

Northern Rockies

Fuels and Fire Behavior Advisory

August 14, 2012

Subject: Rapid transitions from surface fire to group torching and active crown fire behavior in mountain pine beetle killed lodgepole pine.

Discussion: Fire behavior in lodgepole pine that has been attacked and killed by the mountain pine beetle is showing rapid transition from surface fire to crown fires. There are now several instances where fire resources have been surprised by the change in fire behavior. In at least two situations personnel have had to rapidly disengage from the fire and retreat to safety zones.

The foliar moisture content in lodgepole pines that is in the green attacked or red stage can be much lower than surrounding green trees. This lowered FMC is contributing to very rapid fire behavior transitions with little to no warning. This transition has been observed when the relative humidity has dropped below 20% and dry bulb temperature is above 75°. Wind has not been a factor in this transition. Independent crown fire behavior can continue under these conditions without any surface fire below the tree. Embers landing in the canopy of beetle attacked or killed trees can ignite the foliage continuing the crown fire movement. (Visualize putting a lit cigarette in a brown Christmas tree and seeing the entire tree bursting into flames.)

Concerns to Firefighters and the Public:

- Anticipate rapid transition of surface fire behavior to passive and active crown fire behavior when Temperatures are above 75°, Relative Humidity is below 20% and foliage is in sunlight.
- Wind is not needed to influence this fire behavior transition.
- Anticipate rapid fire growth in all directions as this is a fuels dominated condition.
- Anticipate long distance spotting in any direction.
- Anticipate independent crown fire movement that is perpetuated by embers landing in the foliage of beetle attacked or killed trees.

Mitigation Measures:

- Closely monitor fire weather conditions to maintain Situational Awareness.
- Track the probability of ignition. Utilize the table developed by the Missoula Fire Lab for Mountain Pine Beetle attacked trees. Probability of Ignition above 70% should be an early trigger point in decision making. POI greater than 80% firefighters should be prepared for rapid transitions from surface to crown fire behavior.
- When initial attacking new fires in these conditions if possible delay engagement to after peak burning period or early morning when fire behavior is low.
- Escape routes and safety zones must be identified before engagement. Using the green as a safety zone should not be considered. Identify at least two different Escape Routes and Safety Zones in case your original ones are compromised.
- Monitor and understand the effect of weather changes and topography have on fire behavior.
- Post lookouts that can see the flaming front.

Area of Concern: The mountain pine beetle has impacted forests across the Rocky Mountains from above the Canadian border south into Colorado. In Region 1 primary areas of concern are: Helena, Beaverhead/Deerlodge, Lewis and Clark, Bitterroot, Lolo, Nez Perce/Clearwater and Gallatin National Forests. In Region 4 primary areas of concern are: Salmon/Challis, Bridger Teton, and Caribou/Targhee.

Probability of Ignition in Mountain Pine Beetle Attacked Trees

(Green Attacked and Red Needle Stages)

To find the probability of ignition follow the instructions found in the IRPG on pages 83 – 85. Determine the Reference Fuel Moisture (RFM) % and apply the appropriate adjustment factors to determine the Dead Fuel Moisture of pine needles at the fire location. Add the resulting Dead Fuel Moisture Content Correction (%) to the Reference Fuel Moisture (%), this is your Fuel Moisture (%). Apply this number to the MPB Attacked Tree Table to determine the Probability of Ignition for affected trees.

<i>Fuel Moisture (%)</i>	<i>Probability of Ignition (%)</i>
1	97%
2	96%
3	95%
4	94%
5	92%
6	89%
7	87%
8	83%
9	79%
10	74%
11	69%
12	63%
13	56%
14	49%
15	43%
16	36%
17	30%
18	25%
19	20%
20	16%
21	13%
22	10%
23	8%
24	6%
25	5%
26	4%
27	3%
28	2%
29	2%
30	1%

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July 27, 2012

Subject: Heavy/Fine Flashy Fuel Loadings from 2011 & Potential for Extreme Fire Behavior

Discussion: Fine fuel growth from 2011 was not compacted by winter snows. This lack of snowpack, intermittent precipitation combined with unseasonable warm dry weather across much of the Northern Rockies Region this spring has resulted in unusually low moisture content in fine herbaceous fuels. These factors have contributed to conditions where high rates-of-spread and high intensity fires are occurring before the new green growth has cured.

With the elevated fuel loadings and vertical arrangement of grasses and sedges fires are burning with an intensity and rates-of-spread that is not typical of June/early July conditions.



Concerns to Firefighters and the Public:

- Anticipate any ignition with a fine fuel component to ignite easily and move rapidly.
- Anticipate that uncured grasses will not act as a heat sink to slow fire growth.
- Anticipate large acres to be consumed in a short period of time.
- Once the live fuel moisture values fall, flaming fronts will elongate and fires will burn with more intensity and fire behavior will become more extreme.
- Anticipate fires to exhibit extreme spread rates, elongated flaming fronts, and increasing fire brands; expect more long range spotting.
- Anticipate dependent and independent crown fires in the insect infested conifer stands.

Mitigation Measures:

- Indirect tactics may have to be used earlier this year.
- Ensure firefighters have good anchor points Carry the black with you when constructing fireline - keeping one foot in the black.
- Monitor fuel conditions and post information on the National Fuels Monitoring Database.
- Monitor and understand the effect of weather changes and topography have on fire behavior.
- Post lookouts that can see the flaming front.

Area of Concern: Primarily east of the continental divide (Beaverhead, Deerlodge, Helena, Lewis and Clark, Gallatin, Custer National Forests and Dakota Prairie Grasslands) and lower elevations on the Lolo, Bitterroot and Confederated Salish Kootenai Tribal lands.