Managing for Fire Refugia in the Northwestern United States

Outcomes of the second fire refugia workshop in the Northwest (Jan 16 & 17th 2019, Moscow Idaho)

Fire refugia are defined as areas less frequently or less severely affected by wildfire relative to the surrounding landscape and important for the persistence of biota. Land managers and researchers were invited to participate in a two half-day workshop to gain insight on the factors that influence land management strategies on fire refugia. The workshop objectives were to (1) establish a list of possible management actions for managing fire refugia and (2) identify examples of the placement of these management activities within a fire. Additionally, we identified unburned islands of high and low values on a GIS during the workshop.

Nineteen participants from across the Pacific Northwest attended the workshop; they included 12 natural resource managers and 7 researchers. Due to the timing of a federal government shutdown, many federal attendees were unable to attend. Agencies represented were: Washington Department of Natural Resources, Washington Department of Fish and Wildlife, USDA Forest Service, Idaho Department of Lands, and Idaho Department of Fish and Game. Additionally, we had representation from the University of Idaho, the University of California Davis, private landowners, and a congressional staffer.

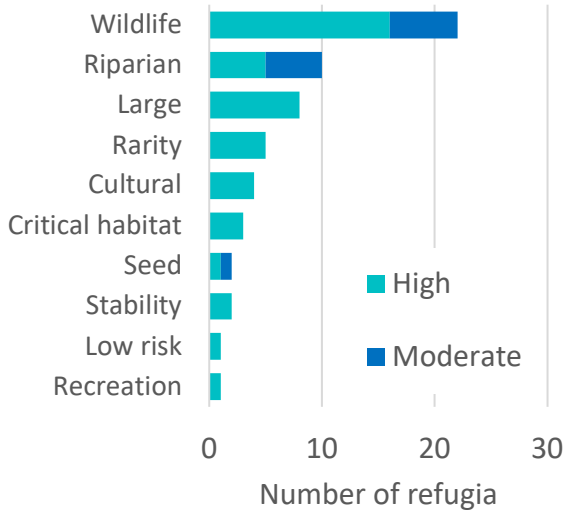

Figure 1: The number of refugia identified as having high or moderate management value by class.

Identifying high and low value fire refugia

During the workshop participants identified high value and low value fire refugia using Google Earth. Eighty-two individual refugia were identified from five fires within the Pacific Northwest: 51 high value, 12 moderate value, and 20 low value. Most refugia were identified as high (or moderate) value because of their wildlife habitat importance (Figure 1). Participants also valued large refugia, as well as those in riparian or topographically sheltered areas (e.g., "stringers").

There were also a number of fire refugia that were identified as having a low priority for managers. These were mainly chosen because they were disturbed, close to roads, or the fire refugia were at low risk for being burned in the future (e.g., wet meadow, rocky terrain lacking fuel).

