

Wildfire Operations Research
Advisory Committee Meeting Minutes
November 19, 2015

LOCATION

Alberta Innovates, Edmonton, AB

ATTENDEES

FPINNOVATIONS

Mark Ryans (on-line)

Dominik Roser

Ray Ault

Greg Baxter

Jim Thomasson

Rex Hsieh

GOVERNMENT

Dave Schroeder, Quentin Spila, Tanya Letcher

Alberta Agriculture and Forestry

Patrick Loewen, Cordy Tymstra, Wally Born

Alberta Agriculture and Forestry

Chris Dallyn (on-line)

Saskatchewan Environment

Dan Thompson, Kerry Anderson

Canadian Forest Service

Michel Charron (on-line)

Canadian Forest Service

Larry Nixon, Wes Steed

Government of the Northwest Territory

Dave Bokovay

Canadian Inter-Agency Forest Fire Centre

Jay Woosaree

Alberta Innovates and Technology Futures

Andy Low (on-line)

British Columbia Wildfire Service

Colin McFayden

Ontario Ministry of Natural Resources

Jon Large

Parks Canada

INDUSTRY

Terry Popowich (on-line)

Discovery Air

Travis Holder

Campbell Scientific

Rick Solomon, Gary Reinelt

Direct Injection Inc.

Rob Hyslop

RGH Pacific EMS

Peter De Bruin

Budenheim

Rob Thompson

Alberta-Pacific

Jeff Berry, Revie Lieskovsky

Conair Aviation

Mark Campbell

ICL Performance Products

Paul Lane

Airspray

Sherra Muldoon (on-line)

Quintilio and Associates

George Day (on-line)

EVS Solutions

0845 – Meeting begins

Welcome

Introductions and general announcements

Spring 2015 meeting Minutes tabled and approved by Larry Nixon and seconded by Jeff Berry.

Membership Update

The Yukon Wildfire Management has joined.

CN Rail has given their one year notice to withdraw their membership.

Staff Changes

Colleen Mooney left FPInnovations in May. She still assists us by editing our reports on a contract basis.

This is **Mark Ryans'** last meeting as he is retiring at the end of November. He will be replaced by **Dominik Roser**. Dominik is based at the Vancouver FPInnovations office.

Ray also mentioned that Steve Hvenegaard is not at meeting as he is delivering a presentation at a special session on mastication at the Association for Fire Ecology and Management conference in San Antonio Texas; Roy Campbell is also not present due to person commitments.

NEW DOCUMENTS POSTED TO WEBSITE

10 new reports and documents have been posted to the FPInnovations Wildfire Operations Research Program website since the spring 2015 Advisory meeting.

Project tracking

Ray Ault explained the status of all proposals and projects can be tracked on the Wildfire Operations Research Program website.

The process starts with a proposal. The form for making a proposal can be found on the website and can be submitted to any of the FPInnovations researchers. Proposals are then presented at an advisory meeting. A vote by funding members determines which proposals become projects. A project page is posted on the Wildfire Program website when a lead researcher is assigned. A project plan is developed and presented to the advisory members for discussion and fine-tuning. As the project develops and progress or milestones are reached periodic updates are made at the following advisory meetings until the work is finished and a final report is posted on the web site. In some circumstances the project can run into difficulties and cannot be completed. For these few project instances the researchers bring the project back to the advisory recommending either changes to the research question or suspension of the project. Those projects deemed by the advisory members as unsuited for funding are listed as pending on the web site project proposal page. Using the web site to track proposals and projects enables our members to access the projects and follow progress.

Today researchers are suggesting three projects are suspended at this meeting:

Insight Robotics – timber-bridge fire detection system evaluation

Determining the effectiveness of water-enhancing gel as a fire-control agent

Matching helicopter drop volumes to wildfire intensity

Projects Completed since the spring meeting

Four projects have been completed since the spring meeting, these are:

1. Wildfire smoke training videos;
2. Spitfire prescribed ignition burn equipment;
3. Smartphone Infrared accessories;
4. Using a radiant panel to compare wildfire chemicals.

These can be found on our website.

Projects with No Updates:

Canopy penetration of airtanker drops in forest fuel treatments and untreated stands.

This project was planned to take place this summer at Slave Lake at a plot set up just outside town. Because of the hectic fire season we didn't have resources to do the work.

