



**Release:**  
July 2012

**Contacts:**  
Jon E. Keeley

**Email:**  
[jon\\_keeley@usgs.gov](mailto:jon_keeley@usgs.gov)

**Phone:**  
559-565-3170

USGS Western Ecological Research Center | Sequoia and Kings Canyon Field Station | 47050 Generals Hwy #4, Three Rivers, CA 93271

## Effective Short-Term Treatments for Italian Thistle

Italian thistle (*Carduus pycnocephalus*) is a noxious alien herb that has recently invaded low-elevation grasslands in California, including ungrazed blue oak and interior live oak stands in Sequoia National Park. Here, Italian thistle tends to dominate under oaks and has the potential to substantially alter the foothill ecosystem by displacing native plants and acting as ladder fuel that carries fires into the oak canopy.

USGS researchers tested the effects of selectively reducing Italian thistle populations alone and in combination with restoration of native species. The findings are reported in the journal *Madroño*.

Researchers tested two thistle eradication techniques (clipping and the application of clopyralid herbicide) and two restoration techniques (addition of native forb seeds or planting native grass plugs) in the Kaweah River watershed in Sequoia National Park. A 3x3 matrix plot of experimental and control treatments were replicated at 20 sites.

After two consecutive years of treatment, researchers found only short-term success using various treatments. Clipping was not effective at reducing Italian thistle populations: clipping reduced thistle density in some areas, but did not reduce vegetative cover of thistles.

Clopyralid herbicide reduced both Italian thistle density and vegetative cover for the first two growing seasons after application, but cover rebounded in the third growing season. Native forb cover and species richness were not significantly affected by clipping or spot-treating with herbicide.

Grass and forb addition treatments by themselves were not effective at reducing Italian thistle during the course of this study, although sowing annual forb seeds after clipping resulted in greater forb cover and moderately reduced Italian thistle vegetative cover in the short term.

### Management Implications

- Spot-treatment with clopyralid was an effective short-term treatment, and broadcast application of clopyralid might protect larger areas from immediate reinvasion. However, it might also harm certain native plants, so further research on clopyralid effects on native plants is warranted.
- Native perennial grass that survived the first summer continued to grow in the experimental plots the next summer, indicating that restoration may be feasible in foothills sites.
- Because experimental treatments were met with little long-term success, Italian thistle populations are likely to remain as seed sources and present formidable management challenges without continued intervention.

#### THIS BRIEF REFERS TO:

McGinnis, T and J Keeley. 2012. Effects of eradication and restoration treatments on Italian thistle (*Carduus pycnocephalus*). *Madroño* 58(4): 207-213. doi: 10.3120/0024-9637-58.4.207.

<http://www.werc.usgs.gov/ProductDetails.aspx?ID=4755>

<http://www.werc.usgs.gov/keeley>



Findings from the study should pave way for further thistle-eradication experiments.