TechLine

Information About Invasive/Exotic Plant Management — Winter 2004 - 2005

Leafy Spurge Threatens Habitat

By Charles Henry
TechLine Editor

Integrated Management Benefits Range, Sage Grouse

Monocultures of big sagebrush (*Artemisa tridentate* Nutt.) and thick stands of leafy spurge (*Euphorbia esula* L.) were impeding the range management goals of Brinker Creek Ranch owner, Mike Miniat, of Kremmling, CO. And the greater sage grouse (*Centrocercus urophasianus*) populations that shared this range were also threatened. So Miniat contacted Mark Volt, the NRCS district conservationist, for recommendations.

"Miniat's range was in only fair condition when he bought this ranch. Only minimal weed management work had been done previously, so the sagebrush densities exceeded 60% and the leafy spurge was pretty much uncontrolled and beginning to spread rapidly," Volt explains.

Grouse breeding grounds (leks) are located nearby and brood nesting areas were declining compared to several years ago, according to Volt. Volt and Miniat set a goal of 15% sagebrush cover as best for forage production and for the grouse. Then Miniat applied for and received funding from the NRCS's Wildlife Habitat Incentive Program (WHIP).

The range is located at approximately 8,000 ft. elevation in north central Colorado. It is comprised of sagebrush, aspen, and scattered lodgepole pine forest. Some cross fencing and water development had been done, but more was needed, according to Volt. Controlling the non-native spurge and thinning the sagebrush were the plan's top priorities.

To date, Volt has used a backpack GPS unit to map the spurge infestations and finalize plans for treating the range. The 56 acres of

See "Sage Grouse" on page 12

Mark Volt, NRCS district conservationist, used a backpack GPS unit to map the spurge infestations and finalize plans for treating the range.

"Study nature, love nature, stay close to nature. It will never fail you."
... Frank Lloyd Wright

Inside TechLine

Riparian Weed Management Research **Page..... 2**

Forest Service Manages Yellow Toadflax **Page..... 5**

Dalmatian Toadflax Control After Fire **Page..... 8**

Research Yields Management Strategies

Jim Jacobs, MSU Ecologist, Bozeman, MT.

A Montana State University graduate student's research project in eastern Montana reveals solid management strategies for controlling invasive species in riparian areas. Steve Laufenberg, working under USDA-ARS ecologist Roger Sheley and MSU ecologist and researcher Jim Jacobs, examined various herbicide and revegetation treatments to control Russian knapweed [*Acroptilon repens* (L.) DC.]

By Charles Henry
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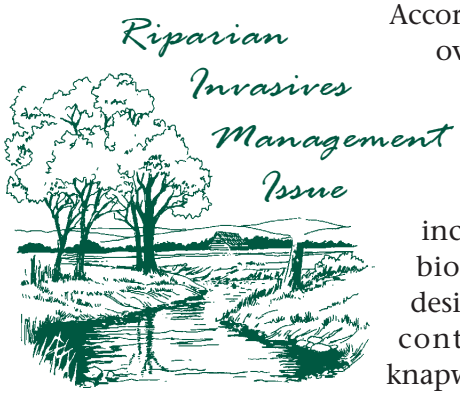
"We compared three herbicides at three different rates and three different application timings in studies along the Missouri River in the Charles M. Russell (CMR) Wildlife Refuge north of Lewistown," Jacobs explains. In another study, the researchers compared two herbicide treatments and four seeding methods.

(***See article "Russian Knapweed Management in Riparian Areas Improves Wildlife Habitat" in previous issue of TechLine***).



According to Jacobs, the overall objectives of this study were:

1. To determine if herbicides have the ability to increase density and biomass of existing desirable species while controlling Russian knapweed.
2. To quantify the response of those residual species to determine if herbicides alone would enhance wildlife habitat.

According to Jacobs, previous research demonstrates that seeding competitive grasses can be an important component for controlling Russian knapweed; revegetation is expensive and has a high risk of failure.

In areas with a substantial composition of desirable species, herbicides alone can remove the target weed and possibly shift the competitive balance in favor of the desirable plant community. However, previous research involving herbicide suppression of Russian knapweed has focused primarily on controlling the weed, with limited regard to the effects on the existing plant community. To achieve land use objectives such as wildlife conservation, invasive management strategies must address the effects on desirable vegetation.

"Our specific objective was to determine the influence of Curtail® herbicide, Rodeo herbicide, and Krenite S herbicide, at different application rates and timings, on Russian knapweed and associated existing plant groups, based on species density and biomass," Jacobs explains. "We hypothesized that Curtail, applied at the highest rate in August, would provide the lowest density and biomass of Russian knapweed and forbs/shrubs, and the highest density and biomass of grasses. Our rationale for this hypothesis was based on expectations that: 1) Russian knapweed would be most vulnerable to the highest rate of a broadleaf-selective herbicide at its flowering stage, 2) forbs and shrubs would be susceptible to this selective herbicide, 3) grasses would not be adversely affected by this herbicide, and 4) grasses would utilize excess water and nutrients made available from broadleaf species suppression.