Exploratory Work

McMaster University has an established network of research sites in the Utikima Lake area north of Slave Lake where they are exploring the impacts of wildfire on peat layers. Mike Waddington and his research team have conducted pre-burn and post-burn sampling activities at the Red Earth Creek research site to further explore the relationship between mulched forest fuels and depth of burn during wildfire events. This is an NSERC Engage Grant.

Building wrap – demonstrated in the NWT but structure not challenged by fire. Feedback we received was that this was more of a structural application rather than wildfire project. Unless we receive outside funding from an organization such as the Office of the Fire Commissioner we likely will not do any further work into building wraps.

Case studies – documenting effectiveness of forest fuel treatments challenged by wildfire. We visited two forest fuel treatments were challenged by wildfire this summer in Saskatchewan. We travelled out twice to collect data and to view the sites. Case studies will be written this winter. These case studies may be used to test drive the National Fuels Database which Rex will explain later in this meeting.

Assessing firebrand collection methods (University of Toronto graduate student Ezgi Kapcak worked as a summer student with FPI starting in May) - Ezgi tested a number of methods for collecting firebrand transport from mulch fuels. Her report is currently in the editing stage and will be posted in January.

Other Notes

The 2015 fire season was a busy one in western Canada resulting in FPIInnovations researchers working on a number of wildfires in various roles:

- Ray Ault – Values Protection Specialist (NWT)
- Steve Hvenegaard – Fire Behaviour Analyst (NWT)
- Jim Thomasson – Air Support Group Supervisor (Alberta)
- Greg Baxter – Helibase Manager (Alberta)

- Roy Campbell – Logistics' Chief Type 1 incidents

Ray attended a meeting of the Canadian Sphagnum Peat Moss Association to discuss the potential for fire in peat harvesting operations.

Rex is working on a contract with Natural Resources Canada to develop a database that helps promote the sharing of best practices in wildland fuels management.

Comment – D. Schroeder – would like to produce a training manual for the data entry part of the project. See this as the first step in the Information Management / Information Technology (IMIT) Strategy.

Q) – W. Steed – there is a need for money to finish the user interface? A) CIFFC may provide support for the completion of the user interface. Currently unknown

Q) C. Tymstra – is there a vetting process for the data?

A) D. Schroeder – some data is qualitative and some is quantitative (it varies by agency). It is hoped more quantitative data in the future. Also capable to have multi-media database.

Funding of a second portable detection camera system and purchase of all needed equipment completed during the year.

Wildland Fire Canada 2016 – Ray Ault is working with Marc Mousseau from CIFFC to coordinate the vendors for next years' conference in Kelowna.

BC Woody Debris Management Fund. We continue to work with BC Wildfire Service, BC Environment, Island Timber, West Fraser and Tolko to fund projects that lessen the impact of harvest debris disposal on air quality and fire risk.

A power point summary of research projects at the Canadian Boreal Community FireSmart Project was presented by Larry Nixon (GNWT) at the 6th International Wildfire Conference in Korea. Greg pulled together a list of the research projects conducted at the Fort Providence research site over the past 20 years to acknowledge the importance of the site and the contribution to the advancement of wildfire science and operations.

Q) D. Schroeder – are we able to see the presentation? Would it be worth doing a National Discussion on the history of the site?

Q) J. Large – heard the USFS and NASA were at the site this summer. Did this require an official agreement?

A) L. Nixon – not an official agreement – just letting the NWT know what projects will be worked on and how many people are attending so planning can take place. Larry also mentioned that most burns that take place include a number of projects.

Mark Ryans provided an overview of the Wildfire Operations Research Program at the Annual General Meeting of the Canadian Institute of Forestry & Registered Professional Foresters of Newfoundland and Labrador in October.

Project Presentations

New Contract Projects

Evaluation of Spitfire prescribed ignition burning equipment (Jim Thomasson)

This project tested the performance of an ignition tool that ‘spits’ small injected balls based on the frequency (balls per minute) required and the distance wanted. This unit is designed for both ground and air ignitions. Balls can come out at 180 per-minute and be shot up to 130 feet. The unit processes one ball at a time for safety purposes. The balls are smaller and heavier for straighter flight lines. FPIinnovations was contracted to document and verify performance metrics and partnered with Jasper National Park (NP) for the testing.

