

Bugs & Diseases

Vol. 21 No. 3

December 2010

14th Provincial Integrated Forest Pest Management Forum

Alberta's eye on forest health

Issue highlights:

Annual Integrated Pest Management	1
Douglas-fir Beetle	2
MPB Early Fading	3
2009 Hail Damage	4-6
Golden Beetle Award	6-7
Kew Gardens UK	8-9
Spruce Budworm Control	9
Spruce Budworm Rock	11

The annual Forest Pest Management Forum organized by Alberta Sustainable Resource Development provides a venue for those who have an interest in forest health in Alberta to gather for an update on current conditions and ongoing research.

The 14th forum was held on November 4th at the Pine Room, Northern Forestry Centre in Edmonton, provided gratis by Natural Resources Canada. In spite of travel restrictions, nearly 100 persons, a record number, attended this forum. They represented forest industry, academic institutions, forest health research community and all three levels of government.

The proceedings included updates on major forest health damaging agents on provincial Crown land and National Parks; presentations on current research on the mountain pine beetle and defoliators; genomics; invasive and exotic pests and young stand pests. Dr. Jan Volney, a Research Scientist affiliated with the Northern Forestry Centre, was the keynote speaker. He delved into nearly forty years of his research experience on defoliator pests in his presentation entitled,

“Beyond the Pest Management Crisis: Lessons from the Panarchy,” a thought-provoking presentation on defoliator pest dynamics. This presentation, delivered in his hallmark fashion, was well received.

Forest tent caterpillar natural enemies and larval nutrition on moth dispersal; impact of prescribed fire on populations and effect of water limitations on pine defense against mountain pine beetle; use of barrier zones to manage invasives; white pine weevil susceptibility of white spruce; resistance of hybrid poplar to leaf-spot and exotic forest pests were the other topics covered during this forum.

This forum is open to anyone with an interest in Forest Health issues in Alberta. If you would like to place your name on the mailing list for this forum please contact Lisa Jean at Lisa.Jean@gov.ab.ca

The proceedings of the 14th forum will be posted soon on the FTP Site: [ftp://ftp.env.gov.ab.ca/pub/out.going/forest_health/IFPM/](http://ftp.env.gov.ab.ca/pub/out.going/forest_health/IFPM/)

Sunil Ranasinghe - Edmonton

Fear and Loathing in Southern Alberta's Douglas-fir Forests

Douglas-fir is the leading tree species on over 17,000 hectares (ha) of forested land in the southwest corner of Alberta (i.e., south of Kananaskis) and found throughout much of the region's forests. Much of this Douglas-fir forest is over mature with many trees in the old growth stage. All in all, a meal fit for an insect. The western spruce budworm (WSBW) thought so and moved right in (see Bugs and Disease, August 2009). However, amidst extensive WSBW defoliation in the Porcupine Hills and Whaleback areas another infamous forest pest refugee from British Columbia was lurking under the bark.

Forest health staff noticed fading red Douglas-fir crowns during the 2007 aerial survey for WSBW. Although quickly determined to be Douglas-fir beetle (DFB) (*Dendroctonus pseudotsugae*), the moderate to severe budworm defoliation made it difficult to determine the extent of the infestation. DFB is first cousin to the mountain pine beetle (MPB) (*Dendroctonus ponderosae*) and has a similar life history: tree crowns fade the year after attack and the trees are killed through fungi carried by the beetle. However, DFB typically prefer slash, stumps, stressed and downed trees. With the WSBW infestation expanding to over 30,000 ha in 2009 there were many stressed trees to infest.

