MARCH – APRIL 2014

BC Forest PROFESSIONAL

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Operationalizing LiDAR — **A User's Guide to Success**

Forestry Applications of Digital Aerial Photography

Legal Perspective: The Honour of the Crown

Year End Membership Statistics


Forestry Through Your Eyes
We want to see forestry in BC through your lenses! If you capture a great shot and want share it with your colleagues, send it to Doris Sun at: editor@abcfp.ca for a chance to get published.
BC Forest PROFESSIONAL

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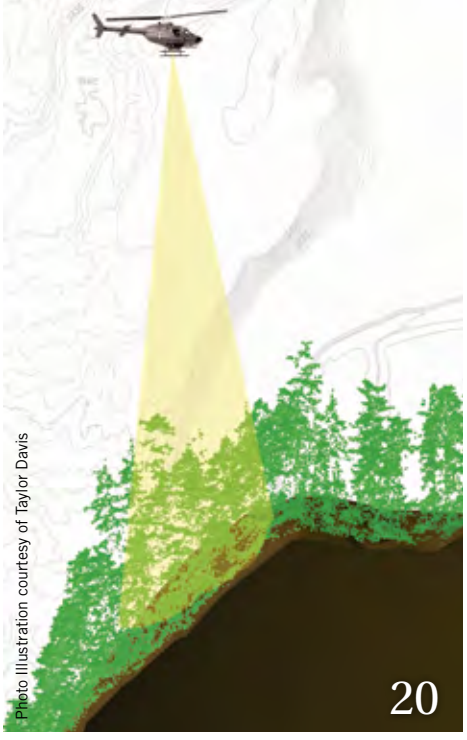

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Memoirs of a Coder

The November/December 2013 issue on forest inventory and the letter by Jack Carradice (in the January/February 2014 issue) triggered memories of my experience as a coder in 1951. As a summer student, I was based on the MV Forest Surveyor working mainly in the Bella Coola area. Our party chiefs were Doug Fligg and Bob Jones who did an excellent job of coordinating several coder/compassman crews; 12 of us living on a 60-foot vessel. Mickey Pogue introduced many innovations such as food air drops using square cotton sheets as parachutes. Since most open areas were old slides, the eggs and jars of jam seldom survived! Inventory sample locations were pre-marked on our air photos, then located on the ground. We sampled using the 'exploded plot' system.

One memorable assignment was when Jim McLaren (the other coder) and I were dropped off with our compassmen on a sandbar up the Kwatna River. With our Trapper Nelson packboards loaded, we slugged our way up to the headwaters through dense devil's club and over a large blow-down of giant spruce in the pouring rain. After several days, sampling as we went, we decided we did not want to retrace our steps, so we made a raft of logs lashed together, and poled our way down the river reaching the pick-up point in three hours. (It would have taken three days to retrace our up-river route.) We camped that night on a sandbar, unaware the high tide and heavy rains would flood us out in the middle of the night! We were relieved when the two outboard skiffs arrived to pick us up, ending a typical week's work on the coast.

Anyone interested in seeing photos can contact Blake Dickens at bbd959@shaw.ca.

Blake Dickens, RPF (Ret.) 379

Another Side to Log Exports

I read with interest the two articles regarding log exports from British Columbia. However I was very disappointed that both articles strongly supported the export of logs, basically in the name of a few jobs. Although the arguments were compelling there should have been an article outlining all the reasons we should not be exporting our logs; in other words, a more balanced approach that each and every member expects from **BC Forest Professional**.

I urge someone with the correct knowledge on log exports be allowed to write a rebuttal column.

Chris Betuzzi, RFT

Editors Note:
We would be pleased to publish a rebuttal article. Please contact us if you would like to write one.

Put in Your Two Cents

The **BC Forest Professional** letters' section is intended primarily for feedback on recent articles and for brief statements about current association, professional or forestry issues. The editor reserves the right to edit and condense letters and encourages readers to keep letters to 300 words. Anonymous letters are not accepted.
Please refer to our website for guidelines to help make sure your submission gets published in **BC Forest Professional.**

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Good Information Stops Worry

My compliments on the article on Log exports in the January/February issue—very interesting and useful.

Fig 2: Advertised Volumes by Origin indicates logs from federal and provincial origins. Is this from federal and provincial lands or does it relate to the authority issuing the export permit?

All other provinces restrict the export of logs from public lands — even to an adjacent province — but there are no restrictions on the export of logs from private lands.

I understand that there are historical reasons for this based on the timing of the Crown Grant, but why continue restrictions on private property rights just because "those who were set in authority over us" decided about 100 years ago that it was the right thing to do?

Information on volumes exported would make a nice complement to the article by Mr. Higgins.

An authoritative article on progress in the post-beetle reforestation program would be very useful. Looking at the statistics on seedlings planted in BC, I see little signs of a surge in planting. Perhaps natural regeneration is doing the job. Considering the (professional, public relations and forest management) mess we were in with post-harvest NSR in the late 70s and early 80s across Canada, it would be a terrible shame to revisit that experience. We do not want another blight on our professional or provincial government record. Good information stops worry.

Tony Rotherham, RPF

President's Report

By Christine Gelowitz RPF

A Strategic Look to 2016

When I first started my term as president in February of 2013, I knew that one of my major projects would be to lead the ABCFP through another strategic planning process — and I was thrilled to be able to take on this role.

As I mentioned in my first **BC Forest Professional** magazine column, I believe that planning is vitally important. If we don't know where we want to be in the future it is really hard to make decisions on a day-to-day basis about where to invest our time and energy — and we are at risk of floundering when the first bump in the road appears. Similarly, if we don't think about things in our operating world that may cause our business to change, it is nearly impossible to evolve our business to meet future needs.

We started work on the strategic plan by assessing the operating environment our association works within from the perspective of a number of people involved with us. We surveyed all our council members, senior staff and ABCFP committee chairs about what they believed will be the top issues our association will face in the next few years and how they felt we should respond. We also asked what strengths the ABCFP had and how we could use those strengths to move forward. We conducted interviews with senior officials involved in the forest sector. We asked them what role the ABCFP should be playing and where the ABCFP should go in the future given the challenges and opportunities they were experiencing or foreseeing in the course of their business. We received lots of great feedback, all of which was used to inform our thinking as council sat down together with senior staff to put pen to paper and craft the new strategic plan.

Because 2013 was a year of complete revision of the strategic plan as opposed to an update, we pulled apart each priority area in our last plan to discuss whether it was still needed and to confirm the outcome and objectives we were striving towards. We also discussed whether we needed to add any new priority areas.

The end result was significant changes from the last version, including the addition of a new priority area focused on enhancing public trust. The outcomes of each priority area were refreshed as follows:

- The ABCFP is recognized as taking a leadership role in the stewardship of forest land and ecosystems.
- The ABCFP and our members demonstrate leadership and passion in matters of professional practice.
- Our profession is evolving and expanding to meet the future workforce needs of natural resource management in BC.
- The public looks to forest professionals as the trusted stewards of forest lands and ecosystems in BC.
- The ABCFP is recognized as a highly effective, efficient and professionally relevant organization.

This plan will be used to guide the staff activities for the next three years and senior staff has already used the new direction to guide the development of the business plan for 2014. I know that the time and effort spent on the strategic plan in 2013 was worthwhile. With this plan our association has positioned itself to look forward for opportunity and for new and different approaches while continuing to deliver on the core aspects of business.

CEO's Report

By Sharon Glover, MBA

Public Trust and Climate Change Adaptation–

Where the Rubber Hits the Road

The Foresters Act (the Act) is one of the few pieces of legislation in BC that allows for "right-to-practice." It is different than legislation governing the biologists or agrologists, and similar to the engineers on the point of practice exclusivity.

In our case, forest professionals are the only people entitled to practise professional forestry in BC. Right-to-practice legislation is rare and not granted easily. The legislature generally frowns on giving one group of people the exclusive right to an area of work. This type of legislation is granted when the legislature believes that the public interest can only be served by restricting the practice to the specific knowledge and skill of a group of professionals.

Right-to-practice benefits you as a professional but there is a trade-off. Forest professionals have been granted the right-to-practice and, in return, they promise to undertake their practice in protection of the public interest. Specifically, section 4 (1) of the Act says "It is the **duty** of the association (a) **to serve and protect the public interest**."

To be clearer about the public interest duty, the Act also spells out the objects of the association. Specific to the public interest the Act says in section 4(2) the objects of the association are the following: "(a) To uphold the public interest respecting the practice of professional forestry by (i) ensure the competence, independence, professional conduct and integrity of its members." It's heady stuff for sure — and important. It puts the weight of public interest and professional independence on our shoulders.

So the association and individual members have the duty to protect the public interest. It is a shared and personal commitment to society. This is why the first edict in the Code of Ethics (ABCFP Bylaw 11) states that the responsibility of a member to the public is "to advocate and practice good stewardship of forest land based on sound ecological principles to sustain its ability to provide those values that have been assigned by society." (ABCFP guidance on interpreting the publics' interest is on our website and is every bit as relevant today as it was when it was written in 2002.)

So that takes us to social license. There is not a strict definition of social license; however, it generally includes three characteristics: having a legitimacy that gains the approval of society, the community and other stakeholders; having performance that builds credibility for ongoing approval; and through achievement obtains trust. Therefore, social license has to be earned and maintained which brings us back to our first duty to the profession "to serve and protect the public interest."

In the association's most recent strategic plan, council recognizes the importance of this linkage. Enhancing the public interest is one of council's five key priority areas for the association. Specifically, they want the public to be confident that ABCFP members are independent and acting in their interest. And, they want members to understand and embrace their role in enhancing public trust.

So how exactly should this be playing out? Let's take, for example, the current discussions around adapting to climate change. Now here's an issue that touches our professional practice. Whether or not you are close to the science, you know that our environment is threatened on a global scale. Climate change is one of those issues that we as professionals in resource development can ill afford to be off-side or silent on. We all have too much to lose.

Let's take a closer look. The province talks a lot about sustainable resource development. And BC sells its products worldwide by marketing the large amount of its forest resources that are certified. It's a distinction we should be proud of. The SFI standard, one of the most popular certification programs, is composed of principles, objectives, performance measures and indicators and is recognized by governments, corporations, and social and environmental groups globally. Its first two principles are sustainable forestry and forest productivity and health. Its objectives around forest management planning use an indicator in forest management planning that planned harvests should be adjusted to account for various changes to productivity including the effects of a changing climate. So our forest certification systems demand that land users incorporate future change as a component of wise stewardship. What's left beyond the market-driven forces is a public duty to act. And the duty to act is greater on those with the science-based knowledge.

Our recently released paper, Climate Change, Forests, and the Practice of Professional Forestry, recognizes that climate change is altering the historic natural disturbance trends, including the scale of forest insect and disease outbreaks. We suggest that forest professionals can reduce impacts to forest ecosystems by adapting forest management practices to promote forests and forest-based industries that are resilient and adaptable in a changing climate.

When the public asks CEOs, senior government officials, and the association what specific actions have been taken to adapt to climate change, working together we will have a good story to tell. It is a story of good forest stewardship, long-term sustainability of our forest resource, and of maintaining public trust and our social licence.

Exam Candidates Form New Study Groups

Are you planning on writing the registration exam this fall? If so, don't study alone — join a study group! Members in study groups can help each other put together their study binders, have discussions about hot topics and hold mock exams. Existing study groups include:

Cariboo Region
(Quesnel, Williams Lake, 100 Mile House, Prince George)
Contact: Derek Burdikin, FIT, at Derek.Burdikin@westfraser.com

Castlegar Area
Contact: Loreen Hodgkinson, FIT, at loreen.hodgkinson@interfor.com

Nanaimo/Port Alberni/Qualicum Beach Area
Contact: Molly Hudson, BIT, FIT, at hudsonm@timberwest.com

Peace Region
(including Chetwynd, Mackenzie, Fort St. John and Dawson Creek)
Contact: Janelle Sakamoto, FIT, at Janelle.Sakamoto@westfraser.com

Go to the Study Groups page for information on current groups and on how to start your own group.

You can also reach out to other exam candidates on the online discussion forum. You'll need to log on so contact the webmaster (webmaster@abcfp.ca) if you have forgotten your logon information.

New Professional Reliance Evaluation Tool for Members

The ABCFP has developed an evaluation tool to assist ABCFP practising members achieve a consistent application of professional reliance. Once you are familiar with the content and steps, the evaluation should only take a few minutes to complete. The evaluation tool is intended for ABCFP members to evaluate your own practices and it may also be used as a reference during your routine decisions or tasks, or as a periodic assessment of your professional work. Upon completion of the self-evaluation you would have considered many of the key components of professional reliance. Check it out on our website under Stewardship and Practice Reports (under the Publications and Forms tab).

Policy Review Seminar to Be Held in June

The Policy Review Seminar will be held three months earlier than usual to facilitate members' study schedule and is still a great resource for your professional development. The seminar will take place in Kamloops at Thompson Rivers University on **Thursday, June 12 and Friday, June 13**. As in past years, this seminar will be available as a live webcast if participants can't attend in person and it will also be recorded for your future reference and studying.

