

**PROJECT TITLE:** Targeted Grazing by Goats to Control Yellow Starthistle in Canyon Grasslands of Northern Idaho.

**PERSONNEL:** Dr. Karen Launchbaugh and Brianna Goehring, UI Rangeland Ecology and Management. In cooperation with Don Sorensen and Lynn Burton, U.S. Forest Service, and Ray Holes, Prescriptive Grazing Services.

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### **ACCOMPLISHMENTS:**

In 2006, 2007, and 2008, project funding was secured to examine if targeted grazing by goats could provide an ecologically beneficial and effective tool for yellow starthistle control in Idaho. We proposed studying the responses of rangeland infested with yellow starthistle to late-season grazing by goats. We hypothesized that consumption of yellow starthistle by goats would lead to fewer seedheads in grazed areas compared to ungrazed exclosures. We successfully initiated this research project and conducted vegetation assessments in 2006. We continued the grazing treatment and vegetation assessment through 2007 and 2008.



The study area was located on lower Bentz Ridge, northeast of White Bird, Idaho on the Salmon River Ranger District of the Nez Perce National Forest (Fig.1). The region is open, steep, and generally southwest-facing grassland slopes with yellow starthistle occurring from large patches to scattered plants.

Twenty-four paired plots were established in six groups of four across the study area. Each paired plot consisted of a 7 x 15 m area that was fenced with poly wire net fencing to exclude grazing (control sub-plot) and similar sized area that was not fenced and subsequently grazed to serve as the treatment sub-plot. In summer 2006, 1233 yearling Boer goats, managed by grazing service provider Ray Holes, grazed about 1000 acres in 73 days (June 25 to Aug. 31 and Oct. 10 to Nov. 10). In summer 2007, 1657 Boer nannies grazed about 1600 acres in 42 days (July 27 to Sept. 10) and in summer 2008, 1706 nannies grazed about 2000 acres in 52 days (Aug. 8 to Sept. 28).

Vegetation assessments in 2007 and 2008 were provided through support of the David Little Livestock Range Management Endowment and the U.S. Forest Service. The vegetation assessment included monitoring of yellow starthistle plant and seedhead density before and after grazing in each paired plot. Canopy cover of grasses, forbs, and yellow starthistle was also estimated. In 2008, we also assessed biomass of yellow starthistle, grasses, and forbs in all grazed and ungrazed plots. In 2008 we also added and examined 24 grazed plots in vegetation communities similar to the paired plot, but not adjacent to them. These plots were added to ensure that the treatment effects we observed in the paired plots were occurring across the grazed landscape.

Initial results indicate that 2006 grazing reduced the number of yellow starthistle plants on the study area as plots designated for the grazing treatment had fewer plants than the control sub-plots before grazing was initiated in both 2007 and 2008 (Fig. 2). After plots were grazed in 2007 and 2008, yellow starthistle plant density was 72% and 58% lower, respectively, in grazed compared to ungrazed sub-plots (Fig. 2). It was clear that goats removed seed material despite the spines as grazed sub-plots had 99% and 94% fewer seedheads than ungrazed sub-plots when examined after grazing for 2007 and 2008 (Fig. 3). Cover of yellow starthistle experienced similar reductions of 77% and 72% for 2007 and 2008, respectively (Fig. 4 and 5). Forb cover decreased by 77% in 2007 but decreased only 22% in 2008 (Fig. 4 and 5). Treatment and control sub-plots had similar cover of grass after grazing was applied (Fig. 4 and 5). Goats readily and thoroughly grazed yellow starthistle as evidenced by the prominent lack of seedheads or foliage throughout most of the grazed areas of Bentz Ridge.