Delivery rate, ignition success and distance tests all proved to be very positive. Evaluations were done in a static position, on an ATV and from a helicopter.

Future steps include a survey for NP’s, design observation and improvements by the company and to report on test results. Further testing may occur on a prescribed burn next spring in Jasper.

Q) Ignition success – ones that didn’t burn – could they explode?

A) The injection hole is rather large which should allow the ball to off-gas before an explosion takes place.

Q) Cordy - will company use the results for marketing equipment? Any liability?

A) If positive – most likely! As for liability we performed tests – we do not give it a ‘stamp’ of approval.

BC Hydro Northwest Transmission Line wildfire hazard assessment and mitigation strategy (Steve Hvenegaard)

Greg Baxter presented Steve’s presentation which outlined the completion of a hazard assessment and accompanying mitigation strategy for the NTL in northwest BC. Steve completed fire behaviour and ignition tests and moisture content studies over a number of years on chipped debris produced from the clearing of the transmission line.

The issue is the deep fuelbed that resulted from the chipping on 37 km of the right-of-way where pile burning was not possible. This report highlighted areas of concern in terms of wildfire risk along the right-of-way. Steve and the partnering BC Registered Professional Forester determined that the accumulated mulch on steep and well drained sites were a hazard in terms of fire behaviour potential due to drier fuels. Mitigation techniques for these sites include creating breaks in the chipped debris

with seeding, exposing soil to allow vegetation to recolonize. On its own, fuel decomposition and repopulation by other vegetation has reduced the hazard in some areas.

On-going projects completed

Using a radiant panel to compare wildfire chemicals (Ray Ault)

FPIInnovations was asked to investigate the cost effectiveness of fire chemicals so worked with the U of A to develop a standard methodology for a lab test and then compare to field observations. Our approach was to use a radiant panel and a standard fuel which was subjected to various chemicals and observe the ignition time. Ignition would be used to compare the various chemicals. These include water, foam, gel, retardants and an untreated sample for comparison purposes. Tests were done in the fall of 2014 and winter of 2015. We reported initial results in spring as the methodology was still being perfected in terms of application of chemicals and the condition of the test fuels. Manufacturers were invited to apply chemicals. These fall number differ from the initial results in part due to mixing of the chemicals.

Q) Why didn't you use coverage levels?

A) Used a standard amount and applied to all samples.

Q) J. Berry – how did you apply?

A) Laid sample flat and poured set volume of chemical over fuel sample.

Q) R. Lieskovsky – what % gel by volume? A) 17 seconds in the marsh funnel is 0.5% (thin)

Q) D. Schroeder – is this the end of the project?

A) Believe there is nothing else to gain. The study results reflect the situation.

Comment M. Campbell – There are differences between products – don't lump together. (Results for one gel product don't necessarily reflect all Gel products)

Q) Why didn't you use coverage levels? A) To minimize variability the samples were blanketed with a set amount of product which immersed the sample in a tray of the chemical. The samples are small and it would have been difficult to consistently apply different coverage levels. The approach we used compared the same single coverage level for all the samples.

Comment P. DeBruijn – to do properly would need to perform burn tests with known amounts/coverage levels – ie. 1 gal/100sq ft... etc.

Q) – R. Hyslop – Were the chemicals applied at manufacturers suggested percentages? A) Manufacturer representatives mixed and applied the chemicals at the lab using percentages they deemed suitable

Comment – R. Solomon – during tests we varied the levels of chemicals with little differences in times to ignition.

Determining the effectiveness of water-enhancing gel as fire-control agent (Ray Ault)

Project Update – there was only one deployment in 2015. This was near Pemberton, BC on the Boulder Complex. We photographed foam and gel drops but were unable to access the drop zone in the evening. The next morning it rained at first light. The data we collected has minimal value. We are finding it is increasingly difficult to get the go ahead for gel use on wildfire incidents. Incident Management Teams seem to be reluctant to use the product.

The last successful field evaluation with gel occurred in Manning in 2012. We have attempted deployments each year with little success. It would seem there is limited interest from agencies in supporting gel data collection on wildfire.

Therefore Ray suggested that this project be suspended

Comments – C. Dallyn – tough to know ahead of time if you are going to use gel. Can you provide a methodology that can be used by agencies to collect the data?

A) Yes – will send a copy.

