systems (CARIS) in collaboration with Lakehead University Agricultural Research Station (LUARS) partnered to test and develop methods for using a brand new, 10-band sensor attached to the DJI Matrice drone system. The *MicaSense Dual* is a camera imaging system that captures 6 separate spectral bands in the visible light spectrum, along with three red-edge and one, medium-infrared bands. Built for the agricultural sector, collected imagery can produce your standard normalized difference vegetation index (NDVI) or enhanced vegetation index (EVI) indices for vegetation classification, but given the added spectral signatures combined with the high-resolution data, we can actually classify down to individual plant and species levels.

One of the biggest strengths of this new sensor is that it has two 5-band cameras, that have been fused together to fire as a single unit, hence the dual descriptor. Its 5 distinct red spectra and the band overlap with both Landsat and Sentinel satellite imagery (Figure 1). The two visible red bands combined with the three, red-edge and Near Infrared bands allow for more specific classification of vegetation using indices such as NDVI or modified simple ratio (MSR) as examples, to not only help differentiate species but also potentially to identify specific plant stresses such as drought, nutrient deficiencies or disease. The Lakehead University Natural Resource Management lab has been collecting data over the summer with this new sensor, flying semi-automated missions twice a week

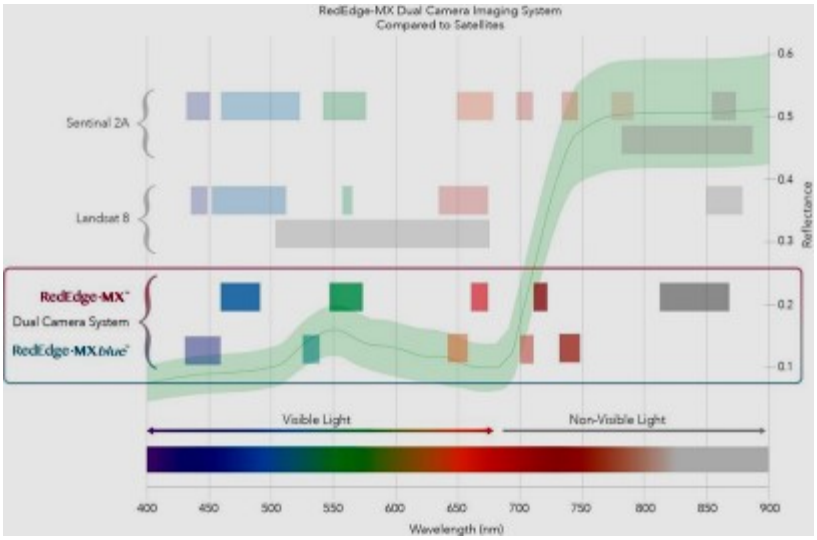

Figure 1. Spectral signatures of the MicaSense Dual compared to Sentinel and Landsat satellites. Source: www.micasense.com/dual-camera.

at LUARS, imaging the growing crops and trees to monitor changes through the season. That is another benefit of using a drone platform; repeatability for change detection at any temporal resolution.

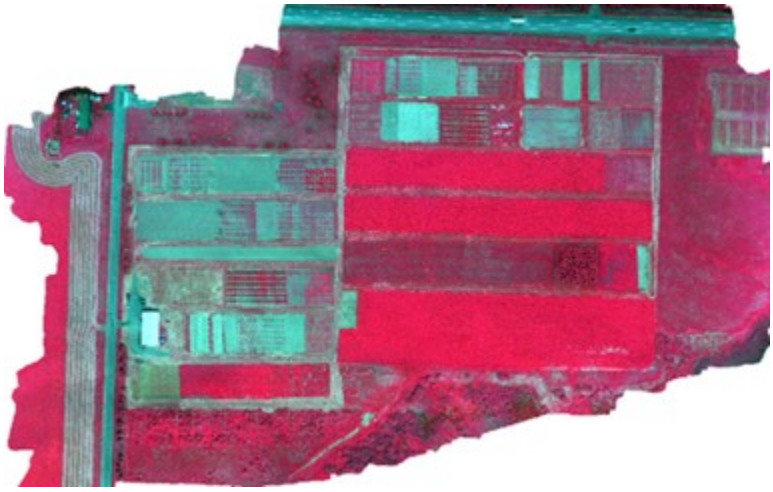

Figure 2. An NDVI mosaic of the LUARS study area showing the general differences between crops, trees and soil from May 2020. Green in this image is soil, the darker aqua represents the asphalt, and the varying shades of red are live vegetation.

CARIS uses the *Dual* on their Matrice 200 quad-rotor remote piloted aircraft systems (RPAS, the (Transport Canada term for drones) in combination with the *DJI Pilot app* to manage all flight parameters for this sensor. The flight missions are pre-programmed into the controller to ensure consistency between flights and the accuracy of change detections. To deal with changing light conditions during or between flights, there is an upward light sensor attached to a mast and a

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calibration panel which is also photographed before and after each flight. The brightness values are then balanced between photos in the mosaicking software to ensure consistent spectral levels across the study area. The images are then stitched into an orthomosaic and later piped into a classification software for analysis.

While the *Dual* was originally designed for agriculture, CARIS is developing methods for use in forestry at both the smaller, stand level and at a landscape level. The techniques are relatively the same, but the challenges can be quite different. For one, the scale is much larger in forestry, drones are limited by their battery life, legal restrictions apply to flight areas, and the amount of collected data quickly fills up hard drive space.

But the potential reward of this sensor in forestry could be game changing. Because it's multispectral, we can use automated classifications to pull out individual trees, stand densities, identify the species, assess its health, detect competition and pest infestations, calculate crown sizes and even potentially predict stem size at all stages of development; from freshly planted seedlings to mature stands. At the LUARS study, we could even detect the allelopathic effects on the grass from the planted trees (Figure 3). If a forester is managing a hard-to-reach area (Figure 4) or knows a site is prone to something like needle rust or thinks it might be suffering drought stress, they would be able to use this tool to assess from the roadside and allocate staff-hours more affectively to only the sites that require attention. And by applying large-area sampling techniques, one can compare data to matching satellite imagery to look for similar patterns across their respective forests, or vice versa. Another use may be to run post-assessments on forest fires. Using the *Dual*, foresters could gauge burn severity after a fire and calculate percent loss to the stands, especially useful for hard to reach areas or areas that could be potentially hazardous to walk through. Remote sensing techniques like this, used effectively, can show us where we can save unnecessary costs, but also help us better manage our natural resources and keep our forest ecosystems healthy.

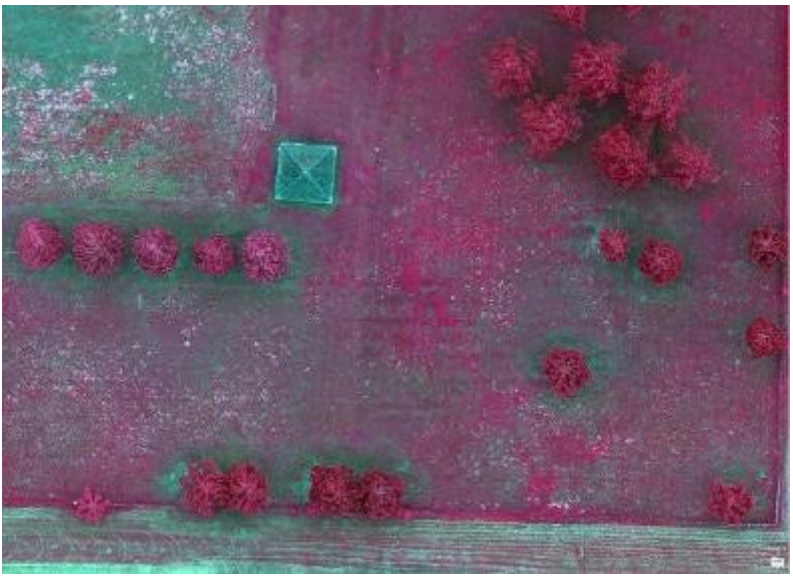

Figure 3. Multispectral mosaic of a grass area next to the LUARS fields. In it, you can see the allelopathic effects from the conifer trees on the grass, turning the grass a greenish colour in this image. Processed 3D model from 70-meters above ground level (AGL).

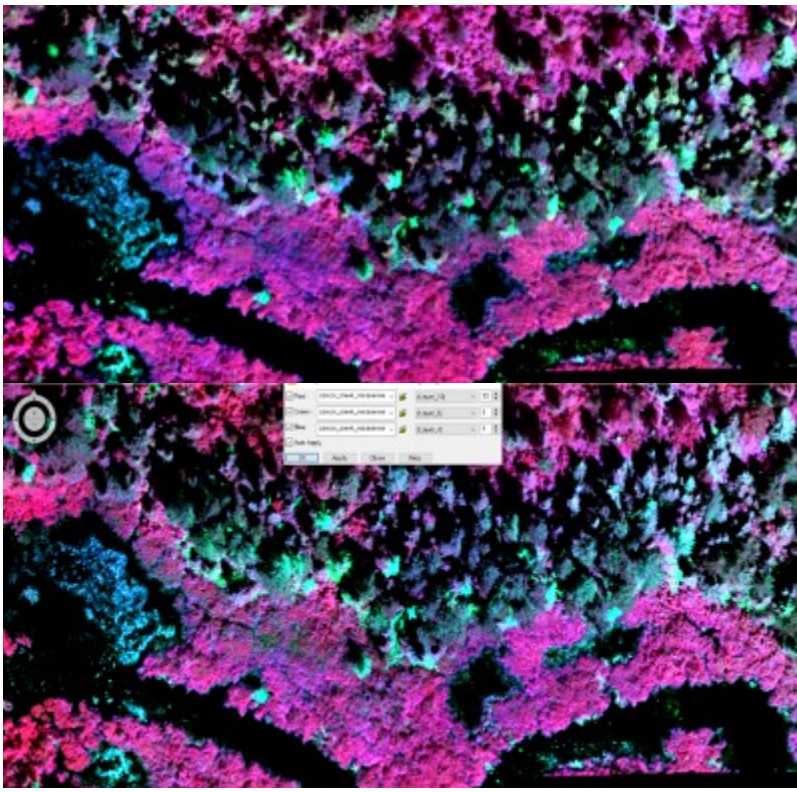

Figure 4. Bands 10, 2 and 7 (top) compared to the near-infrared (NIR) image (bottom). This shows how the subtle differences that a slight shift in electromagnetic (EM) spectrum can pull out the different vegetation species that traditional 4-band imagery misses. Taken from an orthomosaic generated by Micasense Dual Imagery, flown at 120 meters AGL. Source: Lakehead University CARIS.

**Funding for the MicaSense was provided by Dr. Hene through an agriculture research grant.*

**For more information on this technology and its potential uses, consult the following video clips: https://www.youtube.com/channel/UCkiHSVghX8KeSCd9eL7uXNQ

Innovations in Measuring Canopy Cover

Peter Kuntz, R.P.F., Kuntz Forestry Consulting Inc.

