

## Western Ecological Research Center

# Publication Brief for Resource Managers

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## Prescribed Fire Effects on Cheatgrass Persistence in a Sierra Nevada Ponderosa Pine Forest

Historically, western U.S. forests have not been highly threatened by nonnative plants. Thus, the recent cheatgrass (*Bromus tectorum*) invasion in certain Sierra Nevada ponderosa pine forests is of considerable concern. The coincidence of this invasion with prescription burning has led USGS researchers Tom McGinnis and Dr. Jon Keeley to investigate the impacts of prescribed burning in different seasons and other factors on the persistence of cheatgrass in low-elevation forests in Kings Canyon National Park.

Their study, published in the *International Journal of Wildland Fire*, showed that once cheatgrass had become established in open ponderosa pine forests, low-intensity prescribed burning favored its continued persistence. Altering the burning season to coincide with growing season seed maturation has been proposed as a means of controlling other annual species that depend upon yearly restocking of the seedbank. However, this study did not find that was a viable option for control of cheatgrass in this low-elevation forest. The authors concluded that because the fuel load was relatively low on these previously burned sites, fire intensities were insufficient to have much of an impact on the cheatgrass seedbank. In their study, they reported that fireline intensities were within the range for low-intensity surface fires, so this response may be generalizable to other semi-arid ponderosa sites.

The authors also found that cheatgrass was inhibited by a dense surface layer of pine needles, simulating long unburned conditions. Needle accumulation directly inhibited cheatgrass establishment and indirectly inhibited cheatgrass by increasing fire intensity sufficiently to decimate much of the seedbank.

### Management Implications:

- Early season burning does not appear to be a viable means of reducing cheatgrass once it is established in low-elevation forests.
- Surface needle accumulation during extended fire-free periods acts to inhibit cheatgrass by reducing suitable establishment sites and by increased fire intensities during fires.
- Where feasible, fire managers should consider the fire frequencies that can both reduce serious fire hazard and not exacerbate alien plant invasions, and this may be longer than the historical fire return interval.

The authors concluded that current efforts at restoring historical conditions of frequent fire are likely to work to maintain cheatgrass in this ecosystem. Longer fire intervals may be expected to inhibit cheatgrass persistence; however, it is unknown what length of fire-free interval would be required to effect such a change. Fire managers might benefit from taking a more prudent approach that recognizes there are potential negative resource impacts related to restoring historical fire frequencies. Of course, returning to an era of total fire exclusion is not a viable solution; however, there is a large range of fire intervals between these two extremes. Where feasible, fire managers should consider the option of an appropriate compromise between reducing serious fire hazards and exacerbating alien plant invasions on sites where they are a threat.

*Keeley, J. E. and T. W. McGinnis. 2007. Impact of prescribed fire and other factors on cheatgrass persistence in a Sierra Nevada ponderosa pine forest. International Journal of Wildland Fire 16:96-106.*