Field Tour Itinerary

October 26th 1200 -1630 hrs
Field Trip Overview

Outline

<table>
<thead>
<tr>
<th>Time</th>
<th>Comments</th>
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<tbody>
<tr>
<td>1200-1215 hrs.</td>
<td>Buses load at Prospera Place parking lot and travel to Gellatly Staging in West Kelowna</td>
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<tr>
<td>1230-1300 hrs.</td>
<td>Lunch onsite and networking</td>
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<tr>
<td>1300-1330 hrs.</td>
<td>Air tanker Demonstration</td>
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<td>1330-1340 hrs.</td>
<td>Blue Buses load and leave for Bear Creek Interface fire site</td>
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<tr>
<td>1340-1347 hrs.</td>
<td>Yellow Buses load and leave for Rosewood Subdivision Interface Fuel Modification site. Red Bus Delegates stay at Gellatly Staging site for Vendor Sessions</td>
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<tr>
<td>1437-1445 hrs.</td>
<td>Load buses.</td>
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<tr>
<td>1445-1500 hrs.</td>
<td>Blue Buses at Rosewood Site, Yellow Buses to Gellatly Staging and Red Buses to Bear Site.</td>
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<tr>
<td>1537-1545 hrs.</td>
<td>Load buses.</td>
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<tr>
<td>1545-1600 hrs.</td>
<td>Blue Buses at Gellatly Staging, Yellow Buses at Bear site and Red Buses at Rosewood Site.</td>
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<tr>
<td>1637-1645 hrs.</td>
<td>Buses all load and depart for Grand Hotel</td>
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Sessions

- Bear Creek – Interface fire from 2016 hosted by Dale Bojahra (BC Wildfire Service) and Brent Watson (Deputy Chief, West Kelowna Fire Department)
- Rosewood Subdivision – Fuel Modification site hosted by Rory Colwell with Speakers Dave Gill, Forester with Nitityix Resources and Dr. Lori Daniels, UBC.
- Gellatly Staging – Vendor demonstrations hosted by Andy Low, (BC Wildfire Service). Vendor Locations on Site will be as per attached map. These sessions will consist of two fifteen minute vendor demonstrations/interactions. During these times, you are able to attend whichever vendor booths you choose. This included in the package.
- You will find a short write up with a bit more background of each site’s topic and vendor information within the handout package.

In order for our Field Trip on the 26th to be successful, some things to keep in mind:

- Please be prepared for a field day and dress warmly as lunch will be outside as well.
- Have your registration name card on-your designated bus is identified by a numbered colour dot
- Please be respectful of the tight timeframes and be prompt. Each Bus will have a Leader.
<table>
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<th>Vendors – Field Demo</th>
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<tr>
<td><strong>Conair</strong></td>
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<tr>
<td><strong>Firefox Fire Solutions Inc.</strong></td>
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<td><strong>A.S. Roach Fire Services</strong></td>
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<td><strong>Hummingbird Drones</strong></td>
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<tr>
<td><strong>WATERAX</strong></td>
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<tr>
<td><strong>Technosylva and goTenna</strong></td>
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<td><strong>Heli-Fire Support</strong></td>
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SWPI - 442 ROSE VALLEY

- Application for funding submitted to the UBCM through FNES in January 2014.
- Project approved in April 2014.
- Project work started in October 2014 once weather conditions permitted.
- Treatment costs were just under $7,000/ha. 10% of which was funded through in-kind contributions from WFN and the City of West Kelowna.
- The prescription was to reduce stand density and remove ladder fuels and the resulting debris.
- The original stand consisted of approximately 900 stems per hectare. We reduced the density to just over 300 stems per hectare.

Challenges:

- Debris management - once we thinned the stand, the slash loading was significant in certain portions of the treatment area. We literally couldn’t build slash piles under the prescribed size and density. This created difficulties during the burning phase as piles had to be re-piled and moved.
- Smoke Management – because we opted to burn the piles we ran into difficulties with short burning windows. We had to wait until mid-March 2015 before we had a burning window and then by the first week of April it was already too dry to burn.
- Recreationists – despite ample signage, hikers and mountain bikers continued to walk/ride through the treatment area during operations causing safety concerns.