Q) Q. Spila – can you document time to burn through the gel and correlate this with weather data? Could use Alberta PB's and invite a number of suppliers to have their product evaluated.

C. Dallyn - Saskatchewan was going to run some gel tests in a blow-down Prescribed Burn (PB).

Comment – R. Solomon – yes, PB's should be used. Maybe more suppliers would show up. The product needs to be better and this would help with development.

Andy Low (BC) – difficult to research, PB's are costly to set up. Are you able to ground-apply the product?

Q. Spila – the suppliers should pay for the research.

L. Nixon – could use experimental burns in the NWT.

D. Schroeder – require a rigorous methodology, can set up plots beforehand and control many variables.

Consensus, – focus on PB's. Have a new approach and improved methodology ready for discussion at spring meeting. Researchers should explore using prescribed burns as a location to evaluate water enhancing gels.

Matching helicopter drop volumes to wildfire intensity (Ray Ault)

Issue – to develop a science based tool to assist in determining when a heavy helicopter is needed rather than a medium helicopter. I.e., a tool to send right helicopter for the task.

Objective - Determine the threshold fire intensity at which helicopter bucket drops no longer have the desired effects.

Ray listed project activity by year and the number of wildfires visited for data collection:

2013 – 2 fires

2014 – 3 fires

2015 – 2 fires (Cold Lake and Boulder Complex) for 72 total drops

Status of Project - Delivered video package of bucket drops to BC in September; Over winter summarize the data collected for future planning. We have many drops – lots of variability: height, volume, drop speed, placement.

Conclusion - After 3 years working on this project, we conclude there are too many variables to answer the question using field observations. Researchers need to observe helicopter drops on wildfires over several hours, and record HFI and volume dropped. This is best accomplished on the ground. However it is difficult to safely access to an intense fire during operations.

Ray recommended we suspend the project until we have better tools or appropriate burning conditions as part of another project.

Comments – W. Born – check out methodology used by Hirsch in his report on Challenging fires for IA Crews.

Andy Low – challenging to collect observations – can we get Helicopter Coordinator's to collect the data? Can field staff collect data? A) It is possible. We haven't had a lot of success with crews collecting data in the past. It would require the right person.

J. Berry – we talked about this at another meeting. I thought we decided to focus on a model rather than a field study? Field work should correlate to intensity and FWI. May show times when bucketing/bombing will not work – too dry, too hot – too much evaporation.

Ray – The U of A Mechanical Engineers put forward a proposal to model water application and intensity – we will re-visit it over the winter.

Kerry Anderson offered help in developing a methodology.

Consensus: Explore developing a model to address the questions. Update at spring meeting with a revised approach (modelling and methodology).

Design and evaluation of a new wildfire sprinkler (Jim Thomasson for Roy Campbell)

The objective of this project was to address the lack of vertical height adjustments on the sprinkler head. It was a project with the University of Alberta Mechanical Engineering class in 2012 and since then we have tried to engage manufacturers in accepting and building a working model. This was problematic. In 2015, we took the design to a machine shop to fabricate a prototype based on the design drawings.

Currently the vertical adjustment is being worked on with a number of designs being tested. Decisions on design and production will be reached this winter and an operating design shown in the spring?

Q) D. Schroeder – does wetting the tree tops matter? How would we determine this?

Any interest from the Office of the Fire Commissioner in sprinklers? Yes but no funding at this time.

Comment – W. Steed – Partners in Protection includes the Office of the Fire Commissioner, Aboriginal and local fire departments for structure protection. They are re-doing the manual Protecting Your Community with a new chapter on sprinklers, including structures in the boreal forest.

Evaluating smartphone infrared accessories for wildfire operations (Jim Thomasson)

The objective of this project is: To determine the effectiveness of smartphone infrared scanners for wildfire operations. Two IR accessories were chosen for study, the FLIR One Gen 1, and Seek Thermal. These sit on the iPhone 5S. These were compared to the Agema 510 which is the currently used IR platform in a field test.

A test was run in a forest setting using three sizes of heat sources, varied distances and the three IR sensors.

Conclusions: Smartphone scanners could be a useful addition to the firefighter's toolbox. They are small, convenient, easy to acquire, and easy to use. But there are limitations:

- perform best at distances under 15 m
- not reliable when everything in the field of view is hot
- not reliable when several legitimate hotspots are competing in the field of view.
- firefighters need to understand how solar radiation and reflectance affects the images they are seeing.