Although this study focused on the rehabilitation of a Russian knapweed-infested plant community, results of herbicide effects on existing plant species groups can be useful for determining appropriate management strategies in areas dominated by other rhizomatous, broadleaved invasive species.

Study Site

In a randomized complete block design at both sites, 28 treatments (3 herbicides x 3 herbicide rates x 3

herbicide application timings, and a control) were applied from June through August 2000. Treatments were replicated four times at both sites for a total of 224 plots. Curtail, Rodeo, and Krenite S herbicides were applied in June (spring rosette stage of Russian knapweed), July (bud to bloom stage of Russian knapweed), and August (flowering stage of Russian knapweed). Curtail at low, medium, and high rates of 2, 3, and 4 qt./acre; Rodeo at rates of 2, 4, and 6 pt./acre; and Krenite S at rates of 2, 4, and 6 gal./acre were applied based on label rates for Russian knapweed. These herbicides were chosen because of their low environmental risk in areas near water and wildlife.

Jacobs says the study was located on two sites on a floodplain known as Knox Bottom along the Missouri River, near the western boundary of the refuge. Plant communities at both sites consist of native and non-native species. Grass species at site one were dominated by quackgrass [*Elytrigia repens* (L)], a non-native grass, while the native western wheatgrass (*Pascopyrum smithii*) was the dominant grass at site two. The non-native invader Russian knapweed was abundant at the study area and had displaced desirable plant species.

The sites' aspect were negligible with 0% slope at 2,260 feet elevation, with an average precipitation of 11.8 inches and an average annual temperature of 44 degrees F. Soil at the site was a Kobar silty clay loam (fine, montmorillonitic Borollic Camborthid). The study sites were located within the silver sage/western wheatgrass (*Artemisia cana/Agropyron smithii*) habitat type. This habitat type, common in central and eastern Montana, represents one of the driest extremes of the riparian zone.

The silver sage/western wheatgrass habitat type typically occurs as a result of disturbance, where site potential has changed, possibly due to agricultural activity, according to Jacobs. Land use at this area over the past century (approximately 1920s - 1980s) has included crop production and cattle grazing. Throughout that period, cattle were moved from upland summer pastures to the river bottoms for winter grazing. In addition, flooding from the Missouri River occurs with varying frequency and intensity (***see sidebar "Habitat Critical to Many Species"***).

Results

Using herbicides can provide effective short-term suppression of invasive weeds, including Russian knapweed. "Two years after treatment, we achieved control rates of 50-60% (averaged over all sites) based on density and cover with Curtail herbicide," Jacobs says. "We attribute this to the herbicide's ability to preserve the grasses on both the native and non-native test sites. The higher Curtail rates provided the best control two years post-treatment and the better control was achieved with the August application. There was no difference in control between Rodeo and Krenite S (30% control with the early applications with control declining with the later application dates) and the Russian knapweed pretty much came back completely."

There were distinct site differences, according to Jacobs. On the non-native site dominated by quackgrass, Curtail achieved 75% control of the Russian knapweed at the rates of 3.0 and 4.0 qt./acre and 50% at the rate of 2.0 qt./acre. Rodeo and Krenite S herbicide achieved 30-40% control of Russian knapweed at all rates.

"On the native site, Curtail produced 60-80% control at all rates, but there were more differences with the Rodeo and Krenite S treatments. Control declined significantly as rates declined," Jacobs explains. "Again, we attribute selectivity of Curtail to preserve more of the desirable native and non-native grass species which helps increase Russian knapweed control. In general, both medium and high rates of Curtail provided the best Russian knapweed control, but that result was site dependent."

Jacobs says the timing of herbicide application is important for weed control, and literature suggests that Curtail is most effective controlling Russian knapweed when applied from full bloom to the first killing frost. "In our study, the effect of Curtail on Russian knapweed biomass or density did not depend upon the timing of application. Therefore, we rejected our hypothesis that the August application would provide the lowest density and biomass of Russian knapweed. The only exception was the June application, which reduced Russian knapweed biomass the most at site 1. Targeting Russian knapweed juveniles in the spring can greatly reduce the productivity of an infestation."

