Bugs & Diseases

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Alberta's eye on forest health

Issue highlights:

Forest Health and Adaptation

Alberta Government

Firewood Can Spread Invasive Pests and Diseases

Camping season is just around the corner, and with that comes an increased threat of people transporting wood which can harm our forests. Tree killing insects and diseases can be concealed in or on firewood. On their own they usually can't move very far, but with help of campers transporting firewood, these insects and diseases can travel hundreds of kilometers. New infestations have the ability to destroy our forests, reduce property value, and cost huge sums of money to control. What role can we play in minimizing this risk?

Our best and easiest approach is to stop the movement of firewood. Education and "buy in" from the traveling public is paramount to achieving this. The Canadian Food Inspection Agency has created a pamphlet highlighting the importance of not moving firewood. Their message is to "buy it locally and burn it on site!" and self-education about invasive species threatening the local area. The public is encouraged to follow the rules and regulations related to moving firewood and wood products within Canada.

Another step revolves around identifying high risk areas and understanding the threats they face. For example, the emerald ash borer in the Calgary Forest Area is a substantial threat to urban areas, yet represents a low threat to our surrounding native forests. However, the mountain pine beetle presents a greater threat to our surrounding native forest than urban areas. Other pests such as the gypsy moth, constitutes a high threat to both. Knowing this can help with monitoring for early detection and rapid response plans.

To be truly successful, all stakeholders need to be involved. This includes partnering with other government ministries, municipalities, public and private campgrounds. With today's ease of travel, this is now a national and international issue. The Montana/Alberta border is taking appropriate steps by confiscating all firewood prior to crossing the border.

We all have a role to play in protecting the health of our forests. Campers and stakeholders alike are encouraged to take an active role in stopping the movement of firewood and protecting the health of our forests and natural areas.

Bart McAnally - Calgary Forest Area

2017-18 MPB Control Summary

The beginning of April marked the end of Agriculture and Forestry's 2017-18 mountain pine beetle control program. In total approximately 92,230 trees were cut and burned at 7,643 sites across Alberta. The following table lists tree control numbers by Forest Area.

Forest Area	Trees Controlled
Edson	58,476
Grande Prairie	14,876
Slave Lake	14,427
Whitecourt	3,692
Lac La Biche	488
Rocky Mountain House	40
Calgary	271
Total	92,270

Unfortunately, due to a number of circumstances we fell short on meeting our control goal, and 2220 infested trees were left uncontrolled. These trees are located at 285 sites within the Grande Prairie and Slave Lake Forest Areas, and will be a priority for survey and control work next season.

On the flip side, we were very fortunate that the immigration of MPB into the Hinton area from a large source population in Jasper National Park last summer was not as widespread as predicted. This allowed us to expand the Leading Edge Zone (where aggressive single tree treatment occurs) westward to approximately the town of Hinton with existing program funds. To help achieve this, West Fraser (Hinton) bolstered the Department's efforts by controlling approximately 14,500 trees in the area south east of Hinton through a grant from the Forest Resource Improvement Association of Alberta (FRIAA).

Although there is some uncertainty on how the current epidemic in Jasper will impact adjacent Crown forests, we do expect that things will get worse before they get better. We anticipate continued immigration into the Hinton area for at least another few years as the pine host in the park is depleted. Fortunately, declining populations over much of the Grande Prairie and Whitecourt Forest Areas will allow us to focus resources on this priority area.

Mike Undershultz — Edmonton

Golden Beetle Award—And the winner is…

There are few things in life more satisfying than being recognized by your peers. Our Forest Health (FH) team knows this, so every year we acknowledge one of our own with the Golden Beetle Award for making outstanding contributions to our program. This year's selection truly demonstrates 'peer recognition' as everyone in our FH group was given chance to vote for a worthy recipient. And the winner is…Ryan Hermanutz.

Ryan , left, and Tom.

Ryan joined FH in 2015 as a Forest Health Assistant based in Peace River. In 2016, he became the Forest Health Officer for the Peace River and High Level Forest Areas. Comments his peers submitted indicated why people felt he had earned the Golden Beetle Award - Ryan is generally seen as a "keener." His enthusiasm for projects he has taken on was noted by many. Of particular mention, Ryan has assumed the lead role in our efforts to develop a risk ranking and survey procedure for Spruce Beetle. He volunteered to take on the duties co-chair for our FHO Team and to take minutes at our meetings on more than occasion – now that's dedication!

Congratulations Ryan!