In addition, the ABCFP will have the Forest Legislation and Policy Reference Guide available in mid-April — also three months earlier than normal. This guide will replace the RFT and RPF reference libraries used to study for the exams.

Members who attend the Policy Review Seminar, either in person or online, will receive all presentation handouts, a PDF of the Forest Legislation and Policy Reference Guide and a link to the seminar recording as part of the registration price. There will be a charge for hard copies of the guide, as well as for a link to the seminar recording, for those who don't attend the seminar.

Keep reading **The Increment** for registration information. If you have any questions about the Guide or the seminar please contact Brian Robinson, RPF, director of professional development and member relations at: brobinson@abcfp.ca.

ABCFP Releases Position Paper on Climate Change

The ABCFP has issued a position paper on climate change. This paper is the work of the Climate Change Task Force and serves as our official position on this important topic. You can read the paper on the Stewardship and Practice Reports (under the Publications and Forms tab).

By Doris Sun

We Are All Firefighters

Photo: Yan Goulet

The March/April issue of BC Forest Professional magazine on forest fire management has been six months in the making. This Viewpoints theme was passionately endorsed by a member of the editorial board and for good reason: while the recent fire season in BC has, fortunately, been relatively inactive, statistics show that the damage caused by fire events has increased dramatically in the last decade. In 1996, for example, BC saw fewer than 25,000 hectares of forests lost to fire while in 2006, saw a loss of close to 150,000 hectares; similarly in 1999, the province lost approximately 10,000 hectares of forests while in 2009, the figure increased 25-fold.

There is no argument, then, that the issue of fire management is real and pressing. Where opinions often diverge is when we attempt to determine who is responsible for fire prevention and mitigation.

The articles in this issue look at fire management holistically. From profiling burn P3 modelling as a tool to evaluating wildfire risk to actually illustrating the scenario of what a well-prepared community would look like versus an unprepared one in a fictional scenario should wildfire break out, our Viewpoints pieces ponder a variety of community and government-initiated fire preparation strategies.

It was therefore appropriate when deciding on this issue's Viewpoints slogan to revise it from "Fire Management: Who's Problem is it?" to "Fire Management: Everyone's Problem." As much as citizens expect protection from harm and property damage if a fire breaks out in their communities, our articles highlight that everyone has a role, from the hiker extinguishing his/her cigarette in the woods, to the fire chief who decides how to attack a blaze, to the policy maker who enacts measures to minimize loss in future fire events. Along that vein, we hope this issue stimulates thought about fire management from the ground up as we transition into the warmer and drier months ahead.

Stewardship Principles and Fire Management

The ABCFP has defined forest stewardship as the responsible use of forest resources based on the application of an ecological understanding at the stand, forest and landscape levels which maintains and protects ecosystem function, integrity and resilience. It is based upon an ethical responsibility to the land and people for current and future generations.

If you have a natural resource degree or diploma, you will remember learning about the critical role of wildfire in ecosystem health and maintenance. Many of our natural landscapes and plant communities were regulated by the frequency and intensity of fire. This pattern changed over the decades, however, as human intervention has altered the frequency, severity and location of wildfire. A quick flight over the interior of the province on a clear day makes this plainly apparent, as evidenced by the pattern of openings, the extent of beetle salvage activity and the success of fire suppression. As forest professionals, we continue to develop our understanding of the role and importance of maintaining fire on the landscape, in spite of all the management challenges that come with it.

In 2012, the ABCFP's Professional Practice Committee released a report on Fire and Fuels Management[2]. This report referenced seven priority issues. While this report focused mainly on practice concerns, two of the priorities were also stewardship related:

- A need for landscape-level planning to include consideration for fire and fuels management and for fire and fuels-related activities to include consideration for coordinated landscape planning and multiple objectives.
- A need to return fire to the landscape, in consideration of acceptable risks.

Fire management (both wild and prescribed) requires that perfect marriage of knowledge (the science) and experience (the art). It is a daunting subject, due to the many variables involved; not the least of which is the current and future variability our ecosystems are facing through climate change.

A review of the seven Principles of Forest Stewardship reminds us of the complex breadth of factors the forestry team must consider when managing forests and ecosystems, including the presence of fire on the landscape.

[1] The main document can be seen at http://abcfp.ca/publications_forms/publications/committee_reports.asp
[2] http://abcfp.ca/publications_forms/publications/documents/Fire_Fuels_Management_Report.pdf

Wildfire Management in British Columbia

Two Futures

This article illustrates the benefits of proactive wildfire threat reduction for communities in British Columbia. It presents fire management concepts at several levels: the private landowner scale (using FireSmart principles); the community scale (community wildfire protection plans and treatment projects); and the landscape scale (landscape fire management planning). Although the two scenarios below are theoretical, they are based on wildfire events that have recently occurred in North America and could potentially occur again. Which future would you like to live in?

Setting

It's the year 2027 and BC has experienced the warmest winter and hottest summer ever recorded in the northern hemisphere. By mid-summer, numerous fires have threatened communities but the wildfire response has been successful and losses have been kept to a minimum. However, now the fire danger rating is 'extreme' all firefighting resources are on standby, communities are on edge and smoke is everywhere.

Despite aggressive initial attack efforts, a series of small, lightning-generated wildfires in southern BC have now joined together to form a larger and much more dangerous fire complex. While fire response crews have been making good progress to contain the fire on its flanks, a storm system with high-speed winds is predicted to move into the area by nightfall.

A real-time satellite analysis linked to up-to-the-minute weather forecasts predicts high-velocity winds that will blow the fire directly toward a community 15 kilometres downwind. The on-site incident commander reviews a high-resolution, three-dimensional terrain model that shows a forested landscape with high fuel loading.

Extreme wildfire behaviour, high wildfire intensity and a phenomenal rate of spread are predicted. This will be a firestorm and will not be stopped using conventional means. Airtankers will have little effect and it will not be safe to deploy ground crews in front of this dangerous, fast-moving fire.

Future #1

The situation is grim and there is only one option.

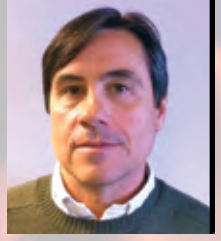
The terrain model indicates that little landscape fire management planning or fuel management has been done near the threatened community. Although trees have been harvested in several areas, large areas of contiguous, high-risk fuel types remain between the cutblocks. Densely reforested areas will not slow the wildfire's progress.

No FireSmart activities have been completed to help protect homes and critical infrastructure from a rain of flaming embers tossed in front of the fire. The model reveals an extremely hazardous landscape and a community that is not fire-adapted. There are few obstacles to slow this fire and the threat is extreme. Catastrophic losses are predicted.

An updated weather forecast shows that there will be a three-hour window in which the winds will die down prior to the high-speed wind event. The only available option is implemented. As dense, black smoke fills the air, the community is completely evacuated — including all fire response resources.

Once the extreme event ends and it's safe to do so, response crews will re-enter the community and attempt to save whatever structures have not been lost in the firestorm.

The outcome is unpredictable, but severe losses are expected.



Viewpoints

By Lyle Gawalko, RFT

Future #2

The situation is grim, but there are options.

The incident commander calls up a new layer on the terrain model that shows a series of landscape-level fuel breaks that were established in 2015 as part of a landscape fire management plan, through targeted harvesting, ecological restoration, fuel management and prescribed burning. These fuel breaks were strategically planned to complement a community forest fuel management zone that extends around the community for two kilometres in every direction.

The fuel breaks are further supported by roads and utility corridors that are clear of fuels for 30 metres on each side and are further buffered by fire-resilient forest stocking standards for another 200 metres on each side. The community was also proactive in conducting FireSmart activities and its structures are prepared to withstand any burning embers that may be blown into the community.

As a final measure, strategic evacuation routes have been cleared and safe zones have been established for community members and firefighters. The model indicates a wildfire-resilient landscape and a fire-adapted community, and the model predicts few (if any) structural losses.

An updated weather forecast shows that there will be a three-hour window in which the winds will die down prior to the high-speed wind event. A well-planned operation begins.

While a precautionary evacuation of the community residents gets underway, the Incident Management Team remains on site to execute a large scale burn-off between the community and the advancing blaze. The burn-off is planned to use the landscape fuel breaks and road corridors as anchor points.

Infrared wildfire monitoring drones accompany a helicopter equipped with an aerial drip torch to begin the light-up, as ground crews working from safe zones begin surface ignition. The burn-off is completed within a few hours and when the storm blows the wildfire into the burned-off area, the extreme fire behaviour is halted.

The community has been saved from the firestorm, but the job is far from finished. The long and arduous task of containment and mop-up begins but everyone is safe and no structures were lost.

Today's outcome has been a good one.

Epilogue

BC's Wildfire Management Branch delivers world-class wildfire management for BC, however, suppression response options can be limited during extreme wildfire events. Proactive wildfire threat reduction, completed before a wildfire occurs, is the key to protecting communities, critical infrastructure and natural resource values. It has been conservatively estimated that there is a 4:1 rate of return on investment in proactive fuel and fire management activities. We do not have to accept Future #1 and its outcome. Future #2, a positive outcome during an extreme event, can be a reality if we work collectively at the homeowner, community and landscape levels to proactively mitigate wildfire threats in BC.

Lyle Gawalko has been the manager of fire management for the Ministry of Forests, Lands and Natural Resource Operations, Wildfire Management Branch, for the past five years. In this position he leads the fire sciences, fuel and landscape fire management, legislation and policy, prevention, fire behaviour specialist and weather programs. Lyle is a graduate of the BCIT Forest Technology and UBC Natural Resources Conservation programs and for the past 25 years, has worked in a variety of forestry jobs in both government and the forest industry.

By Dana Hicks, RFT

Identifying Landscape Wildfire Risk Using Burn P3 Modelling

Where is the next wildfire going to occur on the landscape? Can we predict it?

We may be tempted to gaze into a crystal ball but we probably won't find an answer. We can, though, model forest polygons that are at a higher-than-average risk of burning. The Wildfire Management Branch has begun using Burn P3 (probability, prediction and planning) modelling software to simulate and evaluate the likelihood of fire or burn probability in large landscape units in British Columbia.

Burn P3 is Windows-based software that evaluates the burn probability at every given point/pixel in a display of a landscape unit. This software was developed by Marc Andre Parisien at the Northern Forestry Centre, Natural Resources Canada. The concept of the model development was to have a tool to analyze large landscape units for forest fire risk. This model is becoming a standard for use in identifying fire risk in Canada. Work is ongoing with the fire growth engine within the model. More information can be found at: http://www.firegrowthmodel.ca/burnp3.html. The Wildfire Management Branch is working closely with Marc Andre to further develop the model for use in BC.

The model uses spatial units consisting of Canadian Forest Fire Behaviour Prediction (FBP) fuel types, topography, ignition points (with a grid based on historical human-caused and lightning-caused fire locations), fire zones (natural fire regimes), weather zones (based on the Biogeoclimatic Ecosystem Classification system), a winds grid and vector fire breaks (e.g. BC highways). Using this software, we can simulate a large number of fire iterations within a landscape unit.

Every iteration consists of numerous ignition points. Each ignition point is 'grown' until the fire is extinguished by weather conditions or its growth is limited by fuel levels. After thousands of iterations are completed, the Burn P3 program computes the likelihood of a pixel in the landscape display (at a 25-metre resolution) burning within a given timeframe. Collectively, these pixels represent a map of burn probability for that landscape unit.

This model can be useful as a tool to establish a relative ranking of fire risks for management prioritization, but Burn P3 is a landscape modelling tool with limited use at a forest stand/polygon level. This model uses a Monte Carlo approach where the iterations rely on repeated random sampling to obtain burn probability results; typically one runs simulations many times over in order to obtain the distribution of an unknown probabilistic entity. This method combines deterministic fire growth modelling with probabilistic model inputs, and as such should be considered a snapshot in time. We are running tens of thousands of iterations per resources district in BC.

Burn P3 can also calculate fire intensity for a given landscape. Fire intensity is the heat output of the forest fire and is measured in kW/m (the metric equivalent of British Thermal Unit) at the flaming fire front.

The classic definition of risk is *risk = probability x consequence*. With Burn P3, we now have a way of measuring fire risk on a landscape by using burn probability (probability) and fire intensity (consequence) to indicate fire risk at a landscape level.

Once areas of high wildfire probability are identified, we can overlay a values-at-risk spatial layer. Values at risk are resources or infrastructure on the landscape that could be harmed by fire, such as timber, homes, cabins or utilities.

