



ADAPTING FUEL TREATMENTS IN A CHANGING CLIMATE

PRESCRIBED FIRE, MECHANICAL TREATMENTS, WILDFIRE, & RESTORATION

Workshop Summary 3 | April 2016

The Available Science Assessment Project (ASAP) leads, EcoAdapt and Oregon State University's Institute for Natural Resources, hosted a workshop during the International Association of Wildland Fire's 5th Fire Behavior and Fuels Conference, in cooperation with the Northwest Fire Science Consortium and the Northern Rockies Fire Science Network. The workshop had managers and scientists build on a systematic map of the literature and results of an earlier scientist workshop. Outcomes from the manager and scientist workshop reflect perspectives of 36 participants from 30 organizations, which included federal and state agencies, tribal governments, non-profits, universities, and other research organizations.

The 2016 workshop, in part, explored on-the-ground climate adaptation actions that might be used for fire and fuels management under future climate conditions. Specifically, workshop participants were asked to identify the likely impacts of climate change and what they saw as barriers and potential opportunities for the use of -

- Prescribed fire
- Mechanical fuel treatment
- Managed wildfire
- Post-fire restoration (seeding/planting)

PRESCRIBED FIRE

Climate change will likely impact prescribed fire management in the West by altering burn windows. Prolonged droughts, increased temperatures, high and/or erratic winds, and lower relative humidities will likely alter the timing of burning, while lower snowpacks may open some spring burn windows.

Acknowledging these potential impacts, workshop participants identified several additional barriers to the use of prescribed fire with climate change -

- **Capacity:** trained personnel and capital may be hard to retain or find when a burn window occurs
- **Smoke:** longer fire seasons lead to smoke fatigue and less acceptance of smoke, especially for prescribed fire projects planned near communities
- **Legal issues:** there is a reluctance to conduct prescribed fires for fear of escape and liabilities, this

reluctance may increase with a reduction of optimal burn conditions

- **Ecology:** during drought conditions or in areas of insect outbreaks, both of which may be exacerbated by climate change, prescribed fire may not trigger release or increased tree growth, but may instead act as an added tree stress and lead to mortality

When pressed to think about what managers could use or do to continue a prescribed fire burning program as the climate changes, workshop participants identified several -

- **Communication:** use education and social networking to highlight the benefits of and garner public support for prescribed fire
- **Collaboration:** use Prescribed Fire Councils and find ways to partner and secure funding that spans federal fiscal year gaps

MECHANICAL FUEL TREATMENTS

Warmer, drier conditions and greater chances of extreme fire weather may, at worst, make fuel treatments ineffective and, at best, change the ideal fuel densities and structures for a successful fuel treatment. Given these challenges, workshop participants identified several other barriers to conducting fuels treatment projects -

- **Economics:** with limited operational budgets, managers often try to re-coup project costs through the sale of timber removed in fuel treatments, this ability is limited when transportation distance is far from a mill and/or there is no market for small-diameter fuels
- **Research:** more information about masticated fuels is needed before the effects of this treatment on forest succession, subsequent insect infestations, and fire behavior are well understood
- **Scale:** while landscape-scale fuel treatments are deemed necessary, current and future work will likely remain at much smaller project scales

Given these obstacles, workshop participants were still able to identify several procedures or technological advancements that might make mechanical fuel treatments more feasible even in a changing climate -

- **Collaboration:** forest thinning for fire risk reduction has become an acceptable treatment on privately owned lands and in the wildland urban interface, this

offers avenues for cooperation in implementation of and cost-sharing for mechanical fuel treatments

- **Coalition building:** establishing collaborative groups with shared land-use and risk reduction objectives may help to establish sociopolitical outreach and appeal
- **Technology:** develop and foster technologies for the use of small-diameter or masticated fuels

MANAGED WILDFIRE

If climate change results in a greater frequency of burning conditions that are unsafe for firefighters, managing wildfire for multiple objectives (managed wildfire) may become more appealing. However, these same conditions could also focus even more attention on early suppression efforts where fire personnel are concerned with future fire behavior and weather predictions.

When workshop participants discussed managed wildfire, they identified a large number of barriers, many of which were similar to those identified in the prescribed fire discussion, but those that were unique to the increased use of managed wildfire in a changing climate are listed below -

- **Economics:** longer fire seasons make fire suppression even more expensive
- **Policy:** support of managed wildfire requires buy-in from the agency, administrators, and the public, which doesn't exist everywhere and often needs to be re-established each fire season
- **Legal:** fire managers need professional protection from legal repercussions in order to be more comfortable with decisions and tactics beyond suppression
- **Capacity:** not all fire personnel are trained for managing long-duration fires; a build-up in capacity including fire behavior prediction support is necessary to increase the use of managed wildfire

Communication was seen as the primary opportunity that might make managed wildfire more palatable even in a changing climate. Workshop participants identified the following communication ideas for maintaining or increasing the use of managed fire -

- Increase the use of fuel treatments around valued resources to reduce fire severity or allow for firefighter staging and management in these areas
- Widely share managed wildfire success stories
- Allow and cultivate fire bosses to be fire ambassadors

POST-FIRE RESTORATION

Post-fire seeding and planting needs are likely to increase as fire seasons lengthen and necessitate strategic post-fire restoration. Workshop participants identified the following major barrier to the success of post-fire restoration in a changing climate -

- **Species shifts:** currently seeds and seedlings are planted in locations that match their collection area, this may be less successful as climate changes and species shift in latitude or elevation

Several potential opportunities were identified to preserve the success of post-fire restoration with climate change -

- **Technology:** seed pillows are a developing technology that may mitigate those factors limiting successful seedling establishment during drought conditions
- **Assisted migration:** use understanding of future conditions and natural species shifts of species may be used to adapt seeding and planting guides to assist plant migrations
- **Education:** tracking and documenting climate changes on valued resources (e.g. culturally, medicinally, and nutritionally important plants) may prove to be a useful way to educate the public about climate change and needs for active restoration; similarly, successful natural post-fire recovery and active restoration should be documented to garner public support

ADDITIONAL READING & INFORMATION

Engel, K.H. 2014. Perverse incentives: the case of wildfire smoke regulation. 40 Ecology Law Quarterly. 623(2013): 12-26

Halofsky, Joshua S.; Halofsky, Jessica E.; Burcsu, Theresa; Hemstrom, Miles A. 2014. Dry forest resilience varies under simulated climate-management scenarios in a central Oregon, USA landscape. Ecological Applications. 24(8): 1908-1925.

van Mantgem, Phillip J.; Nesmith, Jonathan C.B.; Keifer, MaryBeth J.; Knapp, Eric E.; Flint, Alan L.; Flint, Lorraine E. 2013. Climatic stress increases forest fire severity across the western United States. Ecology Letters. 16(9): 1151-1156

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The Northern Rockies Fire Science Network (NRFSN) serves as a go-to resource for managers and scientists involved in fire and fuels management in the Northern Rockies. The NRFSN facilitates knowledge exchange by bringing people together to strengthen collaborations, synthesize science, and enhance science application around critical management issues.