Rodeo reduced Russian knapweed density and biomass, but only temporarily, as Russian knapweed density was equal to that of the control by August 2002. However, a timing of application interaction indicates that June and possibly July applications appear to provide effective short-term suppression. Previous research showed that Rodeo applied at the bud stage and again to remaining live plants two months later provided no Russian knapweed control two years after treatment. Spring applications of Rodeo can prevent pre-emergent desirable species from being affected. However, sequential treatments of Rodeo during one growing season may reduce desirable species

See "Riparian Weed Management" on page 4

"Riparian Weed Management"

Continued from page 3

populations to levels at which they cannot effectively compete with Russian knapweed. Although Rodeo has minimal environmental impact on aquatic ecosystems, it appears to lack the desired efficacy for Russian knapweed control.

Krenite S is a selective herbicide that targets woody and herbaceous plants. However, the impacts of Krenite S vary and can be unreliable. The Montana State University researchers found no published data that have examined the effects of Krenite S on Russian knapweed. However, based on this herbicide's low impact to aquatic systems and some success controlling leafy spurge, they wanted to determine if Krenite S could control Russian knapweed in a riparian area.

"In general, Krenite S treatments did not provide consistent control of Russian knapweed. However, higher rates applied in June appear to have some potential for controlling Russian knapweed in riparian bottomlands. Because Krenite S does not easily penetrate the leaves of mature plants, the efficacy of the June application may be attributed to the vulnerability of the juveniles," Jacobs explains.

"Neither Rodeo nor Krenite S provided substantial Russian knapweed control or increases in grasses. However, application of Curtail has increased grass abundance. Similarly, the medium and high rates of Curtail increased native grass density and biomass on the site with a dominant residual understory of native grasses. Non-native grasses were unaffected by Curtail at this site," Jacobs says. "On the site co-dominated with non-native grasses, Curtail maintained native grass density and biomass regardless of rate, and non-native grasses increased in density and biomass from all rates of Curtail. The treatment effects on grasses appeared to be associated with the dominant grass composition at each site, i.e. native vs. non-native grasses. We believe that the most abundant species capture the majority of resources, which allow them to usurp those resources faster than species occurring with less frequency."

"Of the herbicides tested in this study, Curtail provided the best control of Russian knapweed. Although suppression two years after treatments does not infer long-term control, we hoped to observe increases in the density and biomass of all desirable plant groups," Jacobs concludes. "These increases would have had the potential to direct the existing plant community on a positive trajectory towards meeting our wildlife conservation. Because we detected increases only in grasses, we believe that the rehabilitation of the plant community's structure was not successful. Without sufficient community structure and competition from other critical plant groups, Russian knapweed will most likely recover from suppression treatments. Therefore, we believe that herbicides alone are inadequate for the restoration or rehabilitation of desirable plant communities infested with Russian knapweed."

Habitat Critical to Many Species

"Because of its location along the Missouri River within the CMR National Wildlife Refuge, Knox Bottom provides critical wildlife habitat and continues to be managed for wildlife conservation," says Steve Henry, ecologist with the U.S. Fish & Wildlife Service that manages the refuge. "This study was conducted in a river bottom that represents one of the last, intact cottonwood-willow riparian reaches along the upper Missouri River. This bottom provided critical winter range for elk, mule deer, and to a lesser degree, white-tailed deer. The site is used extensively by migratory song birds as well as by wading birds such as great blue heron and is one of the most biodiverse habitats on the refuge. Leafy surge infests nearby sites, but was not present in the study area. The Russian knapweed was mixed with western wheatgrass (*Pascopyrum smithii*) and snowberry (*Symphoricarpos occidentalis*) as well as non-native species such as quackgrass (*Elytrigia repens*), bluegrass (*Poa pratensis*), and annual mustards (*Brassicaceae* family).

Henry says invasive species, especially Russian knapweed, are converting this important native habitat back into non-native monocultures that have significantly reduced habitat value. If these areas are lost, big game will move elsewhere, perhaps onto surrounding agricultural lands, which can cause problems for our neighbors, he explains. "Our goal is to keep the wildlife on the refuge."

As much as 80-90% of upper Missouri River bottomlands have already been lost to noxious weeds, he explains. "As land managers, we can get rid of the weeds, but we want to find ways to keep weeds out after re-establishment of native species. Ideally, we would like to 'weed-proof' native plant communities to the greatest extent possible."

Forest Service Managers Throw Everything at Invasives and Never Quit

By Charles Henry
TechLine Editor

In the Blanco Ranger District of the White River National Forest in Colorado, yellow toadflax and other invasive plant species are finally meeting their match. From a budget of $650 that barely covered management on 70 acres in the mid-1990s, the district has formed partnerships that have helped increase funding and acres managed dramatically in 2004. Range technicians on the 346,000-acre forest district now have a budget of more than $80,000 annually to fund a fully integrated management program that employs biological control, grazing, revegetation, and herbicide management in every major drainage on the district each year.