Mortality of mature Douglas-fir trees was mostly observed on the southern edge of the Porcupine Hills. Initially the mortality was strictly attributed to WSBW defoliation but it should take at least



Photo—Brad Jones 2010

five years to kill a mature Douglas-fir from repeated defoliation. The WSBW infestation did not become very apparent until around 2005 with noticeable mortality occurring shortly thereafter. There was evidence of DFB activity in the dead trees and good reason to think that the beetle had been active for some time in the region. Last summer marked the first year that DFB sites were aerially surveyed and 53 sites were recorded throughout the Porcupines and Whaleback. Compared to the Douglas-fir mortality on the landscape, this number appears low. But MPB numbers are drastically down this year in southern Alberta due to two autumns with extreme temperature fluctuations. There is no reason to think that the DFB did not suffer the same fate.

To complete the forest health agent cocktail, root disease centers are easily visible from the air across the Porcupines and of course droughty conditions have become normal in a changing climate. So there is indeed something to loathe in the beautiful and unique Douglas-fir forests of southern Alberta and perhaps something to fear. But perhaps it is fear of change. Insects and disease do not destroy ecosystems but rather change them. Regardless, this is a cocktail that area forest health staff looks forward to partaking of as we rise to new challenges and spend time in these remarkable forests.



Brad Jones - Calgary

Early Fading of MPB Attacked Pine - Opportunities and Challenges

Dale Thomas - Slave Lake

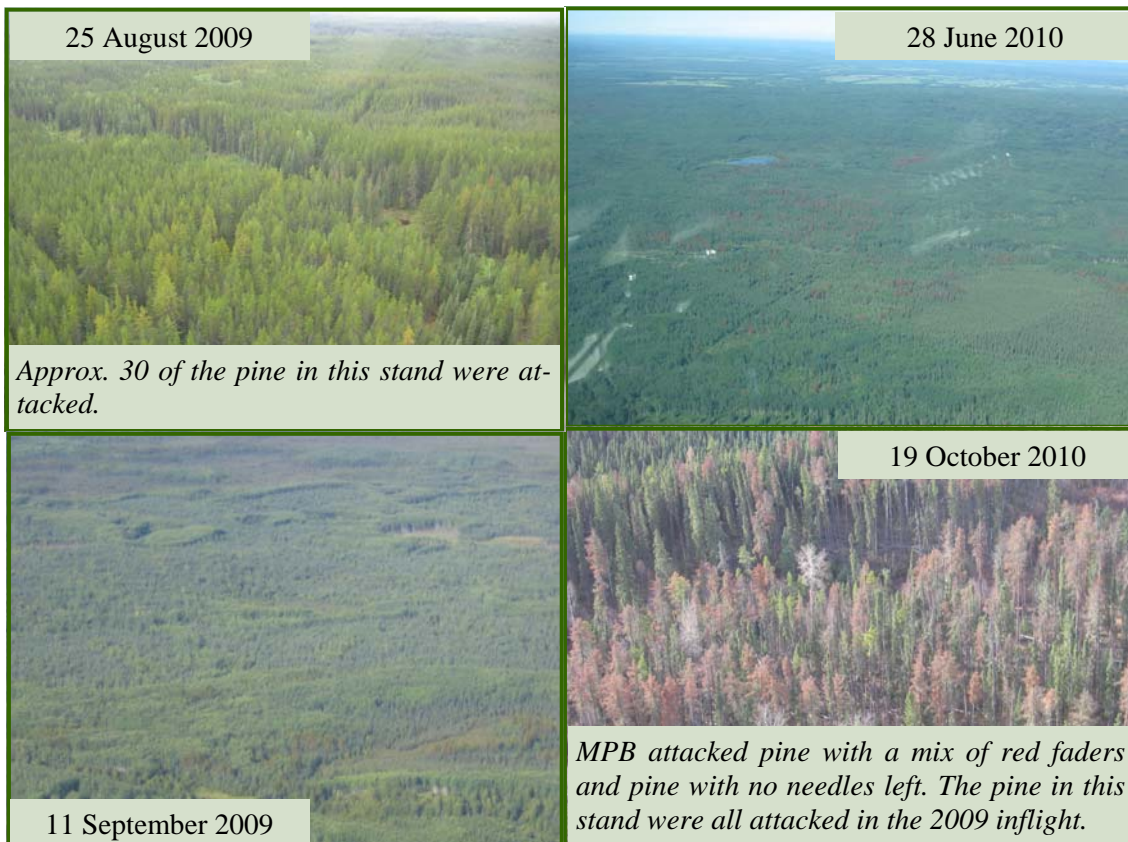
The first indicators of the large 2009 MPB inflight in the Lesser Slave Area were large amounts of MPB caught in some of our lookout tower traps. Lookout towers caught hundreds of MPB over two or three days in their Lindgren Funnel traps in late July, 2009. This information, coupled with higher than usual phone calls from the public and similar reports from adjacent Areas, indicated something “big” had happened.

