

**Wildfire Operations Research  
Advisory Committee Meeting Minutes  
October 1, 2103**

**LOCATION**

Alberta Innovates, Edmonton, AB

**ATTENDEES**

**FPINNOVATIONS**

Mark Ryans	Jim Thomasson	Gary Dakin
Ray Ault	Chad Gardeski	Steve Hvenegaard
Colleen Mooney	Roy Campbell	Mark Ackerman
Rex Hsieh (online)		

**GOVERNMENT**

Quentin Spila, Dave Schroeder, Cordy Tymstra, Tanya Letcher, Rory Thompson	ESRD
Larry Nixon	GNWT
Dan Thompson, Brian Simpson	CFS
Michael Benson	BCFS
Dave Bokovay	CIFFC
Ted Szabo	Alberta Innovates
Chris Dallyn (online)	SK
Dustin Oikle (online)	NB
Colin McFayden, Den Boychuk (online)	OMNR
Walter Nehring, Christopher Boland (online)	YK

**INDUSTRY**

Shirley Niven	Sereca Fire Consultants
Jerry Geissler, Mike Schnarr	Eco Fire Solutions
Rick Solomon, Jamie Stewart, Dwayne Floden	Firefox Inc.
Revie Lieskovsky, Cliff Henderson	Conair Aviation
Rob Hyslop	RGH Pacific Thermo-Gel
Chuck George	ICL
Shawn Bethel (online)	SEI
Terry Popowich (online)	Discovery Air
Joseph Kolbuc	Millar Western
Lomish Bhardwaj, Adam Wall	Genics, Inc.

## WELCOME

### Introductions

Spring 2013 minutes reviewed and approved by Quentin Spila and seconded by Ted Szabo.

Ray Ault paid tribute to Alex Sinclair who had recently passed away. Alex Sinclair was instrumental in developing the Wildfire Operations Research group.

## RECENTLY COMPLETED REPORTS

Ray reviewed recently completed reports; all of which can be found on the website:

- Monitoring microclimate and litter moisture in a FireSmart thinned stand in Lodgepole Pine
- Modelling the probability of sustained ignition in mulch fuelbeds
- Mulched fuels and potential fire behaviour in BC Hydro rights-of-way
- Burn rate of curtain burners used for woody debris disposal
- A video camera system for blind-area smoke detection in Chisholm, Alberta
- Less flammable vegetation for linear industry rights-of-way—a summary report

No questions.

## 2013 PROJECT UPDATES

Lead researchers highlighted key activities for each project:

- 2013 research activities in Fort Providence, NT (Ray Ault)
- Protecting railway bridge timbers from wildfire (Jim Thomasson)
- Using a video camera system for blind-area monitoring, off-season smoke detection, and structure security for the Athabasca fire lookout (Jim Thomasson)
- Design and evaluation of a portable smoke-detection camera system (Jim Thomasson)
  - Question – How are radio signals transmitted (Terry P)
  - Response – 2.4GHz, and 900MHz to give 15 km range shooting over trees; mountain to mountain and 5.8Ghz can give 30-40km (Jim T)
  - Response – Can the detection differentiate between road dust and smoke (Joseph K)
  - Answer – No, it is a manual camera system and relies on the experience of the lookout/camera operator (Jim T)
- Designing an aerial ignition device tracking system (Jim Thomasson)
  - Comment – This will be a valuable operational tool (Cordy T)
  - Comment – Engineering is built in to circuit board of Dragon torch to track ignition (Shawn B)
- Needs-analysis study: camera systems to monitor remote weather stations and local area weather in the Northwest territories (Jim Thomasson)
- Using unmanned aerial vehicles (UAV) for wildfire operations – trip report and upcoming conference (Jim Thomasson)
- Survival zones for wildland firefighters (Ray Ault)
- Determining the effectiveness of water-enhancing gels using helicopter drops (Ray Ault)
- Designing a new wildfire sprinkler (Roy Campbell)
- An improved foam delivery system for wildland firefighters (Roy Campbell)
- Effectiveness of stand cleaning as a forest fuel treatment (Ray Ault)
- Effectiveness of light stand thinning as a forest fuel treatment (Colleen Mooney)
- Developing a long-term monitoring protocol for Fire Smart sites (Steve Hvenegaard)

- Note – A suggestion was made during the proposal discussion at the spring meeting that the title should indicate *fuel treatments* instead of *FireSmart sites*
- Using video camera systems for wildfire management (Ray Ault)
  - Ray – This project has been suspended until next year
  - Question – How will Saskatchewan evaluate video camera detection system and store results?
- Ignition device evaluations and evaluation framework (Roy Campbell)
- Documenting the science behind human-caused fires (Jim Thomasson)
  - Jim – We need to pinpoint the types of human-caused fire that need to be researched
    - Power lines, diesel trucks, flare stacks, etc.
- Heavy equipment usage in US (Roy Campbell)
  - Review of collaborations between FPIInnovations, Canadian agencies and US agencies
    - Pre-suppression ahead of wildfires
    - US is looking at how Canadian agencies are using heavy equipment on wildfires
    - Development of a tactical manual for heavy equipment use on wildfires

## EQUIPMENT DEMONSTRATION

Gary Dakin displayed the inline helitorch prototype and answered questions.