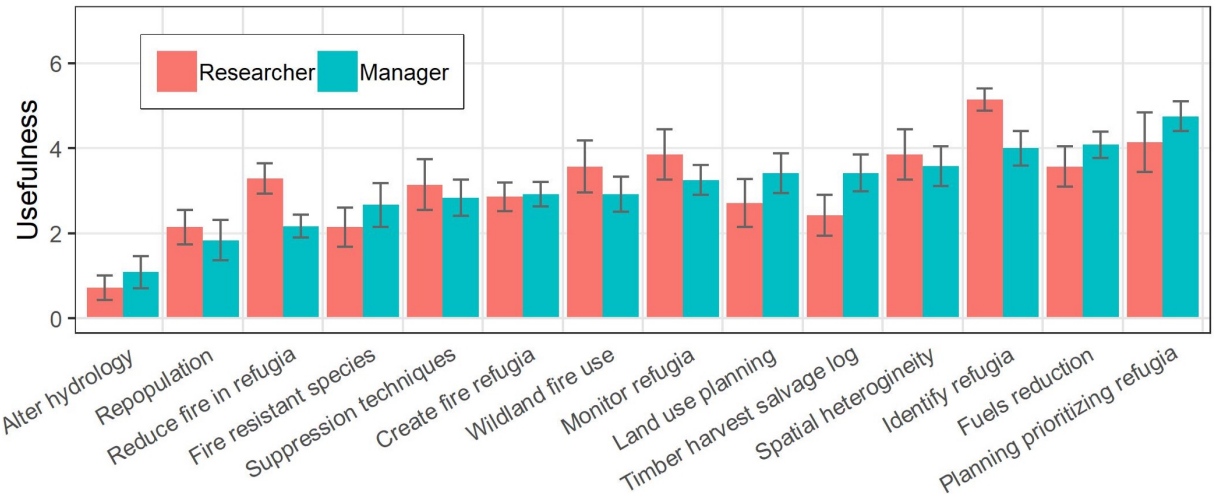

Figure 2: Mean "usefulness" score (from 0 to 7) for different management action categories in promoting or preserving fire refugia. Participants were separated by their occupational group. Standard error bars in grey.

Management actions promoting fire refugia

During the workshop participants developed a list of management action categories by brainstorming management actions to promote or preserve fire refugia. The individual actions were categorized into 14 broader categories. Participants then ranked these actions by their "usefulness" using a Q-sort method (Figure 2).

There was agreement across both occupation types (manager and researcher) that planning/prioritizing fire refugia (e.g., creating a GIS database of fire refugia) and performing fuels reductions (e.g., thinning around or within fire refugia) were the most useful management actions. There was also agreement that altering the hydrology (e.g., raising the water table), and repopulation (e.g., collecting seeds or trees within refugia) were the least useful methods. However, during the workshop participants indicated that the definitions of these 14 management categories were sometimes ambiguous and therefore should be interpreted as a general indication of usefulness, but specific management actions could be more suitable than others given specific circumstances.

Future research topics

At the conclusion of the workshop participants were asked to write down future research topics that would make the most impact in preserving/managing fire refugia. Forty-three research topics (and questions) were identified by the participants. These topics were categorized into eight broader categories (Figure 3). Participants were categorized into manager versus researcher based on their job duties.

Both groups indicated that more research is needed to characterize fire refugia, to gain further insight into the physical and ecological traits and functions of fire refugia. Both groups also indicated a strong interest in further research on the creation and maintenance of fire refugia. Research questions that were posed were generally practical, such as "How do we create artificial fire refugia?"

Conclusion

This workshop provided valuable insight into the values of land managers and how that impacts their decision making. It appears that the fire refugia concept is just beginning to become a consideration for land managers. While there a great deal of interest among land managers in managing fire refugia, more research is needed in translating the ecological significance of fire refugia into management strategies that natural resource managers can implement. These practices must be broad enough to cover the wide range of values among managers in different regions, ecosystems, and from a variety of agencies with differing missions; however, they must also be specific enough to be applied by individuals in their local areas of responsibility.

Acknowledgements

Thanks to all the workshop participants, the College of Natural Resources at the University of Idaho for hosting us, and the Joint Fire Science Program (JFSP, Cooperative Agreement L16AC00202).

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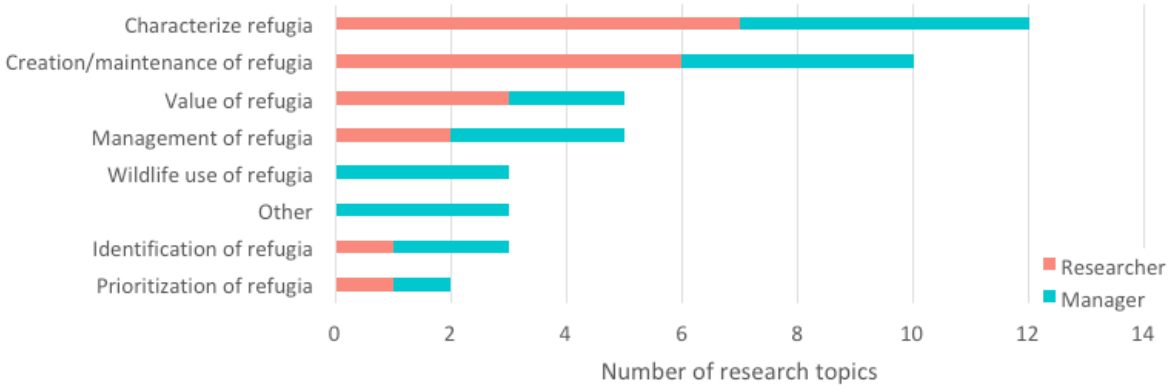

Figure 3: The number of research topics or questions suggested by participants. Topics were separated by the occupational group of the participant.

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