Positives:

- Terrific cooperation and worksharing between WFN and the City of West Kelowna
- Receptive neighbours who put up with the noise and smoke.
- Desired outcome achieved.
Wildfire in a Warming World: Adaptations to Improve Forest Resilience

Lori Daniels, Pascal Armbrorst, Gregory Greene, Raphaël Chavardès, Karen McCloskey
with contributions from Brendan Forge, Marc-Antoine Leclerc, Alexandra Pogue, Quentin Schmidt & Peter Cherniwchan
Faculty of Forestry, University of British Columbia – Vancouver

Abstract

We are concerned fire suppression has altered fire regimes and may jeopardize forest resilience to climate change. Using the fire weather records for Johnson Lake, BC (1991-2012) we compared the potential for surface, intermittent and crown fires in the Cranbrook Fire Zone in southeast BC. Potential for surface fire was greatest in open forests with C7 fuels (56,603 ha). In mature, closed-canopy forests with C3 fuels (21,571 ha), the greatest potential for crown fire was in July and August. Immature, closed-canopy forests with C4 fuels (37,362 ha) had highest potential for crown fire throughout the fire season. The BC Wildfire Service fire records include 942 lightning ignitions from 1991 to 2012 in the Cranbrook Fire Zone. Of these ignitions, 169 occurred in C7, C3 or C4 fuels during weather that could have sustained a wildfire. Nevertheless, only 194 ha burned and 97% of fires were <4 ha. Using the Canadian Fire Behaviour Prediction System, we estimated that the 88 sustained ignitions in C7 fuel could have burned >25,000 ha as surface and intermittent crown fire. We conclude surface fire would be common and abundant in this region, if not suppressed. Climate change will likely exacerbate fire suppression effects. Based on global climate change projections, we show that by 2050 the number of days with very high and extreme fire weather will increase, especially in July and August. Fire weather will become more conducive to crown fire, even in open forests (C7 fuel). Ongoing suppression of surface fires alters forest structure and fuels, increasing the potential for crown fire. Fire danger is increasing with projected climate change, independent of suppression. To adapt, we need to diversify wildfire and forest management to include managed and prescribed fire, thinning and uneven-aged silviculture to restore structures, mitigate fuels and increase forest resilience to climate change.

The Problem: A polarized debate on historical fire regimes may jeopardize forest resilience to climate change

Historical surface fires: High-severity crown fires rare. Recent fires are unprecedented. Fire suppression effects: altered fire regime, fuels accumulation, increased hazard. Ecological restoration: thinning and burning. Climate change exacerbates problem.

Historical mixed-severity fires: High-severity crown fires normal. Recent fires are part of variation. Fire suppression effects: regime not altered, no affect on fuels, weather is primary driver. Ecological restoration: unnecessary or damaging. Weather alone drives fire severity.

Research Approach: Assess fire weather and ignition records to understand:
• relative abundance of surface and crown fires
• degree and effects of fire exclusion and suppression
• effects of climate change on future fire weather and fire regimes

What is the range of fire weather + potential fire behaviour in the Southern Rocky Mountain Trench?

Canadian Forest Fire Behaviour Prediction System:
Combines fuel type with fire weather to predict fire behaviour

Fuels in the Southern Rocky Mountain Trench

Open forest: C7 (56,603 ha)
Mature, closed forest: C3 (21,571 ha)
Immature, closed forest: C4 (37,362 ha)

Comparing Fire Potential Behaviour Among Fuels

Variation among years 1991-2012 at Johnson Lake

Potential fire behaviour: surface, intermittent, crown.

Variation among months April-October at Johnson Lake

- surface dominates over the fire season
- July and August = highest potential for crown fire, but rare
- crown fire possible in all months
- intermittent + crown exceed 40% in July and August
- crown fire possible in all months
- intermittent and crown dominate May to September
Under what weather conditions have modern wildfires burned?