## PROJECT RESULTS

- Effectiveness of underburning as a forest fuel treatment (Colleen Mooney)
- Fire behaviour in mulched fuels along linear corridors (Steve Hvenegaard)
  - Question – Can mulched fuels be burned to enhance nutrient release and regeneration in mulched fuel beds? (Ted S)
  - Response – Often the objective in treatments is to limit vegetative regrowth in corridors (Ray)
- Developing a database for ESRD vegetation monitoring (Dave Schroeder)
  - Question – Has there been estimates of ROI? (Ray)
  - Response – Increase efficiency in using data (Dave S)
  - Comment – There is a need for a common framework to inventory fuels and database management (Dan T)
  - Comment – Development of inventory methods and data collection has been thorough; the Fuels Management Task Team (FMTT) workshop will continue discussions to establish national standards (Dave S)
  - Question – What is the database? (Cordy T)
  - Response – Microsoft Access (Dave S)
- Effectiveness of a low mix-ratio gel on wildfire—will it mix during scooping? (Ray Ault)
  - Comment – Company (manufacturer) needs to develop process that will ensure proper mixing and quality control to enable valid evaluation of gels (Ray)
  - Question – What are the plans for future studies? (Jamie S)
  - Ray – We do not plan on doing more work with scooper aircraft and gels until a method is developed to adequately mix the gel products during the scoop phase
  - Question – Can gel be injected during scooping? (Chuck G)
  - Question – Can we use U of A mechanical engineering department to develop a system?
  - Response – Pilot injects gel prior to scooping because of numerous cockpit and flying demands during scooping
    - Essentially, this study was to evaluate the existing configuration; many suggestions have been made to modify aircraft injection systems to provide more thorough mixing; however, changes require aircraft design approval and would require an interested airplane operator to test and approve of implementation

- Conair has had problems with gel in the injection pump and may not continue with gel field evaluations in amphibious aircraft
    - Response – Gel pumps are available that will work; manufacturers need to modify system (Rick S)
  - Comment – The potential for gel as a fire suppressant is there; equipment innovations need to catch up (Jamie S)
  - Response – The onus is on manufacturers to innovate gel mixing and delivery systems (Ray)
    - During field tests, five drops of low mix-ratio gel were made; R/W drops followed making it impossible to quantify effectiveness of gel
    - FPIInnovations will explore opportunities with U of A's Mechanical Engineering Department to investigate equipment innovations
  - Comment – SEI Sacksofoam system (heli bucket) has been used to mix gel; no problems with pump
    - May need to clarify mixing procedures and fire control objectives (fire suppressant or line building) (Shawn B)
    - Will gel be mixed enroute or from dip tank?
  - Ray – For the purposes of this study mixing was enroute and the study evaluated completeness of mixing during scooping action
  - Comment – An issue with the AT-802 was that there might have been foam in tank; more guidance should have been given for mixing process
  - Ray – No foam in tank; thoroughly scrubbed; invite participation from manufacturers
  - Comment – Look forward to working together in future research
  - Comment – We are still in the infancy stage in determining gel effectiveness; before we move ahead with equipment development we should ensure that effectiveness is confirmed (Quentin S)
  - Comment – Different products have different mix ratios; how do we know that low-concentration gels are equal or effective in performance (as a suppressant, drop cohesion, etc.) (Chuck G)
- Matching helicopter coverage level to head fire intensity – Revelstoke case study (Ray Ault)
  - Understanding bucket volume and coverage level and effectiveness on different intensity fires
  - Still in exploratory stage and need to refine data collection process
- Developing a wildfire smoke training video for lookout observers (Jim Thomasson/Rex Hsieh)
  - Question – Are there lens filters that could highlight smoke? (Quentin)
  - Response – No lens filters, but post processing the video can enhance the smoke signature (Rex)
- Using a radiant panel to compare the relative performance of wildfire chemicals (Ray Ault)
 

*(For the project: Developing a standard evaluation protocol for water-enhancing gel)*

  - Comment – Several products are available; field evaluation is important but lab tests may help to evaluate effectiveness of products (Ray)
  - Several collaborators contributed to exploratory research; trying to remove as many variables as possible to gain statistical validity (Ray)
  - Little work was done with foam
  - Question – What was the moisture content of the trees? (Cordy T)
  - Response – Wide range of values (Mark A)
  - There is too much variability in tree structure; final design of burning tree branches contained in a 'mesh sandwich' is more encouraging; we need feedback on future work (Ray)
  - Question – Can the 'mesh sandwich' method be used for other materials? (Dave S)
  - Response – Yes, other materials can be evaluated with this method (Mark A)
  - Question – Does orientation of the panel matter? (Dave S)