Canopy Cover (CC) is a common metric utilized in urban forestry practice. It is a part of policy development at the municipal level within urban forest management strategies (plans) and provides a basis for compensation when required for restoration plans in forest loss situations. Given the well-established ecological benefits and services that trees provide (clean air and water, psychological well -being, ultraviolet light protection etc.) the metric of CC is tremendously important in the urban setting. Urban forest management plans, a relatively new phenomenon are based on the premise that increasing the CC is desirable and will inevitably contribute to the green infrastructure and assets of a municipality.

Photo credit: Mike Rosen

In its simplest form, CC is the summation of individual tree canopy measures. Tree crown width can be measured from the ground with the sum of these measures comprising CC. Urban forest canopy can be measured by simple delineation of the features on aerial photography, typically done on planimetric bases on *CAD* or Geographic Information Systems (*GIS*) platforms. The sum of these calculations results in "total CC" for a given study area or municipality.

With the advent of modern-day mapping, information management systems and web-based solutions, the CC metric is easily attained. The US Forest Service's *i-Tree*, is a suite of web-based applications that are used to collect tree data and assess the ecological functions and values of trees. Various modules within *i-Tree* lend themselves to specific applications for a variety of users - from homeowners planning their treed landscape to municipalities assessing CC and ecological functions and benefits. *i-Tree Canopy* is one such module that estimates tree cover and tree benefits for a given area with a random sampling process that lets you easily classify ground cover types. *i-Tree Canopy* allows the user to:

- select from existing geographic boundaries, draw project area boundaries onto *Google Maps*, or load an *ESRI* shapefile.
- use multiple, non-overlapping boundaries at the same time.
- randomly generate sample points and zooms allowing the user to choose from a pre-defined list of cover types for that spot.
- review *Google Maps* aerial photography at random points to conduct a cover assessment within a defined project area.

The above described techniques can be modified to suit various applications, for example, if CC is required to calculate the compensatory planting after the removal of trees and forests. In a study our company did in Peterborough, ON, trees, groups of trees and forest stands were removed from an area proposed for development without approval from the City. To ascertain how many trees were required to be planted to match the previously existing CC, CC was estimated for the three above-stated categories. Landscape plans developed utilized the numbers of trees at a given stock size to be planted and assumed a grow-out of 25 years. It was found in this example that the total approximate canopy cover loss was 37,176 m^2. The City of Peterborough determined that a 50mm caliper size tree would have an average canopy area of 55 m^2, 25 years after planting. To compensate for the canopy cover loss of 37,176 m^2, a total of 676 trees were required to be planted.

The permutations on circumstances and the modalities available using both convention CC measurement, *GIS* and now *i-Tree* suite of software are endless.

Part One of a Four Part Series

Using Cutting Edge Technology to Inform Sustainable Forest Management

Ian Sinclair, R.P.F. in Training, Science and Research Branch, Ministry of Natural Resources and Forestry

Around the globe there has been a shift as forest resource managers are using enhanced inventory information to strengthen the linkages between strategic forest management level planning, wood supply management and wildlife monitoring. In this article, the first in a series that describes Ontario's 2018-28 forest inventory cycle, we introduce the technological advances that inform sustainable forest management.

Enhanced forest inventory programs across Canada are using historical records through interjurisdictional reporting, free open source datasets such as new satellite platforms, and cloud-based computing and machine-based learning to develop inventories. Combining monitoring options through remotely sensed data and processing platforms for data analysis allows for better modelling that includes enhanced and more consistent forest attribute measurements from LiDAR (Light Detection and Ranging) data. LiDAR uses measured signals sent from an aircraft or satellite platform; the returned signals then determine the distance from sensor to reflection point on the ground.

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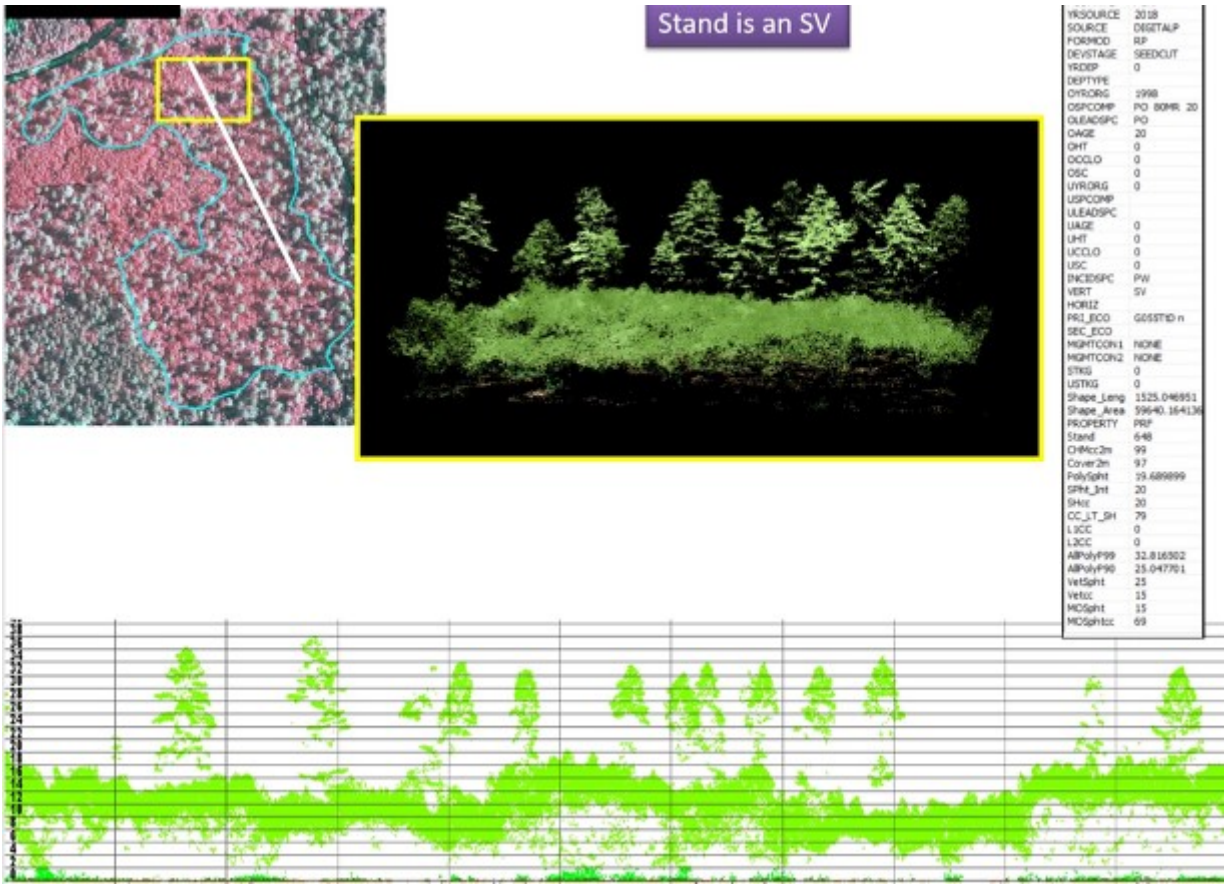

Top left, aerial imagery with forest stand polygon in blue, lidar side profile in yellow and lidar transect -white line. Top right illustrates a lidar oblique side profile outlining the vertical structure as Single story with a veteran (SV) layer (yellow box). Lidar transect profile illustrates another view of the stand profile outlining height ranges of the single and veteran canopy. Image credit: NRCAN, OMNRF, Murray Woods and Forest Analysis Ltd.

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For the 2018-28 forest inventory cycle (known as T2), Ontario is collecting forest measurements at a finer resolution using Single Photon LiDAR. Ontario is also leveraging historical annual reporting information and satellite imagery to update forest attributes.

Using historical records through supplemental information or comparing disturbance patterns through historical satellite imagery in combination with new forms of satellite data and LiDAR technology allows for a greater range of measurements and increased user confidence in the inventory data. Measuring forest attributes from LiDAR data and using a structurally guided sampled plot network through a Vegetated Sample Network (VSN) can also statistically predict important attributes such as volumes, products, vertical structure and wildlife habitat.

Historically, satellite imagery was coarse, expensive, and presented challenges in terms of technological infrastructure and the sharing of information.

However, recent advancements in higher resolution 20x20m satellite imagery that is collected weekly offer the opportunity to track fires from week of ignition, or to observe forest pest infestations as conditions change in an open data environment. Now it is possible to monitor a single pixel cell over 50 years! The new monitoring opportunities offered by these technological advances allow experts to look at green up (bud bursting stage) and senescence (leaves changing colour) and this information can help us to extract individual tree species and predict age more accurately.

In the articles to follow in this series, we will describe Ontario's LiDAR acquisition plan, use of satellite data and monitoring, and development of modelled forest attributes. For more information about how we are applying new technologies and protocols to support sustainable forest management, please contact Ian Sinclair (ian.sinclair@ontario.ca).

The Cutting Edge of an Integrated Digital Approach to Forestry

How the Forestry Geospatial Platform delivers value with real-time data from under the canopy

Lim Geomatics

The history of Lim Geomatics, a Canadian brain trust of computer scientists, software developers, designers, and foresters, is the history of the evolution of the Forestry Geospatial Platform (FGP). This constellation of digital tools was created to help the industry realize the immense potential of rapidly advancing geospatial technologies. The FGP is a set of independent, but interconnected applications and smart-tracking devices all anchored by one central and standardized data repository in the cloud.

Forestry is a complex business. Success depends on executing effective short and long-term plans, but it's hard to know what to do if you don't have good visibility on assets in the field, as well as on the quantity and quality of the resource at play.

Geospatial technologies, such as lidar and GPS, provide the means for shining a spotlight on every stage of forest management operations.

"Having insight on what is in your forest and when it is eligible for sustainable harvesting is critical for making cost-effective decisions," says Alexander Ryerson, Forest Information Specialist with Lim Geomatics. "The FGP empowers foresters with real-time data from stump to dump."

Dr. Kevin Lim, President and CEO, founded the technology firm in 2006 to commercialize his pioneering academic research about how to use lidar to generate highly accurate enhanced forest inventories. Fast-forward a decade and a half, and Lim Geomatics has generated close to 45-million hectares and counting of operational inventories. However, Lim and his team also realized early on that this new stream of data was only valuable insofar as foresters could put it to work making decisions, both when drafting long-term strategic plans and during day-to-day operations under the canopy.