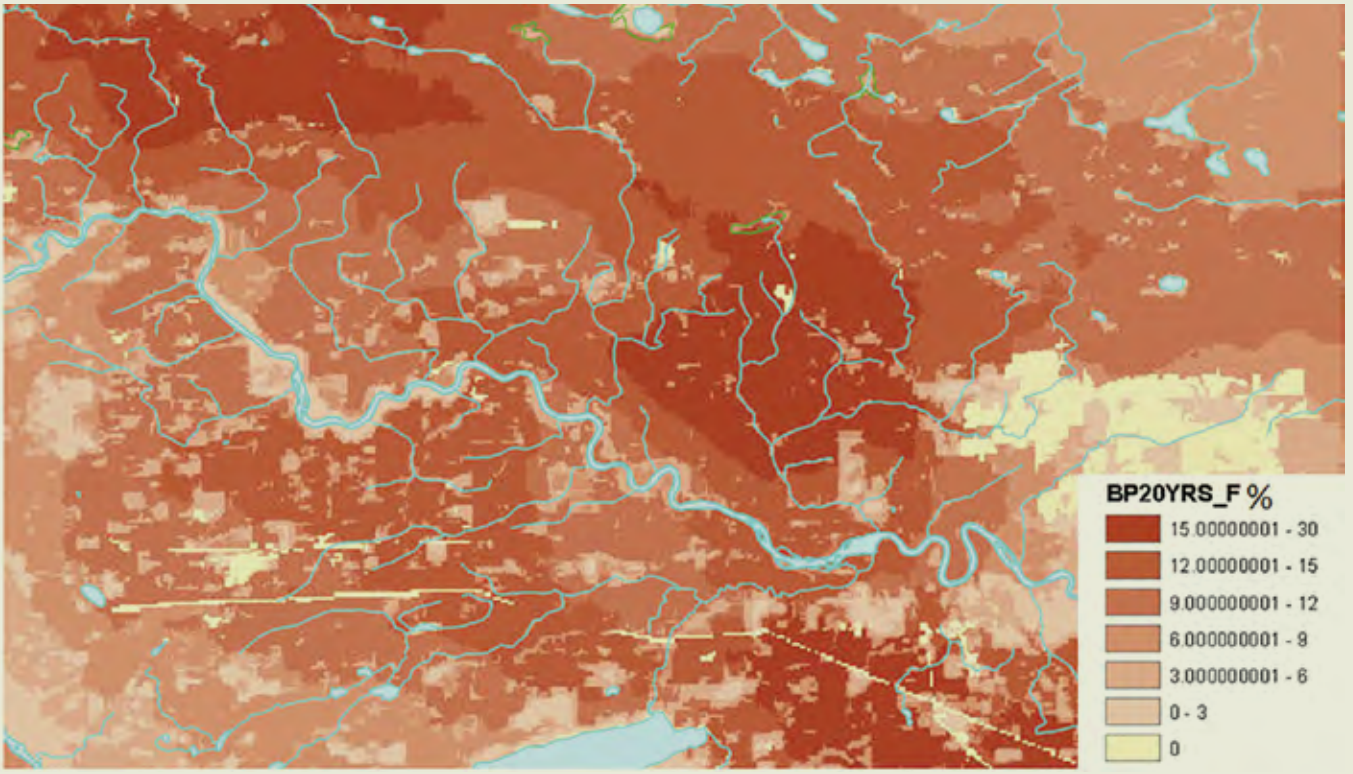


Image courtesy of Dana Hicks

Map showing a section of landscape with the 20 year burn probability by classes

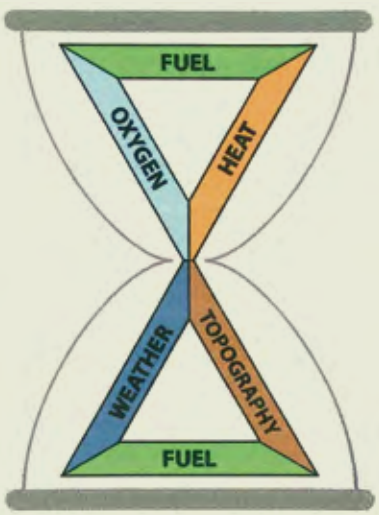
Four categories have been created to provide a priority ranking system for these values. They follow the province's response prioritization system, the Resource Sharing Wildfire Allocation Process (RSWAP). The categories are:

1. human life and property
2. critical infrastructure
3. high environmental and cultural values
4. resource values

By using the computer model to determine the probability of a high-intensity wildfire in a particular area and then identifying values that could be affected, we can make plans to mitigate the fire risk on that landscape. To modify future fire behaviour, you must alter one of the three key components of the fire behaviour triangle: fuel, weather, or topography.

The best method of altering potential fire behaviour is to modify forest fuels in the area. This can be achieved through treatments such as harvesting, prescribed burning or other fuel modification treatments (thinning, pruning, etc.). Other options include using alternative stocking standards to reduce the potential intensity of wildfires in selected areas.

Another use for the Burn P3 analysis is related to forest investments. By understanding how wildfire risks could affect a particular natural resource value, we can plan to manage that value accordingly, by locating high-value resources in areas of lower wildfire risk or by reducing wildfire threats to high-value resources through proactive reduction of those wildfire threats.



The fire behaviour triangle comprises fuel, weather and topography. One of these components must be altered in order to modify future fire behaviour when condocting fire probability modelling.

Future plans for these computer models and analyses include evaluating climate change predictions and associated weather data for different climate change scenarios, to show how and where fire risks might change at both the landscape level and the provincial level as climate change progresses.

Dana Hicks, RFT, is the acting fire science officer for the Wildfire Management Branch of the Ministry of Forests, Lands and Natural Resource Operations. He is an internationally certified fire behaviour specialist and has worked with fire for over 30 years.

By Brian Simpson

BC's New Fire Management Reality: Wake Up and Smell the Smoke

Expanding urban development and increased levels of human activity in BC's rural areas over the past few decades means that we are constantly evaluating and improving our firefighting strategies to better protect communities, resources and infrastructure from wildfire threats.

The Wildfire Management Branch has made great progress in developing a more effective and proactive wildfire management strategy, particularly since the devastating 2003 fire season. However, we must continue to enhance our response and preparedness capabilities to deal with the very real consequences of climate change and other emerging challenges.

I have spent over 35 years working in the BC Forest Service and the last seven in charge of the Wildfire Management Branch. In recent years, I have seen significant changes in the wildfire situation in BC that have caused me to become increasingly concerned. My conclusion is that we must make a fundamental shift to our land management practices to address these ongoing developments or we will experience escalating wildfire impacts in the future far greater than what we have seen in the past. It's time for all of us — from government leaders, wildfire professionals, industry leaders, communities and individual property owners — to 'wake up and smell the smoke.'

Wildfire management practices and fire prevention measures need to continually evolve throughout the province, not just when there's smoke in the air or after we've emerged from a particularly active fire season. The severity of wildfire seasons varies from year to year, but current conditions and future trends warrant a better public understanding of wildfire risks in BC and an increased commitment to fire management at the landscape and community level.

We can't afford to treat wildland fire as just one other issue that affects the landscape. It has to be viewed as a 'game changer' in all our planning and land base activities, due to the damage it can potentially cause. Few other factors present a greater threat to communities and BC's natural resources. In my view, fire management issues demand a higher level of consideration in the decision-making process.

Three main drivers contribute to the escalating wildfire concerns in BC: climate change; fuel conditions; and expanding industrial and urban development that hasn't given enough consideration to the current and future wildfire risk.

We need to take climate change seriously and plan for the worst case scenario. One prediction suggests that severe fire incidents are expected to double by 2050. It's time to focus our attention on that possibility.

The current mountain pine beetle infestation has killed 18 million hectares of trees in BC, creating the largest hazardous fuel type in the province. Fire moving through this type of fuel doesn't behave like a fire burning in green stands of trees. It can generate multiple fire fronts simultaneously (we call it 'squiggling') and lightning storms can start more fires amongst dead trees than the same storm would spark in green stands. Spotting is very common and crowning is almost certain to occur at low thresholds (even in the grey stage of a mountain pine beetle infestation because of the presence of so many dead twigs).

Salvaging of dead trees is ongoing, but current estimates indicate that 10 million hectares of beetle-affected trees will not get salvaged. The next generation of firefighters will have to contend with increased fire intensity where these dead trees have fallen to the ground and new trees have grown up through that debris. In addition, the benefits of naturally occurring fires have been greatly diminished due to well-intentioned fire suppression efforts which means large tracts of land are in a much more hazardous state than if those fires had been allowed to burn.

Fortunately, a number of positive strategies have been implemented by the province in response to these trends. Those initiatives include:

- Increased numbers of fire suppression crews and strategic resources such as air tankers
- Greatly improved suppression tactics and strategies
- Investment in new fire management facilities, including the Provincial Wildfire Coordination Centre in Kamloops and new fire zone offices in Arrow, Merritt and Valemount
- Improvements to several primary airtanker bases
- Over $50 million invested in the Strategic Community Wildfire Protection Program, with hundreds of Community Wildfire Prevention Plans now in place and tens of thousands of high-risk hectares treated
- Implementation of pilot projects as part of a focused Landscape Fire Management Strategy for BC
- 'Type 4' Silviculture Strategies that are moving to address immediate forest management needs as well as some long-term objectives related to climate change, biodiversity and wildfire management (Type 4 Silviculture Strategies for Timber Supply Areas to help better understand the current and future timber and habitat supply situation and what can be done to improve it).

Despite all these efforts to date, we must continue to look to the future and respond appropriately. Decision-makers at all levels need to understand that this requires a fundamental and deliberate shift to create communities and landscapes that are fire-resilient and better prepared to respond to future wildfire threats.

It is essential to make wildfire risk a primary consideration when undertaking land-based activities. Communities, industry leaders and all levels of government must do their part. Forest professionals have a key responsibility to ensure that wildfire threats are taken into account when conducting forest management activities.

Photo: Pete Laing

Four key elements to success:

1. The continued improvement of fire suppression tactics, tools, processes and technology is essential. We need to ensure that our suppression capacity is keeping pace with increasing demands and also find ways to share strategic resources even more than we already do.
2. Landowners, communities and developers need to embrace FireSmart principles. Property owners are responsible for protecting their own structures from wildfires, with the support of technical experts, appropriate legislation and financial incentives. Mandatory conditions for land development and building plans in areas prone to wildfire are necessary to reduce future wildfire risks. Local, provincial and federal governments, in consultation with insurance companies, should consider placing a greater emphasis on proactive fire prevention measures.
3. Local governments and communities must make a commitment to careful planning and fuel management in interface areas. They should view this as a high priority, with support from government and fire management experts. Local bylaws and infrastructure development should reflect that commitment. Community Wildfire Protection Plans are living documents that should be integrated into all their planning and decision-making in interface areas and support wildfire protection for those communities.
4. Fire management and fuel management at the landscape level provide opportunities to make significant gains toward these goals. Mitigating wildfire risks should be a primary driver in all land base planning decisions, approvals and activities. Whether it's the placement of a road, power line, subdivision or the implementation of a timber harvesting plan, one of the key goals of any of these activities should be to create a more fire-resilient landscape. All activities need to be viewed through a 'fire lens' to ensure that — wherever possible — we reduce wildfire risks or at least don't increase those risks. Proactive fire management principles that help BC landscapes evolve into a more fire-resilient state (through a mosaic of managed fuel types, increased use of prescribed fire and the creation of natural fuel breaks) will help mitigate the risk of the 'megafire' scenario and allow firefighters to do their job more safely and effectively.

Without an increased commitment to these goals, there is an expectation that firestorm events (such as the one that occurred in 2003) will become more common. In my opinion, we have two choices: to better manage these anticipated risks now or wait to see if the predictions turn out to be right and only then "smell the smoke."

Brian Simpson is a forest technical graduate from BCIT. Brian has over 35 years of experience with the BC Forest Service in a variety of technical and senior management roles through many areas of the province. Throughout his career his real specialty and passion has been in wildfire management. His broad experience includes certification as a Type 1 Incident Commander in the early 1980s, 10 years as a forest district manager, three years as the provincial manager of fire operations and deputy director, six years as the director of the Wildfire Management Branch to his current appointment as executive director of the Wildfire Management Branch.

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Featured Courses

Building Resource Roads in Wetlands

Canada's forested landscapes feature numerous wetlands, such as fens, bogs and swamps, which present environmental and operational challenges during the planning, construction and maintenance of resource roads. The effects of these roads on the many ecological functions of wetlands are of increasing concern to Canada's resource-based industries, governments, communities and conservation organizations. The low bearing capacity of native soils and the high soil moisture levels that dominate wetland environments necessitate optimized planning strategies, ,specialized road infrastructure designs, and cost-effective construction methods.

This workshop will:

- Provide the participant with the tools to help identify and understand the differences of the various wetland types and associated hydrologic function.
- Describe the development and evaluation of resource road management and construction techniques and the application of alternative products and materials through the implementation of short and longterm environmental impact studies and road performance evaluations.
- Elaborate on the various techniques being employed during resource road construction across wetlands, a "state of practice"
- Showcase examples of foundation design solutions, site monitoring results and performance indicators.
- Discuss how to mitigate potential environmental impacts and reduce life cycle costs of resource roads.