Given these limitations, smartphone scanners cannot be a replacement for the cold-trailing techniques currently used by firefighters. At best, a smartphone scanner can be a useful detection aid, but it is not a tool that can be relied upon to confirm that a fire is extinguished.

Q) L. Nixon – how robust are they for fire? A) Would have to be somewhat careful.

Q) Cost? A) FLIR \$150, Seek \$250, Gen2 \$250 FLIR

Q) C. Tymstra – how is battery life? A) Ran for the whole day for field tests.

Modification of the Alberta helitorch valve (Ray Ault for Roy Campbell)

The issue put forward in this project was that the torch head valve was jamming during flight operations. The problem was given to the Mechanical Engineering design class at the University of Alberta with the objective of evaluating the current valve design and propose re-design options with minimal torch modification.

The University of Alberta came up with a new design that should plug right into existing system. The new design has been sent to Alberta Ignition Specialists for comment. A prototype may be built depending on feedback from the ignition group.

At this time, no further FPInnovations involvement is anticipated in this project. Report is on our website.

Effectiveness of mulching as a forest fuel treatment (Dave Schroeder for Steve Hvenegaard)

Plots were set up and mulched at the research site near Red Earth Creek, AB to test the effectiveness of various treatments where mulching was performed in Black Spruce stands. Strip mulching and stand thinning treatments were applied in Block 1 In May 2015; a crown fire was ignited in an untreated stand and allowed to run into the treatments.

Fire Summary

- Strip mulch had little effect on fire behaviour
- Thinned stand had notable effect on intensity, but not ROS
- All trees candled – ember source

Operational Considerations

Existing strip mulch treatments need to be re-assessed. Treatment size needs to account for fast moving surface fire (mulch and dry feather moss will also result in HFI 4 intensity).

Suppression tactics in fuel treatments should be considered in forest fuel treatments/community protection plans:

- Resource deployments
- Water sources
- Guard construction
- Back burning

Next Steps:

Develop mulch fire behaviour curves; Test suppressant effectiveness; Can something be done with feathermoss? Maybe – thinning (sun) can promote sphagnum abundance displacing feathermoss

Eco-site dependant? Scale up to make a difference? FIRETEC runs

Block 2 – long term, burn in 5 years?

Re-vegetation

Q) How long between mulching and fire? A) One year old mulch

Effectiveness of stand cleaning as a forest fuel treatment (Greg Baxter)

After being set up in 2000, Plot C-3 was burned in 2015. The plot was originally 'cleaned' by the CFS in 2000 by removing the standing dead. In 2005 FPInnovations re-treated the site by removing dead and down on the treated half of the plot.

Ignition technique and locations was changed to allow a burn to compare the treated side to the control (untreated) side. Six spots fires were ignited. Three on each side and fire behaviour was observed every 5 minutes. Results showed that fire spread 2.75 times faster on the untreated stand. It also crowned and spotted up to 125 m out of the untreated plot with an excursion of 52 m in the adjacent regenerated pine stands. Flame lengths peaked at 1.0 m on the treated side and no spotting occurred and fire excursion from the plot was minimal.

Report will be on website soon.

Effectiveness of underburning as a forest fuel treatment (Greg Baxter)

In 2013 we compared an 8 year underburn site to an adjacent untreated site and found differences in fire behaviour. Other than our work in the NWT we are unaware of other areas where underburning is being used as a forest fuels treatment for community protection. To better understand how our underburn research might be used we have initiated an underburn survey. The survey has been given to

fire behaviour specialists in Alberta. Our goal to see if underburning is a treatment currently used, in what fuels and if not used why this is.

Comment – D. Schroeder – could use Horse Creek site for underburning research.

Comment- Underburning is a common treatment in the interior of BC in the C-7 (Ponderosa Pine) fuel type. Suggest BC Wildfire Service be included in the survey.

Comment Follow-up with Alberta Agriculture & Forestry on their Horse Creek and Cadotte Lake underburn projects.

Fuel treatment maintenance operations: productivity and effects on potential fire behaviour (Rex Hsieh for Steve Hvenegaard)

The objective of this study is to document the productivity of equipment used in forest fuels treatment maintenance operations.