Forest Health staff checked some of our dispersal bait sites in the beginning of August and confirmed mass-attacked trees at many of these sites in addition to bait sites well outside the known eastern edge of the infestation.

We started our Heli-GPS surveys the second last week of August and noticed many current attacked trees were beginning to fade already. This was only one month after the trees had been attacked. We postponed our Heli-GPS surveys by two weeks to allow more of the current attack trees time to fade. This was an unusual opportunity to observe the extent of the 2009 beetle flight in “real time” instead of waiting until the next year when they normally begin to fade. By September, many of the attacked trees had already faded to the orange stage and were quite visible during the Heli-GPS surveys.

It should be noted that not all the pine attacked during the 2009 inflight faded early. There were still many that remained green until 2010, but the general extent and severity of the inflight was obvious. By early summer 2010, the trees had faded to a full red colour.

Once Heli-GPS surveys started at the end of August 2010, we began to see two different “stages” of fading. The trees that began to fade in the spring of 2010 had bright orange/red crowns typical of pine trees attacked by MPB the previous summer. The early faders that allowed us to instantly map the extent of the inflight in the fall of 2009 now had a grey/purple hue to them along with needle loss that made them difficult to observe and map from the air.



What the Hail!?

Summer of 2009 was quite a year for forest-health-damaging agents in the Foothills Area. First came an MPB in-flight in July which affected much of northwest Alberta from Edson to the north; then, on or around the August long weekend, a whopper of a storm cut a swath from north of the Obed mine all the way southeast into the Clearwater Area. Campers will surely remember ducking for cover and hoping the damage on the new fifth wheel wouldn't be too bad.

Hail damage on trees is not a rare occurrence as hail storms occur fairly frequently throughout Alberta in July and August. Damage is typically fairly localized and doesn't cover wide areas. What made the 2009 storm an infrequent event was its widespread nature.

The hail damage was first noted by the forest industry reporting damage in regenerating stands and by Forest Health staff in the field. The damage was first thought to be fairly localized but this was disproved when the annual fixed wing Forest Health surveys were conducted in late June and the full extent of the damage was mapped.



In September, helicopters were used to fine tune hail damage mapping to get an accurate picture of how many hectares were damaged and what level of damage was evident. It turned out that 8,081 hectares (Ha) of forest was damaged to some degree in the Foothills Area, including 819 Ha of young regenerating forests. Unlike biotic agents, the hail doesn't pick and choose which tree host it hits so whatever tree species were in the path were

the ones that were damaged. The regenerating trees were largely lodgepole pine.

Clearwater Area experienced the same storm but with much higher effect on regeneration: 4,717 Ha of total damage was recorded, 2,392 Ha of which occurred in regenerating areas (see map page 5).

Hail damage is most easily recognized on young trees as it can readily be seen and because the damage is typically more acute.