The driver behind this emerging program is Hal Pearce, range technician in Meeker who inherited the job from Tom McClure. McClure brought his weed awareness and experience with him when he transferred from western Montana and with Pearce they began to build the district's program. McClure is now the weed coordinator for U.S. Forest Service Region II based in Denver.

Hal Pearce, USFS Range Technician, Meeker, CO

Drawing Courtesy of Colorado State University

"There are several keys to our success," Pearce says. "We keep management involved by never shutting up about invasives. When you can show a passion for improving the resource, you find very little resistance. Granted, risk taking is not for everyone – it's easy to find someone who will say 'no.' But if you are doing the right thing, you should be able to convince people that the resource benefits. You have to be professional and do it right. When people see that, they relax a bit and their support follows."

"A weed program has to be funded on a consistent, year-to-year basis to succeed. If you have that, it is easier to find partners to share the load and increase your effectiveness. We have nearly a dozen partners on our yellow toadflax projects and even though we do the work, their involvement is critical," Pearce explains.

Yellow toadflax (*Linaria vulgaris* P. mill.) is the primary invasive threatening the Blanco District forest land with nearly 20,000 infested acres inventoried to date. "We have a healthy range system on the forest, if you discount the areas with toadflax," Pearce says. "There are also small infestations of houndstongue (*Cynoglossum officinale* L.), musk thistle (*Carduus nutans*

See "Yellow Toadflax" on page 6

"Yellow Toadflax"

Continued from page 5

L.), spotted (*Centaurea maculosa* Lam.) and diffuse knapweed (*Centaurea diffusa* Lam.), and leafy spurge (*Euphorbia esula* L.) on the district, but toadflax receives most of our management attention. We are still mapping toadflax and half the infestation is in remote areas with 75% of that within the Flattops Wilderness Area. We could have as much as 30,000 infested acres."

The 1,900-acre Rio Blanco Ranch Yellow Toadflax Project within the Blanco District began in 2004 when they secured funding from multiple partners (***see sidebar: "Project Partners"***). This project took on great urgency in 2002 after the Big Fish Fire burned adjacent to the project acres. "Yellow toadflax does not grow under decadent old spruce forest which is comprised of thick 'black' timber," Peace explains. "But the fire opened up the forest canopy, so now we have 18,000 acres of prime toadflax habitat ready for infestation."

Through constant experimentation, Pearce and his staff have found the equipment, integrated tools, and techniques to begin shrinking toadflax infestations on the district (***see sidebar: "Project Integrated Methods"***).

Herbicides:

Along with the integrated tools of prevention, increased awareness, biological control releases, and grazing management, Peace uses ongoing and wide-spread test plots to fine tune his herbicide treatment program. Their experience has yielded what they believe is the right mixture of herbicides and rates to successfully control yellow toadflax, minimize retreatments, and protect forbs and shrubs that inhabit the same sites. Pearce says they are achieving nearly 90% control with one application of Tordon® 22K herbicide applied at a rate of 1 qt./acre mixed with dicamba at 1 qt/.acre, 2.4-D at 1 lb./acre, and Telar herbicide at a rate of 1 oz./acre applied with a nonionic surfactant added to 20-40 gallons of water per acre.

"Where we boom spray one year, we only have to spot-spray the next. Where there were 250 acres of yellow toadflax the first year, we are finding only 25 acres the next. This type of efficacy means we can reduce the herbicide load on each acre each year," he says. "Over the long run, we end up using less herbicide per acre than if we treated infestations at a lighter rate, but continually year after year."

Equipment:

Due to the remoteness of most toadflax infestations in the project area as well as the rest of the forest, Pearce has been inventive in building the best mix of application equipment. Plus, they have found ways to treat toadflax in the Flattop Wilderness Area as well. "Even though we now have some excellent equipment, the operator is still the key to success," Pearce says. "Keeping the same staff year-to-year is a tremendous advantage. I employ a retired school teacher and two college students who have come back each year. I would tell anyone to look to their local schools as a good source of seasonal help."

Pearce has one computerized truck sprayer that now stays mainly on lower elevation roads. They cleaned up their rights-of-way in the first years so now this truck is used more and more as a nurse truck. It services three Honda 450 Foreman 4-wheel drive ATVs mounted with 25-gallon tanks. The ATVs have manual transmissions, which Pearce has found work better than the automatics because the auto's charging system doesn't keep up with the pump and transmission. The ATVs have 5 gallon/minute Flowjet pumps, two 16-ft. boom nozzles (for a total working swath of 32 feet), and hand guns with 25-ft. of hose.

