

# Bugs & Diseases

Vol. 23 No. 1

April 2012

## Zama Spruce Budworm Project to Continue...

**A**lberta Sustainable Resource Development (ASRD) has entered into a Letter of Agreement with the Northern Forestry Centre (NoFC), Canadian Forest Service to provide help to collect field data of the Zama Spruce Budworm Project in northern Alberta.

With the recent retirement of Dr. Jan Volney, Research Scientist at the NoFC, the continuation of this long-term field experiment faced an uncertain future. In view of the potential benefits of this research to find a long-term, ecologically friendly alternative to aerial spraying of the biological insecticide Btk to control budworm populations, Forest Health Section entered into negotiations with NoFC to take over field data collection for another five years. This agreement was recently ratified by the senior managers of ASRD and NoFC.

The project began in 1996 with the establishment of a network of plots and tree measurements and in 1997 High Level Forest Products initiated the harvesting treatments. Thinning removed 25% or 50% of the standing volume in three patterns: uniform shelterwood cuts, standard strip cuts, strips with irregular feathered edges and conventional clearcuts. As checks, untreated residual stands were also left adjacent to the clearcuts. The entire experiment involved 344 hectares.

The current fieldwork is a continuation of the previous work and involves the establishment and collection of pheromone traps from a network of plots placed throughout all treatments. Also, each fall, branches are collected from white spruce trees within each treatment to measure levels of defoliation sustained in the summer months. These two measurements provide an insight and comparison into the population levels of spruce budworm and the damage they cause. Every five years, detailed tree mensurations are taken to see how well the trees are responding in terms of growth and yield, again comparing the results to the various treatments.

The NoFC staff will provide the experimental protocols and initial training to ASRD staff to collect the field data. Data analysis and publications will be looked after by the NoFC staff. ASRD will provide any permits needed to use the land base, maintain the plots, collect necessary data and provide those to NoFC for analysis. Both parties involved in this agreement will have free access to the data and findings of this study to share those with their clients.

This agreement is in effect until 2017 at which point it can be extended by mutual agreement, if deemed necessary and feasible.

*Sunil Ranasinghe and Mike Maximchuk*



*Alberta's  
eye on forest  
health*

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*Alberta*  
Freedom To Create.  
Spirit To Achieve.

## Out of sight...but not out of mind

Ever walk through the forest and come across several spruce trees lying in various directions all broken off at the base? Or how about walking through a regenerated cutblock or wellsite and notice several red, dead young pine? A little further digging into the matter might answer your curiosity. This issue's installment of getting to know your friendly neighbourhood forest pest covers a small group of species that one rarely sees yet their damage is quite noticeable and recognizable...subterranean pests.

Some forest pests in Alberta fall into the subterranean group as their life cycles and associated damages are generally under ground. There are three genera of these pests. Armillaria root rot, Tomentosus root rot and Warren's root collar weevil, are all common occurrences in the boreal forest, yet it is the tree mortality and damage that is usually seen first and gives their presence away. Armillaria root rot is caused by seven species in western Canada, of which *Armillaria ostoyae* is the most common in Alberta. The disease can be found on a variety of hosts, including pine, spruce, aspen and poplar. Signs and symptoms of the disease on larger trees include thinned, irregular shaped crowns and areas of blow-down. These areas are characterized by stems broken off at the base or butt, lying criss-crossed in several different directions (similar directions would possibly indicate a wind event). The disease can remain living for many years within infected stumps and initiate infections on young trees causing regeneration issues. On smaller pine and spruce trees, those that have been recently killed will have yellowish-red foliage. Digging into the soil around the butt area and roots will turn up white "mycelial" fans under the bark and also black shoestring type growths called rhizomorphs. In the fall, dark honey-colored mushrooms may also be present. The disease spreads throughout the stand through root to root contact, the rhizomorphs and possibly spores from the mushrooms. Due to the outwards spread from a central spot, the disease often causes "holes" in the stand which is another potential sign of an armillaria root rot center.

White mycelial growths on a mature aspen stem and white spruce root.

(Hawk Hills, north of Manning)



Tomentosus root rot is caused by two species however the main species of concern is *Inonotus tomentosus*. The disease is generally considered a pest of immature and mature spruce and pine. It too causes similar signs and symptoms on larger trees with thinned, irregular crowns, stems lying in several directions and distinct holes or stand openings. Infected trees have white pocket rot or reddish stain in the butt and roots. Tomentosus spreads within a stand by root to root contact and may also live and spread from infected stumps, 15 to 20 years following harvest.