The suite of digital tools that comprise the FGP was designed so foresters, whether in the office or out in the field, can ask the system questions and quickly get meaningful answers. Prism is a data collection

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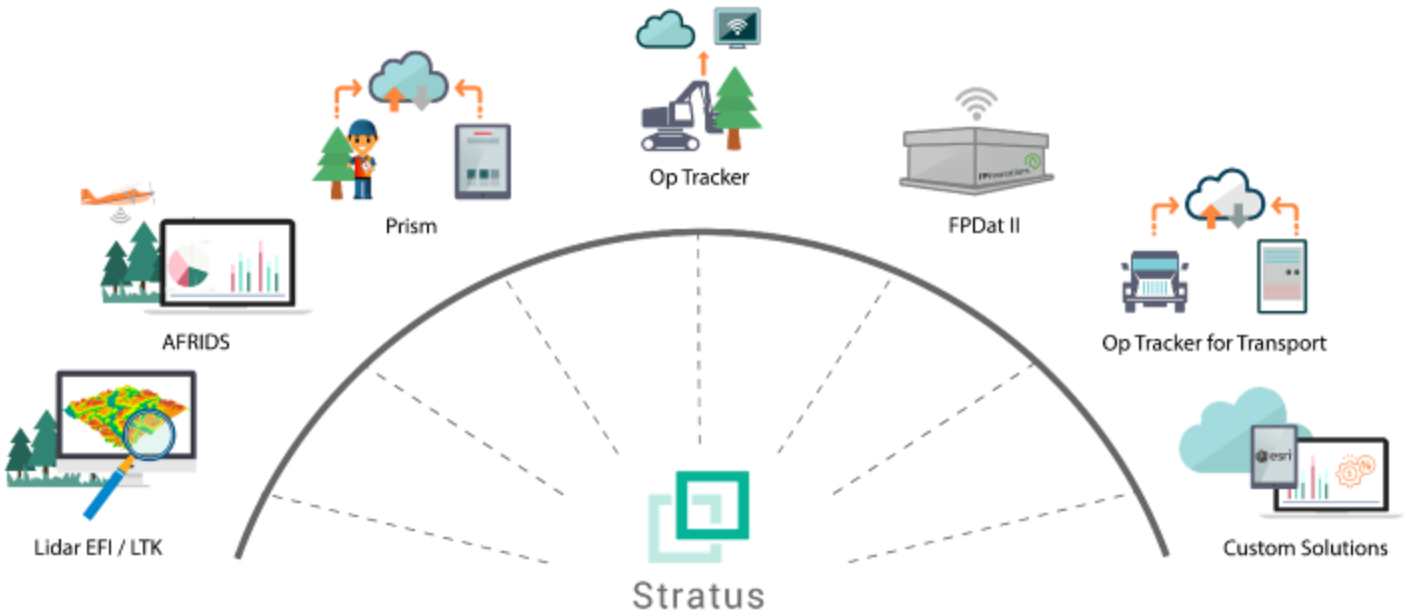
Lim Geomatics: Forestry Geospatial Platform



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and reporting application that can be used for timber cruising or any kind of survey work. Lim Geomatics recently added an equation builder to Prism that provides users with the capacity to calculate standing volume from raw field data. The potential of the FGP really gets going when you pair Prism with other digital tools such as Op Tracker, which monitors the progress and performance of harvesting equipment. Op Tracker can provide timely data about the depletion area of a unit during, not after, a harvest. "As you're cutting, you can update and improve your estimates on volume and species of wood that's coming out of the forest to feed the mills" Ryerson says.

Ryerson describes how forest managers back in the office can then use Stratus, which was released in early 2020 and forms the hub for utilizing the data streams generated by the FGP, to revisit the operational plan and schedule another harvest nearby so the company can meet the quota at the mill on time.

The FGP is making a difference to the bottom line of forestry companies around the world. The return on investment is generated from increased safety, improved sustainability, and substantial efficiency gains at every stage of the planning and operations cycle. This integrated system of digital tools has proven just as practical and useful as those hardened steel teeth on the edge of a feller buncher saw blade.

The Inventory of the Future

Laird Van Damme, R.P.F. (laird.vandamme@outlook.com) **and** **Alex Bilyk** (ambilyk@lakeheadu.ca)

The foundation for forest management planning is the forest inventory. In Europe and USA, a grid of sample plots was used to generate statistically valid estimates of volume for an area of interest. This method was in use for 100 years or more in some cases. Although provinces maintain their own forest inventory for forest management purposes, Canada's National Forest Inventory (NFI) uses a forest of sample plots supplemented by remote sensing data[1]. The NFI provides additional coverage in areas not inventoried by provinces since the 1980s and uses a consistent methodology to track changes due to climate change and other factors that enables reporting on the state of Canada's forests to meet international obligations.

Canada's provinces have relied upon aerial photograph interpretation to produce statistically invalid but nonetheless useful estimates of volume and habitat quality among other attributes for decades. In Ontario, as is the case for most provinces across Canada, this has been the dominant method since the 1940s, with the latest round being completed from 2007-2017.

The smallest unit of management in provincial inventories is a stand consisting of a homogenous group of tree species and age/sizes. Harvest blocks consist of groups of stands. This matches even aged management planning system applications rather well but creates some challenges for uneven aged management systems in central and southern Ontario.

In the last data capture cycle in Ontario's enhanced FRI (eFRI) program used airborne digital multi band imagery to better estimate tree species, volume and to identify ecosites (vegetation and soil associations). The base unit of management remains the stand (Figure 1). Minimum polygon sizes have dropped and capture more granular information than previous efforts could, aided by increased image resolution and soft copy technology compared to analog (paper) black and white photography of the previous generation of FRI.

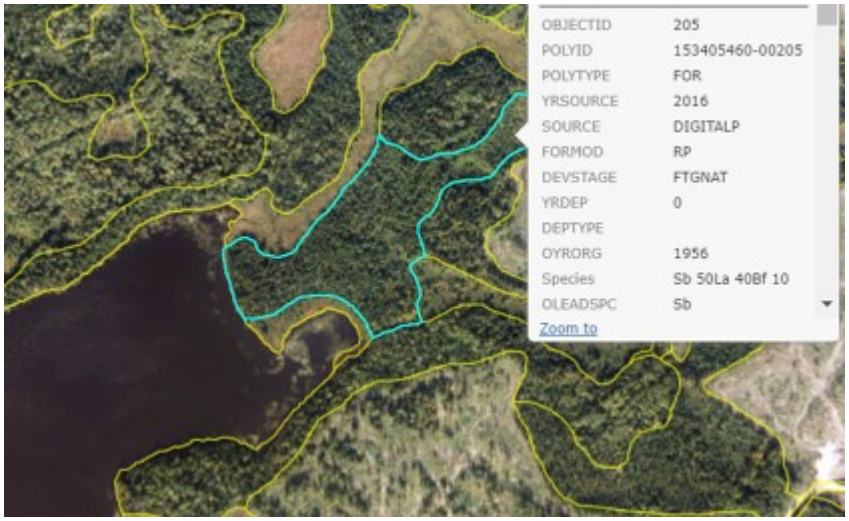

Figure 1. An example of eFRI forest stand Polygons and a partial attribute list from a selected stand (Source: KBM resources Group www.kbm.ca).

Despite the technology advances associated with eFRI, the timing and quality of the end-product has been a source of controversy among forest planners. For example, one forest had 29 photo interpreters each with their biases and different skill sets leading to considerable variation in inventory quality. Other forests also had multiple interpreters and contractors leading to considerable variation in product quality even though the digital data and ground sampling methods were standardized. Furthermore, many inventories delivery times did not line up with planning schedules. This situation underscores the need to manage the technology and people within a broader management system.

Technology advances continue at a rapid pace in active sensors like LiDAR[2], passive airborne and space borne sensors along with terrestrial data capture and processing methods that are tracking along at the speed of Moore's law[3]. This means that there is more data at lower costs at nearly exponential rates. Thus, the challenge confronting professional foresters is managing these ever-expanding data to create information useful for decision making in a timely fashion.

Many provinces have active LiDAR programs that are well underway. Ontario is investing in a fully airborne LiDAR-based forest inventory for the next round of eFRI. Data capture is well under way. In addition, multiple platforms from satellite, airborne (manned/drone) and ground are being deployed in multi-

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[1] https://nfi.nfis.org/en/

[2] LiDAR stands for Light Detection and Ranging and is an active airborne sensor that emits and receives laser pulses that accurately measures terrain elevation and tree crown characteristics such as tree height.

[3] See https://en.wikipedia.org/wiki/Moore%27s_law

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phased sampling schemes. Many government agencies, academic institutions and private companies are engaged in these efforts.

The new single photon LiDAR or SPL that Ontario is flying trades some features off from traditional LiDAR for the ability to capture large areas cost effectively[4]. Like all Lidar enhanced inventory data this allows for semi-automated and more accurate classifications based upon ground plot calibration data providing estimates at the sub stand level (raster or pixel) scale or individual tree scale based upon the sampling system and algorithms used by the analysts. This has the potential to improve both even aged and uneven aged management systems. The last cycle of NFI updates, uses LiDAR and these statistical methods.

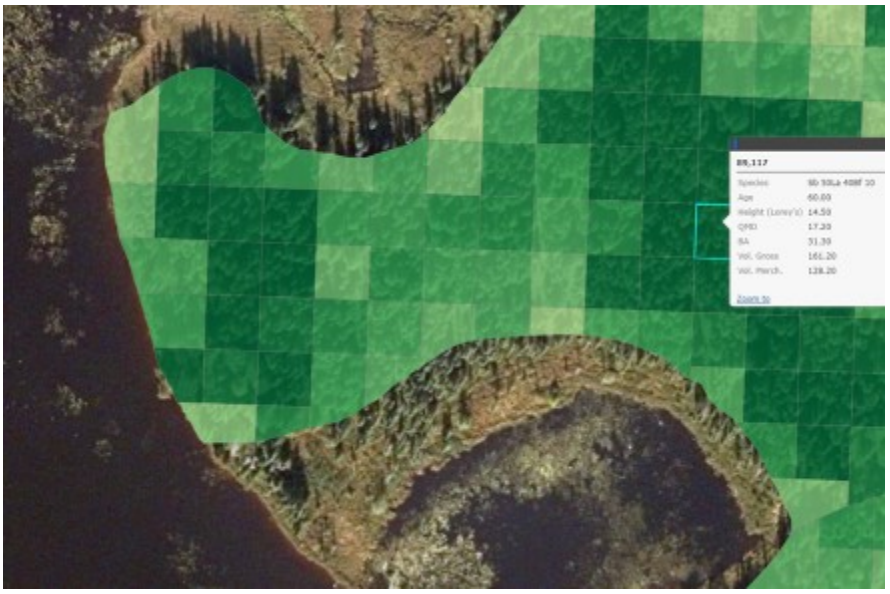

Figure 2. Raster-based inventory example from LiDAR data (Source: KBM resources Group www.kbm.ca).

The current field calibration methods for airborne LiDAR based forest inventories use conventional mensuration techniques in fixed area ground plots to calibrate digital imagery and LiDAR data. The province of Ontario is now contracting out this phase of data collection.

Figure 2 is an example of LiDAR enhanced inventory with 16-meter^2 pixels that identify taller trees with higher volume (dark green) within the stand compared to shorter trees and lower volume areas (light green). Rather than clear cutting this stand, an irregular shelter wood harvest could focus on the dark green areas and retain the light green areas for future harvest. The challenge with this increased information is balancing economic opportunities while avoiding the trap of high-tech high grading.

Figure 3. Single tree crown isolation sample as part of an individual tee classification inventory (Source: KBM resources Group www.kbm.ca).

Crown maps of individual trees can also be derived form airborne LiDAR (Figure 3). In addition to estimating volume, this method may help predict wood quality in addition to further enabling uneven-aged management and partial cutting systems. The wood quality-based inventories are part of research programs underway at Lakehead University. The algorithms for doing this kind of work have improved but still struggle with the changing landscape of the forest. It remains a focus of research and development in remote sensing to solve the single tree classification problem at a forest scale.