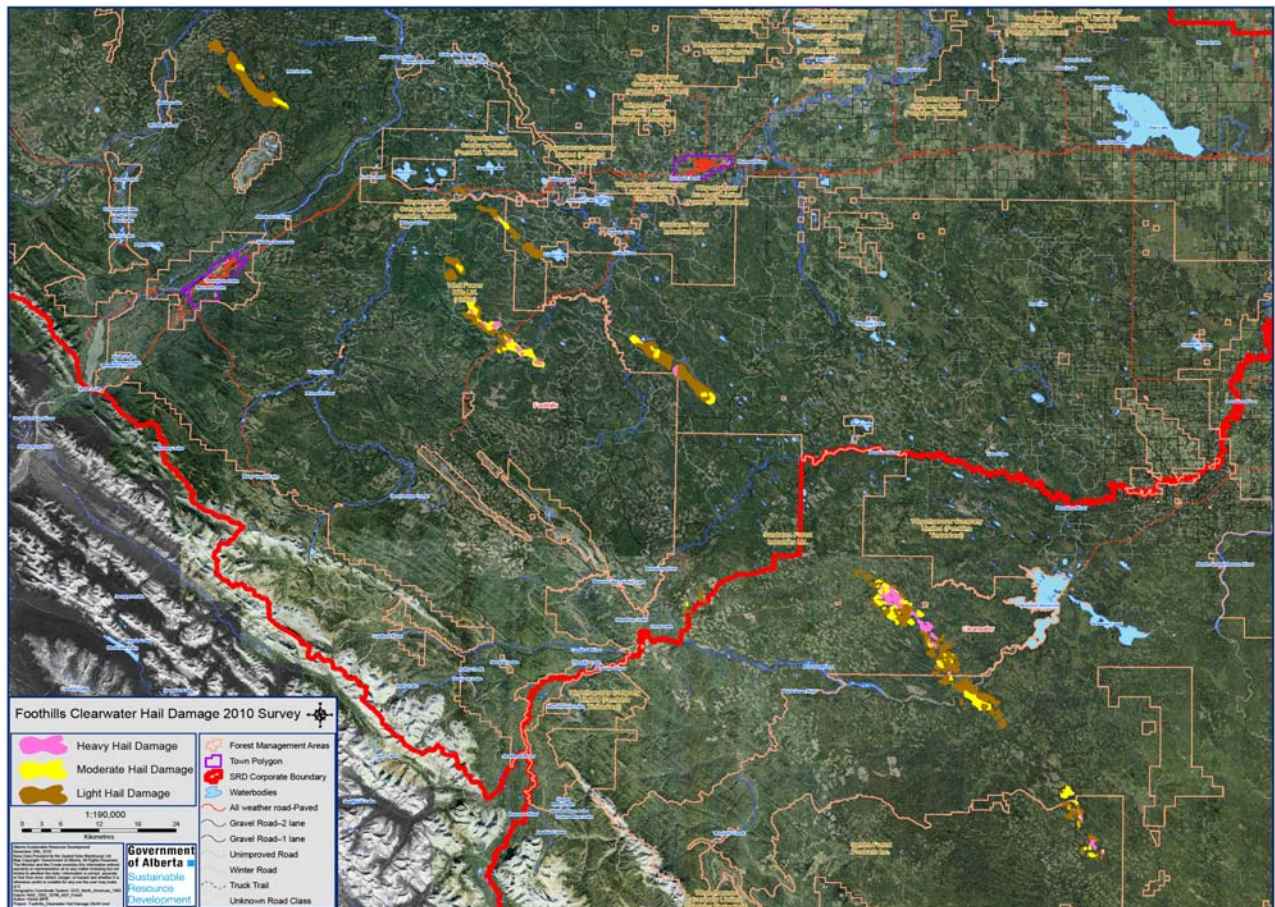
Damage occurs mechanically from stones impacting the tree. Tell-tale signs of hail are small scars on the branch stem and the main stem and the stripping of needles from the branches. Damage is often located only on the side of the tree first impacted by the hail (windward). The lee side is often undamaged allowing the tree to likely recover. If enough of the needles are stripped from the entire tree or turn red and the buds are killed, the tree will have a low chance of survival.