Tom Hutchison — Edmonton

Brood Productivity and Phenology of Mountain Pine Beetle Along an Elevation Gradient

Mountain pine beetle, *Dendroctonus ponderosae*, can extend their life cycle from one to two years and the length of the life cycle is highly regulated by temperature. Accordingly, the life cycle of mountain pine beetle, as affected by temperature, will differ between years and geographic region. Annual weather directly affects the population dynamics of high elevation MPB and this has been described in the western United States. Other than an observational description by Reid (1962) in Banff, the relationship between high elevation and mountain pine beetle population dynamics in Alberta are unstudied.

Amman (1973) was the first to study population dynamics of mountain pine beetle at various elevations. This work, conducted in Wyoming, revealed that the cool weather experienced by high elevation populations slowed adult maturation and brood development. Cool spring and summer temperatures delayed adult emergence and mating activity. Additionally, the sub-optimal summer temperatures slowed brood development and caused offspring to enter the winter in life stages that susceptible to cold winter temperatures. This resulted in abnormally high rates of overwinter mortality that reduced population growth compared to low elevation populations.

Additional studies have built on Amman's work to describe the importance of MPB life cycle length on, in particular, the ability of MPB to establish and persist in a given region and to outbreak. One-year life cycle MPB are highly synchronised populations that are capable of mass-attacking high-vigour trees. This short generation time, along with other factors, increase population growth and outbreak potential. Two-year life cycle MPB have to overwinter twice, are exposed to natural enemies for longer, and have reduced food quality as phloem desiccates as the tree dies (Amman 1973, Safranyik 1978). This leads to abnormally high mortality and populations that do not persist in time.

The objectives for this project are to document MPB biology along a gradient of elevation in the northeastern slopes of the Rocky Mountains in Alberta. We will assess brood productivity and flight phenology of MPB at high elevation sites compared sites at lower elevations in 2018 and 2019. This information will allow us to describe the population dynamics of MPB in northeastern slopes of Alberta based on elevation and weather. We will use this knowledge to adapt the Alberta Agriculture and Forestry MPB control program annually based on weather and to predict the behaviour of high elevation MPB using climate change scenarios. This information will also assist forest industry with forest management planning and to reduce forest susceptibility.

Caroline Whitehouse — Edmonton

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Get to Know an FHT – Brittany Taylor

It is time once again to get to a new FH staff member.
A: Allison Brown, Forest Heath Officer; B: Brittany Taylor, Forest Health Technician

A: *Thanks for agreeing to this interview Brittany! I'm sure everyone in the Forest Health community will be happy to learn a bit about Whitecourt's new Forest Health Technician. For those who have not met you, could you tell me about your education?*
B: Well, currently I am a Biologist in Training and I have one year to go until I am a Professional Biologist (wahoo). I started my schooling at Red Deer College then transferred to Dalhousie University to finish my Biology degree. In my second year at Dal, I took a volunteering position in a parasitology/entomology lab. My main task was collecting the supercooling points of tick eggs. I think by being in a laboratory setting, and working with masters students, I started to think 'hey, I can do this experimenting stuff too'. I ended up staying at DAL another year to complete my honours project, which is a decision I do not regret.

A: *So what was your honours project on?*
B: To put it in simple terms, it was about the symbiosis of a particular bacteria and dog ticks.

A: *Very nice. I think I remember reading that article in the August 2017 Bugs &Diseases edition! Can you tell me a little bit about your related work history?*
B: Of course. In the first summer I came back from Halifax, I took a position as an industrial herbicide applicator for the oilfield. I spent 2 summers in the same position with the same employer.

Brittany in Peru.

A: *So you worked with invasive plants?*
B: Yeah. I obtained my authorized assistant ticket, and I began learning how to identify weeds and about different kinds of herbicide. At the time, I didn't think this experience would amount to anything, but to my surprise it helped me get a job as a Forest Health Assistant in Hinton, AB.

A: *What is your first memory of working in Hinton?*
B: I remember the first day I went out in the field with Caroline [FHT of Hinton]. I was a bit nervous, because I had never done r-values before, and I wanted to prove that I am capable in the field. I still remember what I was wearing that day; I was pretty tight on cash after being a student and using my tax return to travel Costa Rica, so I was wearing shabby men's jeans from a second hand store, a free fruit-of-the-loom t-shirt and grubby old shoes from spraying. When Caroline saw me she grinned and said something along the lines of 'you belong with me.

A: *Well, that's an interesting comment.*
B: I will never forget it! It took me a moment to realize that she was talking about my shoes! They were pink when I bought them, but the dye from the herbicide had stained my boots a brilliant bright blue. Turns out, Caroline knew this was herbicide dye.
A: *What knowledge you are taking with you from Hinton to Whitecourt?*

B: Well I am bringing my understanding of Hinton's invasive plants program. I am hoping I can use this knowledge and adapt it in order to create a specialized program for Whitecourt. I'm also bringing my experience with aerial surveying for mountain pine beetle as well as my capability of with working with contractors and FIRES database.