Two Lamtrac 8290Q mulchers were monitored at two separate sites – Robb and Fiddle River. Two sites had different terrain and snow conditions. Little difference in production rates occurred.

An additional site near Brule has been included in study. Equipment productivity studies will be completed over the winter.

Developing wildfire smoke training videos for lookout observers (Rex Hsieh)

This project was to assist in training Alberta's new lookout observers. An in-house training tool using videos and simulation exercises was developed to help train recruits to find smoke quickly and expose them to its associated fire behaviour.

Four additional training videos were provided to the Hinton Training Centre in 2015 to complete the project. To date the project delivered: 15 training videos, a database and two documents on how to film smoke videos for future training. Hinton Training Centre started using this video in 2013 to train their lookout observers.

2015 Wildfire Detection Workshop (Ray Ault)

FPIInnovations hosted its 4th Detection Workshop / Conference in March to continue to explore advancements and opportunities in wildfire detection.

This workshop had 6 themes:

- Current conditions and trends
- Public reporting opportunities
- Advances in satellite technologies
- New approaches to land-based detection

- Innovations in aerial-based detection
- Infrared scanning resources

Concluding Comments:

- Cellphone and public reporting – need to explore methods to predict where public reporting will occur
- Need for nationwide 310 FIRE reporting
- Camera systems – single camera monitoring
- Explore fire report automation – at lookout
- Satellite technology – interest in collaboration

Comments – G. Day – there is a camera installed in Oregon which is viewed in Durban, South Africa.

J. Large – are satellite images on-line?

K. Anderson – can 310-FIRE be inundated with calls? This may have happened in Arizona during a destructive fire.

Jeff Berry - Apps – can a fire App be developed that geo-references a photo that can be sent in? A) We had a project proposal along these lines many years ago and after initial discussions concluded it was outside our expertise. Alberta has a 310 FIRE app currently in use but it doesn't have the photo option.

An in-line mixing kit for helitorch systems (Ray Ault for Roy Campbell)

Unlike the ground based in-line mixing torch, there have been a few problems with the aerial torch. Currently, light flaring shows that more gas than gel is entering the mixture. It is believed the reason for the flaring has been found – because the pressure is so strong when gel is released, the recoil of the spring sucks back a small amount of gel into the line – over time this builds up and reduces the gel mixing in – line during operations.

This problem is being addressed and tests will take place over the winter and spring testing in the field will take place in April/May.

Developing an instrument to measure wildfire intensity: a field-ready package (Ray Ault)

Mark Ackerman developed first generation thermal cube. It then was a graduate project to develop an improved thermal cube. This prototype was improved in 2014.

We would like a field ready package that collects heat flux data so that it can be deployed quickly in the field.

To assess needs we put together a Steering Committee to provide input on need requirements. Two design concepts were put forward and building these are currently delayed at the University. If not built

by Christmas will take to a commercial shop. The goal is to have a prototype ready for summer evaluation (2016).

Using UAVs to scan winter burn piles (Jim Thomasson)

We assisted the FPInnovations Remote Sensing Group with a project exploring the use of unmanned aerial vehicles in locating hot spots in winter burned debris piles. This was a 5 day project last April in the Whitecourt area. Seven blocks were scanned over three mornings. The UAV completed 4 blocks a day where a R/W complete about 20 blocks a day. Future work includes providing a cost comparison of the UAV to helicopter operations. Miller Western and Weyerhaeuser data will be used for this. We will also participate in an FPInnovations UAV Webinar on Dec 3, 2015.

Survival zones for wildland firefighters (Greg Baxter)

The spring of 2015 provided FPInnovations the first opportunity to collect survival zone data on slope following 14 fires on level terrain. Jasper National Park was performing a prescribed burn in the Vine Creek area and this allowed us to set up a plot in a previously burned area (80x50 m) on a steep slope.

We set up four camera boxes collecting video, temperature and heat flux data – 3 sites in the burned area and 1 just outside. Results showed the three sites within the burn collected temperature and heat flux data that were survivable. The site just outside the burn collected a heat flux of 16.4 kW/m² for 15 seconds which would be on the edge of survivable. The fire around the site was a crown fire that removed most of the fuel on the hillside showing extreme conditions and fire intensity.