Severe scarring on the trees can effectively girdle the tree as well. Any open scarring on a tree's main stem will allow for pathogen entry causing heart rot issues



Hail Scarring on Pine

down the road in extensively scarred trees lowering survival at worst and log quality at the least. Trees stressed by hail damage will likely be more susceptible to other forest health agents as well. This includes various rust species, defoliators and bark beetles. Stactiform rust has frequently been seen in pine regen hit by hail in this area causing very poor form at least and often death if occurring low on tree.



Mature trees can typically recover from all but the most heavily damaging hail. Providing enough needles remain on the tree to conduct photosynthesis and transpiration functions, the tree will recover. The tree will likely be harvested or die of other causes (unassociated root disease, wildfire, etc) before pathogens entering through hail scarring or damage from other agents become an issue.

As damage on immature trees is far more acute, heavily damaged trees will most likely die or at least be severely affected in form. Immature trees with light damage should recover as buds are typically unaffected; the foliage isn't fully removed and the stem scarring isn't widespread. Moderately affected trees have a more difficult time recovering.

Damage from the 2009 storm was highly variable with light needle stripping evident in both mature and immature stands as well as full destruction of regenerating stands in some cases and full needle removal in mature stands.

By most accounts, more severe weather will occur with climate change so widespread hail damage may be more frequent. There is a shortage of information on what happens to stands if impacted by hail early in the rotation. What level of heart rot will heavy stem scarring cause and will lumber recovery or peeler log recovery be severely impacted? How much bud damage and needle death/removal will allow for full recovery? What insects and diseases will profit from the stress of the tree caused by hail damage? We would like the answers to these questions. We are working on setting up research trials to attempt to answer these questions.

Brooks Horne - Hinton

What the Hail!? (continued)



Stalactiform rust on hail damaged pine



Heavily damaged pine regeneration



Heavily damaged mature pine/aspens



Heavily damaged pine plantation near Robb

2010 Golden Beetle Award

The Golden Beetle Award for exceptional Forest Health service to the province has been passed to this year's recipient, Dale Thomas, Forest Health Officer in Slave Lake. Dale has been an excellent contributor to the Forest Health Program since his move to FHO in the Winter of 2006/2007.

Dale's wealth of experience on the fire side gives him good practical knowledge of aircraft and logistics. He is very pragmatic and is always a voice of reason. He is also now a bug geek like the rest of us who can't help but pull over the car while on holidays to check out some budworm damage or MPB development.

2010 Golden Beetle Award (continued)

Dale is instrumental to the Forest Health group's dynamic approach to MPB management. A good example of his contributions occurred in the aftermath of the large July/Aug 2009 MPB inflight. While conducting our usual flights looking for trees attacked in 2008, Dale noticed that many trees had a yellowish hue to them. Upon conducting field checks, he found widespread and heavy new 2009 attack and persistent drought had caused the trees to fade early. Aerial surveys were halted and the program changed across the north as other Areas then noticed similar fading.

Dale is a good source of advice for the newer FHOs as he is very approachable and has gone through a number of contract cycles. His work is appreciated by all of us in the Forest Health Program.

Congratulations Dale!



Brooks Horne - Hinton

Kew Gardens UK

The last stop on the London ‘Tube’ system before Heathrow is to Kew Gardens - formally known as Royal Botanic Gardens, Kew – some 132 hectares of landscaped gardens and glasshouses on the south-west fringe of the city.

Kew’s history dates to the early 1600s and the construction of a four-storey brick house and gardens which were purchased by the Royal Family in the late 1700s. In 1841, government took control of the gardens and began constructing glasshouses, one of which is the world’s largest surviving Victorian glasshouse and covers 4880 square metres.



Today, the mission statement of Kew Gardens is “to inspire and deliver science-based plant conservation worldwide, enhancing the quality of life.”² In the beginning, it served as a repository for alien plants and trees.