An 8-wheel Argo Conquest with a 100-gallon tank and the same nozzle, hose, and pump setup as the ATVs is also used. This unit can work longer without refills (four times greater than an ATV), traverse rougher terrain than an ATV, and has a lighter footprint on

Yellow Toadflax Project Partners (past and present)

- Habitat Partnership Grant from Colorado Division of Wildlife
- Rocky Mountain Elk Foundation
- Rio Blanco County
- Garfield County
- Bureau of Land Management
- Colorado State Weed Fund
- Dow AgroSciences
- Colorado State University
- Colorado State Forest Service
- Bel/Aire/Oak Ridge State Wildlife Areas
- Palisade Insectary (CO Dept. of Agriculture)
- Big Country RC&D
- Private Landowners (15-20)

fragile soils and vegetation. It also works better in wet areas due to its increased floatation.

In extremely rough terrain and the wilderness area, Pearce's crews employ horseback-mounted sprayers initially developed by himself and Tom McClure. These CO2-powered units can operate in wilderness areas since there are no moving or mechanical parts and they can reach areas without creating excess operator fatigue found with backpack sprayers. Pearce employs three to four seasonal spray technicians per year and each person is trained on all the equipment. This results in high productivity as the crews can move from one application method to another as weather, work schedules, and the seasons allow.

"I think each forest district in the country should have a dedicated, full-time weed specialist," Pearce concludes. "It takes a dedicated person to manage the summer work and also complete the grant writing, project planning, NEPA documentation, and training required for success."

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Yellow Toadflax Project Integrated Methods

Biologicals:

Pearce has made releases of the yellow toadflax moth/caterpillar (*Calophasia lunula*). As larvae, this insect feeds on new shoots and leaves, but it is not well adapted to the cold found at high elevations. The Blanco District managers feel this insect is suffering high winter mortality.

More successful so far is the toadflax stem boring weevil (*Mecinus janthinus*) that eats both Dalmatian and yellow toadflax. They have made more than 18 releases (100 insects per release) over the past three years. University of Colorado students monitor a 2002 release site to determine how well they overwinter. The site was at 9,000 ft. elevation, on a north slope, and the insects are still alive. Biological control is a very long-term commitment, but may be the best realistic hope of ever controlling an infestation of this size.

Grazing Management:

The district managers have adjusted grazing schedules with the cooperation of permittees to eliminate heavy grazing and soil disturbances since these are major avenues of toadflax and other invasive weed introduction. They also have a leafy spurge grazing program with a sheep permittee that covers forest, private, and state wildlife lands. The sheep graze early in the spring followed by herbicide treatments later in the fall. Infestations are steadily declining.

Herbicide Test Plots:

Since 1998, Pearce has had a continuous test plot program to try to find the best prescription of herbicides, rates, and timings. This program has grown to more than 20 plots that have been re-treated each year since inception. However, they did not retreat some of the plots in 2004 so they could measure which treatments held control the best.

One new treatment was tried in 2004. Tordon® 22K herbicide was applied on plots at a labeled rate of 1 qt./acre in a tank mix with Telar herbicide at a rate of 1 oz./acre and Overdrive herbicide added at a rate of 4 oz./acre. These plots will be read in 2005 for efficacy levels.

By Charles Henry
TechLine Editor

Effect of Herbicide Treatments on Dalmatian Toadflax Establishment and Spread in Burned Forest Sites

An ongoing study in the Helena National Forest in Montana is beginning to reveal management options for control of Dalmatian toadflax *(Linaria genistifolia ssp.)*. After the severe 2000 fire season, forest service managers were not sure what to expect. They knew that Dalmatian toadflax was spreading rapidly throughout the forest replacing native plant species, but they wondered how much of this non-native invasive would return or move into burned sites after the wildfires that year. Forest Service technicians had been treating some of these infestations before the fires, but were not satisfied with their results.

Melissa Brown, Weed Management Services, Helena, MT

With funding from the Helena National Forest, Dow AgroSciences, LLC., and the Montana Noxious Weed Trust Fund, Melissa Brown, working with Celestine Duncan, set out to find answers to these questions. Brown and Duncan are independent researchers based in Helena, MT.

The goal of this study was to evaluate different labeled herbicides at two different rates on forest sites that had suffered low, moderate, and high burn damage. From this work, they seek the prescription that would provide the highest level of control at the lowest herbicide rates.

"Dalmatian toadflax was a big challenge in the Helena Forest and after the fires of 2000, finding what would manage these infestations became one of the forest's highest priorities," Brown says. "Before the fires, the study site did not have a high density infestation, but there was a very dense and large infestation next to the study area that did not burn. We picked this site because at one location we had forest that had experienced low, moderate, and high levels of fire damage."

Average annual rainfall at the study site ranged from 14" to 16". The trial comprised two herbicide treatments and a check plot replicated three times over the following sites:

	Elevation	Slope
Low burn	5028 ft.	19%
Moderate burn	4937 ft.	17%
High burn	4905 ft.	24%

The infested site was a SE facing slope and the treated sites were NW facing. Soils are categorized as follows:

NW slope (plots): Mountain slopes with Typic cryochrepts-Typic cryoboralfs complex, Loamy skeletal, and Cobbly clay loam surface layers.

