Weed Manager-Driven Local Research Projects, Part 2

In April 2015, 25 weed managers from across Montana met in Bozeman for Level 3 Noxious Weed Management Certification. The two-day course covered methods for monitoring vegetation and evaluating effectiveness of weed management, including plant sampling techniques and data analysis. Participants returned home with the task of completing a research project that answered a weed management question relevant to their own program. Participants could work independently or in small groups. Field work occurred between May and October 2015. In all cases, a two-tailed t-test was used to compare treatments (α=0.05, unless otherwise indicated). Following are short synopses of some of the projects that were completed.

Integrating Herbicides and Seeding to Improve a Noxious Weed-infested Field in Broadwater County (Jill Allen and Scott Dunning, Jefferson and Broadwater County Weed Districts; *Contact: jallen@jeffersoncounty-mt.gov*). The original seeding of a dryland grain and hay field in the southern portion of the Elkhorn Mountains failed, and the field turned into an area consisting of Dalmatian toadflax and spotted knapweed. Picloram and metsulfuron were applied in spring 2012, controlling Dalmatian toadflax and spotted knapweed very effectively. However, cheatgrass became the dominant plant species. In 2013 the landowners no-till seeded the field with a mix of grasses, shrubs and forbs. The goal of this project was to determine if there was a difference in cover of invasive species and seeded grasses between 2012 and 2015. We randomly placed four transects, and data were collected every 10 m along each transect. Seeded grass cover increased from 2012 to 2015; average grass cover in 2012 was 2.3% compared to 18.1% in 2015. Invasive plant cover was reduced by approximately half in the 3-year time frame, with means of 90% invasive cover in 2012 compared to 43.3% cover in 2015. It is evident from our data that invasive plants (primarily cheatgrass) are still dominant plant species at our study site, however the plant community composition has changed with a reduction of Dalmatian toadflax and spotted knapweed. It appears that the desired vegetation is increasing and the plant community is on a positive path.

Efficacy of Herbicide Treatment to Reduce Noxious Weed Presence and Density in 3 Gallatin County Road Rights of Way (John Ansley and Michael Jones, Gallatin County Weed District; *Contact: michael.jones@gallatin.mt.gov*). We examined if seasonal spray crews are effective at reducing noxious weed presence and densities on county road rights of way in Gallatin County. Three roads were chosen due to similarities in location, growing conditions and the vegetative communities present in the right of way. Each road was sampled at 10 locations. At each location, a 1 m^2 frame was tossed randomly into the right of way. Each corner of the frame was marked with road hairs for relocation later. Noxious weed data that was collected included frequency and number of live stems. Pre-treatment sampling occurred on 5/19/2015 and post-sampling treatment occurred on 9/30/2015. Roads were spot-treated in late July with a tank mix of Perspective (4 oz/A), 2, 4-D amine (1 qt/A) and Telar (0.5 oz/A). Noxious weed frequency declined from 10 to 7, but this was not a significant change due to large variation among the locations. Weed density within the sampling locations was reduced to zero on two rights of way but stayed the same on the third right of way. Although density of all weed species across all three rights of way was reduced from 21 to 11 stems/m^2, this was not statistically significant. Our data suggest that herbicide treatment is somewhat effective at reducing noxious weeds, but differences among roads suggest that rights of way with habitat more conducive to weed growth will have higher presence and densities of noxious weeds. Areas with rights of way more conducive to noxious weeds should be considered strongly for fall treatments, taking care to preserve desirable vegetation.