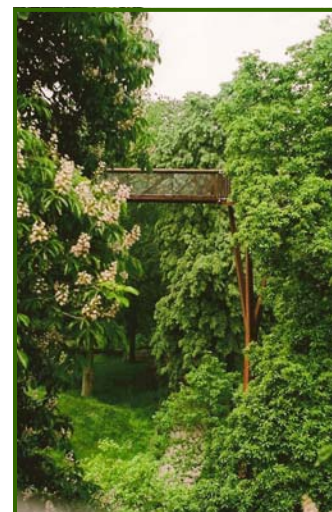
During the late 18th and early 19th centuries the introduction and cultivation of non-native plants was conducted by many organizations in Britain, and being a “Plant Collector” was a globe-trotting vocation. Kew

was the recipient of most of these collections, as well as exotics from private gardens, and became the primary centre of economic botany in the world.¹ Kew still retains that role, to an extent, and its Millennium Seed Bank Partnership (MSBP) saves plants and trees that might otherwise disappear for a variety of reasons including climate change, human activities and even the impacts of invasive species. Ten percent of the world’s wild plant species have been banked to date.

But Kew is much more than ponds, flowerbeds and greenhouses. Kew’s arboretum covers most of the Garden’s landbase and is, for the most part, arranged by genera. Some of the planted tree vistas date from the mid 1800s and some specimen trees arrived as early as the 1640s.

One interactive attraction dedicated solely to trees is the Rhizotron and Xstrata Treetop Walkway. A walkway journeys below ground to explore the Rhizotron, an installation which “explains the relationships that exist between tree roots, the soil and organisms such as nematodes, beetles, woodlice and bacteria.”²

Back outside, climbing the stairs 18 metres leads to a walkway among the tree canopy. On this 200 metre walkway one can view the birds, insects, lichens and fungi that live among the tree tops. Kew online offers interactive games for adults and kids to learn about a tree’s world.



Kew Gardens UK (continued)

Non-native pines thriving at Kew's 'Pinetum' include Black Pine, Stone Pine and the pre-historic Wollemi Pine. Stone Pines (*Pinus pinea*), native to southern Europe and north Africa, grow cones that take 7 years to mature and are the biggest producer of edible pine nuts in Europe. Kew's oldest, living stone pine was planted in 1846. Wakehurst Place, a country garden estate managed by Kew, has a Pinetum which was planted by the estate's owner between 1903 and 1936.

My own visit at the end of May was also an excellent time to see all of the 'new residents' swimming and waddling around the many beautiful ponds. An 'armchair' visit to www.kew.org can show you Kew at home and their many partnerships around the world.



¹ Lever, Christopher. 1992. They Dined on Eland. Quiller Press, London.

² <http://www.kew.org>

Marian Jones—Sundre

New Waterways/Lac la Biche Spruce Budworm Control Program Launched

A new and innovative initiative has been undertaken by the LLB/WW Forest Health team in response to the ongoing SBW infestation that has persisted for a number of years – playing dance music throughout the forest. Although some may think this idea is too good to be true, trial runs have proven to produce positive results.

Tom Hutchison, Forest Health Officer for the region, states “We tried classical music, but that just seemed to lull the SBW larvae to sleep. When they woke up, they were hungry and ate just as many needles as when there was no music at all. With country music, especially the songs

where the truck was stuck or Mama got run over by a train, we believe the SBW larvae were sad and actually ate more to take their mind off of their problems. We tried rap music, but quit after about 5 seconds and didn't care if it may have worked. We just weren't going to play rap!

Fortunately, we discovered a huge breakthrough when we played dance music. The budworm larvae gyrated so much they fell off the trees, and did not have the energy to crawl back up. The song “Boogie-Woogie-Oogie Dancing Shoes” seemed to be particularly effective.”

New Waterways/Lac la Biche Spruce Budworm Control Program Launched (continued)



Tom Hutchison (Forest Health Officer) and Marty Robillard (Forest Health Technician) at a recent recruitment drive

Eight different trial plots have been set up in the Fort McMurray area. Panasonic XMD81 speakers are placed in a grid pattern at approximately one kilometre intervals and volumes are adjusted accordingly using high frequency decibel interlog base technology. Transmissions are monitored regularly through the Fort McMurray Fire Center. Waterways Manager John McLevin, who has been known to dance with trees, states "I sort of like the dance music in the radio room.....it keeps my staff on their toes!"