SE slope (infested): Steep with Typic ustochrepts, Loamy-skeletal and Channery sandy loam suface layers.

At the low burn site (the highest on the slope), there was a good stand of perennial grasses and conifers that lived through the fire. On the moderate site trees were still alive, but most of the vegetative understory was killed. At the high burn site conifers, shrubs, grasses, and forbs were all killed.

The two herbicide treatments were applied in September 2001 with a CO2 sprayer in a spray volume of 14 gal./acre. In the first application, Tordon® 22K herbicide was applied at a labeled rate of 1 pt./acre. In the second application, Tordon 22K was applied at 0.5 pt./acre mixed with Plateau herbicide at a rate of 6 oz./acre (0.094 lb ai/ac). These rates were selected to minimize negative impacts on the forb, shrub, and conifer communities at the sites.

"Three years after application, treatments in the low and moderate burn sites reduced Dalmatian toadflax establishment from 83 to 98% compared to control plots," Brown says. "At the high intensity burn site, toadflax densities were not significantly different between herbicide treated and untreated plots. There

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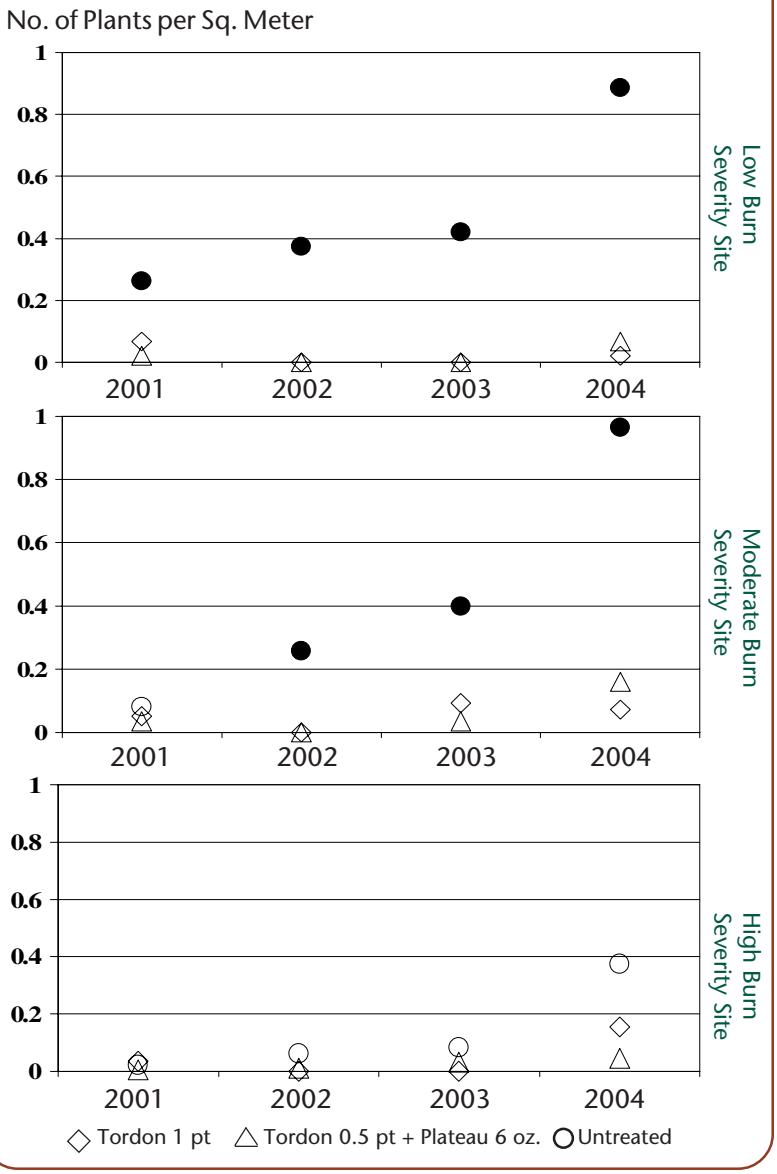
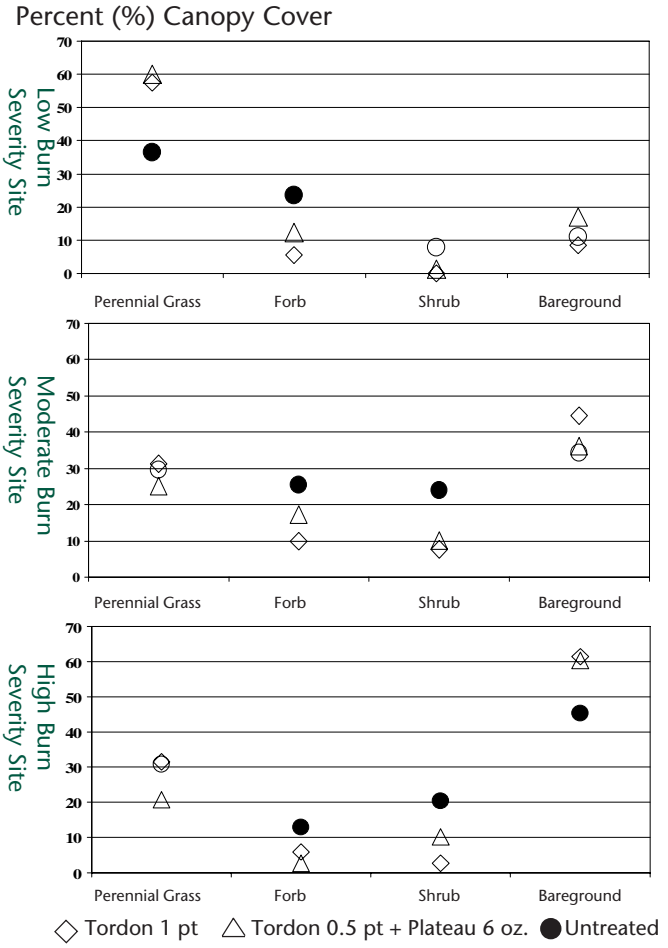
Dalmatian Toadflax Density at Three Burned Sites: Pre-treatment to 3 YAT