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This three day course will provide an overview of the economics of renewable energy development, with a focus on a British Columbia context.Students will learn the following: Economics and Regulation of Energy in BC, Renewable Energy Project Economics, Business Planning for Renewable Energy Projects. Anyone who is interested in developing renewable energy projects either themselves as an entrepreneur, or within their organisation. However, the course will also be of interest to anyone who is interested in the changing energy landscape in British Columbia and is curious about how renewables fit into the mix.




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Date: Jan 20-24, 2014 Location: UNBC Prince George

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Date: Feb 17-21, 2014 Location: UNBC Prince George

Economics of Renewable Energy
Date: Feb 18-20, 2014 Location: UNBC Prince George

Northern Silviculture Committee Winter Workshop
Date: Feb 18-19, 2014 Location: UNBC Prince George

Building Resource Roads in Wetlands
Date: Feb 20, 2014 Location: UNBC Prince George

GIS for Mining and Exploration
Date: Mar 3-7, 2014 Location: UNBC Prince George

RoadEng Road Design
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Date: Mar 17-21, 2014 Location: UNBC Terrace

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Wildlife Danger Tree Assesor's Course

Wildland Fire Safety Module
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Date: June 19-20, 2014 Location: Kamloops, BC

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Date: Mar 20-21, 2014 Location: Victoria, BC
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Will Wagner, PhD, RPF

Fire, Wolves and Beetles: Neutral Change Agents?[1]

My understanding of the ecological basis of forest husbandry has crossed many streams and sometimes I had to backtrack quite a distance as I tried to separate science from myth. I am still struggling with casting off some of the truths I accepted in my introduction to forest preservation during the post-Korean War 'Bambi-era.' Not only were my facts about the impact of wildfire learned from movies like *Bambi*, there was Grimm's 1697 fairytale, *Little Red Riding Hood*, where I was warned of one danger in the woods, *Canis lupus*. This fairytale contrasts the known world of the human-dominated village with the unknown terrors of the forest.

After my family bought its first television, I cannot remember a year passing without seeing images of 30-metre flames spreading through tree crowns, while grim-faced news reporters cited how many hectares of forest were destroyed by the latest catastrophic fire. Often in the same story there would be pictures of wildlife cowering on river banks and reminders of their bleak future of starvation and death. As I grew older, statistics on livestock and structural damage were included in the storyline to illustrate the increasing costs in lives and dollars. Not only were wildfires apparently becoming more frequent, they were increasingly expensive in impact and control.

Until about 25 years ago, land management agencies such as the US Forest Service genuinely believed they could essentially eliminate fire from the forest if they had enough resources to suppress fires — and they sought to do just that. Now managers are realizing that, despite spiraling spending on fire suppression, fires cannot be indefinitely kept at artificially low levels in forest systems that are adapted to frequent burning. Further, by the late 20th century, fire managers began to concede that historically, frequent low-intensity fires were natural in the forests, slowly creeping along the forest floor after lightning ignitions, reducing fuel on the forest floor and naturally thinning out brush and small trees. Managers attempted to mimic this kind of fire with prescribed burns. As I began a slow acceptance of the benefits of low-intensity disturbance, I still assumed that the areas of high-intensity fire, where tall flames killed most of the trees, were fundamentally the unnatural result of fuel accumulations from decades of fire suppression. I adopted the trendy idea of 'catastrophic wildfire,' which divided fires into two categories: good fires and bad fires depending upon whether they burned at low-intensity or high-intensity, respectively. Then emerging evidence challenging this assumption began to appear (Hutto, 2008). The importance of severe fire may be much broader than commonly appreciated. Far from being 'destructive' and killing off all wildlife, I have visited severely burned areas that sometimes show excellent rejuvenation and ecological richness including wildlife. In such areas, natural conifer regeneration occurred, often with thousands of seedlings per acre after the fire. Moreover, some of the highest levels of biodiversity are found in the most heavily burned areas.[2] Many flowering plants and shrubs depend upon fire for germination and reproduction (Hanson, 2010).

I now view fire disturbance as a natural process and source of heterogeneity within some fire-prone forested communities, reflecting a real shift in my perception of the natural world. Fire disturbance history creates patterns in a vegetative mosaic of various seral stages etched in the landscape, making a diversity of habitats, biological barriers to insect and disease movement and even the spread of future fires. I had moved from the perception of the forest system as one in 'natural balance' to one of non-equilibrium or in constant change. With this perspective, I saw fire not as an enemy but as a potential ally in the design of future forest structure. Of course, the alliance would depend on an understanding of the processes that are responsible for the 'desirable state'[3] before undertaking stand manipulation.

As my perception of fire changed, so did my view of wolves and other large carnivores. I followed studies at Isle Royale National Park on wolf-moose interaction and their conclusions that the maintenance of natural ecological processes, including predator-prey systems, are required to stabilize wildlife populations (Peterson, 1999). There are often situations where ecological processes are under stress and intervention by management is required to maintain the robustness of the wildlife populations. For example, the introduction of the predator, the wolf, at Isle Royale National Park is such a case.

This brings me to the relationship in the North American west of continental warming, wildfire, lodgepole pine and the mountain pine beetle. High-intensity fires, extensive beetle-induced mortality and their interaction play fundamental roles in the ecology of lodgepole pine forests (Brown, 1975). The beetles' strong preference for older and large trees often leads to infestations in stands that cause heavy fuel buildup. These stands are mature and

Please see **CHANGE AGENTS** page **31**

1 Agent-based models can simulate the actions and interactions of multiple, heterogeneous, organisms where more traditional, analytical techniques are inadequate. Because ecological systems are typically non-linear, in order to obtain sensible analytical results, non-linear, stochastic and computational techniques are used. Applications of results in the real world, for example, optimal harvesting theory, which draws on optimization techniques developed in economics, computer science and operations research, are used in fisheries.

2 For a great discussion on the role of fire on ecosystems see: Chase, Alston. 1987. Playing God in Yellowstone: The Destruction of America's First National Park Harcourt Brace and Company, San Diego

3 In most areas of British Columbia some type of large-scale disturbance is indigenous, and must be included in a realistic definition of 'desired state'. In some areas a partial equilibrium may exist in which patchy disturbance is balanced by re-growth, but in many others equilibrium is impossible. Where an equilibrium does not exist, defining the desired state is challenging, because one must recognize that there are often several plant communities that could create the 'desired state' for a certain site at a given time.

4 For an excellent discussion of the fire ecology and management of ponderosa and lodgepole pine forest-types, see: Agee, J.K. 1993. Fire ecology of Pacific Northwest forests. Island Press, Covelo, CA 493 pages

By Glen Sanders

A Decade Later: Wildfire Lessons Learned

The year just ended was the 10th anniversary of the worst fire season on record in British Columbia. The province was experiencing a hotter than normal year and was in the third year of this type of weather. During the extended extreme fire conditions there were over 2,500 wildfire starts. The effect in human terms was unprecedented: three lives were lost fighting the fires; 334 structures were destroyed; 45,000 people were evacuated and 260,000 hectares of forest were consumed by fire. The cost of the wildfires in 2003 totaled $700 million.

Many of the communities involved have never recovered to their pre-fire season status.

As some recall, the Honourable Gary Filmon chaired the Firestorm 2003 Provincial Review following the devastating events to evaluate the overall response to the emergency and make recommendations for future improvements. The Firestorm 2003 Provincial Review asked four key questions: "Was British Columbia prepared for the firestorm? How well did British Columbia's emergency systems and crews deal with the situation? What could be done better if it happens again in the future? What action should be taken?"

The Filmon Report[1] made 41 recommendations, some specific to the Office of the Fire Commissioner (OFC). Back in '03 the OFC played a crucial role in the emergency response at an operational level. However the OFC, as it is staffed today, is likely not in a position to have any administrative role in a major wildfire season like that which was seen during the summer of '03.

During the '03 Declaration of a State of Emergency, the OFC had the authority to order fire equipment to respond anywhere in the province, regardless of restrictions for responding outside of their community; effectively, individual fire departments operated as one single provincial fire department. This was particularly noteworthy because, unlike the police or ambulance service, there is no mandated responsibility in the province of BC to have a fire department. Establishing and maintaining a fire department is purely a local government decision. Taxpayers in a specified area generally decide by referendum or similar democratic process to establish a fire department. The residents of that area pay for that service and the fire department is obliged to remain in the taxpayer-defined service area in case there is a fire or other emergency requiring their personnel, equipment and training. Fire departments attract liability if they respond outside their service area without authority through mutual aid agreements. A lesson learned from 2003, then, is the provincial government will likely never declare a province-wide 'state of emergency' again because, while it gave the government extraordinary powers, it also caused considerable uncertainties and economic hardship, particularly to industries like tourism.

Another Filmon Report recommendation called for the "OFC to implement a searchable database to maintain a current and accurate province-wide inventory of private and public sector equipment for fire response." That is a huge undertaking and the OFC does not have the resources to maintain an inventory like that given the high turnover of equipment at the local firefighting level. The OFC has been reduced considerably by budget cuts and now has virtually no meaningful role to play in fire service delivery or fire cause investigations.

One notable success coming from the Filmon Report though, was its recommendation for the utilization of sprinklers. Particularly, grants funded by the Union of British Columbia Municipalities (UBCM) have made four Sprinkler Protection Units (SPU) available for deployment throughout the province should a major wildfire encroach on the interface. Many local fire departments have also invested in their own SPUs and have them at the ready for deployment. There are management and logistical issues with the SPUs, but those issues have been successfully overcome in most cases and when the SPUs were deployed, they were shown they have saved property.

So the question is what have we learned since the fire season of '03? My observation of the local fire departments is they have applied many of the lessons they learned from their experience in '03 and the equipment and training they have acquired is evidence of that. I am dubious about the lessons learned by government, however, and many of the missteps identified in the Filmon Report will be repeated when the next firestorm strikes. A wise person once said, "The worst mistake a person can make is to think that those in charge actually know what they are doing."

Glen Sanders is the president of FireWise Consulting Ltd. He was a member of the Shawnigan Lake Fire Department for 33 years and over 21 years as fire chief. He was named the Canadian Fire Chief of the Year in 2006 by the Canadian Fire Chiefs' Association. He is also a past president of the Fire Chiefs' Association of British Columbia. He can reached at glen@firewiseconsulting.com.

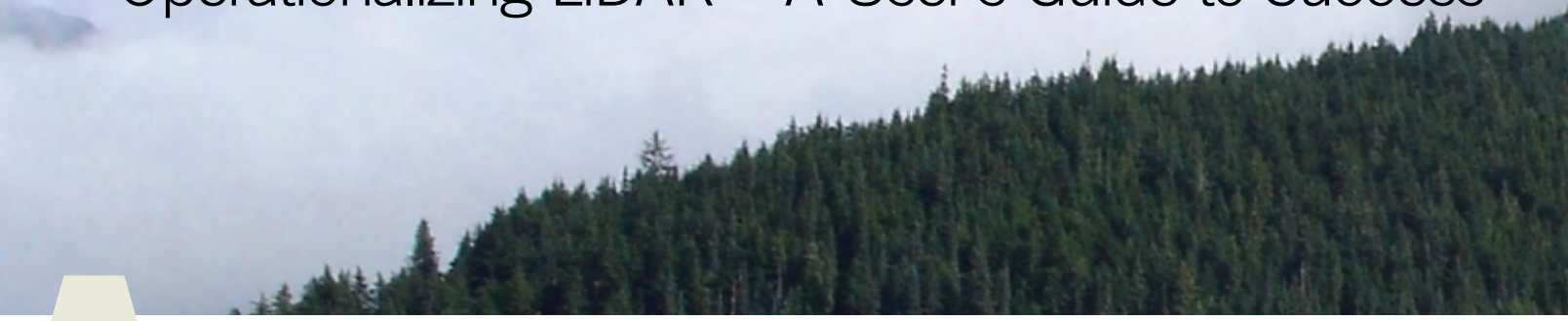
1 The full report can be downloaded at: http://bcwildfire.ca/History/ReportsandReviews/2003/FirestormReport.pdf.

Interest

by Gordon Frazer, Ph.D
Coleen MacLean-Marlow, RPF,
and Taylor Davis



Operationalizing LiDAR – A User's Guide to Success



Although many LiDAR industry insiders never imagined the day would come, LiDAR is quickly becoming a well-recognized acronym and highly coveted corporate asset in Canada's forestry sector. Light Detection and Ranging (LiDAR) is a method of time-distance measurement using the speed of light to obtain spatially precise information on the three-dimensional structure of forests and underlying 'bare-earth' topography. There are currently three main commercially available platforms for LiDAR data acquisition: terrestrial (static, ground-based) LiDAR, mobile (vehicle-based) LiDAR, and airborne (rotary or fixed-wing) LiDAR. While terrestrial and mobile LiDAR have some demonstrated application in forestry, it is airborne LiDAR that has received the greatest attention because of its ability to rapidly collect high-spatial-resolution terrain information (multiple points per square metre) over relatively large geographic areas (hundreds of thousands of hectares).