- Response – There is more reliable ignition from vertical orientation (Mark A)
- Question – Can mesh test method be used to validate field observations (create a qualitative link to real world? (Dave S)
- Question – Can using thermal cubes (heat flux instrumentation) in field evaluations contribute to this link? (Ray)
- Question - What is the compaction of sandwiched fuel? (Ted S)
- Question – How does density affect combustibility? (Dave S)
- Question – How do we couple test methods to ‘real world’ attack methods? (Chuck G)
- Response – Are we trying to mimic real world processes or evaluate relative performance of products? (Ray)
- Comment – We use retardants and suppressants in different tactical applications but tests aren’t available to mirror this (Dave B)
- Comment – We need a combination of tests to evaluate product effectiveness (Chuck G)
- Developing an instrument to measure fire intensity (Ray Ault)
  - Comment – Currently sensors can measure high intensity over a short time or low intensity over a long duration; objective is to develop units to measure a wider range of heat flux over a longer duration (Mark A)
  - Comment – Will continue work in development of new units and use of these to collect units; suggestion to write up proposal with Cordy to present to CIFFC science and technology group to build capacity across country (Ray)
- Containing fires in harvest debris: what are the limits of initial attack crews? (Steve Hvenegaard)

## NEW PROJECTS

- National Forest Fuels Management workshop
  - Fuels Management Task Team contract
- Assessment of noise exposure in wildfire operations
  - Data to be collected during deployments through Safety Officer program
  - Comment – Data can be collected during spring training (power saw, pump, R/W)(Quentin S)
  - Comment – Concerns with other suppression related operations (AAO, loaderman) (Mike B)

## PROJECT PROPOSALS FOR 2014

- What is the overall improvement in efficiency and anticipated cost savings of a load-shedding bucket over a standard bucket?
  - Comment – Load-shedding buckets are part of Alberta’s R/W contracts; often used as secondary bucket (Quentin S)
  - Comment – BC has estimated that 10% more water can be delivered with a load-shedding bucket
- Can UAV technology be used to reliably detect holdover fires in winter burn-piles?
- Can the real-time weather data collected using firefighting aircraft be used to calculate the local adiabatic lapse rate?
  - Comment – Concept is in early stages of development (Mike B)
  - Comment – this may be of value to programs such as Blue Sky or other venting or smoke dispersion prediction programs (Dan T)
- Fire behaviour in fifteen-year-old blocks at CBCFS (proposed from the floor by Larry N)
  - We are interested in studying fire behaviour in fuel types such as this (Larry N)
  - Old C-4 fuel stands have created fire behaviour problems (Tanya L)
  - This can be easily incorporated into future burn activities at CBCFS
- Voting Results:

Project	High	Medium	Low	Total
Lapse Rate	6	3	0	2.6
UAV	1	3	6	1.5
Bucket	2	7	1	2.1

*(scoring = 3 points for high, 2 points for med, 1 point for low divided by votes cast)*

## STRATEGIC GOALS FOR WILDFIRE OPERATIONS RESEARCH GROUP

Ray asked for feedback on the following to ensure the Wildfire Operations Research group's activities reflect member priorities.

1. Partner with members to enable innovation and continuous improvement within their organization by playing a leading research and integrating role.
2. Deliver projects selected by members on time and on budget.
3. Enhance services offered to members to help them quickly adopt and implement targeted solutions for their business and realize positive returns.
4. Support members during extreme fire events with certified incident command personnel.
5. Expand research network to adapt knowledge created elsewhere to answer member issues and to influence the research community, including universities, to undertake projects that address knowledge gaps.
6. Diversify membership to include organizations impacted by wildfire or are responsible for mitigating the effects of fire to increase the scope of the program and widen the financial support.
7. Community Protection makes up 50% of our budgeted time allocation. Ray asked for consensus on this time allocation.

Feedback:

- Comment – A large amount of research isn't getting through to large group of users (Larry N)
- Response – We are open to ideas and will continue to try new approaches to improve tech transfer (Ray)
- Comment – Researchers need to be on the ground to gather data (Rick S) (this comment related to #4 support members with certified staff)
- Comment – Researchers may not be able to gather data if deployed on the ground (Mike B) (i.e. if deployed as command-team staff they will not be available for projects)
- Comment – Good problem analysis is going to be 60% of solution; try to not repeat research that already has been done. (Chuck G)
- Comment – Fuel treatments are 50% of work load; should fuel treatments be included in strategic goals so that there may be a time when 50% is decreasing? (Dave S)
- Response – Do we need a subgroup or steering committee for fuel treatments? We can put together a list of what we have accomplished and gain insight on other research that we need to accomplish. (Ray)

- Comment – There is a need for decision-making tools that could assist DO's in prioritizing fires and other operational needs. (Cliff H) Most decisions are made on the 'seat of their pants' and there should be tools available to help in the duty room.
- Comment – Work is ongoing work to update several tools – FBP calculator, FWI calculator, and options to interpolate weather data. Need to test efficacy of tools. (Dan T)
- Comment – ON is generally satisfied with strategic goals. Can decision support tools be useful in managing risk? (to suppress or not suppress fire) (Colin M)
- Comment – SK is interested in talking with Dave S and Larry N about fuel management and regeneration of burned sites at Fort Providence.

## **WRAP UP**

The spring meeting was set for March 18, 2014 at Alberta Innovates in Edmonton, AB.