Field trials have gone off without a hitch to date. And, the public seems to like it too. Hunters in the area say the dance music keeps the moose, deer, and particularly the rabbits, hopping. Oil workers in the area say this music makes the day go by quicker and it's a great way to stay in shape. Cole Schneider, a Wildfire Ranger, states "I like this dance music thing. I like to dance, especially when I have ants in my pants."

"Buzz" Boyachuk, SRD Air Attack Officer, has graciously volunteered to become the poster boy of this project. His function is to attend functions when he is functioning.



"Buzz" Boyachuk – Poster Boy

Initial funding has been secured through the Damaging Insects Strategic Control Organization (D.I.S.C.O.) of Canada. A representative of this group (DJ MR Biggy Wig) said: "I like this use of dance, I'm glad they took this stance, I say we all give it a chance, and maybe soon we'll try it on those darned invasive plants."

However, further assistance is required. If you wish to become involved in this worthwhile project, please contact Forest Health Technician Marty Robillard at martin.robillard@gov.ab.ca or 780-675-8223. Cash donations are welcomed (actually cash donations are preferred).

Marty Robillard - Athabasca

Spruce Budworm Rock!

Sung to the tune of “Jingle Bell Rock”

Silken webbing, chewed off needles, budmining, frass,
Rounded off crowns, and larvae en masse.
Sometimes there's dead tops, and sometimes whole trees,
This is what one sees!

Choristoneura fumiferana,

Let our poor trees be,
You've been bad now, for some time now,
You've got us lookin' at the ol' *Bt*.

So stop your feedin' stop your breedin'

Give it a rest

Stop killing spruce and fir.

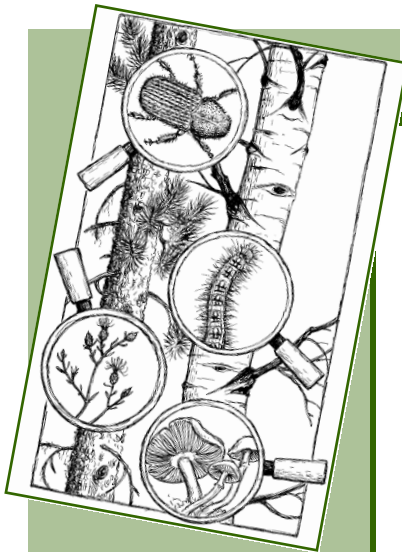
Epidemic to endemic cycle again

That's the way it should be, make it good for a tree,
And to that say amen!

Tom Hutchison — Athabasca



Please click the speaker link above
to hear audio version of poem!



Forest Health Officers:

Brad Jones

Calgary
403.355.4854
Brad.Jones@gov.ab.ca

Brooks Horne

Hinton
780.865.6969
Brooks.Horne@gov.ab.ca

Dale Thomas

Slave Lake
780.849.7409
Dale.Thomas@gov.ab.ca

Devin Letourneau

Grande Prairie
780.538.5609
Devin.Letourneau@gov.ab.ca

Kristofer Heemeryck

Rocky Mountain House
403.845.8205
Kristofer.Heemeryck@gov.ab.ca

Mike Maximchuk

Peace River
780.624.6456
Maximchuk@gov.ab.ca

Seena Handel

Whitecourt
780.778.7267
Seena.Handel@gov.ab.ca

Tom Hutchison

Athabasca
780.675.8234
Tom.Hutchison@gov.ab.ca

ISSN No. 1499-5859 (print)

ISSN No. 1499-5867 (online)

Published Apr., Aug. & Dec.

Editor: Andrea Sharpe

Bugs & Diseases informs
forestry-related personnel about
current forest health issues.
Articles are welcome.

© 2010 Alberta Sustainable
Resource Development