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[4] http://www.cif-ifc.org/wp-content/uploads/2019/10/AWARE_CIF_eLecture_New_LIDAR_Technologies_on_the_Horizon.pdf

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Terrestrial LiDAR (t-LiDAR) may help achieve the goal of single tree classification inventories at the forest scale. The t-LiDAR captures 3-dimensional data for each tree from the plot centre that provides more data and eventually more data at lower cost (Figure 4) compared to conventional ground sampling methods. The current t-LIDAR technology still has limitations and challenges, especially in mixedwood stands with a thick underbrush. But mobile t-LiDAR is becoming more common and helps alleviate these challenges.

Figure 4. Terrestrial LiDAR Example(Source: LU CARIS https://www.lakeheadu.ca/programs/departments/nrm/research/facilities/lucaris)

This remote sensing-based data described above can be used for both strategic and operational planning. The immediate gains of better terrain and height information from LiDAR data can be used to solve challenges around road location as well as providing better insights into potential harvest volumes realized from a block.

The LiDAR and associated thematic map products data can be viewed on phone and tablet applications by harvest machinery operators with real time georeferencing using GPS technology (Figure 5). With improved GPS quality, “ribbonless” boundary layout is slowly being adopted in parts of Ontario.

Having a full tree enumeration and real time data collection while wood is harvested, enables new ways of organizing wood products inventory and supply management. These new systems can potentially save the industry nationwide billions of dollars each year (Dr. Kevin Crowe, Lakehead University, personal communication).

Whereas the first industrial revolution came with the steam engine, the second with electrification/ assembly lines and the third with automation, we are in the fourth revolution within the internet of everything and big data. FPInnovations describes this as Forestry 4.0 (see https://www.youtube.com/watch?v=r4vhLQ8OEP0) and JD Irving is already harnessing it (see https://www.esri.com/videos/watch?videoid=3mwbnYaVX4c&title=j-d-irving-limited-seedling-to-shelf-a-forest-product-supply-chain-gis-transformation).

The pace of change in data collection and sampling methods with the potential to enhance forest management has never been more exciting. The challenge remains for foresters to manage these data to make informed decisions in a timely manner. For further information on what is happening with enhanced forest inventory in Canada, check out the AWARE program’s website at UBC and the enhanced forest inventory yearly update, available on the CIF e -lecture series - http://www.cif-ifc.org/wp-content/uploads/2019/10/The-AWARE-Project-and-Outcomes-Sept-2019.pdf

Figure 5. Deploying the information to all end users on various software and hardware applications. (Source: http://www.treemetrics.com/ourtechnology/)

Innovations in Urban Forest Inventory

Peter Williams, R.P.F.
Williams & Associates, Forestry Consulting Ltd.

Tree inventories are necessary and helpful for many aspects of urban forestry. A tree inventory provides information such as tree health, species, size and location; this information is used to generate reports that can help urban foresters in their strategic planning, the development of maintenance and management plans, as well as to help educate residents about their urban forest.

Methods range from dots on a paper map with data on a spreadsheet to sophisticated GIS-based software inventories with real-time interaction with other systems (e.g., data collection devices, work order management systems) which can update the database after tree removal, maintenance, or planting activities.

Inventories up to 200 hundred trees can utilize the map/photo and spreadsheet approach or use a GIS shapefile to record the tree locations and data. However, larger inventories, particularly those that support ongoing tree management programs (e.g. municipal tree programs), work best with software that interacts with other software systems – formatted to be accessed and used by municipal staff with perhaps some limited access to the general public.

Municipalities use a variety of programs and technologies to manage their infrastructure and finances, and some have incorporated trees into those systems. Historically, many municipalities have customized their own GIS-based tree inventory systems. However, in the last 10 or 20 years, interactive tree inventory and management programs have been developed that enable the inventory to be updated so that the management of trees can be accessed by many municipal departments or systems (e.g. municipal works projects or urban development proposals).

Williams & Associates has been conducting tree inventories, large and small, for many years using a number of systems including: customized programs for small projects, municipal in-house programs and two integrated inventory programs, *ArcGIS Collector*™ and *TreePlotter*™ (ESRI and Plan-It GEO products respectively).

ArcGIS Collector is used by some municipalities for their inventory and live updates, but it does not itself integrate with other municipal programs. *TreePlotter* has proven effective for doing inventory work for a number of municipal and private clients. The *TreePlotter* database is maintained on the Cloud, it has an integrated Work Order system and can work with other GIS and municipal software. *TreePlotter* is easy to work with and municipal technical staff can easily help set it up and can troubleshoot problems quickly. *TreeKeeper*, a Davey Resource Group product, was one of the first integrated inventory systems and is widely used in the US and several places in Ontario.

There has been some interest in using other remote tree inventory methods such as ground-based *LIDAR*, *Google Streets* imagery and *UAV* (drones). Ground-based *LIDAR* is used by municipalities to collect information on the condition of their roadways and curbs and there has been some interest in extracting tree inventory data from this output. While this could provide excellent location and perhaps diameter information, it may not be helpful with species determination or tree risk assessments. *Google Street View* and similar imagery software have been assessed for application to tree inventory data collection but have similar issues as *LIDAR* (while providing accurate location information).

With the pace of technological development, the methodology and software options for tree inventory will continue to diversify and become increasingly functional along with the innovation of more novel, high-tech approaches. For the near future however, there is little doubt that tree inventory will continue to be dominated by GIS –based technologies.

A New Surveillance Tool in Development May Prevent Oak Wilt from Establishing in Ontario

Dr. Sharon Reed, Forest Health Research Scientist, Ministry of Natural Resources and Forestry

Since the 1900s, invasive forest pests have caused considerable damage to North American forests. Detecting pests before they become established on the landscape is key to successful elimination. An invasive disease called oak wilt is not present in Canada but has been reported on Belle Island, Michigan, 500 metres from Windsor, Ontario.

The invasive fungus that causes oak wilt is carried by small beetles called nitidulids. Nitidulids, also called picnic beetles or sap beetles, are attracted to tree sap in fresh wounds. When contaminated beetles visit fresh wounds, the fungus invades the vascular system and blocks water flow. The lack of water moving up the tree causes the leaves to wilt. Once an oak tree is infected, the fungus enters the root system and can attack adjacent healthy oak trees via root connections.

One challenge of monitoring for invasive diseases like oak wilt is prioritizing areas for surveillance. To overcome this challenge, the Ministry of Natural Resources and Forestry (MNRF) is collaborating with Natural Resources Canada, the Canadian Food Inspection Agency, and Quebec's Wood Exports Bureau and their Ministry of Forests, Wildlife, and Parks to develop an early warning tool. The research began in 2019 and is continuing in 2020.

The early warning tool consists of an insect trap with a collection cup containing liquids. An attractant, specific to nitidulid beetles, is placed on the trap. The liquid and beetles are collected at regular intervals and sent to a DNA extraction laboratory. Scientists use new DNA-based tests to look for the oak wilt pathogen's DNA code to determine if it's present on beetles or in trap fluids. The DNA-based tests also reveal how much pathogen DNA is in the sample.

The frequency and amount of pathogen DNA helps researchers understand how close to the trap the diseased trees are. Since beetles can be blown by wind during storms, a single detection represents a smaller risk while many repeated detections over

Lindgren funnel traps were used to collect beetles during the study.

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time may indicate that oak wilt infected trees are within kilometres of the trap. One shortfall of the DNA test is that it doesn't reveal whether the fungus was alive or capable of infection at the time it entered the trap. Thus, DNA detections should be considered a warning, not a sign that infected trees are present in Canada. This tool will allow surveillance programs to focus visual surveys in areas known to be at risk.

During 2019 and 2020, traps for nitidulid beetles were set up along Ontario's border near the City of Windsor, Essex Regional Conservation Authority (ERCA), the St. Clair Regional Conservation Authority (SCRA), and MNRF on property owned by the Sault Ste Marie Conservation Authority. The Michigan Department of Natural Resources also set-up traps in a location with oak wilt so scientists would know if the DNA tests were working.

Scientists showed the new DNA tests work when they found large quantities of DNA from the oak wilt pathogen on beetles in the Michigan samples. The pathogen's DNA was also found in smaller amounts on beetles in two trap samples collected by SCRA and one trap sample collected by ERCA. These traps were next to the Ontario border and may represent wind-blown beetles coming from infected trees in the United States. These findings confirm the risk of oak wilt establishment in Ontario and the need for vigilance. Many municipalities have established "no pruning" guidelines to reduce the amount of oak wounding during times of heightened risk, i.e, not pruning while the beetles are active in summer.

You can help by learning the signs and symptoms of oak wilt. They are posted on the Invasive Species Centre website at https://www.invasivespeciescentre.ca/invasive-species/meet-the-species/invasive-pathogens/oak-wilt/.

Report suspected infected trees reports to CFIA by email (cfia.surveillance-surveillance.acia@canada.ca) or by contacting the local CFIA office.

Since oak wilt and many other forest pests can be transported on firewood, it is best to always buy your wood from a local source.

Want more information about forest research in Ontario?

Visit https://www.ontario.ca/page/forest-research.

Interested in our science publications?

Visit ontario.ca/page/catalogue-natural-resource-scientific-and-technical-publications

Taking the First Steps Towards Autonomous Forest Operations

Mark Partington, R.P.F., Manager Transportation and Infrastructure, FPInnovations

New technology such as automation, augmented and virtual reality, artificial intelligence and the Internet of Things has the potential to drastically change the forest industry and ensure its competitiveness. The development and application of these technologies is sometimes referred to as Forestry 4.0, a term inspired by the concept of Industry 4.0, which refers to the next Industrial Revolution and the automation of manufacturing and industrial processes. These technologies offer the opportunity to create solutions for challenges such as labour shortages, high fibre-supply costs, safety concerns, and forest connectivity, as well as to improve environmental performance.

The implementation of full autonomy of machines in harvest operations is not expected for at least another 15years, but full-to-partial autonomy in forest transportation could be as soon as the next 3-5 years. This would be a significant leap forward in the use of technology in forest operations when we consider that there have been little in advancements since the advent of mechanization in the 1970s.

Truck Platooning

Truck platooning is an emerging vehicle technology in which two or more trucks in a convoy are linked by a computer system that maintains the desired distance between trucks, as well as controls acceleration and braking, reacting faster than a driver can. FPInnovations conducted trails in 2019 where in a two-truck convoy, the driver of the second truck was present to supervise the driving but the

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Figure 1. Truck platooning will be a reality as soon as the next 3-5 years.

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technology controlled the steering, acceleration, and braking. This setup showed that in over a thousand kilometers of driving that the technology can be successfully deployed in real-world forest road conditions. The eventual goal, which could be as soon as the next 3-5 years, is to achieve full driving automation where a lead driver is only required in the first truck.