A number of environmental factors contributed to the data collected by FPInnovations (in no way do we recommend taking refuge on a steep slope above a fire): there was a previously burned area with little to no fuel to re-ignite; there were light winds allowing the radiation to go straight up; and a rock bluff in front of the test area increased the size of the survival zone.

Additional survival zone work will be collected when opportunities arise – at PB's, on wildfires or on experimental fires such as the plots we have in the NWT. The output from this work will be an increasing number of case studies needed to draw wider application of results.

Using the environmental lapse rate to forecast wildfire blow-ups (Greg Baxter)

At the spring meeting the results of a literature review was presented on the environmental lapse rate and how it can influence fire behaviour. It was found that it was tough to measure due to the coarse coverage of atmospheric data collected by Environment Canada. It is a goal of this project to supplement this data by collecting near real-time data on the stability of the atmosphere to be used by fire behaviour personnel to help predict potential fire behaviour and thus safety. After the spring meeting Conair suggested they might already be collecting the required data to identify the environmental lapse rate in real time from aircraft. Thus, we planned to work with Conair to examine the aircraft data to learn if it can meet the requirements.

We also worked with the Kamloops Fire Center as they predict daily stability using Environment Canada's morning data and then use this to predict afternoon stability. They would benefit from using near real-time data. This work was to begin this summer, but the fire season did not allow this to occur. So work will take place this fall and winter.

We met with BC Wildfire Services in Kamloops this fall to obtain permission to use their daily stability forecasts and to access their fire reports. This will allow us to identify unstable days and the associated fire behaviour. From the BCWS data we will:

- Identify highly unstable days
- Compare fire behaviour on these days to the lapse rates
- Determine if super-adiabatic conditions existed when not predicted
- Identify which aircraft were flying during super-adiabatic conditions
- Determine if the aircraft data correlates with the fire behaviour and lapse rates on specific fires for the next step in the process

A meeting is scheduled with Conair in December. They provided us with a sample dataset of the atmospheric information they collect while working on fires. We have identified a subset of data that we could use to determine lapse rates as the aircraft are flying. The goal at this meeting is to establish a process to collect this near real time data to help predict near real-time atmospheric stability profiles. We will also:

- Determine the accuracy of this data as Conair does not calibrate this sensor on an annual basis.
- Establish a server that live data can be sent for use.
- Compare stability profiles to those calculated by both the Kamloops Fire Centre and Environment Canada.

The work over the winter will reveal if we should continue with Conair data or re-visit the AIMMS-20 sensor for data collection.

Project Proposals

1. Evaluating foam stick and applicator.

Submitted by Alberta Agriculture and Forestry/ Wildfire Management Branch

The Provincial Fire Warehouse and Service Centre, along with the Fireline Equipment Working Group has proposed a formal evaluation of the Phos-Chek foam stick and applicator to gain more insight into this product's operational use and application.

Preliminary field testing to identify potential project parameters have been conducted this past summer, and detailed project planning needs are currently being discussed and developed. Advisory Committee endorsement, support and input are seen as the next logical steps in project development.

Q) How long do the sticks work? A) 15-20 minutes at 400 gal/min.

2. Developing an UAS (Unmanned Aerial System) testing grid

Submitted by BC Wildfire Service

During the 2015 fire season in British Columbia, the BC Wildfire Service completed a pilot project to assess the effectiveness of utilizing unmanned aerial systems (UAS) to capture orthomosaic images and conduct infrared thermal scanning, with promising results.

In order to engage with UAS service providers, the BC Wildfire Service requires an evaluation tool or system to assess the capabilities of providers related to the capture and display of visible and thermal imagery for the purposes wildfire operations.

Objective: Develop a “thermal grid” that UAS service providers can be assessed on to determine if they have the necessary competencies and qualifications to operate in a wildfire environment in support of operations.

Develop a decision aid that can be used to evaluate and categorize the type of equipment and level of service that UAS service providers could possibly provide.

Comment – Q. Spila – Alberta already has a grid in Hinton. The grid is available in spring and would provide the same conditions to evaluated UAV’s as is currently used for helicopter operators.

3. Communications system survey and workshop

Submitted by Yukon Wildfire Management (Vern Marshall)

The ability to communicate is essential for safe, cost effective operations. The field of telecommunications is growing quickly. Evolutions in technology open new opportunities for improved communications.