Contrary to what some people believe, LiDAR is not a new technology and has been the subject of considerable international research interest and investment over the past three decades by the forest science community. However, the emergence of LiDAR as an operational tool in forest management in Canada has been far more recent than its technological viability. Adoption and integration of LiDAR into corporate and government operations has varied from small proof-of-concept studies to large, tenure-wide acquisitions and cross-organizational implementations. The main impediment to the early adoption of LiDAR by forest companies has been the real or perceived upfront costs of data acquisition, as well as a lack of clear understanding of how this new source of spatially explicit terrain information can be used to benefit day-to-day company operations and overall competitiveness. Also, the pathway from research to operationalization is not straightforward, and will vary according to the size and spatial configuration of the forestlands, forest and terrain conditions and management goals.

Preliminary findings from a few of the larger operational trials in BC, Alberta, Ontario and Newfoundland suggest that certain LiDAR-derived datasets and end-user applications provide a more immediate and larger return-on-investment than others. For example, a Digital Elevation Model (DEM) and Canopy Height Model (CHM) are easily extracted from a classified LiDAR point cloud and readily used in harvest planning and engineering applications. LiDAR-enhanced forest inventories, on the other hand, require further investment and longer timelines to implement, but can provide unparalleled precision and spatial detail for short and long-term resource planning.

LiDAR, however, is not a 'magic wand,' and it must be implemented with considerable thought and care to garner the best chance of success and greatest economic benefit. The cost-benefit of LiDAR will inevitably vary from project to project, depending on company circumstances (i.e. timber value, size and distribution of timberlands, climate, terrain, etc.) and the company's ability to embrace, guide and capitalize on technological change. In this article we offer 10 guiding principles – that is, thoughts, suggestions, or even commandments! – that may help companies presently thinking about adopting a LiDAR program, or may provide additional insight for those already in transition and contemplating a larger and more challenging data acquisition program, achieve a greater chance of success.

10 Commandments of LiDAR

1. Recognize the opportunities, challenges and limitations of LiDAR.
LiDAR cannot penetrate solid objects, such as foliage or wood, and must find gaps in the forest canopy for a laser pulse to reach the ground. It does not directly measure forest inventory attributes, such as diameter, basal area, volume, or biomass, and datasets require independent calibration using a network of ground-reference plots to extract this information. LiDAR will not give you species composition or wood quality (at least not yet), nor will it eliminate the need for skilled forestry professionals or 'boots on the ground.' It can, however, provide unique kinds of spatially contiguous terrain information (i.e. canopy height, cover, and bare-earth topography) required by inventory specialists, engineers, and forest managers to make informed decisions on resource use and sustainability.

2. Know explicitly how LiDAR will be used to achieve key management goals.
The upfront costs of LiDAR can be large, so it is essential that companies understand how this technology will be used to improve operational performance in both the short and long terms. Small-scale operational trials can be beneficial in this regard, allowing companies to evaluate the potential cost-benefit of LiDAR and to better anticipate the challenges and opportunities associated with full-scale deployment. While

Photo courtesy of Taylor Davis

much can also be learned from external trials completed elsewhere, it may be prudent to acknowledge that certain cost-benefits will be project-specific and may not be readily applicable everywhere.

3. Find skilled LiDAR professionals with relevant experience.
LiDAR datasets can be both large and complex, and successful integration of these data within any organization will depend on the coordinated efforts of several skilled and experienced LiDAR specialists. The LiDAR data provider is at the critical front end of the production chain, and all subsequent processing and analytical work will depend on the overall quality and integrity of the delivered data. LiDAR analysts, application specialists and biometricians will be responsible for the creation and delivery of more specialized, value-added data layers, which ultimately become integrated directly into the workflows of operational staff.

4. Understand the real costs of LiDAR data acquisition and processing.
Airborne LiDAR sensors are very expensive to purchase, maintain and operate, and datasets require extensive preprocessing and quality control before they can be delivered to the client. Nevertheless, LiDAR data costs continue to trend lower as technology becomes cheaper and the demand for services and competition in the marketplace rise. Prices, however, will vary across Canada due to regional differences in weather, terrain, remoteness, and forest type. In general, expect to pay between $3 and $10 per hectare in BC, with costs dependent on total project area, location, schedule, platform (rotary vs. fixed-wing), minimum point density and requested deliverables. Apparent bargains do exist, although remember to pay heed to that age-old proverb, 'you get what you pay for.'

5. Seek out cost-sharing opportunities with others.
LiDAR data acquisition costs will decline on a per hectare basis as the total project area increases. This is due to the high fixed costs associated with LiDAR mission planning and mobilization. Therefore, one way to achieve a better economy of scale with LiDAR is to pursue alliances or partnerships with adjacent or nearby stakeholders to collectively expand the total size of the project area. Cost sharing agreements may or may not include final data products, but this may well be worth considering, if confidentiality is not an issue or one that can be incorporated into the agreement.

6. Develop a comprehensive LiDAR acquisition plan well in advance of the flying season.
LiDAR data acquisition is constrained by local weather and near-ground atmospheric conditions, which often means short, sporadic, seasonal windows of opportunity for data collection, especially for more remote coastal and mountainous regions of BC. The best and only way to guarantee successful data capture is to make sure that flight plans, survey specifications and pricing are negotiated well in advance of the flying season.

7. Contract an experienced LiDAR data provider with a proven track record.
Be advised that not all LiDAR datasets are created equally and few, if any, will be error-free. Identifying skilled, experienced, and knowledgeable LiDAR data providers who are willing to work closely with the client is the key to surviving any difficulties that might arise while transitioning to a new technology.

8. Get basic LiDAR data products into the hands of the end user as soon as possible.
Return-on-investment will be far more immediate if basic LiDAR data products are placed in the hands of the end-user as quickly as possible. The DEM and CHM, for example, are two common data products delivered by the LiDAR data provider with high end-user value and should be distributed to planning and engineering departments for immediate use. Other more complex, value-added data products can be integrated as they become available. For large acquisitions, be sure to work closely with your LiDAR data provider and technical specialists to match the delivery schedule with the data uptake rate. This is the only way to avoid the frustration of production bottlenecks.

9. Form partnerships with others to pursue more risky R&D efforts.
For outcomes with unknown value, consider seeking outside

Please see **LIDAR** page **24**

Interest

By Jamie Heath, MSc, Ken Whitehead, PhD, and Mike Trepanier, RPF



Forestry Applications of Digital Aerial Photography Captured During Late Winter Conditions

Aerial photography in Canada is normally acquired under clear sky conditions during the summer months to ensure the images are bright, have minimal shadowing and good contrast. While these conditions are generally preferred for most applications, the presence of deciduous and shrub layer vegetation and shadowing within the forest canopy make it difficult to accurately identify individual crowns. These conditions can also pose significant challenges for some forestry applications where assessment of coniferous saplings, poles and sub-canopy trees is required; for example, secondary structure and silviculture assessments.

The remote sensing process of extracting land cover types based on their spectral characteristics is known as image classification. This can be as basic as separating forested from non-forested areas. For some forestry purposes however, it is desirable to be able to identify and classify individual trees at the species level. The first step towards achieving this goal is normally to carry out a preliminary image segmentation in order to identify groups of pixels comprising individual trees. Remote sensing techniques such as local maximum filtering or valley following are often employed for tree level segmentation. Local maximum filtering identifies local bright spots, which are assumed to represent tree centres while valley following traces out the dark valleys between individual tree crowns on the digital image and uses these to group pixels accordingly. Once the pixels comprising individual trees have been identified, tree crowns can be classified as single objects, providing greatly increased classification accuracies.

While such methods can help isolate individual tree crowns, the presence of understory vegetation and strong shadows make both segmentation and classification a difficult and error-prone process. It is therefore desirable to be able to remove these extraneous factors from the analysis. The effects of understory vegetation can be largely eliminated by using photography captured at times when the deciduous species are bare of leaves and there is a contiguous layer of snow on the ground, but not on the trees themselves. Under such conditions, background pixels can easily be identified, making it possible to create a tree canopy mask that greatly simplifies both the segmentation and classification process.

The high contrasts caused by strong shadows can also complicate attempts at image classification. However, if the imagery is collected under conditions of diffuse illumination then shadowing can be reduced considerably, and often completely avoided. Suitable illumination conditions tend to occur under a contiguous layer of overcast cloud. When the effects of shadowing are eliminated, the reflectance from a tree crown represents the summation of reflectance from needles and branches, with contributions from both the interior and edges of the canopy. This provides a much better basis for classification than the same object viewed in direct sunlight when patterns of light and shade tend to obscure the subtle differences which characterize different species (as illustrated in Figure 3).

The examination of the digital imagery in Figure 1 and Figure 2 reveals the differences between aerial photos captured in summer conditions (clear skies and high sun angle) and photos captured in winter conditions under overcast cloud. Shadows are very soft or absent on the overcast winter image and there is little-to-no contrast between illuminated and shaded areas (north side of above ground objects). It should be noted that the overcast winter imagery required substantial image processing, as the dull overcast image has a low dynamic range. The winter overcast image is dull in appearance, but shows remarkable detail. In comparison to the summer image, it is easier to identify tree species, relative crown diameter, mountain pine beetle damage, stocking density and coniferous regeneration under deciduous cover. There is also increased clarity of each tree crown, particularly on the north-facing side, even within a multi-storey stand.

By acquiring imagery during overcast conditions when snow is present on the ground but not on the canopy, it is possible to considerably improve classification accuracy at both the individual tree level and stand level. It is recognized that the operational constraints imposed by this approach may make it difficult to acquire such imagery on a consistent basis given the number of days which imagery can be acquired in a year are limited to a short window in late spring. However, the potential benefits of collecting data under such conditions are likely to outweigh negative considerations, and it is likely that such an approach could offer considerable benefits for specific forest inventory surveys and assessments.

Jamie Heath, MSc., is an aerial mapping consultant and founder of Terrasaurus Ltd. He has provided digital aerial photography, specializing in overcast and oblique photo acquisition, to the BC forest industry since 1999.

Ken Whitehead is a postdoctoral fellow in the Department of Geography at the University of Calgary. He is currently studying the application of unmanned aerial vehicles for environmental monitoring. In the past he has worked as a remote sensing/geomatics specialist in the UK, South Africa, and Canada.

Mike Trepanier, RPF, is a consulting forester with expertise in silviculture, harvesting and forest tenure management. He has worked for Industrial Forestry Service Ltd. for the past 19 years and serves a client base spanning government, industry and small tenure holders.

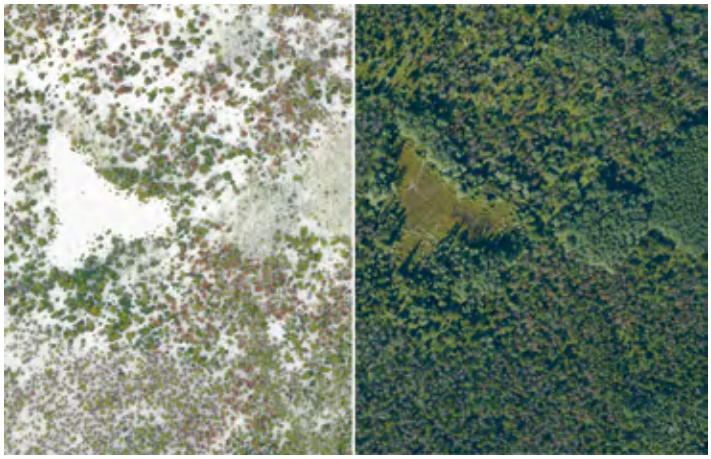


Figure 1. Aerial photos (15cm pixel size) of a regenerated forest stand impacted by mountain pine beetle (overcast weather with snow cover on left, and clear sky summer season on right). Aerial imagery captured with an 80 megapixel Phase One aerial camera. Both images processed for optimum levels / intensity.

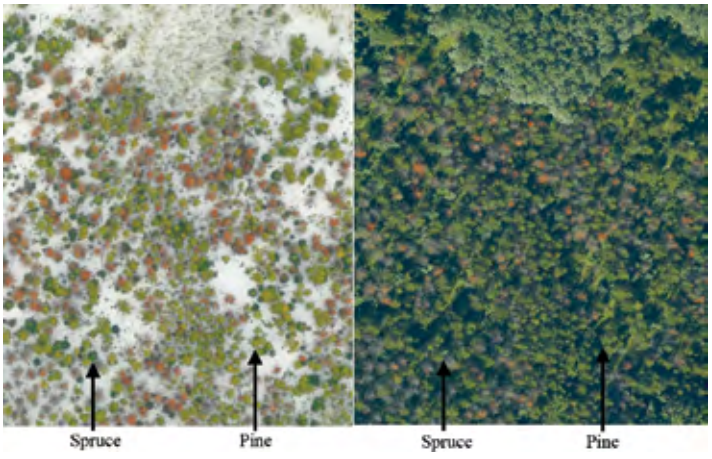


Figure 2. Close up of the aerial photos (overcast weather with snow cover on left, and clear sky summer season on right) displaying the differences between spruce and pine trees. Aerial imagery captured with an 80 megapixel Phase One aerial camera.

