



2017 FIRE CONGRESS
Research Highlight



The influence of fire regime and abiotic factors on the population dynamics and leaf qualities of a wild harvested understory herb, *Xerophyllum tenax* (Melanthiaceae)

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MAIN QUESTIONS OR ISSUES THAT YOU ADDRESSED

- How do fire severity, canopy cover, soil moisture and harvest influence the growth, survival and reproduction of beargrass?
- Do effects depend on plant size?
- How do fire severity, canopy cover, soil moisture and harvest influence the long-term persistence of beargrass?

LOCATION AND ECOSYSTEM INVESTIGATED

This study took place in north-central Oregon, within the Mount Hood National Forest, Clackamas Ranger District, 3700-4400 foot elevation sites, within the Pacific Silver Fir and Mountain Hemlock dominated ecosystems, in areas that experienced wildfire in 2014.

KEY FINDINGS OF YOUR RESEARCH

- Fire severity had different effects on different parts of the plant life cycle, and these effects varied with time since fire, as well as with plant size. Generally, fire reduced survival one and two-years post-fire, increased growth, increased flowering (1 and 2 but not 3 years post-fire), increased capsule production, and increased vegetative reproduction.
- Long-term persistence may be highest under low severity fire (<25% of tree mortality)
- Increased canopy openness, even without fire, would likely increase long-term persistence
- Decreased soil moisture would likely decrease long-term persistence
- Harvest (at low intensities; one type of indigenous harvest) decreased survival and increased vegetative reproduction, with a net positive effect on population growth rate.

HOW DID YOU ANSWER THE MAIN QUESTIONS OR INFORM THE ISSUES?

We censused plots within three populations over the course of three years (2015-2017), tracking every individual (>3,000 plants). Each year we recorded size, survival, reproduction, seed set, and new recruitment. In 2016, we harvested 10 leaves from the second innermost whorl of a random selection of half the plants >20mm

This research was presented at the 7th International Fire Ecology and Management Congress, which was held in Orlando, Florida, November 28-December 2, 2017 and was hosted by the Association for Fire Ecology, in cooperation with the Southern Fire Exchange.

basal diameter across all our plots. We used this data to build regression models, then used those to build Integral Projection Models to look at long-term projections for plant population growth.

HOW MIGHT/WILL IT INFLUENCE FIRE MANAGEMENT DECISIONS OR PRACTICES?

This study provides key information for managers making decisions about the use of fire or timber thinning in forest management. Beargrass is an important ecological (e.g., wildlife resource) and cultural component (e.g., used in basket making by tribal communities) of forested ecosystems in the Pacific Northwest. This study suggests low severity fires (such as those implemented by Native Peoples in the region over millennia), support the greatest long-term persistence of beargrass, that indigenous harvest has a net positive effect on population persistence (this does not include commercial harvest, which is more intensive), that canopy opening (with or without fire) increases long-term beargrass population growth, and that climate change would negatively impact long-term population growth.

WHO IS THE MAIN END-USER OF YOUR RESEARCH?

Forest service or other public or private land managers in the Pacific Northwest who are interested in the effects of fire, timber thinning and climate change on understory species, particularly beargrass.

CONGRESS SESSION

GRIN: Stoking the Flames for the Next Generation of Fire Scientists, Jeff Kane.