



RESTORING THE WEST

FOREST RESTORATION NEEDS IN OREGON AND WASHINGTON

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With over a century of wildfire suppression and other land management practices, forests across the western United States are experiencing dramatic increases in fire, insect, and disease outbreaks as well as widespread habitat degradation. These large scale events have driven a shift in public forests management; where ecological restoration has become a new paradigm. Determining where, how much, and what type of management is needed to achieve ecological restoration at large regional scales will help guide management that restores a Natural Range of Variability (NRV) in forest structure across the west. A changing climate may have an effect on whether or not desired future conditions can be returned to its former NRV. Nevertheless, restoring to a NRV is widely assumed and understood to increase resilience and adaptive capacity.

Natural Range of Variability (NRV)

NRV is defined by the disturbance processes and associated variability in ecosystem characteristics that occurred ~100-200+ years before European settlement.

In this study, researchers investigated the extent of forest restoration needed to move present day forests towards a NRV across fire-adapted landscapes in eastern Washington, eastern Oregon, and southwestern Oregon. They assessed forest vegetation restoration needs for over 28 million acres of forest based on the distribution of different forest types (e.g., Dry Mixed Conifer vs. Moist Mixed Conifer) and the current relative abundance of structural classes (see below) compared to NRV reference conditions. Using this approach, researchers determined which structural classes were overrepresented and underrepresented in each landscape unit. They then evaluated which of several different treatment or restoration categories ('Disturbance Only', 'Disturbance then Succession', and 'Succession Only') could transition acres to structural classes that would restore a distribution of classes to within the NRV reference conditions.



Structural classes. Illustrations adapted by Haugo et al. 2015 with permission from Van Pelt 2008.

KEY FINDINGS

- 40% of all coniferous forests (over 11 million acres) across eastern Washington, eastern Oregon, and southwest Oregon need a change in current forest structure to restore NRV reference conditions.
- 'Disturbance then Succession' (i.e., thinning or fire with time for growth to the next structural class), was the most common restoration need category across the region.
- The level and type of restoration varied greatly between forest types, with the greatest overall restoration need in forests historically characterized by frequent low to mixed severity fire regimes.
- Patterns of forest ownership had a large influence on regional patterns of restoration needs.

The Northwest Fire Science Consortium is a regional fire science delivery system for disseminating knowledge and tools, and a venue for increasing researcher understanding of the needs of practitioners.



RESULTS

Regional restoration needs

Forty percent of all coniferous forests across the study region need to transition to a different structural class to restore forest structure to a NRV reference condition. The most common restoration need was categorized as 'Disturbance then Succession' (20% of all forests). Disturbance, by way of mechanical treatment such as thinning and/or fire, can hasten the transition of a mid-development closed canopy forest to a mid-development open canopy forest. These forests can further transition into a late-development open canopy structural class with time for growth and application of fire. Other treatment categories such as 'Disturbance Only' (14% of all forests) which includes mechanical treatment and/or fire transitions and 'Succession Only' (7% of all forests) which includes time for growth with application of fire and time for growth without fire transitions, were also important. This study suggests that the distribution of forest types characterized by different fire regimes – low, mixed, and high severity – is partly what drives these regional scale patterns of restoration need. Restoration needs were concentrated in the forest types that were historically characterized by low to mixed severity fire regimes.

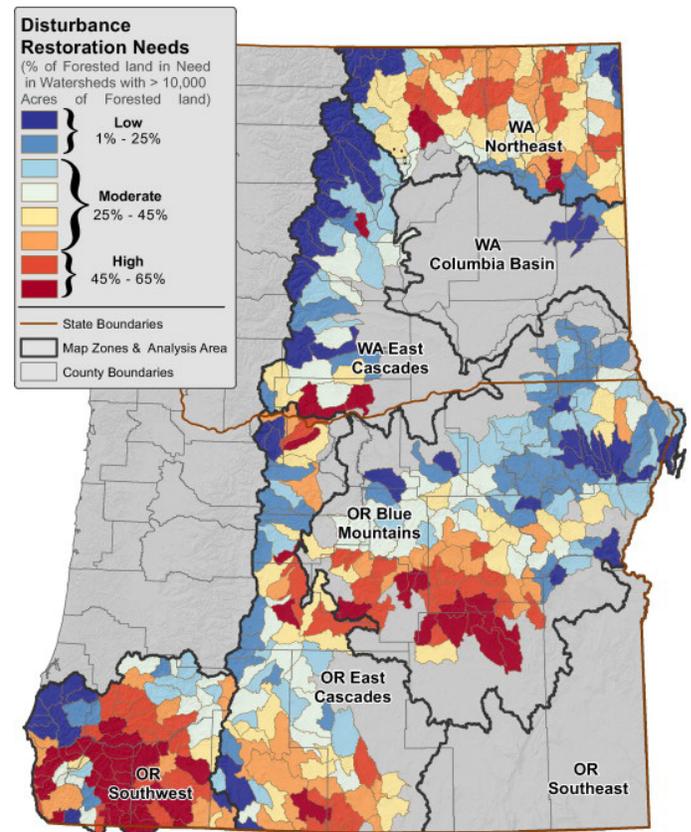
Patterns of forest ownership

Forest ownership had an influence on patterns of restoration need. US Forest Service lands had the greatest total acreage of disturbance restoration needs ('Disturbance Only' and 'Disturbance then Succession') but as a percentage of overall ownership, restoration needs were higher on Bureau of Land Management, State, and Private forests. Across the study region, disturbance needs were greatest in southwest Oregon and northeast Washington. Forest ownership in these areas are dominated by private industrial timber companies where forested land historically characterized by low and mixed severity fire regimes is kept in early and mid-development closed canopy conditions. Private lands also had the highest successional restoration needs. This study highlights that disturbance alone cannot restore NRV forest structure, instead a combined approach of a mechanical treatment and/or fire while also promoting the growth of old trees and late-development forest structures is needed.

IMPLICATIONS

This research suggests that there is an immediate need for thinning and/or fire within forests historically characterized by low to mixed severity fire regimes across eastern Washington, eastern Oregon, and southwestern Oregon. A regional scale approach allows local land managers the ability to incorporate large scale, multi-ownership context into local forest management and resto-

ration planning that, consequently, influence overarching ecological processes. These assessments are not silvicultural prescriptions however, and should only be used to inform local landscape evaluations and development of treatment prescriptions. The results for this study, including data, outputs, and reference model descriptions, are made available by the authors for reference and use by all.



Disturbance Restoration Needs, Haugo et al. 2015

MORE INFORMATION

This brief is based on the following article:

Haugo, R., C. Zanger, T. DeMeo, C. Ringo, A. Shlisky, K. Blankenship, M. Simpson, K. Mellen-McLean, J. Kertis, M. Stern. 2015. A new approach to evaluate forest structure restoration needs across Oregon and Washington, USA. *Forest Ecology and Management* 335:37-50.

**The authors are working on an update of this publication that incorporates current condition data and regional expansion to western Oregon and Washington.*

Supplementary material can be found at:
Ecoshare: <http://ecosshare.info/products/r6-analysis/>

Contact: nw.fireconsortium@oregonstate.edu

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