- 942 lightning ignitions
- 191 ignitions in IDF and PP zones
- 169 “sustained” in C7, C3 + C4 fuels

Area burned:
- 194 ha in total
- 97% < 4 ha and 3% = 4 - 52 ha

Possible explanations:
- Ignitions occur during unsuitable weather
- Fires are suppressed limiting spread

Is weather suitable to sustain lightning-ignited wildfires?

Weather can sustain wildfire
- Almost all of 169 lightning ignitions when Fine Fuel Moisture Code (FFMC) and Fire Weather Index (FWI) exceeded critical thresholds
- Relatively few lightning strikes have a strong potential to influence the fire regime

Would wildfires be surface or crown fires if allowed to burn?

Timing and type of fire had 169 lightning ignitions burned
- Ignitions varied among years but were most common in July and August
- C7 fuels, surface fires would have dominated with some intermittent fire
- C4 fuels, crown fires would have dominated, with very little surface fire

How much open forest might have burned without suppression?

Wildfire in C7 Fuel:
- 66 sustained ignitions
- duration = number of days with precipitation < 0.6mm

Modelled area burned:
- used daily fire weather in the Canadian Forest Fire Behaviour Prediction System
- assuming fire spread for 4hrs/day (very conservative), estimated area burned per fire
- modelled > observed area burned by 123-fold

In these dry forests, fire suppression is altering the fire regime
- Lightning and fire weather are conducive to surface and intermittent crown fire
- Surface fire would be common and abundant, if not suppressed
- Fire size in the modern records is biased and should be used cautiously

Will climate change exacerbate fire suppression effects?

Case Study: Knife Creek, Cariboo
Fire Danger will increase with projected warmer, drier fire seasons
More very high and extreme fire weather, especially in July and August
Fire weather more conducive to crown fire, even in open forests (C7 fuel)

How do we adapt to improve forest resilience to a warmer world?

De-polarize the debate: think in grey instead of black and white
Historical mixed-severity regimes included surface and crown fires

Fuels and weather interact …
- Suppression of surface fires alters forest structure + fuels, increasing chance of crown fire

Adaptation: Triage then diversify wildfire and forest management
to include managed and prescribed fire, thinning and uneven-aged silviculture to restore structures, mitigate fuels + increase forest resilience to climate change
The 2016 Bear Creek wildfire

The Bear Creek wildfire was reported late in the evening of Aug. 21 2016. The blaze, about six kilometres north of West Kelowna, grew to 60 hectares due to strong winds and prompted evacuation orders and evacuation alerts for about 80 homes in a neighborhood near Bear Creek Provincial Park. People who were staying overnight at the Bear Creek campground were also evacuated.

This interface fire fell under unified command and spurred the activation of an Emergency Operations Centre and an Emergency Support Services Centre in Kelowna. The complex response involved multiple agencies, including the Regional District of Central Okanagan, the RCMP, BC Hydro, several local fire departments and the BC Wildfire Service. At the peak of the incident, more than 50 firefighters were on site, supported by heavy equipment and aircraft. Because of the fire’s aggressive behaviour, and its proximity to a densely populated centre, it garnered media attention from major news outlets in Toronto and Vancouver, as well as local outlets in the Interior.

Bear Creek Provincial Park borders on both Crown land and private land, and the fire overlapped jurisdictional boundaries of various fire departments and the BC Wildfire Service. Values affected included the provincial park, private homes and a major licensee’s Tree Farm Licence. Access to the fire site was complicated by the steep terrain, which descends into Okanagan Lake. There was only one road evacuees could use to leave the area and emergency crews to enter it. Since the fire broke out at night, actions by aircraft (including airtankers, skimmers and helicopters) had to be delayed until the following morning.

Despite these challenges, only a few secondary structures, (no homes) were lost. On Aug. 24, the evacuation orders and alerts were completely rescinded and the fire was reported to be 100% contained. Firefighters continued to mop up and patrol the fire for several weeks after the incident.
Bear Creek Wildfire