A: *Now let's shift gears a little bit. Can you tell me what you wanted to be when you grew up?*
B: It's funny that you ask that. I recently found a picture of a poster I made from either kindergarten or grade one which had the answer to the same question. Apparently 5 year old Brittany wanted to be a Doctor but I am not sure how much my parents influenced my answer. I guess in ways I am a sort of tree doctor and I like to think that maybe that's what mini-Brittany meant by 'doctor'.

A: *We'll definitely be doing lots of work trying to keep our forests healthy! Can you tell me something that not many people know about you?*
B: Well that's a hard question. Not many people know that I have a website and blog about gardening and the science of it. I was motivated to create it to challenge people to grow produce, no matter where they are. I named it the Grow a Better Future Challenge and I am sure if you google 'bringing back community' you will find my website.
A: *So is it fair to say that you enjoy gardening?*
B: I like to say that I have grown to love gardening… (pun intended!), even though I am not that great at it. Since I don't have any pets or children, I pour all my excess love into my garden.

A: *Well I hope I get a little taste of your produce this summer! On a more forest health related note, can you tell me which forest health damaging agent is most interesting to you, and why?*
B: Hmmm… Well, for some reason the first thing that comes to my mind is dwarf mistletoe. Now I haven't worked much with the disease agent, but I have seen it in the field from a helicopter. While I was aerial surveying last year, I saw this tree that had a big green fluffy top. I named the tree 'Bob Ross', because the tree looked like it had an afro.

A: One last question—In your opinion, what is the biggest challenge facing the health of AB's forests?
B: This is sort of a sad note to end on but an important question to be considered. I think the biggest challenge that forests will face will be climate change. Climate change is a multi-faceted and irreversible issue and I think we are going to see an array of problems pop up as a result to it. The effects could show up discreetly in the form of an explosion in a population of insects which, in turn, munch away a bunch of trees, or it could be more obvious where trees dry out and dying due to a reduction in annual rainfall and increased temperatures.
A: *I guess what you are saying is that it could be difficult for us in the forest health world in the coming years.*
B: It is hard to say what will happen, but I do think we will face a lot of challenges as trees cannot migrate to areas with habitats they have evolved for. I am hopeful that with science and planning we will be able to mitigate the effects of climate change. All of us, the trees, the animals and humans will have to evolve. We have no choice.
A: *I can tell you have thought deeply about this issue. Thank you for sitting down with me this afternoon.*
Welcome to our team Brittany!

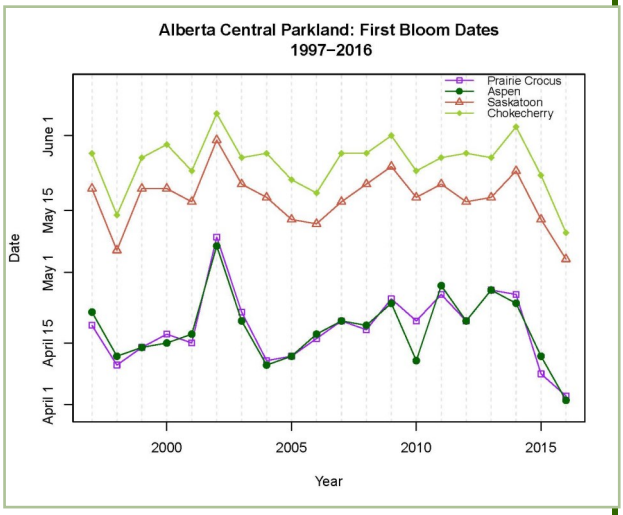
Allison Brown– Whitecourt Forest Area

The 'Eyes of Science' - Alberta PlantWatch

As plants and insects develop in spring in response to increasing temperature, their appearance and timing is linked and predictable. We can use the bloom time of a common plant to predict when an insect pest will emerge. Bloom time of saskatoon (*Amelanchier alnifolia*) can be used to predict when gypsy moth and spruce budworm emerge (Coincide, 1989). Dr. Kevin Judge (MacEwan University, Edmonton) studies hump-winged grigs in the foothills; their breeding season seems to coincide with saskatoon flowering time. The grigs' calls (stridulations) are often heard then, and thus the bloom dates might help predict when grigs can be observed.

In a past project with Dr. Ken Fry, we found that the best plant event to indicate when to catch the woolly elm aphid as it moves down the stems of saskatoons or apples into the soil, was blooming of northern bedstraw (*Galium boreale*).