Autonomous Trucks

The automation of transportation operations is seen to have its initial opportunity for implementation in the deployment of autonomous vehicles in mill yards. Autonomous vehicles have been applied in warehouse environments for at least the last 15 years, but further developments are required to ensure reliable, safe, and effective application in outdoor environments.

FPInnovations took a first step in adapting autonomous vehicle technologies to the forest industry, in 2019, by conducting a demonstration in a mill yard where a human driver was not required to control the vehicle. The test vehicle was equipped with an autonomous driving system and worked for two days in a secured area between various loading points in the log yard and the delivery dock at the mill and included trips with empty and partially-loaded trailers. For the duration of these tests, the truck and trailer positioned itself with a GPS antenna in a previously mapped environment. The results of these tests were favorable to demonstrate that the technology is close to being available for application in controlled environments such as lumber yards.

Additional advancements and applications of autonomous vehicle technologies is expected to accelerate in the coming years. The Canadian forest sector is in a good position to make this technology transformation a reality and to ensure the economic viability and sustainability of forest management in Canada. For further information on the use of this technology, please contact Edouard Proust, Advanced Vehicles Engineer, edouard.proust@fpinnovations.ca.

Innovations in Hard Surface Planting

Michael James, General Manager
DeepRoot Canada Corp.

There is an old saying that "You can't see the forest for the trees". However, for traditional foresters it might be the other way around. Some can't see the tree for the forest. In fact it is their job to see the whole forest as a connected integrated system. It isn't that traditional foresters don't know about all of the services and values that individual trees can provide... they do. However, they measure and assess those values in aggregate.

Urban Foresters on the other hand are more focused on individual trees. When you only have 5 or 6 trees on a city block, each tree becomes important and the individual services and values that each tree provides is magnified exponentially.

In the last 10 years cities have recognized the importance of Urban Canopy and all of the benefits canopy provides. Unfortunately, urban planting sites often suffer from inadequate availability of rootable soil. The ideal site for trees has soil spread about two to three times the crown diameter at maturity – standards which are rarely fulfilled in urban areas. Restrictions such as narrow road space, underground utilities, adjacent building foundations and adjoining compacted soil all play havoc with the tree's need for adequate rooting space. This has underscored the need to have large mature street

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Photo credit: DeepRoot Canada Corp.

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trees to achieve municipal canopy targets which in turn has resulted in Municipal Soil Volume standards for street trees.

For example, the City of Toronto guidelines now requires 30m³ of soil for every new street tree planted.

Municipal Soil Volume standards in turn have fostered a growth in new technologies and innovation to achieve these soil volume targets in downtown urban spaces where everything is compacted to support the "hard" (or "grey") infrastructure that the municipalities require (like sidewalks, roads and buildings).

These innovations include soil vault systems, tree pit aeration and irrigation systems, root management products and others. Silva Cells are an example of this innovation.

The Silva Cell is a modular suspended pavement system that uses lightly compacted soil volumes to support large tree growth and provide powerful on-site stormwater management through absorption, evapotranspiration, and interception. Since 2007 over 3,000 Silva Cell installations have taken place around the world.

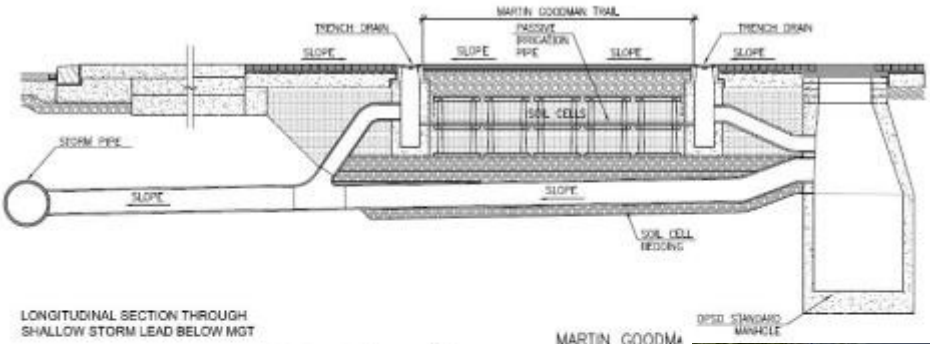
The Silva Cell structure has a 90% void space filled with tree planting soil. The structure of the Silva Cell supports the hardscape above such as sidewalk, plazas, bike lanes, parking bays. So now it is possible to grow a large mature tree in a downtown dense urban setting without giving away valuable space to uncompacted soil.

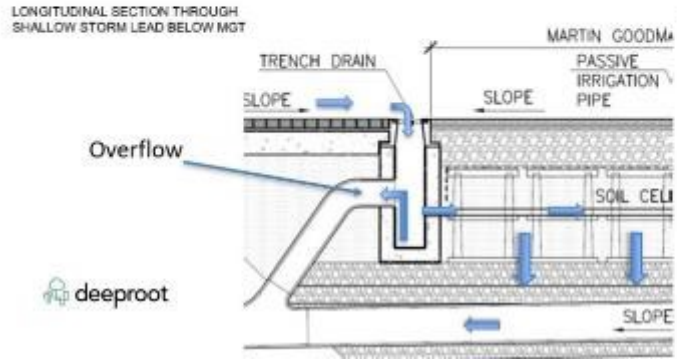
That 30m³ of lightly compacted soil under the sidewalk with a tree planted in it is also a resource for stormwater management - a giant, underground bioretention swale.

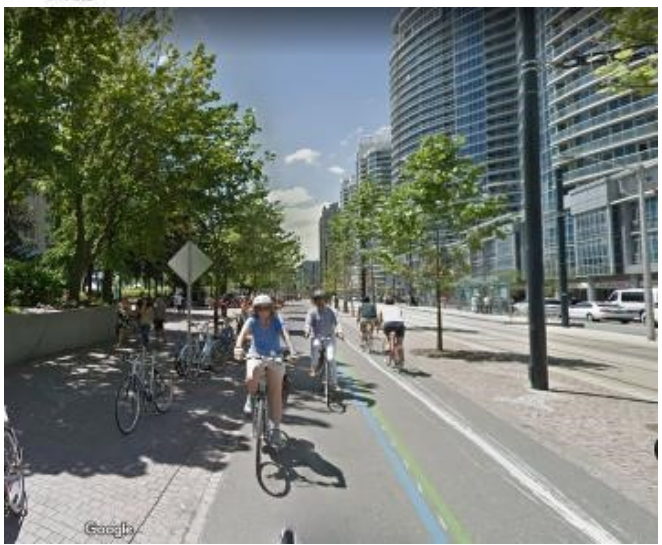
Large mature trees can significantly reduce stormwater runoff through evapotranspiration and increase water quality. They provide excess capacity and resiliency for traditional grey infrastructure systems. Their root system feeds the microbial life in the soil that cleans the stormwater.

Street trees are true bio-utilities. **This is Green Infrastructure at work.** These solutions can be used for one tree or a whole neighborhood.

When Municipal Soil Volume standards and regulations for stormwater are combined, the integrated tree and stormwater management system becomes a powerful and cost-effective Green Infrastructure solution.







Canada Proud: Canadian Forestry Front-and-Centre During Covid-19

Derek Nighbor, President and Chief Executive Officer, Forest Products Association of Canada

When the impacts of COVID-19 started to hit Canadians in a real way in mid-March, I don't think any of us anticipated the critical role that forestry workers and forest products would play in the months ahead.

I remember being at a Natural Resources Canada meeting on the 2 billion tree planting program in Ottawa on March 13th. That day would be the last I would set foot in a public meeting to this day.

The next couple of weeks were seized with calls with members, Cabinet Ministers and MPs, and government officials discussing things I never imagined we would be discussing:

- What do we need to do to keep our people safe from this emerging and potentially mutating virus?
- Can we continue to operate our mills?
- Will the Canada/U.S. border be open?
- What financial measures do we need to be advocating for - to ensure workers and their families get the money they need to pay the bills?
- What supports do we need to ensure our businesses survive?
- How bad is this going to get?

It all came seemingly out of nowhere.

As I look back now, I am incredibly proud of how our people, our customers, and supply chain partners responded.

We not only had our supply chain declared as essential and kept it moving, but companies did incredible work to keep workers safe and the products we were making – long known for their environmental benefits – were now being lauded for their health benefits.

The pandemic has reminded us of the important health benefits of Canadian forest products and has reinforced the essential nature of our supply chain – wood, pulp, and paper products and their ubiquitous presence in the daily lives of Canadians. From toilet paper to food containers to face masks and hospital gowns, the importance of our sector has been hiding in plain sight, and we have embraced our role as an essential provider to Canadians.

On April 2nd, when U.S. President Donald Trump moved to block 3M mask shipments to Canada – masks that contained Canadian produced premium reinforced pulp - the calls were coming into our office to understand why we aren't making these products in Canada. A good question – and one that I believe in the post-pandemic world should give us pause as a country about how we can still be free traders yet be much better at leveraging our natural resources to provide essential products to our people.

Needless to say, events related to the COVID-19 pandemic have brought Canadian forestry workers and forest products to the forefront. The global dimensions of the crisis and the economic and social uncertainty are almost impossible to grasp. Yet, so many Canadians and Canadian businesses across the country have been stepping up to keep their communities healthy and safe.

Canada's forest sector employs more than 230,000 workers in over 600 communities across the country. We have long been known for our green credentials and our sector's world-leading approach to forest management. Meeting that responsibility day in and day out, while keeping our people safe, is our sector's primary focus.

Given the nature of our work, we are a sector that knows quite a bit about resilience in the face of disruption. Whether that involves market conditions, bad weather, forest fires, or pest outbreaks – we plan for the unexpected, and then execute decisively.

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The strengths of our industry are our people, our commitment to the environment, our production capabilities, and our deep culture of safety. We know that strong leadership and flexibility from our boardrooms to our mills to the forest floor will allow Canada's forest sector to be a leading part of Canada's post-COVID economic recovery.

Forest sector professionals are, at heart, deeply rooted in our mainly rural and northern communities. These roots make us intensely aware of the need around us, and it is part of our DNA to support those who need help.

Over the last few months, Canada's forest sector and its people have donated hundreds of thousands of dollars to local food banks, hospitals, women's shelters, mental health organizations, Boys and Girls Clubs, and United Way operations. We have also stepped up to provide frontline health care workers and public health authorities with protective masks and gear, respirators, sanitizers, and tissue supplies. Some FPAC member companies have even launched social media initiatives to applaud the efforts of the local heroes in our areas.

In the forest and in our communities, a crisis for one is a crisis for all. Canadians can be assured that the people of our industry will continue to be there for them to provide the essential products and services that will sustain our communities through this turbulent period. It's **#ForestryTogether** – and it's what we do.

#ForestryTogether Videos:

English: https://www.youtube.com/watch?v=zq0NVZoiZOE&t=2s

French: https://www.youtube.com/watch?v=QOGsTpLllZg

Council Corner

Chris McDonell, R.P.F.
Vice President

Council Corner is to provide membership with insight into what happens at OPFA Council meetings.