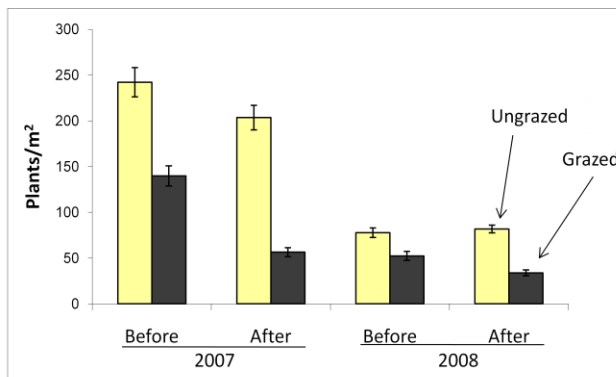


Fig. 2. Density of Yellow Starthistle Before and After Grazing

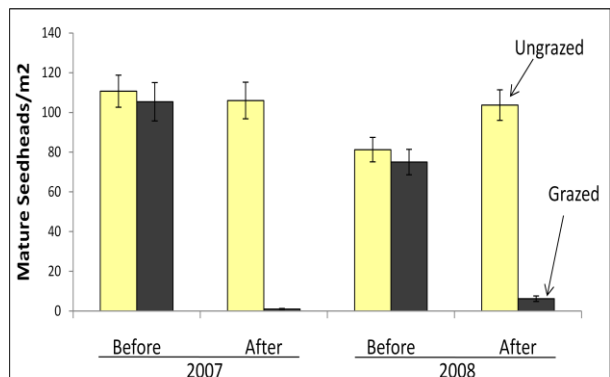


Fig. 3. Density of Starthistle Seedheads Before and After Grazing

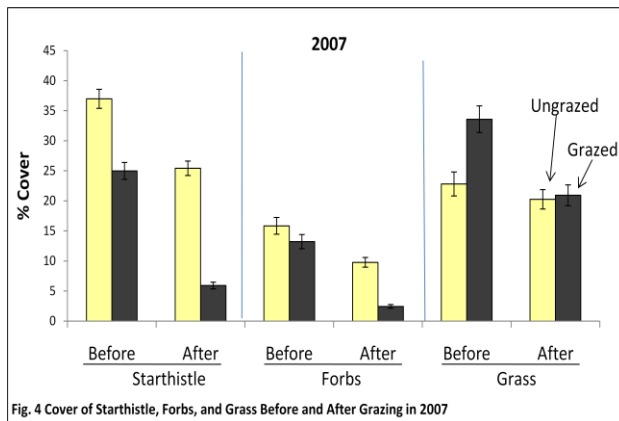


Fig. 4 Cover of Starthistle, Forbs, and Grass Before and After Grazing in 2007

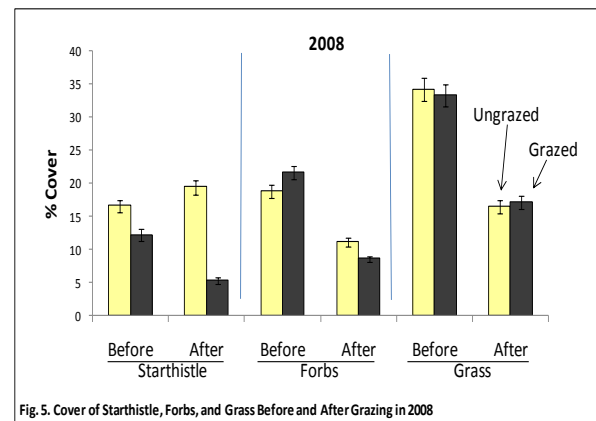


Fig. 5. Cover of Starthistle, Forbs, and Grass Before and After Grazing in 2008

This project was made possible in 2006 through a \$77,500 contract provided by the U.S. Forest Service and about \$7,000 of field support from the University of Idaho (K. Launchbaugh) and the U.S. Forest Service (D. Sorensen). In 2007, the grazing contract was supported by the U.S. Forest Service (\$53,500), the American Sheep Industry Association (\$10,000) and the Idaho County Weed Board (\$15,000). The David Little Endowment supported Brianna Goehring (\$19,380) in her Master of Science research which included the vegetation assessments in summer of 2007 and 2008. In 2008, the grazing contract was funded by the U.S. Forest Service

with field work supported by the Little Endowment (\$19,246) and in-kind contributions from the U.S. Forest Service and the University of Idaho.

A study is currently underway that will explore the effects that passage through the goat digestive tract has on yellow starthistle seeds. Five nanny goats were be fed a known number of yellow starthistle seeds. Feces were then collected from each goat for eight days. Samples of feces are being dissected to determine percentage of seeds that survive digestion and are deposited in feces. Recovered seeds will then be tested for germinability and viability. The information gained from this study will give insight on the potential risk of spreading yellow starthistle seed via goat feces.

#### **PUBLICATIONS:**

We anticipate that this research will yield a graduate student thesis and scientific journal article on prescribed goat grazing for yellow starthistle control in *Invasive Plant Science and Management*. The work will be presented at the 2009 annual meeting of the Society for Range Management to be held in Albuquerque. The procedures and documents necessary for the grazing contract has serve as a model for applying targeted grazing as a weed management tool in the Forest Service and other land management agencies. Information has been shared in training sessions on targeted grazing among land managers, grazing service providers and cooperative weed management teams. The inclusion of this research project is expected to be included in future workshops, grant proposals, and extension documents.