Solid points are significantly different from hollow points.

At the low burn site (the highest on the slope), there was a good stand of perennial grasses and conifers that lived through the fire. On the moderate site trees were still alive, but most of the vegetative understory was killed. At the high burn site conifers, shrubs, grasses, and forbs were all killed.

Plant Community Canopy Cover at Three Burned Sites 3 YAT



was minimal difference between Tordon 22K alone and the Tordon 22K and Plateau mix."

The sites will be monitored for the next several years by Helena high school students participating in a Youth Forest Monitoring Program. "Retreatments may be required," Brown concludes, "as there is still an infestation adjacent to the plots that could reinfest the study sites."

By Charles Henry
TechLine Editor

Forest Service Partners to Achieve Success

Often times it is not the number of acres of invasive plants that are managed that counts, but that the *key* acres are managed. The Arapaho-Roosevelt National Forest comprises most of the acreage (1.5 million acres) in the north central mountains of Colorado and hosts 9.7 million visitor days per year. The Sulphur Ranger District is only a small portion of the entire forest, but it contains the headwaters of the Colorado River and is next door to Rocky Mountain National Park (RMNP). It is comprised of the largest concentration of lakes and other recreation uses such as hiking, off-road vehicles, and hunting in this forest. Thus, the non-native invasive plant infestations in this ranger district, if unmanaged, could be readily spread.

Three years ago the district began working with Grand County and other partners under a coordinated plan that has reduced infestations or contained them at small levels and prevented their spread. "Working under the weed management area (WMA) concept, the county, private landowners, RMNP, the Colorado Division of Wildlife, the Bureau of Land Management (BLM), Colorado DOT, and the Colorado State Land Board all came together to form a unified plan of action against the threat of noxious and invasive weeds," explains Billy Sumerlin with the Grand County Department of Natural Resources in Granby. "Our county is larger than many eastern states (1.2 million acres) with all these agencies having substantial acreages to manage. But the one neighbor central to all of us was the Sulphur Ranger District. It is the key to progress in the entire area. Without its participation, the rest of our programs would not have the success that we have. Its involvement is so critical that they were recognized as the *Partnership Program of the Year* by the Colorado Weed Management Association in 2003."

Neilie Tibbs has served as the range technician responsible for implementing the district's plan for the past three seasons. She is a crew of one that implements control on the Grand County portion of the district. "At the beginning of the year, I sit down with the county to plan where we are each going to work, but it really comes down to spraying at the lower elevations early and then gradually working into higher areas as the snow melts," Tibbs says. "With the amount of acreage involved, it looks daunting, but we just go where the weather and climate allow us and it works out well."

Weed management area managers target Canada thistle (*Cirsium arvense*), Oxeye daisy (*Chrysanthemum leucanthemum* L.), chamomile (*Anthemis cotula* L.), Black henbane (*Hyoscyamus niger* L.), yellow toadflax (*Linaria vulgaris* Mill.), leafy spurge (*Euphorbia esula* L.), white top (*Cardaria draba* L.), houndstongue (*Cynoglossum officinale* L.), and musk thistle (*Carduus nutans* L.) in priority order. Tibbs says they really don't know how many total acres of these species they have, but they know where the infestations are and are gradually building their mapping database as treatments are made each season.