Non-target Effects of Aerial Herbicide Applications on Bitterbrush (*Purshia tridentata*) (Karen Laitala, Powell County Weed District and Fred Staedler, DNRC Anaconda Unit; *Contact: klaitala@Powellcountymt.gov*). Spotted Dog Wildlife Management Area (WMA) provides habitat for a variety of wildlife species. In some locations within the WMA, spotted knapweed co-occurs with bitterbrush, a native shrub that provides exceptional wildlife forage and cover. Spotted knapweed control has included aerial applications of Transline (chlorsulfuron) or Tordon (picloram). To investigate efficacy of two different herbicides on spotted knapweed control and non-target effects on bitterbrush, a study was conducted on two adjacent sites with significant

bitterbrush plant communities. Six 50 ft transects were established, three repetitions per treatment. We sampled spotted knapweed and bitterbrush frequency in 5, 0.1 m^2 frames along each transect. A visual damage rating system was determined and bitterbrush plants within each sample quadrat were evaluated on a scale of 1-5 with 1 indicating no visible symptomatic herbicide damage; 2, slight damage, or yellowing of leaves, accompanied by absence of leaves along stems; 3, moderate damage; 4, extreme damage; and 5, complete mortality. Spotted knapweed frequency differed between treatments with the application of Tordon more effectively controlling spotted knapweed than Transline. Bitterbrush frequency was not significantly different between treatments, but injury to plants sprayed with Tordon was greater, with an average of 4.3 (heavy injury) compared to the Transline treated site, which had an average of 0.7 (light injury). Herbicides are an important tool for maintaining or increasing the productivity of noxious weed infested rangelands. However, because of inherent non-selective nature of aerial herbicide applications, adverse effects on non-target plants can be a concern. Suggested future management strategies are to 1) monitor these sites to assess bitterbrush recovery and browsing demands on these plants and 2) determine whether herbicides selected for application, and method of application (e.g. ground versus aerial, broadcast versus spot spray) are acceptable for program goals.

Is Grazon P+D More Effective than the Common Tank Mix of Herbicides against Spotted Knapweed? (Mike Mooney, BLM, Dillon; *mmooney@blm.gov*). The objective of this study was to determine if there is an advantage to using Grazon P+D over a tank mix of Tordon 22K and 2,4-D for spotted knapweed control. The study site was a bluebunch wheatgrass and Idaho fescue grassland infested with moderate to high densities of spotted knapweed. The site was sectioned into two twenty acre parcels, and each parcel contained three 100 m transects with density sampled every 10 m using a 20 x 50 cm quadrat. Sampling occurred the day before treatment and then again 8 weeks after treatment. Each parcel was treated in June. Grazon P+D was applied at a rate of 64 oz/A and the tank mix of Tordon 22D and 2,4-D at rates of 16 oz/A Tordon and 32 oz/A 2,4-D. The latter mix had almost the same pounds of active ingredient as the Grazon P+D treatment. The two treatments had similar results when applied at the same rates and within the same time frame. In summary using either of these methods to control spotted knapweed appeared to be effective. Grazon P+D costs about $14.50/A to apply at the rate that was used compared to the cost of the tank mix at $10.39/A.

Effect of Cattle Trampling on Houndstongue Density in the Bear Canyon Area of the Gallatin Valley (Tammy Young, Young's Tree and Forestry; *justsayy@yahoo.com*). This study examined houndstongue density in cattle-trampled meadow versus non-trampled meadow in the Bear Canyon area near Bozeman. I hypothesized that the vulnerability to houndstongue invasion increases with the amount of livestock trampling. I set up three, 50 ft transects in two treatment areas; one area had been heavily trampled a year earlier, and the other area had no discernible trampling. I counted the number of houndstongue plants in five, 1-m^2 frames along each transect. Average houndstongue density was lower in the less trampled area with 1.2 plants/m^2 compared to 8.1 plants/m^2 in the trampled area. The increase in houndstongue abundance in the trampled area relative to the non-trampled area suggests that part of the prescription for controlling houndstongue should include limiting disturbance such as trampling by livestock. However, further experimentation including more samples, more noxious weed species, and spanning larger and more diverse areas would be more informative for herbicide applicators, cattle ranchers, and land management agencies.

Due to the length of this Weed Post, there is no word puzzle. It shall return in June!

MONTANA STATE UNIVERSITY EXTENSION

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