"Aah... Chris.... you're on mute", President Denis Gagnon R.P.F. points out, in a most stateman-like manner. Like the commander of the Enterprise he scans his 57" flat screen, marking the arrival of incoming board participants to his living room. Pixels coalesce from all corners of the province to form a virtual Hollywood Squares (google it) of forest-based wisdom and experience. An exchange of pleasantries, adjustments of headsets, resetting of backgrounds and positioning of beverages, an OPFA meeting of board and staff begins.

As a new board member as of December 2019, I had one exposure to the 'normal' pattern of in-person meetings at a modest Pearson Airport hotel. In March, as the public health yardsticks of COVID-19 compelled us to progress from planning a modified AGM and conference, to canceling it, to moving on-line, it was all hands-on deck. Board calls occurred weekly, staff engagement was timely and on-point. A shared purpose and commitment drew all board members together to discuss, assess and reach consensus decisions. While OPFA was not unique as all employers, families and organizations faced challenges, it was a sure sign of highly effective board with good collaboration between board and staff.

We've adapted, in the short term, out of necessity and made it work.

Ensuring the business of OPFA continues and the needs of members are met are the priorities. The conversion from boardroom table and whiteboard to video conferencing and document sharing happened rapidly with Fred, Louise and Priscilla always a few steps ahead. We're tackling the affairs of OPFA more efficiently than ever before. What was once a day and a half meeting plus travel is now accomplished in 2-3 hours. The work is getting done.

There are some subjects that require a bit more planning to do well online. Strategic planning, normally a process that is enabled by free-flowing conversation and debate, group work on flip charts and opportunities for 'blue sky' thinking, is better done outside the normal confines of a time-bound conference call. The essence of an idea is raised, expanded, tested and reshaped by the interaction of others spontaneously is tough to emulate on screen. Not all have "Jeopardy-like reflexes" to get oneself off-mute and jump in when the thought is top of mind. There are challenges to a video conference format, but I'm confident we'll figure it out. The board executive and Fred are taking some time to design an effective process that ensures ample time and opportunity for the Board and staff to work on this critical task.

Some subjects are challenging to discuss regardless of the format. Social justice is a case in point. I've been pleased to experience the fearlessness of board colleagues to raise the topic and the willingness of the board and staff to engage, to challenge ourselves as an organization to ensure we are doing all we can to advance diversity and inclusivity in our profession. The 'Black Lives Matter' movement is an opportunity for reflection for every individual, every organization including the OPFA. As a regulated profession we have a duty to protect the public interest and ensure we are welcoming to a broad diversity of forestry practitioners.

The OPFA recognizes the importance of ensuring racial equality and the need to examine our efforts to be an open and accessible organization and to work with other organizations to highlight the many pathways to a rewarding forestry career. Resources have been identified to support awareness of the unfairness of systemic racism and how to identify unconscious bias in everyday life and in the workplace. Consider the opportunity to explore this important subject in your professional development with a visit to the members section of the website.

In the realm of social science, study after study in organizational behavior demonstrates that diversity is a strong indicator of organizational success. For OPFA, public board members bring perspective, experience and skills obtained largely outside the realm of traditional professional forestry careers. In mid-August, Minister of Natural Resources and Forestry John Yakabuski made an important announcement, appointing 4 new public members and extending a fifth for a second term. With a full

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complement of five public members and nine elected R.P.F.s, President Denis may need to trade-up for a larger console.

Public members have a very significant role to play on the board and statutory committees. They possess experience in an array of fields - business, academia, not-for-profit, legal, international diplomacy, and human rights – and that only scratches the surface. Not only are they extremely interesting individuals with good ideas and enthusiasm, their participation strengthens board decision-making and governance.

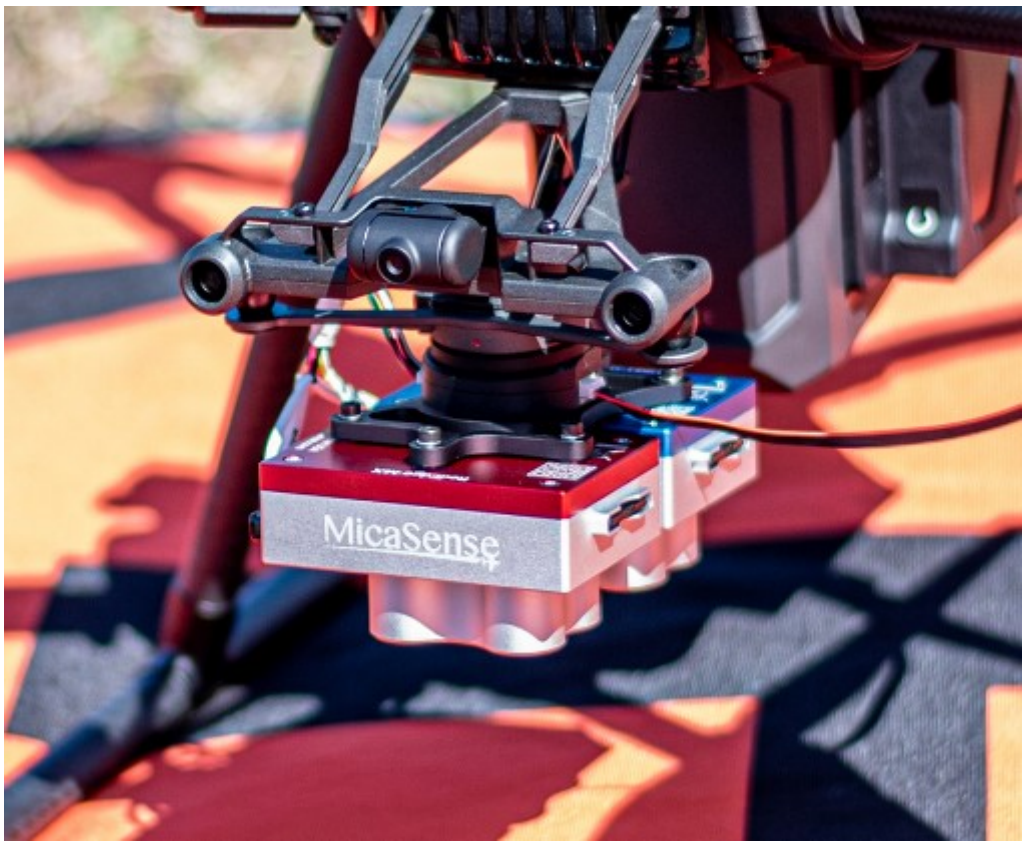
As importantly, they hold a mirror to our organization, giving the board a broader view, above the trees, over the hills and across the greater landscape, reflecting the opportunities that exist for OPFA, to communicate more effectively, to elevate professional practice and apply best practices in board governance.

"Chris – Chris .....Chris! Have we lost you?" ..."Ahh sorry, no, Denis, I'm here." This time I can't blame it on my mute button.

Listening to the energy of the board call, my colleagues chiming in with terms of reference edits, confirming financial checkpoints, proposing Twitter messages and wisdom about human rights, I was thinking to myself, 'what an interesting organization this is, what a talented group, what an opportunity we have'.

While uncertainty surrounds us, it is people working together that will make a difference. It is not office buildings, filing cabinets and whiteboards that define our future success. It's collaborative, fearless engagement, open conversations, patience, persistence and commitment to continuous learning and adaptation.

We have all we need to build a bright future for the OPFA.



The remotely piloted aircraft system carrying the MicaSense Dual camera system - a close-up view. (See cover photo and page 3-4 for more details). Photo credit: Ryan Wilkie.

Are you Tuning in to the OPFA Webinars for Members?

Louise Simpson
Registration Manager, OPFA

With new software, the OPFA now has the ability to host our own webinars and we are determined to put it to good use! Webinars are recorded for the OPFA website, for those unable to attend on the day or to re-watch. If the topic of the webinars is related to your Personal Practice Focus and your Learning Plan, they are eligible to be included as part of your Continuing Education hours.

Provisional and Student Members may have already participated in the webinar series "***Becoming a Professional Forester***" held in August.

In the first webinar in this series; "***What Is a Competency Assessment?***", Louise Simpson, the OPFA Registration Manager, explains the process and documents required for both the Credential Assessment Process and the competency assessment for those applying for Associate Membership with a limited scope of practice. If you are a Provisional Member from a program not accredited by the Canadian Forestry Accreditation Board (CFAB), this video is a must-watch!

The second webinar in the series; "***How I Became a Professional Forester***" includes guest speakers Annonciade Murat, R.P.F., Samuel Nsiah, R.P.F., Corinne Arthur, R.P.F., Brandon Williamson, Associate R.P.F., and Dr. Krish Homagain, R.P.F. who share their experiences and advice on becoming a Registered Professional Forester in Ontario. Having come from a variety of backgrounds, including graduates from programs accredited by the Canadian Forestry Accreditation Board (CFAB), graduates from programs not accredited by the CFAB, and internationally trained individuals, this webinar contains great information for anyone who is beginning their journey to become a professional forester.

The third webinar in the series; "***Creating Opportunities for Yourself***" features guest speakers Lacey Rose, R.P.F., Ronnie Huang, R.P.F., Svetlana Zeran, R.P.F. and Dr. Mark Zhang, R.P.F., who share their experiences developing their professional forestry career and provide tons of useful tips and advice for those looking to begin or expand their own forestry career.

Check out this reading list, recommended by Svetlana Zeran, R.P.F. during the **Creating Opportunities for Yourself** webinar:

1) Getting Things Done by David Allen
2) Never Split the Difference by Chris Voss
3) Lean in by Sharyl Sandberg
4) Crucial Conversations by Patterson, Grenny, McMillan & Switzer
5) Radical Candor by Kim Scott
6) The Northern Spotted Owl by Benjamin Stout

Next up, for September, all members should have seen a message in their inbox recently inviting you to join the September webinar series; "***What Does It Mean to Be a Regulated Professional in Ontario?***"

The first webinar in this series, held on September 8th, "***Professional Foresters Across Canada; Similarities, Differences and Lessons Learned***" featured the OPFA's Executive Director and Registrar Fred Pinto, R.P.F., with guest speakers Carla Rhyant, the Executive Director for the Association of Alberta Forest Management Professionals, and Casey Macauley, R.P.F., the Registrar for the Association of BC Forest Professionals. Tune in to learn more about what it means to be a professional forester in Canada, how professional forestry is regulated in other provinces, and how the

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regulatory bodies across Canada, including the OPFA, work together on a national scale. The speakers will also share their insight into changes that are occurring and the future of professional forestry.

The second webinar in this series, on September 22nd, "***Things You Should Know: Your Legal Obligations as a Regulated Professional in Ontario***", features guest speaker Richard Steinecke, partner in the legal firm Steinecke Maciura LeBlanc, for a discussion on the legal aspects of being a regulated professional in Ontario. You will want to tune in for suggestions on how you can improve your practice as a professional forester, and to gain an understanding of the role lawyers play in the OPFA enforcement process. This webinar will also discuss how the legal role of a regulator in Ontario has evolved over the years, including how they are changing to be more accountable to the public and better protect the public's interest.