"We believe it was more important to begin controlling the weeds rather than wait until we had them all inventoried," she explains. "This may seem a bit backward, but our success rate has borne out this strategy."

"We believe it was more important to begin controlling the weeds rather than wait until we had them all inventoried," she explains. "This may seem a bit backward, but our success rate has borne out this strategy."

"I think our forest ranger district has one of the more aggressive herbicide programs and our results justify our commitment to this method. Because we began controlling our target species early, we use less herbicide each year as infestations are contained or controlled completely," Tibbs explains. "We operate under a forest-wide EIS, and we honor any "no-spray" areas in the county if a neighboring landowner so desires. We achieve total control of white top in the campgrounds and we are containing Canada thistle and yellow toadflax."

Tibbs says they certainly try to use an integrated approach, but that the high elevation of the district (8,000 to 10,000 ft.) has limited their tools. "We made

Tibbs pulls a trailer with a 200-gallon nurse tank and room for a four-wheel drive Bombardier ATV with a 25-gallon tank on the rear and 15-gallon tank on the front. This unit has a hose reel with handgun and Boom Buster nozzles that can spray a 16-ft swath.

numerous biological releases, but they didn't overwinter. We revegetate with native grasses and weed free grass mixes whenever it is called for. We work hard on prevention by disseminating information in campgrounds and at trail heads and by presenting programs to the public whenever we have the opportunity such as volunteer work days."

The range technician explains that there was a bit of resistance from summer home owners and a few visitors to the use of herbicides, but a monstrous pine bark beetle infestation in the area has turned this opposition around. Many private landowners have been forced to spray for beetles and this has increased their knowledge of and comfort with these tools, she says.

"Even when we work in the campgrounds with herbicides now, people are very supportive because we built public awareness first about the disastrous impacts invasive plants can have on habitats and our forests," Tibbs says. "It has helped that this area receives a lot of visitors from the Midwest and these vacationing farmers know full well what weeds can do."

Even though they use as many management tools as possible, Tibbs says their focus remains on treating invasives. "We monitor each infestation with digital photo points, so we can see the progress," she concludes. "We actually go to more sites each year, but we find smaller infestations. The total acreage of invasive plants treated is declining because we are consistent from year-to-year."

Sulphur RD Control Program

Equipment:

New to the district in 2004 was a ¾ --ton pickup with a 200-gallon tank and 200 ft. of hose. With this truck, Neilie Tibbs pulls a trailer with a 200-gallon nurse tank and room for a four-wheel drive Bombardier ATV with a 25-gallon tank on the rear and 15-gallon tank on the front. This unit has a hose reel with handgun and Boom Buster nozzles that can spray a 16-ft swath. If Tibbs encounters infested areas too large for the ATV, she refers the work to the county's larger equipment. Conversely, the county will call her for areas best treated with her equipment.

Control Program:

Matching the right herbicide and rates to each species is critical for success. Tibbs says the following program achieves the best results in their program:

Invasive	**Herbicide**
Canada thistle	Curtail®
	Escort
	Telar
Houndstongue	Tordon® 22K
	Curtail
Oxeye daisy	Escort
	Curtail
Black henbane	Tordon 22K
Yellow toadflax	Tordon 22K
	Curtail
Chamomile	Escort
Leafy spurge	Tordon 22K
	Curtail
Musk thistle	Curtail
	Escort
Weeds near water or Riparian zones	Rodeo

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"Sage Grouse"

Continued from page 1

Gary Kramer, USFWS

leafy spurge and sagebrush will be sprayed with Tordon®22K herbicide at a labeled rate of 1 qt./acre mixed with 2,4-D at a rate of 2 lb./acre. Applications will be made next June with a fixed wing aircraft due to the ruggedness of the ground. Application is scheduled for the third week of June which is optimum for leafy spurge control at this elevation.

Grazing on the treated ranges will be differed for 1-2 years to allow the grass to recover from weed and sagebrush competition. Two more years of follow-up spot spraying will be implemented as funding allows to maintain leafy spurge control. "Follow-up will be crucial to success on this project, and Miniat is prepared to do that. In effect, we are using a wildlife habitat program to eliminate the spurge, which will also help the rancher's forage production as well as benefit the sage grouse. It's a really good plan for all concerned," Volt concludes.

Volt and ranch owner Miniat set a goal of 15% sagebrush cover as best for forage production and for the grouse. Then Miniat applied for and received funding from the NRCS' Wildlife Habitat Incentive Program (WHIP).

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TechLine
c/o Ag West Communications
P.O. Box 1910
Granby, CO 80446-1910