Warren's root collar weevil, *Hylobius warreni*, typically feeds on pine and spruce and can be found within both mature and newly regenerated stands. They require two years to complete their development into an adult. The damage is caused by the feeding action of the larvae in the root collar area, just below the duff layer. This feeding can cause mortality in young trees if the root collar area is seriously girdled and may cause thinned, irregular crowns in mature trees. Smaller, young trees that have been recently killed will have yellowish-red foliage, very similar to Armillaria and one must either pull up the tree or dig into the soil to accurately determine the causal agent. Also, adult weevils present in unharvested, reserve blocks may migrate back into plantations and cause mortality and subsequent regeneration issues.

Warren's Root Collar weevil larva and feeding damage. (near Doig Tower)



Next time you come across some of these forest conditions, do a little digging and look a little harder. Chances are, one of these three common pests will be what you find.

*Mike Maximchuk—Peace Area*



## Get To Know an FHO

by Mike Underschultz

It is time once again to spotlight one hard working member of the forest health family. I recently had the opportunity to travel to beautiful southwest Alberta to talk with Brad Jones, the Forest Health Officer (FHO) in the Southern Rockies Area.

Brad and I took a stroll along the Bow River to talk about his past and present, and to find out what is really behind that bushy brown beard. Here is an excerpt from our conversation:

MU - For the benefit of those who have not had the pleasure to meet you, could you please start by telling me about your education and work history?

BJ - The forest health racket is a second, maybe third career for me. I worked in the music business for much of the 1990s in Montreal and the UK, buying and selling indie and punk rock for distributors. I spent much of the 2000s in school. I now hold a MSc in forest insect ecology from the University of Alberta and worked as research technician before coming to SRD.

MU - And how long have you been with SRD as an FHO?

BJ - I started here in the fall of 2008.

MU - When you were a kid what did you want to be when you grew up?

BJ - I'm still growing, still trying to decide. Independently wealthy sounds good.

MU - What type of things keep you busy on weekends?

BJ - Usually listening to loud music and managing my children. These days my kids are obsessed with insects and pond life so this summer will be packed with camping, hiking and catching and watching critters. Can't wait!

MU - Can you tell me a bit more about your wife and kids?

BJ - Creepy question, but my trophy wife of almost 20 years, Kerry, brings in the arts to my science. She is an instructor at the Alberta College of Art and Design, and a damn fine designer and artist in her own right. The boys, Sage and Teague, 5 and 3, are as full-on as two little boys can be. Makes me tired just thinking about it. But they love food and nature so we do well together.



MU - Any nicknames?

BJ - Not that I know of...

MU - Really BJ, I find that hard to believe.

MU - Favourite movie?

BJ - I have no idea.

MU - Really? Hmmmm

MU - Boxers or briefs?

BJ - Depends on the day, and what the day holds.



MU - Being a music guy, I have to ask what the last album you acquired was?

BJ - I've been utilizing the public library a lot lately while my kids grab books and DVDs. That's not stealing right? But I recently laid down cash on some vinyl for Tom Waits *Bad As Me* and Bonnie "Prince" Billy's *Wolfroy Goes to Town*. Pretty pleased with both.

MU - Wow, you seem to be a pretty hip guy for a bug geek.

MU - Now I want to switch gears and talk a bit more about forest health. Can you first tell me what your favourite forest pest is?

BJ - I don't play favourites but will always have a soft spot for forest tent caterpillar. I find it all very interesting.

MU - What are the best and worst parts of your job?

BJ - The best part is easy... I work in the Southern Rockies and do field work. I don't think I need to explain that. I'm not so sure about the worst. I could complain but I know a good gig when I have one.

MU - In your opinion what is the biggest challenge facing the health of AB's forests now and into the future?

BJ - Ourselves, you knew I was going to say that. We need to see the forests as natural capital, not as a resource. Climates change, priorities change and we need to be adaptive. Or something like that, you get the point. The Forest Health Section can play a key role in supporting some fine forest management. I'm excited for the challenge.

MU - If an evil wizard suddenly appeared and was going to turn you into a forest insect or pathogen, and let you choose your fate, what species would you pick and why?

BJ - You want me to say spruce broom rust don't you? Because of the odour.

MU - Well let's just leave it at that. I thank you for meeting me on such short notice, and I hope to see you again soon.

BJ - You're welcome Mike.

## Whitebark and Limber pine recovery planning in Alberta

Whitebark and limber pine are iconic high elevation five-needle stone pines familiar to most hikers in the mountains of Alberta. These remarkable trees can live up to 1000 years and are often found on rocky outcrops exposed to the harshest conditions. Whitebark and limber pine share similar biology and a mutualistic relationship with Clark's nutcracker for seed dispersal, although whitebark pine is almost solely dependent on the bird. Both species occur in diverse community types and are considered to perform important ecological functions: the large seeds are an important food source for wildlife; they are pioneer species after disturbances; they help to stabilize soils in the harsh environment where they often occur. The most famous five-needle pine in Alberta is the Burmis Tree in the Crowsnest Pass (Photo below).