I have coordinated Alberta PlantWatch for 3 decades, encouraging volunteers to observe and report flowering and leafing times for selected plant species. This study of the timing of life cycle events is called 'phenology'. The date when flowers appear in spring is controlled by how much heat they have been exposed to, and our warming winters and springs have sped up plant development. For instance, in central Alberta aspen poplar and prairie crocus are blooming 2 weeks earlier over 7 decades (1936 to 2006). Over those years, February mean minimum temperatures warmed by 6 °C!



While the date of the first sign of spring (aspen pollen-shed) can vary by at least a month from a very late year (2002 on graph) to a very early year (2016), the sequence of plant events is predictable from year to year. For example, in central Alberta aspen and prairie crocus bloom around mid-April (average timing 1987 to 2006) and saskatoon in mid - May. Chokecherry follows about 9 days later, followed by common purple lilac May 30 and lodgepole pine May 31.

Using plant timing to choose the best time to control insects can help minimize effort and expense because insects can be caught at the precise emergence time or instar stage. Plant phenology is also useful to predict the end of the spring fire danger period in forests. When the canopy greens up, transpiration and humidity increase and fire risk drops.

Crocus Photo: Irene Crosland

Observing for PlantWatch is easy. For information on the plants and stage descriptions, see Canada PlantWatch www.plantwatch.ca, and my older site plant-watch.naturealberta.ca (the latter has more photos and info on wildlife and indigenous uses of plants but is missing some species). Choose a plant and location where you can see it

Saskatoon Photo: Charles Bird

every day. Maybe add a tag to help you observe the same plant over time. When the flower buds open that day is first bloom. Mid-bloom is when about half of the buds have opened. Leafing is when the first leaf has unfurled in 3 different spots on the tree.

Observing and reporting dates for even one plant is very helpful. Send your dates in by email or mail using our standard data sheet. You can also submit electronically on the www.plantwatch.ca site but due to FOIP issues I am unable to communicate with observers. I am working on an Alberta web reporting system.

We now have over 57,000 records on plant timing in Alberta, going back to 1987. This extensive baseline shows how common plants are reacting to our increasingly variable climate. Phenology is a useful tool to manage future risk, i.e. to better manage the impacts of heat, drought and insects. As Jacques Regnière said at the SERG meeting last February "There will be insect surprises in the future!"

Elisabeth Beaubien —Alberta Plant Watch

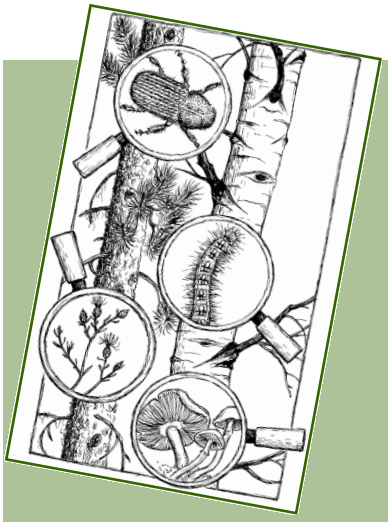
A New Forest Health Tech for Calgary Forest Area

I would like to introduce Louis Price the new Forest Health Technician in the Calgary Forest Area. Louis was born and raised in Newfoundland before attending the University of New Brunswick for a Bachelor of Science degree in forestry. He spent 6 years in various forest management roles, including forest health, for Alberta Parks before returning to UNB for a Master of Environmental Management degree. It was during this second round of education where he met his wonderful wife Libby, mother of their one year old girl Shay Isabelle. After returning to Alberta in 2012, he spent a couple years with a consulting firm in Edmonton developing forest management plans before re-joining the Government of Alberta in Slave Lake as a Wildfire Ranger and eventually becoming an Air Attack Officer. In his spare time during the summer months, Louis enjoys camping, gardening, softball and motorcycle rides. The winter months are all about skiing.

His passion for forestry has taken him in many directions and I'm excited to have him on our team as the newest Forest Health Technician located in the beautiful Calgary Forest Area.

Welcome Louis!

Bart McAnally —Calgary Forest Area



Serpentine Leaf Miner

(Picasso of the Woods)

Serpentine Leaf Miner
Artist on a tree
Your path you trace on aspen leaves
Most exquisitely

How is it you're called a "pest"
With work that is so fine
Decorating every leaf
With a lovely, squiggly line

Even if you cause some harm
You don't go on killing sprees
In that regard you pale compared
To other insects or disease

So Phyllocnistis populiella
Your craft's a guilty pleasure
The artistry is there to see
And the damage hard to measure

Tom Hutchison—Edmonton

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