



Wildfire Operations Research

Advisory Committee Meeting Minutes March 5, 2013

LOCATION

Alberta Innovates, Edmonton, AB

ATTENDEES

FPINNOVATIONS

Mark Ryans	Steve Hvenegaard	Roy Campbell
Ray Ault	Colleen Mooney	Gary Dakin
Greg Baxter	Jim Thomasson	Rex Hsieh

GOVERNMENT

Quentin Spilla, Dave Schroeder, Cordy Tymstra, Tanya Letcher	ESRD
Dean MacDonald	Parks Canada
Larry Nixon	GNWT
Dan Thompson, Kerry Anderson	CFS
Michael Benson	BCFS
Dave Bokovay	CIFFC
Ross Bennett, Office of Fire Commissioner	AB
Ted Szabo, Virginia Chavez	Alberta Innovates
Chris Dallyn (on-line)	SASK
Colin McFayden (on-line)	OMNR

INDUSTRY

Shirley Niven	Sereca Fire Consultants
Sterling Hutchinson, Gordon Frizzell	ICL Performance Products
Jerry Geissler, Dennis Hulbert	Eco Fire Solutions
Rick Solomon, Jamie Stewart	Firefox
Revie Lieskovsky	Conair Aviation
Kelly O'Shea	Partners in Protection
Chris Lindsay	FTS
Rob Hyslop	RGH Pacific Thermo-Gel

WELCOME

Introductions

Fall 2012 minutes approved by Quentin Spila (ESRD), seconded by Mike Benson (BCFS).

Meeting Dates:

- FPInnovations proposed fixed dates for spring and fall meetings to the first Tuesday in March and October. Discussion centred on the ease in planning.
- [Cordy - ESRD] Could align every second fall meeting with Wildfire Canada.
- Majority agreed with a show of hands. No one expressed a concern on the concept of fixed dates.
- The meeting was set at October 1, 2013 at Alberta Innovates in Edmonton.

RECENTLY COMPLETED REPORTS

Ray provided a list of recently completed reports (8), all of which can be found on our website:

- Exploring the capabilities of helicopter bucket and helitank tracking systems
- Drop patterns for the Bambi-Max bucket and the Bell 212 helitanker
- Health impact of smoke exposure in wildland-urban interface fires: a literature review
- Visual assessment method of measuring cup amounts in airtanker drop tests
- Modelling ignition probability in mulched fuel beds
- Can light stand thinning weaken an advancing crown fire? A case study in Black Spruce
- Determining the effectiveness of water-enhancing gels as a fire-control agent using helicopter drops
- Survival zone for wildland firefighters: a case study in Jack Pine

RETURN ON INVESTMENT (ROI)

Ray gave an update on how FPInnovations has developed a ROI survey, which is to be sent out to clients following completed projects. This “Member Satisfaction Survey” provides clients an opportunity to give feedback on our performance and to estimate their return on investment. FPInnovations is heading towards this type of feedback to illustrate the benefits of our work. We are looking to achieve a 2.5x return on investment. This process is in its early stages and we anticipate it will take clients a while to accurately estimate ROIs. Five Member Satisfaction Survey forms have been completed recently:

- National wildland fuels management survey
- Exploring the capabilities of helicopter bucket and helitank tracking systems
- Drop patterns for the Bambi-Max and the Bell 212 helitanker
- Determining the effectiveness of water-enhancing gel as a fire-control agent using helicopter drops
- Fire behaviour in mulched fuel beds along linear corridors

Comments/Discussion:

- [Dave - ESRD] Maybe think of doing this upfront to collect what the client’s expectations are.
- [Larry - GNWT] Who does this information go to? It may have value to others, but as of now it is just the project proponent.
- [Ted - AI] How do you define value? There may be scientific value which cannot have a price put on it, but may contribute to scientific advancement. Could develop a guide listing values and a reference to fill form.

- [Dean - NP] Develop three (?) criteria to rate effectiveness.