The third webinar in this series, on September 29th, "***Regulating Professions in Ontario; Common Processes, Changes and Challenges***", features guest speakers Brian Maloney, Executive Director of the Association of Ontario Land Surveyors, Chantal Bélisle, Deputy Registrar of the Ontario College of Teachers, and a representative from the Human Resources Professionals Association (to be confirmed). The OPFA is part of the Ontario Regulators for Access Consortium, and regularly meets and interacts with other regulatory bodies across Ontario to share information, resources, and lessons learned. This webinar will give you an insight into how Ontario regulators take on the task of regulating a profession.

Stay tuned for more invitations in your inbox or visit the Members Events page of the OPFA website for more upcoming webinars; we hope that you will be able to join us and participate!

Working Near Water – Codes of Practice Notice

Fisheries and Oceans Canada's Fish and Fish Habitat Protection Program is continuing efforts to implement the fish and fish habitat protection provisions of the *Fisheries Act* by developing additional guidance and tools. They wish to inform you that four new interim codes of practice have been made available on their Projects Near Water website.

The codes of practice that are now available for your use are:

- Beaver dam removal
- Culvert maintenance
- End-of-pipe fish screens for small water intakes in freshwater
- Routine maintenance dredging
- Temporary cofferdams and diversion channels
- Temporary stream crossings

These codes of practice are in effect immediately, and can be used by project proponents to plan and undertake their activities. That said, these have been released as interim codes of practice because Fisheries and Oceans Canada's Fish and Fish Habitat Protection Program have a strong desire to discuss them with you, and to seek your input on how to improve them before they are finalized. If you wish to comment please contact Lee-Ann Smith, A/Manager, Provincial/Territorial Partnerships, e-mail: leeann.smith@dfo-mpo.gc.ca

Improving Professional Practice: Resources for anti-racism

Fred Pinto, R.P.F.
Executive Director, OPFA

As regulated professionals we are required to serve all people in Ontario fairly. The question is how can we do so when we may not be aware of the unconscious biases we hold? Here are three resources that will inform and challenge you:

1. This is a 45 minute video that explores unconscious bias. It uses gender bias as a case study to illustrate unconscious bias. The video teaches us what each of us can do to create more inclusive work spaces and to make better decisions. This video is required viewing for all OPFA Councillors and members of the Registration Committee. https://vimeo.com/126173011
2. "Call it out" is a 30 minute Ontario Human Rights Commission video e-course that offers a historical overview of racism and racial discrimination in Canada, explains what "race," "racism" and "racial discrimination" mean, and provides approaches to preventing and addressing racial discrimination. http://www.ohrc.on.ca/en/learning/elearning/call-it-out
3. This is a book that describes the latest methods used to evaluate our biases or blind spots. This book is recommended to students taking professional ethics in their Master of Forest Conservation program at the University of Toronto.

   Banaji, M.R. and Greenwald, A.G. 2013. Blindspot: Hidden Biases of Good People. Delacorte Press, New York, N.Y. 272 p.

What Does it Mean to be a Regulated Professional?

Fred Pinto, R.P.F.
Executive Director, OPFA

As members of a profession we want the public to consider professional foresters as respected and trusted professionals. Professional foresters do not automatically earn the public's respect and trust by virtue of their right to practice legislation or because we say we are trustworthy. Like all regulated professionals, we need to earn the respect and trust of our clients and the public on a continual basis through good governance of our profession and through our individual professional practice.

As a regulator, the OPFA must ensure registrants are competent and are aware of the conditions that govern professional foresters. To do so all registrants are required to renew their registration each year by the approved deadlines and answer several questions that provide proof that the registrant has at least the minimum of 60 hours of continuing education in a three year period, have retained a copy of their updated personal practice focus and learning plan, and confirm each year that they have reviewed the Code of Ethics, Acts of Misconduct, Standards of Practice, Practice Guidance and Practice Bulletins. These conditions were enacted by OPFA members through the responsibilities assigned to us by law as a self-governing profession.

I wish to thank the majority of registrants who annually comply with the regulations set by OPFA By-Laws. Unfortunately, a significant minority do not and this takes time away from other valuable work that the administration could be pursuing for its members. About 10% of members that are required to pay annual fees and report their competency maintenance activity for each year do not do so by the established deadlines. About 2% of practising members indicate that they do not have the necessary minimum of continuing education to maintain their competency. About 20% of practising members do not answer the questions related to confirming their continuing education and professional currency.

Most registrants are gracious when notified of any non-compliance and work to rectify the issue. To the few that get upset when they get a non-compliance message, I ask that they think about the response they will get from their clients, employers, and liability insurance supplier for their non-compliance. As the Registrar of the regulator of professional foresters in Ontario, I cannot and will not let the non-compliance of a few affect the legal and financial standing of the OPFA and its membership.

To help improve the understanding of what it means to be a regulated professional the OPFA has organized three webinars in September 2020. Members will have the opportunity to learn about what it means to be a regulated forest professional in British Columbia, Alberta and Ontario, understand what it means to be a regulated professional in another Ontario profession, and hear from one of OPFA's legal counsels. Notices for these webinars are found elsewhere in this newsletter and have also been e-mailed to you. I encourage you to join in the live sessions or listen to them at another time once the recorded session is posted on the OPFA's website. Please talk to other OPFA members and encourage them to join in the webinars.

Ontarians depend on the work of regulated professionals every day through the services provided by professional services practices. Professionals in health and non-health practices play a significant role in our service business sector. Businesses depend on the work of the professionals they directly and indirectly employ to provide services essential to their own business success whether it be accountants, lawyers, engineers or health care professionals

Every year, economic upheaval, immigration and demographic shifts, and increased labour mobility are among the factors contributing to dramatic changes in business, employment and the Ontario society. In this context, the Office of the Fairness Commissioner (OFC) has guided improvements in the way qualified professionals are licensed in Ontario to meet the objective of the fair-access legislation. The purpose of Ontario's fair access to professions legislation and the role of the Fairness Commissioner, is to help ensure that individuals applying for registration by regulated professions or compulsory trades are governed by registration practices which are transparent, objective, impartial and fair. The objective is to help ensure that all individuals who are qualified to practice a profession or compulsory trade have a fair opportunity to have their credentials, competencies and qualifications recognized.

Ontario's fair registration practices legislation is found in two statutes. One statute deals with the self-governing professions which control access to the health professions. It is Regulated Health Professions Act (RHPA), in particular Schedule 2 of that act, called the Health Professions Procedural Code (the Code). The other statute called the Fair Access to Regulated Professions and Compulsory Trades Act, 2006 (FARPACTA) governs the non-health related self-governing professions and the College of Trades. They are the regulators which control access to the non-health professions and the compulsory trades. Since the enactment of fair access legislation in 2006, the OFC has been responsible for the implementation of many registration procedures which have benefited applicants for professional registration but there are still barriers to professional registration procedures which the regulators need to address.

Attracting diverse, talented newcomers or improving inter-provincial labour mobility is critical to Ontario's economic future. Licensing offers us a window to view how well we are accommodating this need. Since the enactment of the legislation, we have made progress in ensuring the registration practices are transparent, objective, impartial and fair. But it's ongoing work, every year a report from each regulator is submitted to the OFC and a meeting to review this report is held and every 3 years, the OFC conducts a rigorous assessment of registration practices of all regulators. All the findings and recommendations from this report are published on the profession's page to keep the profession accountable to its obligation. The regulator is responsible to resolve within a specified period any deficiencies found as a result of the 3-year review.

Registration practices, like the economy itself, is evolutionary — it must change with the times. In today's fluid workforce, where we are literally competing with the entire world for skills, we simply cannot afford to be insular or parochial. Obviously, the registration practices are an important safeguard for the public, ensuring that only qualified professionals are licensed to practice in their respective fields. But there is a vast difference between protection and protectionism. We have made progress in ensuring greater transparency and reducing barriers to access the profession, and we must keep going.

Office of the Fairness Commissioner – August 2020.

Grey Areas
SML Steinecke Maciura LeBlanc Barristers & Solicitors
A COMMENTARY ON LEGAL ISSUES AFFECTING PROFESSIONAL REGULATION

The Case for Empathy by Regulators

by Natasha Danson
Summer 2020 - No. 248

What is the primary purpose of the complaints process of a regulator of a profession? A likely answer would be: to protect the public from an incompetent or unethical practitioner. Most regulators might also say that the nature of the process is such that participants are rarely happy with the outcome.

However, an important purpose of the complaints process should also be to inspire public confidence in the regulator's oversight of the profession. If that is true, a key aspect of the process should be to create as positive a complaints experience as possible. Two recent sources emphasize the importance of empathy for regulators in achieving that goal.

In the first, a major survey of over 1,200 complainants and 1,600 respondents in Australia was analyzed in an article by Susan Biggar and others and was recently published in the Journal of Medical Regulation. The research was based on records available from the Australian Health Practitioner Regulation Agency (AHPRA).

The research indicated that most complainants and respondents found that it was easy to locate information about the process. Most complainants also found it easy to initiate a complaint and, where phone contact was made by complainants, they found the interaction helpful. However, beyond that, most complainants felt the fairness of the process, the level of communication (e.g., updates) and timeliness was unsatisfactory. Except for where cases were summarily closed without a full investigation, most practitioners had similar perceptions of the process.

A major concern of complainants related to the fairness of the process. Many complainants felt that the process was not impartial and protected the practitioner. Complainants also felt that they had not been heard, that reliance was placed on inaccurate information provided by the practitioner and that they did not have an opportunity to respond to the outcome.

Many complainants had concerns about the outcome. Many did not understand the outcome:

> Complainants commonly mentioned a lack of clarity in the outcome letter. The wording in the letters was considered "vague," "bureaucratic," "impersonal," "insensitive," with "inappropriate assumptions." Fifty complainants said they did not know that an outcome had been reached, yet due to the anonymous nature of the surveys the reason for this cannot be verified.

Many complainants also did not agree with the outcome. This was the major difference in perception between complainants and practitioners:

> Conversely, most practitioners (70%) were satisfied with the outcome of their matter, yet many felt the regulatory threshold for even considering the notification [complaint] was too low.

For practitioners, the greatest dissatisfaction seemed to relate to the stress created by the complaints process:

FOR MORE INFORMATION
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Grey Areas

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A COMMENTARY ON LEGAL ISSUES AFFECTING PROFESSIONAL REGULATION

> When asked how stressful the notifications process was on a scale of 1 to 10 (with 10 being extremely stressful), 89% selected ≥ 7, with 51% selecting 10. Many practitioners felt this stress was not adequately acknowledged by [AHPRA]. Practitioners noted that the negative effects were often long-lasting and impacted on both their personal and work life. Timeliness and the lack of useful updates often heightened their stress levels.

In their discussion of the results, the authors suggest that regulators should develop "service principles that include respect, listening, transparency, updating, timeliness, apology, improvement and fairness". This includes managing expectations:

> … clarifying public knowledge around three key aspects of health regulation: (1) the role of the regulator, the complainant and the practitioner; (2) the purpose of the regulatory process and greater transparency around the process; and (3) the limitations of regulatory outcomes and reasons for outcomes ….

As a result, AHPRA:

> … has introduced ongoing staff training in effective communication strategies, including active listening skills, the capacity to respond to people in distress (including threats of suicide and self-harm), managing expectations, communicating outcomes and responding to complaints about the process.