Whitebark and limber pine are both under threat from bugs and disease across much of their North American range. Most notably, the introduced white pine blister rust is responsible for high rates of mortality and in areas like Waterton Lakes National Park, and cone producing trees are becoming rare. Mountain pine beetle is devastating whitebark pine in the Greater Yellowstone Ecosystem because the warming climate is promoting a one year life cycle and low mortality at higher elevations. Mountain pine beetles are currently not a large threat in whitebark and limber pine habitat in Alberta but both species suffered high mortality during the last outbreak in the 1980s and the future is uncertain. The exclusion of fire disturbance and a warming climate are additional factors that interact with rust and beetles, but the impact of each factor individually is difficult to know and will vary by location. Despite a relatively large population of both species in the province, whitebark and limber pine were listed as *Endangered* in Alberta in 2009 due to the rapid decline and severe threat level. Federally, whitebark pine has been recommended for *Endangered* listing with a decision expected this summer. Limber pine may follow in the next few years.



The Burmis Tree, a limber pine, in the Crowsnest Pass. Allegedly the most photographed tree in Alberta.



The provincial *Endangered* listing of both species triggered the development of recovery plans. Recovery plans are prepared under the supervision of Alberta Sustainable Resource Development's Fish and Wildlife Division. In the case of whitebark and limber pine the Forestry Division is co-leading recovery. Other agencies and groups represented on the recovery team include Alberta Parks, Parks Canada, the Canadian Forest Service, the Alberta Native Plants Council and the Albert Forest Products Association.

Plans are expected to be completed this year with the goal of keeping self-sustaining populations on the landscape. One of the keys to successful survival of both species is to identify trees that exhibit resistance to rust infection. Seeds can be collected from trees and screened for resistance, bred, propagated and planted. Other recovery objectives include reducing direct mortality when possible, enhancing natural regeneration and address habitat needs both in the context of climate change and also at the scale of regeneration sites. There are numerous conservation and recovery efforts already under way in Alberta plus some exciting research. The stakes are high and the challenge large for the management of both whitebark and limber pine.

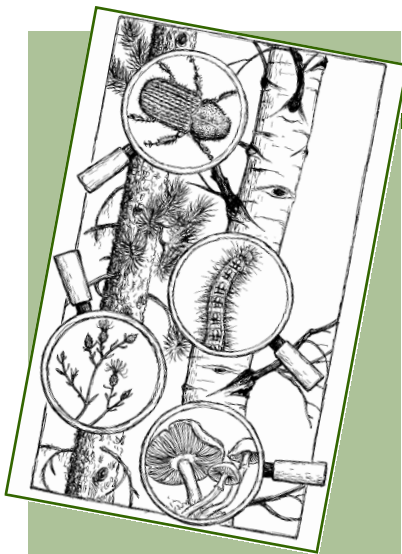
For more information: [www.whitebarkfound.org](http://www.whitebarkfound.org) and [www.whitebarkpine.ca](http://www.whitebarkpine.ca)

Photo right: Whitebark pine on the top of Table Mountain above Beaver Mines Lake in the Castle River area.

Photo below: Lone limber pine farther west than expected above the confluence of North and South Racehorse Creeks north of the Crowsnest Pass.



Brad Jones—Southern Rockies



## Winter's Blessing or Curse

People curse and complain, when the mercury dips,  
To mid-winter frigid lows,  
And many a back has been heard to crack,  
Shoveling after it snows.

But a winter quite warm, and lacking of snow,  
As many can attest,  
Has lots of effects, sometimes quite adverse,  
That can later manifest.

There're a lot of critters that can't survive,  
A normal winter's cold and snow,  
Even native species are held in check,  
By the odd bout of 40 below.

Normal snow packs are important too,  
To recharge the soils and springs.  
To keep away drought, and help plants and trees,  
Cope with numerous things.

So a mild, dry winter can be a nice break,  
That folks can appreciate.  
The trade-offs, however, for such clement weather,  
May not be so great.

Native pest outbreaks, foreign invaders,  
Drought stress, or other such bummer,  
Will these be the price, for weather so nice,  
I guess we'll find out this summer.

*Tom Hutchison—Athabasca*

### Forest Health Officers:

**Brad Jones**

Calgary  
403.355.4854  
Brad.Jones@gov.ab.ca

**Andrea Sharpe**

Hinton  
780.865.6992  
Andrea.Sharpe@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

**Ed Trenchard**

Whitecourt  
780.778.7267  
Ed.Trenchard@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.

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Resource Development