REPORTS AND PROJECTS NEARING COMPLETION

Ray presented a list of reports nearing completion:

- Evaluating the effectiveness of FireSmart priority zones for structure protection
- Mulched fuels and potential fire behaviour in BC Hydro right-of-ways
- Comparing cost per metre of wildfire chemicals
- Differences in solar radiation between treated and untreated Lodgepole Pine stands
- Identifying less-flammable native Alberta grass species
- Initial attack capabilities in burning slash
- Fire behaviour in harvest debris
- Needs analysis for wildfire aerial intelligence gathering platforms
- Evaluating curtain burners for woody debris disposal

CONTINUING PROJECTS

Short updates were provided on our on-going projects:

BRIDGE TIMBER PROTECTION

(Jim Thomasson)

Jim showed fire progression from a point source on railway bridge timbers.

Questions/Comments:

- What work is next? This summer will try different chemicals.
- [Ted - AI] Any concrete used? Not on bridges, there is no give to concrete and it would crack quickly.
- Would metal beams make a difference? When a bridge lost or restored, metal is used.
- Were tests done in wind? No, tests conducted in calm conditions, wind would increase ROS.
- Did you compare treated vs. untreated ignition sites? Yes, individual tests were done with a similar ignition source on each chemical and a control. Treated timbers did not prevent ignition and spread.
- Project has led to the human-caused ignition project proposal submission.
- Have suppression techniques been looked at? This would be the logical next step and would need to be a directed project from CN.

SURVIVAL ZONES FOR WILDLAND FIREFIGHTERS

(Greg Baxter)

Greg outlined new data collection methods. Up to now, data collection has been slow because so many factors need to fall into place. We will work with SASK and AB to make use of quick-deployment data collection boxes on wildfires. This method requires working closely with the agencies.

Questions/Comments:

- [Dean - NP] We would allow deployment of boxes on NP fires.

FIRE BEHAVIOUR IN MULCHED FUELS ALONG LINEAR CORRIDORS (Steve Hvenegaard)

Steve outlined the work done on right-of-ways in BC and the testing completed in both the Northwest Territories and in Horse Creek, AB.

Questions/Comments:

- [Larry - GNWT] Will you be looking at regrowth, season of treatment? We are compiling a database of treatment sites to document regrowth based on age and stand type.
- [Cordy - ESRD] Site conditions are critical. Treatments vary based on this. How do you pick direction of study? This is a very big project. ESRD Science Plan can be used to help direct.
- [Dan - CFS] Has the orientation of treatment been considered? Not at this time. We have used grids because they are easier to put in. Could be important with wind funnelling. Most likely will follow landscape features.
- [Gord - ICL] What is the timeframe on this? It is a large project. At least three years and can get grad students to work on certain components (Ray).
- [Mike - BCFS] Need to know if these are wicks or firebreaks. How do retardants work on mulch?
- [Dean - NP] Look at fuel types and age class. This requires a long-term monitoring strategy.
- [Cordy - ESRD] Can burn at the Missoula burn lab where you can control RH, MC%, etc. May also qualify for Joint Fire Science Funding. Also contact Bushfire CRC.

The PowerPoint presentation will be put on the website for members to review. They can email Steve with any questions or suggestions.

USING A RADIANT PANEL TO COMPARE THE RELATIVE PERFORMANCE OF WILDFIRE CHEMICALS ON FOREST VEGETATION (Ray Ault)

This is one approach being investigated for the *Developing a Standard Evaluation Method for Water-Enhancing Gels* project. We have worked with MYAC Consulting to develop a radiant panel that will be used to test the relative effectiveness of various fire chemicals.

Questions/Comments:

- [Dave - ESRD] Can you tilt the panel to simulate radiation on the forest floor? We have thought of this, but can use smaller radiant heaters to do this. Could tilt to roughly 45°.
- [Dennis - EFS] How do you handle heat off the back of box? Some tests can be done with back and sides of box removed. There are different properties for different products, need to do tests with different lag times to show strengths of various products.
- Can you measure heat flux at any point? Yes, with thermocouples at various places.
- Can look at retardants vs. gels vs. water.
- [Cordy - ESRD] Needle MC% will vary, need to sample for each test.
- [Dan - CFS] Can you weigh tree through whole process? CFS has sensors that can be used for this.

DETERMINING THE EFFECTIVENESS OF WATER-ENHANCING GEL AS A FIRE-CONTROL AGENT USING HELICOPTER DROPS (Ray Ault)

We collected some data last summer on a wildfire near Peace River, AB. We plan to continue this project this summer to collect more data.