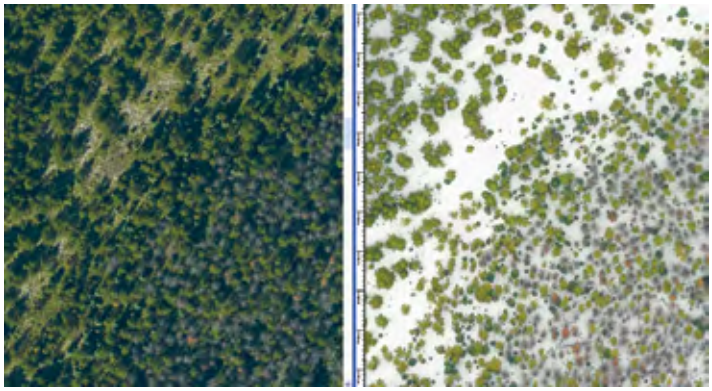
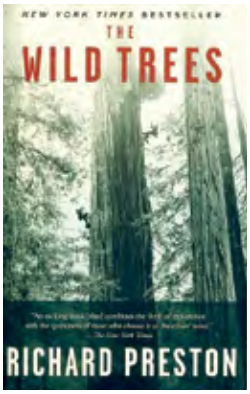


Figure 3.

The Wild Trees

By Richard Preston
ISBN: 978-0-8129-7559-8
320 pages, paperback



The Wild Trees is an account of a small dedicated group of Americans to find and observe the remaining redwood giants in the forests of the western United States. I found the book by chance back in 2008 and had read a couple of Richard Preston's other books, *The Hot Zone* and *The Cobra Event*. Given that both of those books are concerned with biological disease I approached *The Wild Trees* somewhat dubiously. However, from the turn of the first page it was difficult to put the book down; it's well written, easy to follow and thoroughly engaging.

The author provided a chronicle of the adventures of the group, all of who are interested in climbing and observing giant redwoods in close quarters. Details are provided on the first ascent, subsequent quests for elusive groves of giant trees, research conducted on redwood ecosystems and the author's personal account of climbing with the group. Steve Sillett appears as the ring leader. In the first chapter he's a student of the University of Arizona, and is now a professor at Humboldt State University. He specializes in old growth forest canopy ecosystems and has appeared on National Geographic documentaries discussing the unique values associated with redwood forests (short clips of these documentaries can be found on YouTube).

The Wild Trees also documents the decline of redwood forests, which were heavily logged, and the foundation of parks that have sought to save as many of these trees as possible. The now sporadically placed redwood groves contain mythical giants and a good portion of the book covers the search for the tallest and widest trees. Part of Sillett's research has been to map and document these groves, most of which are kept secret to prevent unwanted attention, protect ongoing research and maintain precious ecosystems.

Ranking: 5 out of 5 cones

The book is relevant to anyone who has a general interest in forested ecosystems, especially old growth forests. It's also an adventure story that leads the reader on a journey from simple beginnings to a more refined purpose, with plenty of drama, action, and tragedy (which can be expected when a group of friends with no climbing experience tackle trees greater than 300 ft tall) along the way. And my initial misgivings about Preston's ability to write a good book about trees, given his background in the study of zoonosis, are thoroughly proved wrong when it's revealed the author has been climbing with Steve Sillett for several years. It all makes for very entertaining reading, told by an author who knows how to spin a good tale.

Review by Sam Coggins, PhD, RPF

LIDAR continued from Page 23

partnerships to share risk and reward. The application of LiDAR in forestry is still evolving and will require continued investment by industry to further develop its use. There may be several opportunities to gain research and development support through universities, government institutions and funding programs, or through partnerships with other private sector companies.

10. Embrace and nurture technological change.
In the end, the success of any LiDAR program will depend on an organization's ability to utilize and embrace new technology. The full integration of LiDAR into company operations will require some change in the ways things were previously done, and support by staff and management will be critical during the period of transition. LiDAR-derived data products, such as the DEM or CHM, are no different than other common GIS layers, other than that they have unparalleled spatial accuracy and spatial detail. Experience, so far, indicates that planners and engineers work easily with LiDAR data products, and many have shown reluctance in returning to traditional sources once exposed to LiDAR data.

The business case for airborne LiDAR in forestry is not yet complete but it is gradually unfolding as more and more companies and government agencies invest in operational trials across Canada. LiDAR data are intrinsically information-rich due to their high spatial resolution and precise 3-D geometry. As a result, this technology may one day serve the multiple and diverse information needs of a single organization (i.e. inventory, growth and yield, silviculture, harvest planning, engineering and environmental). There has been remarkable progress made in recent years to operationalize LiDAR in Canada, thanks to industry innovators and early adopters, and through industry-government research and development partnerships. However, continued innovation through investment by industry and government will be necessary to realize the full potential of LiDAR in Canada's forest sector and to finally transfer this technology from the once exclusive domain of forest scientists and firmly into the hands of today's forest professional.

Gordon Frazer, Ph.D., is a consulting LiDAR remote sensing scientist specializing in forest inventories. He has been working with LiDAR data since 2001, and has produced several LiDAR-enhanced inventories for clients and research partners in Alberta and BC. Gordon lives in North Saanich and can be reached at gfrazer@islandnet.com.

Coleen MacLean-Marlow, RPF, is a consulting forester who has been practising on the coast for 21 years. She served as project lead for the NVI Acquisition and LiDAR Enhanced Forest Inventory Project, a joint venture between industry and government. She lives on Quadra Island and can be reached at cmarlow@gicable.com.

Taylor Davis, MA Environment & Management, is a LiDAR applications specialist with Terra Remote Sensing Inc. Taylor has worked at Terra since 2001 and has been involved with multiple aspects of the organization, including R&D and project management activities specific to airborne LiDAR. Taylor can be reached at taylor.davis@terraremote.com

By Jeff Waatainen, LLB, MA, BA (Hons)

The 'Honour of the Crown' in the BC Forest Industry

> *Precisely what duties arise in different situations will be defined as the case law as this emerging area develops.*
>
> The Supreme Court of Canada in *Haida Nation v. British Columbia (Minister of Forests)*, 2006, on the duties that the Crown owes to First Nations who claim Aboriginal rights and title.

The Haida decision represents the Supreme Court of Canada's seminal discussion on the Crown's duty to consult with and accommodate First Nations who claim Aboriginal rights or title, but have yet to establish those rights or title in court or through treaty. A recent decision of the BC Supreme Court indicates that, ten years on, we are still muddling our way through the aftermath.

Moulton Contracting Ltd. v. British Columbia concerned various claims that the plaintiff logging contractor advanced against the Province of British Columbia, the Fort Nelson First Nation (the "Band"), and particular members of the Band. The dispute concerned two Timber Sale Licenses (TSLs) that the Province had awarded to the plaintiff, but that the plaintiff was unable to harvest on account of a blockade that various Band members erected upon an access road. The blockade reflected the Band members' unhappiness over the Province's consultation efforts with respect to a major amendment made to a forest development plan on account of the TSLs.

Critically, the Province failed to advise the plaintiff that Band members were not satisfied with the Province's consultation, or that these members had threatened to take action that would to prevent logging under the TSLs. Since the plaintiff was unaware of this threat, it did not pursue other work normally available to it until it was too late.

The plaintiff's claims against the Band and members were dismissed. The court also dismissed the plaintiff's claim that the Province was obliged to provide access to the roads and cutblocks: the TSLs included a standard clause that exempted the Province from any liability that might arise due to a First Nations blockade.

The court was left to consider whether the Province had breached either of two implied terms of contract found to exist in the TSLs. The first implied term was an obligation on the Province to discharge its duty to consult with First Nations. The second was an obligation on the Province to inform the plaintiff in a timely manner if any First Nations people were dissatisfied with the Province's consultation and threatened interference with the plaintiff's logging operations.

Ultimately, the court found that the Province was liable to the plaintiff for a breach of the second implied term, and awarded damages to the plaintiff in the amount of $1.75 million. In essence, the Province's breach took away the plaintiff's opportunity to pursue other sources of revenue aside from the TSLs.

While the court did not find the Province liable to the plaintiff in damages on account of the first implied term due to the exemption clause discussed above, and due to concerns about the existence of a causal relationship between any breach and the plaintiff's losses. The court nevertheless did find that the Province's consultation efforts did not maintain "the honour of the Crown" and, therefore, that the Crown had breached this contractual obligation. The court was critical of the Province's failure to accommodate the limited capacity of the Band to evaluate the Province's forestry proposals. While the court clarified that this "is not to say … that the Province was under an obligation to provide funding for improved capacity," one gets the impression that the court made this statement with a wink of the eye. The court went on to say that if consultation owed to the Band was not completed in a timely manner "the Province owed a duty to delay posting the TSLs for sale." In other words, the message that the court appears to have delivered to the Province is: "while you're not necessarily obliged to fund a First Nation's evaluation of any forestry proposal, it could be a long wait if you don't".

An appeal of this decision was filed in the BC Court of Appeal.

Jeff Waatainen is an adjunct professor of law at UBC, has practised law in the forest sector for over 15 years, and currently works in the Forestry Law Practice Group of Davis LLP's Vancouver offices.

In Memorium

It is very important to many members to receive word of the passing of a colleague. Members have the opportunity to publish their memories by sending photos and obituaries to **editor@abcfp.ca**. The association sends condolences to the family and friends of the following members:

Dr. Hubert William Ferdinand Bunce

RPF #370
October 26, 1932 – November 4, 2013

Dr. Hubert William Ferdinand Bunce passed away peacefully at home surrounded by his immediate family. Hubert is survived by Jill, his loving wife of 53 years; his sister Julia Hawkins (Christchurch, England) and her 5 children; eldest son, Hubert, his wife Yvonne and daughters Anna and Magdelene; second son Christopher, his wife Nancy Jacklin and their children Louise and Owen; and daughter Sarah and husband Dale Kolody.

Hubert was born in London, England and immigrated to Canada in 1955 to practice forestry. He subsequently took a Master's of Forestry at UBC (1960) and completed his doctorate at Syracuse University (1967). Hubert was a Registered Professional Forester (BC), Fellow of the Institute of Chartered Foresters (GB) and Life Member of the Commonwealth Forestry Association (GB).

Hubert worked for Canfor and Columbia Cellulose in the late 1950s and 60s. He started working with Reid Collins & Associates from 1972, consulting the forest industry in BC and worldwide (Brazil, China, Pakistan, Indonesia) until his retirement in the late 1990s.

He was an active member of several national forestry committees: Assessing & Standardising Metrification; Forest Inventory; and Forest Terminology & Usage.

In semi-retirement he continued his forestry interests as part owner of the Blue Mountain Woodlot, the BC Forest History Association and Canadian Forest Inventory Committee. He was an active participant in the Philosopher's Café at the West Vancouver Library and at the Vancouver Civitas Society.

Hubert enjoyed travelling, hiking and camping and shared these experiences with his family. His travels included numerous road trips across North America, a year in Europe (1971) and trips to New Zealand, Russia, South Africa, Seychelles and Australia. He also enjoyed exploring coastal BC by small boat since 1958. Hubert was a gentleman who touched the lives of many people and was generous with his time and knowledge. Memorial donations may be made to the Canadian Arthritis Society or Canadian Cancer Society.

Submitted by Sarah, Hubert and Christopher Bunce

Maurice James Ayers

RPF # 246 (Ret.)
February 5, 1927 - December 12, 2013

Maurice, born in Sussex, England February 5, 1927, died in Victoria December 12, 2013. He came to Canada in 1928 with his parents, settling in Vernon on a fruit farm as part of the Land Settlement program. His orchard-tending experience as a youth remained with him throughout his forestry career. He enlisted in the army whilst in high school and returned to graduate from Vernon Senior High. He then enrolled in forestry at UBC graduating in 1951 with a bachelor's degree. As a student he worked in forest inventory for the BC Forest Service.

Upon graduation he worked for Alaska Pine and Cellulose as assistant forester in Port Alice (1951-53) and then Moresby Camp in the Queen Charlottes (1953-1955). In 1955 he moved to Victoria with his family to begin work as a consulting forester with D.W. Smith Ltd. There he worked on inventory, road location, logging and forest planning for several forestry clients.

Many today will remember Maurice for his varied and productive forestry career with Pacific Logging and its successor companies. He joined Pacific Logging Ltd. in 1963 as forester and logging manager. Between 1965 and 1980 he was involved with local and international property assessment and acquisition. From 1980 on he was director, vice-president of administration and corporate secretary. He retired after the merger with the Tahsis Company Ltd in 1985.