Currently there is no formal mechanism by which agency telecoms professionals to share best practices and improve interoperability. This proposal would see this gap addressed by conducting a survey of current practices and a face-to-face workshop to highlight innovation and tech transfer.

Survey of FPIInnovations member agencies on the status of what communications systems are currently in use, identify plans to upgrade their systems over the next five years and identify exploratory research being undertaking into new technologies that may have implications for fire and emergency management.

Q) – Haven't we had this proposal before? A) Yes, previous discussions lead to this needing to be a CIFFC initiative to enable out of province travel. The radio communications programs no longer fit under a specific CIFFC working group and therefore this might be an opportunity to host or organize a workshop.

Comment: D. Schroeder – maybe could include other emergency services in the future. Communications with other agencies is often a problem on fires. Could also identify previous radio communications issues and discuss how these were resolved.

4. Developing a rapid-response kit/protocol to document interaction between fuel management and wildfire

Submitted by Yukon Wildland Fire Management (Colin Urquhart) and Alberta Agriculture and Forestry (Dave Finn)

Many fire agencies have embraced proactive fuel management projects with the aim of mitigating wildland fire risk. These hazard abatement projects have not been rigorously scientifically validated and often come at high expense. There are sparse and infrequent guiding operating procedures and dedicated resources for documenting fire behaviour in these scenarios.

FireSmart fuel prescriptions, though often implemented, have had few case studies written up on their efficacy in a wildland fire incident. Developing a rapid-response kit / protocol that FPInnovations member agencies could employ to capture relevant data as a wildfire is breaching a treatment would be of great utility in validating agencies risk mitigation efforts.

- Conduct a literature review / survey on the best practices on wildland fire documentation. This should include tools and instrumentation used as well as procedures.
- Develop a paper that agencies could use to provide guidance to develop a rapid response kit (the instrumentation necessary e.g. wind anemometer, cameras, etc...) to document the event and suggested protocols / procedures for the observer to follow.

Comments: D. Schroeder – the problem is getting people to incidents quickly. Can create an Adobe form for Smart phones (a type of app).

Comment – L. Nixon – not just a fuels management issue – also a fire observations issue – need to standardise.

Q) – J. Large – What happened to the Fire Behaviour Knowledge Database? Similar to what McAlpine and Wotton have put together. A) The concept wasn't supported with funding.

5. Collect data on fire behaviour/susceptibility and possible treatments in conifer regen/old burn

Submitted by GNWT (Larry Nixon)

Looking at the original ICFME plots at CBCFS and the lack of info on fires in 'old burns' and/or regen areas and realising that we have a great opportunity to collect data on some well documented plots. Need data on fire behaviour/susceptibility and possible treatments in regen/'old burns'.

Objectives:

Evaluate susceptibility of regen/'old burn' to fire in various conditions.

Document:

- Fire behaviour in such fuels
- Spotting distances, smoke generation
- Effects of varying levels of residual debris on fire behaviour/susceptibility
- Effects on the forest soils
- Possible treatments to reduce risks around Values at risk

Comment – D. Schroeder – talk to Dan Thompson and Kerry Anderson so this information can go into Firetec. Can run the CBCFS site through Firetec.

6. Effectiveness of Smartphone IR to detect heat from within a burning tree.

Submitted by BC Wildfire Service

This proposal comes as the result of the death of a faller by a dangerous tree that was burning inside that then fell onto the faller. This project could follow on the work completed by FPInnovations which used the IR on smartphones to find hotspots. This project may also show what the IR can't do.

Voting Results

Project	High	Medium	Low	
Foam	6	0	0	18
UAV	1	1	4	9
Comms	2	4	0	14
Rapid Response	3	3	0	15
Regen fire	3	3	0	15
IR phone	0	0	6	6

3 points for high, 2 points for medium, 1 point for low

Next Meeting: Tuesday March 8, 2016

(Canadian Forest Service 5320 – 122 St Edmonton) Fall Meeting – should we run at

Wildland Fire Canada 2016? We could have an evening session. This will be investigated.

Comments: May conflict with CIFFC meetings. National Smoke Forum is on Friday after conference.

The meeting concluded with the Wildfire Group presenting Mark Ryans with a fire book in recognition of this being his last meeting. He will be retiring at the end of November. Thanks for everything Mark!!