



Can Targeted Browsing Be a Useful Surrogate for Prescribed Burning?

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The limitations on prescribed burning are numerous, but fire's ecological role in shaping the health and integrity of our forests is incredibly important. Browsers, such as domesticated goats, prefer to consume woody species. People can use goats and other browsers to help manage ecological communities that are degraded by nonnative invasive shrubs and vines or located in the wildland-urban interface or where smoke impacts are considerable. Furthermore, browsers could supplement prescribed burning by treating forest stands in "off years" or outside of typical burn windows.

In the oak and pine woodlands of the Missouri Ozarks, we are testing targeted browsing as a management tool.

Browsers can constitute an additional and accessible tool in managing fire-maintained landscapes.

Figure 1—Goat perched on snag (top) browsing a dogwood on the Mark Twain National Forest in Missouri. Photo: Gina Beebe.

TESTING TARGETED BROWSING

"Targeted browsing" is the use of browsing livestock at predetermined levels of intensity and seasonality to achieve desired land management objectives. In the oak and pine woodlands of the Missouri Ozarks, we are testing targeted browsing as a management tool to meet restoration objectives and fuel targets on the Mark Twain National Forest (figs. 1, 2).

Silvicultural prescriptions for woodland restoration require lowering overstory stocking levels and removing the midstory to increase sunlight reaching the forest floor. However, this often results in vigorous sprouting by oaks and hickories as well as less desirable species such as red maple. Furthermore, it can increase the abundance of woody shrubs, including fragrant sumac and blackberry, which compete with herbaceous plants.

This aggressive woody ingrowth into the midstory could be managed effectively with frequent low-intensity surface fire. However, maintaining such levels of disturbance can be complicated on some sites, resulting in the need for other or a combination of approaches. Specifically:

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Figure 2—Browsed (left) and nonbrowsed (right) plots. Photo: Gina Beebe.

We are interested in the combined effects of targeted browsing and prescribed burning in meeting our restoration objectives.

1. We are investigating browsing season (late winter, spring, and late summer) to determine when we can maximize the impact of browsing on the growth of woody stems while minimizing its impact on ground flora;
2. We are interested in how targeted browsing might stimulate the available seedbank by reducing midstory vegetation (such as dogwoods) and thereby increasing sunlight reaching the forest floor and exposing bare mineral soil through trampling; and
3. We are interested in the combined effects of targeted browsing and prescribed burning in meeting our restoration objectives—that is, a two-layer (ground and canopy) open woodland with a diverse forb- and grass-dominated ground layer that provides critical habitat for important wildlife species.

Finally, we will examine the effects of targeted browsing on fuels, a topic of rising interest to many land managers. Past declines in fire use have led to an accrual of surface fuels, reaching levels of management concern. Surface fuels play a critical role in fire spread, and their removal greatly reduces the likelihood of fire hazard and stand-replacing crown fires as well as the need for recurrent prescribed burns.

RESULTS

Although examples are limited, targeted browsing has been demonstrated to supplement prescribed fire as a fuels management technique. Goat browsing, in particular, can be a highly effective fuels reduction treatment due to the ability of goats to consume a wide variety of plants and to remove shrubs up to 6 feet (2 m) high, reducing both vertical and horizontal fuel continuity.

Goats and other browsers can constitute an additional and accessible tool in managing fire-maintained landscapes.

Targeted goat browsing has a notable impact on litter, 1-hour fuels, and 10-hour fuels. In a study by Tsiouvaras and others (1989), a herd of 113 goats per acre reduced 1-hour dead fuels by 58.3 percent and average litter depth by 27.4 percent in 3 days. Goats' capacity to reduce fine dead fuels is mainly through trampling as the fuels are crushed and incorporated into soils.

To learn more about this project, please visit our project website: https://www.nrs.fs.fed.us/sustaining_forests/conservation/enhance/biodiversity/goats-fire-woodlands/

LITERATURE CITED

Tsiouvaras, C.N.; Havlik, N.A.; Bartolome, J.W. 1989. Effects of goats on understory vegetation and fire hazard reduction in a coastal forest in California. *Forest Science*. 35(4): 1125–1131.