Upon joining Pacific Logging (later its successor company Pacific Forest Products Ltd.) Maurice took an active part along with a special group of industry pioneers and leaders in forestry who, between 1962 and 1985, took the Canadian Pacific Railway Company E&N Land Grant private lands from liquidation to a successful multi-faceted forestry business with a nationally-recognized forestry program on 121,400 hectares of private lands.

Those who joined Pacific will remember Maurice for his business sense, support and mentorship. Maurice not only had an immense understanding of his natural surroundings but an insightful knowledge of human nature. He would so often listen and wait before entering the mêlée of any discussion, then offer his considered advice, often with a wink of admonishment. His was a special gift with a lifelong commitment to forestry. We were all privileged to experience the brunt of his quick wit and benefit from his thoughtful candor and support.

Outside his career Maurice's passions were family, travel, tennis, fishing, old songs and poetry. Predeceased by his first wife Margaret and second wife June, our sincere condolences go to his children Karen, Brian and Colin (Mary) and his grandchildren Lauren, Michael and Alicia as well as his many extended family members in Canada and the USA.

Submitted by Bruce Devitt RPF (Ret)#368. With thanks to Karen Ayers, Don Avis, #1630 RPF, Ken Hart, #22 RFT (Ret), Don Smith RPF (Ret) #153

Membership Statistics

ABCFP—December 2013

NEW REGISTERED MEMBERS

Kirsten Blythe Jorgensen, RFT
Landon Daniel Levesque, RFT
Neil Alexander MacEachern, RPF
Calvin Robert Strom, RFT

NEW ENROLLED MEMBERS

Stephen Bernhard, FIT
Clinton Joseph Gould, TFT
Nicole Candace Blair-Larson, FIT
Stephanie Jane Lauer, FIT
Joseph Adam Moran, FIT
Katelyn Rae McMahon, TFT
Louis Eugene Orieux, TFT
Amanda Stokes, FIT
Frank Richard Tiramani, FIT
Jason Neil Whitehead, TFT

REINSTATEMENTS (REGISTERED MEMBERS)

Sugu Thuraisamy, RPF

REINSTATEMENTS FROM LEAVE OF ABSENCE (REGISTERED MEMBERS)

John Jason Jarvis Millar, RPF

REINSTATEMENT ENROLLED

Jennifer Lynn Leslie, FIT

REINSTATEMENT REGISTERED

Dawn State, RPF(Ret)

REINSTATEMENTS FROM LEAVE OF ABSENCE (ENROLLED MEMBERS)

Tara Leigh Bergeson, FIT
Acacia Rae Nethercut-Wells, FIT

REINSTATEMENTS FROM LEAVE OF ABSENCE (REGISTERED MEMBERS)

Lori Susan Bartsch, RPF
Joyce A. Beaudry, RPF
Lisa Marie Bourdages, RFT
Matti Douglas Boyce, RPF
David A.M. Clark, RPF
Steven M. Day, RPF
Stephanie Rachelle Ewen, RPF
Samuel Dennis Flanagan, RPF
Thomas Edward Gilmore, RPF
Ronald Michael Hart, RPF
Lisa E. Hanna, RFT
Roderick Lloyd Hillyard, RPF
Cara Helena Pauline Illerbrun, RPF
Bruce Leonard Jones, RFT
Janet Lynn Kuntz, RFT
Matthew John Lamb-Yorski, RFT
Christopher Alan Lee, RPF
W. Hugh Lougheed, RPF
Douglas Ian MacIver, RPF
James R. Magowan, RPF
Susan McKellar, RPF
Gayle Caroline McMurray, RFT
Keith Daniel Mullens, RFT
Aurnir Nelson, RPF
David James Phillips, RFT
Robert Henry Rose, Jr., RFT
Melanie Mahrusa Sherstobitoff, RPF
Shawn M. Switzer, RPF
Constance M. Viszlai, RPF
Christopher A. Waite, RPF
Terri Louise Worthen, RPF

REINSTATEMENTS WITHOUT REQUEST (ENROLLED MEMBERS)

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Jessica Lea Bockus, TFT (on LOA)
Betsy Cranmer, FIT (on LOA)
Candace Paige Dow, TFT (on LOA)
Grant Kurt Huettmeyer, FIT (on LOA)

REINSTATEMENTS WITHOUT REQUEST (REGISTERED MEMBERS)

Edward J. Armstrong, RPF(Ret)
Michael Scott Aspeslet, RFT
Timothy D. Baines, RPF(on LOA)
Kevin Scott Bradley, RFT
Tamara Jane Brierley, RPF
Cheryl Mandy Crumblin, RPF(on LOA)
Shelley Louise Dawson, RFT
Peter de Bruijn, RPF(Ret)
Donald Leslie Gossoo, RFT, ATE
Robert Bruce Gray, RFT
Dennis Arthur Heigh, RFT(on LOA)
Penny A. Hendricks, RPF
Darrin Richard Humber, RPF
David Arnold Jansen, RFT
Alastair Rory Kernahan, RPF
Indra LaLari, RPF(on LOA)
Tara E. Leduc, RPF(on LOA)
D. Kelly G. Love, RPF(on LOA)
Paul Douglas MacNeil, RFT
Russell Charles Gordon Martin, RFT
William Jordy Moore, RFT(on LOA)
Art James Murphy, RPF
Shawn Torin Murray, RPF
Larry Floyd Nixon, RFT
Anand Pandarinath, RPF(on LOA)
Frederick Arnold Pattenden, RFT
Jason Thomas Pond, RPF(on LOA)
Katrin Ramona Powell, RPF
Wendy E. Quinn, RPF
Frank J. Rowe, RPF
Lana Lea Schulli, RFT
Richard D. Stewart, RPF
Paul James Toovey, RPF(on LOA)
Steven Donald Williams, RFT
Roger J. Wysocki, RPF

DECEASED

Dr. Hubert W.F. Bunce, PhD, RPF(Ret)

THE FOLLOWING PEOPLE ARE NOT ENTITLED TO PRACTISE PROFESSIONAL FORESTRY IN BC:

NEW RETIRED MEMBERS

Laurence J. Badowski, RPF(Ret)
Paul J. Birzins, RPF(Ret)
Joanne M. Bowden, RPF(Ret)
Warren Dean Burkinshaw, RFT(Ret)
Warren H. Cooper, RPF(Ret)
Kenneth G. Cunningham, RPF(Ret)
Dean A. Currie, RPF(Ret)
Kenneth S.J. Ewanick, RPF(Ret)
Arthur Andrew Hammerton, RFT(Ret)
William R. Herringshaw, RPF(Ret)
Stephen J. Hough, RPF(Ret)
Patrick D. Hughes, RPF(Ret)
Bernard A. Kaplun, RPF(Ret)
Raymond K. Krag, RPF(Ret)
John B. Laing, RPF(Ret)
James E. Langridge, RPF(Ret)
Paul R. Lucas, RPF(Ret)
Leslie K. Lund, RPF(Ret)
Catherine P. McClary, RPF(Ret)
Rosemarie O'Connor, RFT(Ret)
Michael K. Pelchat, RPF(Ret)
Eric John Phillips, RFT(Ret)
K. Brian Quick, RPF(Ret)
Paul F. Scott, RPF(Ret)
Jo-Anne E. Seppala, RPF(Ret)
Grant Paul Smith, RPF(Ret)
Dawn State, RPF(Ret)
James M. Stephen, RPF(Ret)
Reg E. Thurlborn, RPF(Ret)
Oliver Raymond Travers, RPF(Ret)

Membership Statistics continued

CONTINUED... **THE FOLLOWING PEOPLE ARE NOT ENTITLED TO PRACTISE PROFESSIONAL FORESTRY IN BC:**

K. David Walsh, PEng, RPF(Ret)
William J. Warner, RPF(Ret)
R. Grant Watkins, RPF(Ret)
Carmen Wheatley, RPF(Ret)
Tony W. Wideski, RPF(Ret)
Robert F. Woodside, RPF(Ret)
Kim Charles Young, RPF(Ret)

LEAVE OF ABSENCE (REGISTERED MEMBERS)

Kim G. Allan, RPF(on LOA)
Andrew Arnold Alstad, RFT(on LOA)
Breck C. Alward, RPF(on LOA)
Kenneth Matthew Anderson, RPF(on LOA)
Kirk Toshiro Araki, RFT(on LOA)
Alan G. Barber, RPF(on LOA)
Anthony Drani Baru, RPF(on LOA)
Sandi L. Best, RPF(on LOA)
Daniel T. Biggs, RPF(on LOA)
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A. Paul Blueschke, RPF(on LOA)
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Susann Melissa Brown, RPF(on LOA)
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George Martin Buchanan, RFT(on LOA)
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Alison J. Burns, RPF(on LOA)
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Gordon G. Catt, RPF(on LOA)
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Marley Dana Chewter, RPF(on LOA)
Jayme Louise Cloet, RPF(on LOA)
Gabriel Blair Coleman, RPF(on LOA)
David L. Cooper, RPF(on LOA)
Donald G. Couch, RPF(on LOA)
Susan L. Craven, RPF(on LOA)
Thomas William Cummings, RFT(on LOA)
Grant Douglas Cummins, RPF(on LOA)
James Newton DeCoffe, RFT(on LOA)
Robert G. D'Eon, RPF(on LOA), RPBio Kerry C.A. Deschamps, RPF(on LOA)
Michael A. Dietsch, RPF(on LOA)
Terence Russell Dodge, RPF(on LOA)
Peter Dodic, RPF(on LOA)
Hongyun Dong, RPF(on LOA)
Rhonda Lori Dougherty, RFT(on LOA)
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Jennifer May Eckford, RPF(on LOA)
Stephen J. Edwards, RPF(on LOA)
Sonja Jane Efford, RFT(on LOA)
Fred R. Elsaesser, RPF(on LOA)
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Craig E. Farnden, RPF(on LOA)
Scott A. Folk, RPF(on LOA)
Rena Mary Gibson-Protzner, RFT(on LOA)
Mark D. Gillis, RPF(on LOA)
Mark Timothy Gillis, RPF(on LOA)
Vicky V. Grainger, RPF(on LOA)
Mark D. Greene, RPF(on LOA)
Michael Eric Hak, RPF(on LOA)
David Lloyd Hale, RPF(on LOA)
David Stephen Hall, RFT(on LOA)
Linda Carolyn Harris, RFT(on LOA)
Kylie Maria Harrison, RPF(on LOA)
J. Russell Hendry, RPF(on LOA)
Lennart J. Holm, RPF(on LOA)
William P. Horbal, RFT(on LOA)
Barry W. Hunter, RPF(on LOA)
Allan Stanley Jacobs, RFT, ATC (on LOA)
Graeme Duncan Jacques, RPF(on LOA)
Andrea Marie Jancicka, RFT(on LOA)
Dr. Lucie Jerabkova, PhD, RPF(on LOA)Earl Simon Johnson, RPF(on LOA)
Aaron B. Jones, RPF(on LOA)
Paul Douglas Jones, RFT, ATE (on LOA)
Jason Richard Kennedy, RPF(on LOA)
Dag Arne Kristiansen, RPF(on LOA)
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Janet Louise Lane, RPF(on LOA)
Catherine Lea Laursen, RFT(on LOA)
Kathryn Zoe Lawrence, RPF(on LOA)
Jeffrey Kevin Leahy, RPF(on LOA)
Joanne J. Leesing, RPF(on LOA)
Joseph Long, RFT(on LOA)
Cassandra Mann, RPF(on LOA)
Peter Markovich, RPF(on LOA)
Janet Katharine May, RPF(on LOA)
Bruce William McClintock, RPF(on LOA)
Debra McDonald, RFT(on LOA)
Margaret Jean (Peggy) McDougall, RPF(on LOA)
Denise L. McGowan, RPF(on LOA)
John Jason McLeod, RPF(on LOA)
Mark Messmer, RPF(on LOA)
Diane Elizabeth Millar, RFT(on LOA)
Carmen Aldea Minor, RPF(on LOA)
Christy Patricia Nichol, RPF(on LOA)
Marvin G. Nowlin, RPF(on LOA)
Elaine Ellen Oneil, RPF(on LOA)
Brian John O'Neill, RFT(on LOA)
Tove Marie Pashkowski, RPF(on LOA)
Irvin J. Penner, RPF(on LOA)
Sargent A. Pereverzoff, RPF(on LOA)
Raeshelle Marie Pickering, RPF(on LOA)
John Everett Pitts, RFT, ATE (on LOA)
Thomas Charles Rankin, RPF(on LOA)
Lawrence S. Redfern, RPF(on LOA)
William Redhead, RPF(on LOA)
Tara Marlene Reimer, RPF(on LOA)
Erica Sophia Nancy Reuter, RPF(on LOA)
Craig Spencer Robinson, RPF(on LOA)
Philippa M.J. Rodrigues, RPF(on LOA)
Stephanie Marie Sambo, RPF(on LOA)
Karen Margaret Scheffers, RPF(on LOA)
Eric Andrew Schroff, RPF(on LOA)
Aliette Marion Seigel, RPF(on LOA)
Timothy Adam Singer, RFT(on LOA)
Alina Janina Skiba, RFT(on LOA)
Russel Garry Smith, RPF(on LOA)
Jessica Meren Sorg, RPF(on LOA)
Brian Michael Stewart, RPF(on LOA)
Duncan S. Stewart, RPF(on LOA)
Kimberly Kyla Strange, RFT(on LOA)
Colin W.G Templeton, RPF(on LOA)
Kathleen M. Thompson, RPF(on LOA)
Robert Douglas Thompson, RPF(on LOA)
Barry L. Trenholm, PEng., RPF(on LOA)
Kona Lynn Van Diest, RPF(on LOA)
Albert Leopold Vandenberg, RPF(on LOA)
Lindsay Alison Vandesteeg, RPF(on LOA)
Virginia Clare Vincent, RPF(on LOA)
William B. Wade, RPF(on LOA)
Kenneth Allan Whitehead, RFT(on LOA)
Richard Lee Winje, RFT(on LOA)
Frank J. Wolfinger, RPF(on LOA)
Mitchell D. Yaremko, RPF(on LOA)
Sarah Michelle York, RFT(on LOA)
Dr. Abdel-Azim M.A. Zumrawi, PhD, RPF(on LOA)