FOREST FUEL TREATMENT STUDY

(Roy Campbell)

Roy described the background of the project and the various studies involved in this broad area. Individual projects were then presented outlining this year's plans. This is an evolving area that may be influenced by Alberta's Science Plan and Strategy. Lead researchers from each study area presented their research plans for 2013. Their presentations will be posted to the website. The four study areas are:

- Stand cleaning
- Under burning
- Light thinning
- Mulched fuels

PRODUCT DEVELOPMENT

COMPLETION OF PORTABLE FIRE DETECTION TOWER

(Jim Thomasson)

Chisholm tower successful following 3 years of use. A second 110-foot tower is under construction in Edson. Cost is approximately \$110,000. Images are sent on a private network and can be sent to either a lookout tower or the local fire centre. Towers are portable and can go anywhere.

ATHABASCA LOOKOUT BLIND AREA CAMERA

(Jim Thomasson)

The Athabasca Tower camera upgrade will be used to monitor Solomon Ridge, which is blind to the Athabasca Lookout. It uses the concept of the portable tower, but it is installed on a fixed telecommunications tower.

IGNITION DEVICE EVALUATION FRAMEWORK

(Roy Campbell)

Advisory Committee endorsed project. Developing an ignition device testing process. Focus has been on ignition device evaluation process and development of templates. Nine templates have been developed and we are now moving towards a database for practitioner use. A number have been tested: torch rider, ground torch, fuses, etc. The heli-torch with in-line mixing kit will be tested this season.

WILDFIRE SPRINKLER PROTOTYPE

(Roy Campbell)

This project was endorsed by the advisory committee. The project focuses on sprinkler versatility with increased vertical water distribution. Worked with the UofA Mechanical Engineering class to design a new sprinkler to reach tree crowns. Prototype manufacture is underway and will be tested this year.

HELITORCH IN-LINE MIXING

(Roy Campbell)

This is an ESRD-directed project. An in-line mixing prototype was designed to fit the Alberta heli-torch. It has been built and testing will begin this spring.

FOAM WAGON

(Roy Campbell)

This is an ESRD-directed project. Project is focused on improving the ESRD-engineered foam wagon using the MEC E 460 class at the UofA Mechanical Engineering Department to do the design work. Once the design is completed (this spring), a decision will be made in regards to building a unit.

Questions/Comments:

- [Dean - NP] Any need for agencies to help out and test these? Always looking to go out to complete an ignition device evaluation.
- Is the goal for the sprinkler for structure protection or firebreak? Focus has been for wildfire and prescribed burns, although it could likely be used for structures as well.
- Our objective is to put the blueprints on the website for a manufacturer to produce and market. We don't want to be in the business of building and marketing equipment.

DIRECTED PROJECTS

- Camera for remote weather stations (GNWT)
- Ignition system tracking tool for aerial ignition device systems (ESRD)
- Assisting with aircraft drop patterns (Conair)
 - ESRD Forest Fuels Task Team wants to follow up on the 2002 FPInnovations fuels management workshop with a similar event in 2013.

SUSPENDED PROJECTS

NEEDS ANALYSIS FOR NEXT GENERATION FIRE-FINDER (ESRD)

MANAGERIAL USE OF DATA FROM HELICOPTER TRACKING SYSTEMS (BCFS)

This was a spin-off from last year's project where we evaluated the accuracy of the tracking systems. There was no interest to pursue it further.

DETERMINING HELICOPTER BUCKET DROP PATTERNS (BCFS)

Also a spin-off from work we did last year to further define helicopter bucket drop patterns. That work has been modified into the current project proposal "*Matching helicopter coverage levels to fire intensity (BCFS)*"

TRACKING SYSTEM AND APPLICATION

In the spring there was discussion around the use of tracking systems for dozers and other resources. The concept did not garner required support.

INDUSTRY FIRESMART STANDARD FOR OIL CAMPS

The treatment of wooden infrastructure around large industrial camps using special paints or chemicals was identified as a potential project. Discussion over the winter suggested this is of interest, but not necessarily a project.

Comments/Questions:

- [Dean - NP] Can an agency go back and pick one of these up? Yes, and it would be a directed project.