More fulsome reasons for decision is also recommended.

This emphasis on empathy was also highlighted by Professor Kieran Walshe from Manchester University. In a recent podcast he discussed the concept of regulation as being a social discourse. He said that activities, such as investigations, are shaped by the behaviour of the people who do them. The reputation of the regulator is also significantly affected by the behaviour of the people who perform those activities. For example, if the representative of the regulator (e.g., staff or investigator) is directive, rude, dismissive, bureaucratic, and employs the assertion of authority, complainants and practitioners will respond accordingly and develop a resentful view of the regulator.

However, if the representative of the regulator demonstrates compassion, empathy (without showing favouritism), respects the dignity of the complainant and practitioner, listens to them, and treats their concerns seriously, the complainant and practitioner will respond more cooperatively and favourably and will have a more positive view of the regulator.

Regulators who develop policies, form letters, and train and recruit staff and investigators to act with empathy as a priority will be more effective and will also become more respected.

The AHPRA study can be found at: https://meridian.allenpress.com/jmr/article/106/1/7/435351/How-Can-We-Make-Health-Regulation-More-Humane-A.

Professional Walshe's podcast can be found at: https://player.whooshkaa.com/episode?id=665839.

In Memoriam

George Blight, R.P.F. (Ret.)

August 2, 1933 – December 25, 2019

Alfred George Blight passed away peacefully on Christmas Day last year at age 86. He is survived by his loving wife Colleen, children Margot, Jill, Timothy and Katherine, 11 grandchildren and 1 great grandchild as well as his sister Jean and sister-in-law Shirley. George was predeceased by his brother William.

George graduated with a Bachelor of Science in Forestry from University of Toronto in 1956. Raised in Espanola, George was born in Massey during the Great Depression. Setting out for university and earning a professional degree was an important achievement in his family. George proudly displayed a treasured gift of scaled replica horse-logging tools (cant hook, single tree, skidding tongs, choker chain) on the wall in his office, fashioned by his blacksmith father.

After graduating, George worked with KVP Co. in Espanola and joined the OPFA in 1959. Through his career he mentored forestry grad employees on the importance of joining the Association. George served on Council twice, 1977-78 and 1982-83, and became a Life member in November 1997.

George soon joined the Ontario Department of Lands and Forests, first in Geraldton and transferring to Hearst in 1960 as Timber Management Supervisor. George innovated early silviculture practices such as scarifying with an engine block dragged behind a skidder and girdling hardwoods to trial underplant with red spruce. But the L&F uniform did not hold him long.

In 1965 George took another innovative step and became a forest consultant, not with private land owners, but to family-operated local mills. As mill demands grew, George saw first-hand the challenges they faced acquiring timber licenses to maintain uninterrupted operations, while ironically surrounded by vast public forest that could easily support an expanded sustainable harvest. By offering part-time services to several mills, he established a full-time job that would help the mills grow and operate year-round by relying on a professional who knew timber and how to work with government. That George excelled in his role there is no doubt;

"George was the best Clay Belt/Black Spruce Silviculture Forester that I ever worked with ... I always marveled at how George could keep each of his client's operational information so private. He worked for all of the Hearst operators as their professional Forester plus carried out their operational work independently (IMAGINE!). Not many consultants could do what George did for such a long period of time. Hall of Famer in our Profession."
Trevor Isherwood R.P.F.

Perhaps George's most significant and lasting achievement was his role in establishing Ontario's first co-operative Sustainable Forest License (then Forest Management Agreement FMA). George saw the opportunity to mature the Hearst industry but had the daunting task of bringing 3 fiercely independent businesses together

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on common ground. He supported and coached a team of Hearst operators forward, and under his leadership the Hearst Forest license was established in 1986. For over 30 years now, the Hearst area mills have benefited from a long-term security of supply and provided a stable foundation for several communities.

George's innovation and entrepreneurship didn't stop there. Through his business Amisk Forest Services Ltd., in 1986 George established what was to become a common business structure today for Sustainable Forest Licenses; the license holder carries on forest management through an independent professional consulting firm.

George provided fertile ground for young foresters who worked for and with him. His company performed the first tree planting contracts tendered by MNRF relying on seasoned planters from northern First Nation communities; a rich cultural immersion opportunity while also providing jobs to those under-employed FN communities. Learning silviculture by doing. Wood supply modelling for underutilized aspen across multiple management units. Understanding fire ecology by tracking old burn boundaries.

Navigating with aerial photos and laying out roads. Juggling multiple clients fairly. Serving on the OPFA Council.

George led with an inspiring range of talent and principles; walk the forest to develop confidence and credibility in your field knowledge, do your homework and separate out relevant details, have a clear understanding of priorities and don't take unnecessary risks to get a job done. There was no better experiential teacher for the breadth and depth of forestry.

The continued health and success of forest-dependent communities and industry in the western Clay Belt region of Highway 11 are built on George Blight's legacy.

George Graham R.P.F.

In Memoriam

Donald Fraser Moore George, R.P.F. (Ret.)

1926-2020

Donald George passed away peacefully Sunday April 5th, 2020 as a result of a stroke. Born in Canso, NS he served as a clerk in the Canadian Army in Halifax WW2, and then he went to University of NB where he graduated with a degree in Engineering in Forestry. He went to Quebec as a mining tech and then to New Brunswick as a forester. His fame was selection wood cutting in Algonquin Park , where he was a forester and last year the Friends of Algonquin published a book in his honour: From Nova Scotia to Algonquin : Memoirs of a Dirt Forester. He worked hard to map the selection cutting areas and today Algonquin Park flourishes because of this technic.

Donald was survived by his son, Ralph (Diane) and three grandsons: Joshua, Nathan and Jacob. He leaves behind sister in law Jennie, several cousins, nephews and nieces from the George Family (Nova Scotia) including Muriel Louise, Eric, Mike, David, Gareth and Phil. The McAloon Family (Cheryl, Susan, Kevin (deceased), Terrence, Mary, Maureen, Sharon, Shaun and Brian).

He was predeceased by his parents Levi and Nettie George of Canso, NS, Wife Grace (1953-1998) and wife Thelma (1999-2015). Siblings: Clarrie, John Robert, Austin, Winnifred and Muriel.

Special thank you is extended to the staff and management of Rosewood retirement home where Donald resided for the last four months after a rehabilitation stay at Providence Hospital in Kingston. Thanks to the staff of Providence and Kingston General Hospital. A special thank you to Ernie Dewing and Gervais Roy, who were his companions for several years playing scrabble and helping with activities of daily life. To his friends that were frequently calling him thank you (Winifred Nickerson and William MacMillian, Dorothy Gray).

In lieu of flowers a charitable donation can be made to the Friends of Algonquin.

READY FOR YOUR ANNUAL MEMBERSHIP RENEWAL?

In October, Members will receive Annual Membership Renewal information in the mail outlining needed actions. You will also receive an email with detailed instructions and links.

Annual membership renewal involves:

1. Reviewing and **updating your personal information**-please ensure your mailing address and other information is accurate;

2. **Paying your annual membership fees** (if applicable) for December 1, 2020, to November 30, 2021. Fees are due December 1, 2020, and are subject to a Late Payment Fee (see the current Fee Schedule) and;

3. **Completing your Competency Support Report form** (if applicable) for December 1, 2019, to November 30, 2020. Competency reporting is due January 15, 2021, and is subject to a Late Reporting Fee (see the current Fee Schedule)

The chart below summarizes what activities are required for each membership category:

MEMBERSHIP CATEGORY: / ANNUAL RENEWAL TASK: ☑required	Student	Provisional	Full	Associate	Non-Resident	Inactive	Life	Honourary
1. Update Personal Information	☑	☑	☑	☑	☑	☑	☑	☑
2. Pay Membership Fees (by Dec. 1)	no	☑	☑	☑	☑	☑	no	no
3. Competency Reporting (by Jan. 15)	no	no	☑	☑	☑	no	no	no
4. Report working only within Scope (by Jan. 15)	no	no	no	☑	no	no	no	no

Payments may be made online (must be logged in as a Member), e-transfer (to opfa@opfa.ca), or by mailing a cheque, money order, or credit card information. Cheques and money orders must be made out to the **Ontario Professional Foresters Association** in order to be accepted by the bank.

Member News

New Full (R.P.F.) Members:

Daniel Bechard
Dimitrii Boyko
Aaron Brecka
Kayla Hayden
Michele Kan (from Inactive Membership)
Daniel Root

New Associate (Associate R.P.F.) Members:

Wayne Pawson

Please welcome and support the following people who have been admitted into the OPFA but are not yet entitled to practice professional forestry in Ontario:

New Provisional Members (R.P.F. in Training) (may practice if under the direct supervision of a qualified member):

Patrick Bazinet
Jacqueline DeSantis
Breanne Neufeld
Brendan Ross
Emmett Snyder
Cynthia Wolfgram

New Student Member:

Shannon MacDonald

Deceased Members:

George Blight, R.P.F. (Ret.)
Donald George, R.P.F. (Ret.)
Charles R. Groves, R.P.F. (Ret.)

The following person is not entitled to practice professional forestry in Ontario and is no longer a member of the OPFA:

Resigned, Full Member:

Jack Winkler

The following person is still a member of the OPFA but is not currently entitled to practice professional forestry in Ontario:

Membership Suspended for Administrative Reasons:

Jeremy Jones

Continuing Education

Webinars

Websites that offer free webinars to earn CEUs for your membership maintenance.

1. Canadian Institute of Forestry

https://www.cif-ifc.org/e-lectures/

2. Ontario Ministry of Natural Resources and Forestry. MNRF Science, contact Kristy Mckay, Science Transfer Specialist at Kristy.McKay@ontario.ca

3. Forestry and Natural Resources Webinars

http://www.forestrywebinars.net/

4. Conservation Webinars

http://www.conservationwebinars.net/

5. Urban Forestry Today

http://www.urbanforestrytoday.org/

6. Climate Webinars

http://www.climatewebinars.net/

7. Cornell University

http://blogs.cornell.edu/cceforestconnect/subscribe/

8. How To Do Urban Wood

http://illinoisurbanwood.org/urban-wood-network-announces-how-to-do-urban-wood-webinar-series/

9. Forestry Chronicle

http://pubs.cif-ifc.org/journal/tfc

10. Canadian Journal of Forest Research

http://www.nrcresearchpress.com/journal/cjfr

11. FPInnovations

http://blog.fpinnovations.ca/

Coming Events

Climate Change Response Framework:
Adaptation Planning and Practices Online courses
Fall 2020 - Winter, Spring 2021

https://forestadaptation.org/learn/adaptation-planning-and-practices-online-courses-fall-2020-winter-spring-2021

CIF-IFC 2020 National Conference and 112th Annual General Meeting - Virtual Event

September 15-16, 2020

www.cif-ifc.org/2020-conference-agm/

European Gypsy Moth Webinar

October 7, 2020

https://www.eomf.on.ca/news-and-events/events/34/european-gypsy-moth-webinar

Ontario Woodlot Association Annual (Virtual) Conference

October 27 - 29, 2020

https://www.ontariowoodlot.com/