LEAVE OF ABSENCE (ENROLLED MEMBERS)

Kyla Paige Ahtiainen, FIT(on LOA)
Denise Christy Blid, TFT(on LOA)
Vicki Lynn Bobbie, FIT(on LOA)
Dacen Edward Brooks, TFT(on LOA)
Brier Adrienne Cadden, FIT(on LOA)
Dr. Dillon Bay Chrimes, PhD, FIT(on LOA)
Jocelyn Marie Ciarniello, FP(on LOA)

Membership Statistics continued

CONTINUED… **THE FOLLOWING PEOPLE ARE NOT ENTITLED TO PRACTISE PROFESSIONAL FORESTRY IN BC:**

Benjamin Alexander Filewod, FIT(on LOA)
Dr. Qinglin Li, PhD, FIT(on LOA)
Sean David Nomme Pledger, FIT(on LOA)
Scott Thurston, TFT(on LOA)

RESIGNATIONS (REGISTERED MEMBERS)

William Lyle Badger
Christopher Andrew Bowie
Eugene A. Desnoyers
Michael C. Fidgeon
James S. Graham
Robert G. Korda
Craig E. Mistal
Jonathan David Schulz
Gregory Scott Shea
James M. Spyker
J.M. Greg Taylor
Marlene Corinne Thimer
Richard Turgeon
Claire Trethewey
Grant Andrew Willems

RESIGNATIONS (RETIRED MEMBERS)

Darrell William Barron
Clifford D. Beliveau
Darren Michael Genge
Brian Walter Grunewald
Sherry Lou Mallach
Peter Mandjik
Darrell N. Orosz
Luc C.J Turgeon
Elizabeth Schweizer

RESIGNATIONS (ENROLLED MEMBERS)

Ryan Anderson Milne
Mikhael Edward Alexander H. Drosdovech

ABCFP MEMBERSHIP STATISTICS—January 2014

NEW REGISTERED MEMBERS

Kyle James Miller, RFT
Richard August Timm, RFT

NEW ENROLLED MEMBERS

Richard Jason Cane, FIT
Shelly Michelle Louise Buck, TFT
Tyrol Craig Forfar, TFT
Raquel Evelyn Helene Gilstead, TFT
Nicole Beth Luchanski, FIT
Katherine Maria Pelkey, FIT

REINSTATEMENTS (REGISTERED MEMBERS)

Roderick B. Meredith, RPF

THE FOLLOWING PEOPLE ARE NOT ENTITLED TO PRACTISE PROFESSIONAL FORESTRY IN BC:

NEW RETIRED MEMBERS

Stephen Kerry Grimaldi, RFT(Ret)

LEAVE OF ABSENCE (REGISTERED MEMBERS)

Christopher Kenneth Borgfjord, RFT(on LOA)
Stephen John Chaplin, RFT(on LOA)
Indra LaLari, RPF(on LOA)
Todd Alexander Smith, RFT(on LOA)
Todd Michael Yakielashek, RPF(on LOA)

LEAVE OF ABSENCE (ENROLLED MEMBERS)

Betsy Cranmer, FIT(on LOA)

RESIGNATIONS (REGISTERED MEMBERS)

Harold M. Armleder
Katrin Ramona Powell
Wendy E. Quinn
Lana Lea Schulli
Gary M. Townsend
Richard Turgeon

RESIGNATIONS (ENROLLED MEMBERS)

Nicola Annette Koch Bakker

ABCFP MEMBERSHIP STATISTICS—February 2014

NEW REGISTERED MEMBERS

Colin Trevor Campbell, RFT
Rurik Wilhelm Muenter, RPF
Owen Lee Smith, RPF
Jocelin Nellie Teron, RPF
Jana Aileen Trappl, RPF
David Brent Zurevinski, RPF

NEW ENROLLED MEMBERS

Andrew Foster Ambery, FIT
Kyle Joseph Anderson, FIT
Stacey Duena Maria Boks, FIT
Craig Patrick Campbell, TFT
Aaron Gregory Hames, FIT
Trent Edward MacAulay, FIT
John Andrew Murray, FIT
Vojtech Prilesky, FIT

NEW LIFE MEMBERS

Michael D. Meagher, PhD, RPF(Ret)
John V. Parminter, RPF(Ret)

REINSTATEMENTS (ASSOCIATE MEMBERS)

David A. Ferguson, ATE

DECEASED

Kenneth Reginald Devick, RFT
Stephen G. J. Homoky, RPF(Ret)
William P.T. McGhee, RPF(Ret)
Edwin Charles Redlin, RFT, ATE

THE FOLLOWING PEOPLE ARE NOT ENTITLED TO PRACTICE PROFESSIONAL FORESTRY IN BC:

NEW RETIRED MEMBERS

Carolynn J. Anderson, RPF(Ret)
Edward J. Armstrong, RPF(Ret)
Calvin B. Bigelow, RPF(Ret)
Robert F. Bowden, RPF(Ret)
Laura Ellen Cottle, RPF(Ret)
Peter de Bruijn, RPF(Ret)
Michael P. Folkema, RPF(Ret)
Jaqueline Hipwell, RFT(Ret)
James A. Maxwell, RPF(Ret)
A. Larry Michaelsen, RPF(Ret)
Mary Lou Page, RPF(Ret)
Robert John Peever, RFT(Ret)
Leo J. Rankin, RPF(Ret)

LEAVE OF ABSENCE (REGISTERED MEMBERS)

Drew Marshall Alway, RPF(on LOA)
Timothy D. Baines, RPF(on LOA)
Kenneth H. Baker, RPF(on LOA)
Shane L. Berg, RPF(on LOA)
David Wallace Bryant, RPF(on LOA)
Ken Chalmers, RPF(on LOA)
Cheryl Mandy Crumblin, RPF(on LOA)
Patrick George Ellis, RFT(on LOA), ATE (note: active ATE)
Anita M.K. Fashler, RPF(on LOA)
Michael A. Fenger, RPF(on LOA)
Elizabeth Mary Grilo, RPF(on LOA)
Dennis Arthur Heigh, RFT(on LOA)
Robert John Kendall, RPF(on LOA)

Membership Statistics continued

CONTINUED... **THE FOLLOWING PEOPLE ARE NOT ENTITLED TO PRACTISE PROFESSIONAL FORESTRY IN BC:**

Warren Alexander King, RFT(on LOA)
Tara E. Leduc, RPF(on LOA)
D. Kelly G. Love, RPF(on LOA)
Brendan MacDonald, RPF(on LOA)
Sharon Michele Mandrusiak, RFT(on LOA)
Carl M. McLennan, RPF(on LOA)
William Douglas Merrie, RFT(on LOA)
Anne Margaret Molony, RFT(on LOA)
William Jordy Moore, RFT(on LOA)
Donna Elizabeth Myketa, RPF(on LOA)
Anand Pandarinath, RPF(on LOA)
Pierre Andre Pelletier, RFT(on LOA)
Patric John Pictin, RFT(on LOA)
Jason Thomas Pond, RPF(on LOA)
Corinne Lea Stavness, RPF(on LOA)
Deepa R. Tolia, RPF(on LOA)
Paul James Toovey, RPF(on LOA)
Lorne Keith Walker, RFT(on LOA)
Wade James Watson, RPF(on LOA)
Robert Macrae Weaver, RFT(on LOA)
Michael George Zaklan, RFT(on LOA)

LEAVE OF ABSENCE (ENROLLED MEMBERS)
Candace Paige Dow, TFT(on LOA)
Grant Kurt Huettmeyer, FIT(on LOA)
Kevin Pentti Kurkiniemi, FIT(on LOA)

REMOVALS (REGISTERED MEMBERS)
Terrell John Douglas Balan
Chris Bauditz
Kevin Scott Bradley
Sinde Jay Carter
Shelley Louise Dawson
Victor Drohomirecki
John Heath Dymond
Kelly Shawn Favron
Trenton John Gainer
Colin Anthony Germsheid
William H. Graham
Robert Bruce Gray
Penny A. Hendricks
Jennifer Heron
Earl Donald Hills
Kevin P. Horsnell
James Ralph Knight
Scott Barton Lindeburgh
Neil Edward Lipinski
Russell Charles Gordon Martin
James M. MacMillan
Paul Douglas MacNeil
Suzanna Matovich
Anthony J. McDonald
Douglas S. Misutka
Scott Grant Muir
Art James Murphy
Shawn Torin Murray
George Patrick Ostoforoff
Frederick Arnold Pattenden
Stewart William Philpott
Brian Thomas Quinn
Alfred Lee Ray
Wendy Carla Rost
Frank J. Rowe
Darren Edward Rowsell
Eric Neil Sankey
Suzanne W. Simard
Matthew P. Simons
Rory Alexander Smith
Krzysztof Piotr Stec
Aaron James Straub
Glen Eric Swanson
John F. Wai
Steve Lee Williams
Angus Laird Woodman

REMOVALS (ENROLLED MEMBERS)
Jessica Lea Bockus
Catherine Mary Brady
Simone Leanne Crook
Joshua James Dick
Bart Christopher Brian Fyffe
Jesse Daniel Grigg
Jeffrey David Hamilton
Hao-Yu Huang
David John William Mullett
Kyle Ryan Myschowoda
Kimberly Anne Parr
Silas Matthew Patterson
Michael John Prokopenko
Candice M. Randle
Dimitri Alban Vaisius
Holly Anne Vear
Mitchell R. Wilson

REMOVAL (ASSOCIATE MEMBERS)
Anthony J. McDonald
Barry R.W. Ostrand
Krzysztof Piotr Stec

RESIGNATIONS (REGISTERED MEMBERS)
Jeremy Alan Beal
Tanis Elaine Blocka
Douglas B. Howard
Alastair Rory Kernahan
Erin Linnea Lindberg
James Ian McDonald
Larry Floyd Nixon
Angela Marie Palmer
Suzanne Beverly Pelletier
Robert A. Scherer
J. M. (Greg) Taylor
Roger J. Wysocki

RESIGNATIONS (RETIRED MEMBERS)
Ronald William Burrell
Roxton Chan
Peter Norman Jansson
Hans A.O. Magdanz
Robert A.B. McFarlane
Bruce D. McKerricher
Barry R.W. Ostrand
Allen R. Pollard
Michael Popoff
John S. Woodward

RESIGNATIONS (ENROLLED MEMBERS)
Dallas Robert Campbell
Tracy Lea Godin
Daniel Kyle Smallacombe

CHANGE AGENTS continued from Page 18

over-mature, with later seral stage species developing in the understory. Intense fire in beetle-damaged stands operates to restart the lodgepole pine cycle again and again. If human society intends to build a sustainable economy on pine, it probably will have to intervene in this cycle.[4]

While the wolf may not be as bad as depicted in fairytales, I still feel discomfort when I am stumbling through the woods of Compton Island and am sure I am being accompanied by a number of wolves. Let's face it, in certain conditions I could be to them what a mature pine is to the bark beetle: their supper! All policies, even those that are science-based, require the use of a large amount of common sense in their application. This is especially true in the use of fire as a management tool in the forested landscape.

Will Wagner resides in Campbell River where he is continuing research initiated while with the Canadian Forest Service. He studied forestry at UC Berkeley, forest engineering at Oregon State and the economics of forest resources at University of Victoria. He has practised forestry in three regions of the US and in the Interior and on the coast of BC.

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A Moment in Forestry

Submit your moment in forestry to Doris Sun at: **editor@abcfp.ca**

Accidental Discovery Submitted by Curtis Macdonald, FIT, Vanderhoof

Almost trampled on by a member who was working in the field north of Vanderhoof, this toad was nonetheless gracious enough to pose for a photo.

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