PROJECT PROPOSALS

LONG TERM MONITORING PROTOCOL FOR FUEL TREATMENTS (ESRD)

- [Chris - SASK] Can you add pre/post treatment protocols? Fire breach protocol – what data should be collected?
- Will the data be accessible to everyone? Yes, and we hope university grad students pick up and use the data.
- [Dave - ESRD] Should a task team be put together for this? The Fuel Management Task Team has a similar proposal.
- [Kelly - PIP] Call it what it is, "fuel treatment". Name change noted.
- [Cordy - ESRD] Pre-treatment data is important and needs a collection process. Make sure there is a linkage to the science community because treatments may be challenged in court.

DOCUMENTING HUMAN-CAUSED WILDFIRES (ESRD)

- [Tanya - ESRD] Who would hold this information? We would put a report on our website and could send it to HTC. HTC could benefit from better training video for these topics.
- [Dan - CFS] Can there be science included? For example, scientifically showing how powerline or railroad fires actually ignite?
- [Larry - GNWT] Need to identify what to look at first and then work through causes.
- [Ted - AI] Need a legal framework first to help set up the project if this data is to be used in court.
- [Cordy - ESRD] Who is this project for? Who will use it? Can it be used for training, cause investigation and also for prevention information?
- Causes are known, so don't you just need video? An example of this is from the ATV-caused fire project where we used video for prevention and legal work.
- [Cordy - ESRD] If used for education, recommendations should be required in the report.
- [Larry - GNWT] Have listed 4 approaches; these needs to be streamlined.
- We will work on one cause-agent this year and then report back.

SMOKE AND FIRE BEHAVIOUR TRAINING VIDEO FOR LOOKOUT OBSERVERS (ESRD)

- Tower video and surface fire video are combined and used for training.
- [Mike - BCFS] We don't use towers, but we use aircraft - similar views.
- [Dean - NP] Would be good for training to understand air stability.

MATCHING HELICOPTER COVERAGE LEVELS TO FIRE INTENSITY (BCFS)

- What is the intensity threshold for bucket use? Not just for water, but for gels and retardant also.
- This may assist in resource allocation and dispatch to fires of various intensity levels.
- [Cordy - ESRD] Could you ask pilots? They are not really the best source of information because they are more concerned with drop location, not results. Could talk to them afterwards to clarify techniques used, etc.
- We can measure bucket volume now with tracking systems. Flow rate could be related to head fire intensity (for load-shedding buckets).

USING VIDEO CAMERA SYSTEMS FOR WILDFIRE MANAGEMENT (ESRD)

- What is the next step for camera use? What are management's needs?
- Determine priorities for systems in different circumstances. For example Southern Rockies put up their own cameras for weather monitoring and visibility.
- [Dean - PC] Parks currently uses cameras to relay fire video to information booths along highways in some circumstances for educational purposes.

VOTING RESULTS

	High	Medium	Low
Long-term monitoring of FireSmart sites	10	2	0
Documenting human-caused wildfire starts	3	4	5
Smoke and fire behaviour training video	1	1	8
Matching helicopter coverage levels to fire intensity	10	2	1
Video camera systems for fire management	1	2	7

OTHER ITEMS

DEVELOPING AN INSTRUMENT TO DIRECTLY MEASURE FIRE INTENSITY

- Since 1959 we have been using Byram's theory to estimate fire intensity. This is challenging and time consuming. We have used thermal cubes to measure intensity, but we are looking to develop the next-generation sensor that would better quantify fire intensity.
- Isn't there a lot of data on building ignitions? We would be able to better document fire intensity approaching a building.
- [Dean - PC] Can be used for restoration; cubes could be used to learn intensity thresholds to achieve desired results in terms of ecosystem and determine thresholds for burning.
- Could data be transmitted? Technology is there, but the interference caused by a fire may interfere with the transmitting of data. Needs to be studied.
- How about placing sensors the same way seismic equipment is moved – long-line into place.
- We need to involve the university and peer-reviewed reports to add weight to results and accuracy of sensor.
- Can leverage with NSERC. We are considered an industry partner, so we can work with the university and get students.
- Suggested potential funding partners:
 - CIFFC Fire Science
 - ESRD Science Plan
 - NRC
 - CSIRO
 - Joint Fire Science Program
 - Missoula Fire Lab