Klamath Mountain Landscape Fire Severity Patterns: Considerations in Riparian Areas After the Smoke Clears

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2006 Klamath Mountain Fires

Composite Burn Index Map, MTBS
2008 Klamath Mountain Fires

Composite Burn Index Map, MTBS
Mixed Severity Fires in the Klamath Mountains
What does severity look like in the field?

unchanged  low  moderate  high
Importance of Riparian Areas
Fire in Riparian Areas

Fire is an integral part of riparian areas in the Klamath Mountains.
Fire Perimeters 1984-2011
Is Fire Equal in all Riparian Areas?
Fire in Riparian Areas

Riparian areas are resilient to recurring disturbance from flood related disturbance to fire disturbance.
Fire History in Riparian Areas

C. Skinner
Is fire return interval or fire severity more important?
Patterns of Fire Severity in Riparian Areas
Slope Position

2006 Fires

2008 Fires
Slope Position

Greater % High Severity

Mid Slope Intermediate

Greater % Low Severity

Taylor & Skinner 1998
Slope Position

- Fire type (backing/heading)
- More wind on upper slope
- Humid microclimate in canyon bottoms
- Stand structure/height of vegetation
Slope Steepness

2006 Fires

2008 Fires
Slope Steepness

- Rate of spread on steeper slopes
- Very steep slopes tend to be rockier with less fuel accumulation
- Steeper canyons may actually funnel fire
Topography
Does fire history affect fire severity?
Number of Fires

2006 Fires

2008 Fires
Fire severity and Weather: Effects from Inversions

"Of the hundreds of persons who visit the Pacific slope in California every summer to see the mountains, few see more than the immediate foreground and a haze of smoke which even the strongest glass is unable to penetrate."

C. Hart Merriam

1898 Visit to Siskiyou County
Chief, Division of Biological Survey

From: Morford 1984
Inversion Elevation (approx. 4500 feet)

- Dominant high pressures with a stable air mass and low winds lead to subsidence inversions
- These inversions trap smoke leading to decreased solar radiation, decreased temperature, and increased RH
- These inversions have been noted to set up around 4500 feet
- Beneath the inversions fire behavior is greatly reduced while above fire behavior is largely unchanged
What do inversions affect?

- Particulate matter
- Stream temperatures
- Fish movement
- Fire behavior
- Fire severity
- Fire management strategies
Inversion Days in 2006 and 2008
Non-inversion days
Inversion Days in 2006 and 2008

2006 Fires

- No inversion
- Inversion Day, Above
- Inversion Day, Below

2008 Fires

- No inversion
- Inversion Day, Above
- Inversion Day, Below

2006 Fires

- No inversion
- Inversion Day, Above
- Inversion Day, Below

2008 Fires

- No inversion
- Inversion Day, Above
- Inversion Day, Below

2006 Fires

- No inversion
- Inversion Day, Above
- Inversion Day, Below

2008 Fires

- No inversion
- Inversion Day, Above
- Inversion Day, Below
What does this mean for riparian areas after the smoke clears?

- During years with different fire weather (wet spring vs. driest spring on record) patterns of fire severity can be spatially variable.
- Topographic influence on patterns of fire severity may be an important consideration for riparian management.
- Other influences such as fuel loading, dominant overstory canopy tree and aspect may be important.
- Long duration of inversions may lessen fire behavior and leave lower rates of fire severity throughout riparian corridors.
Thank You!