TechLine

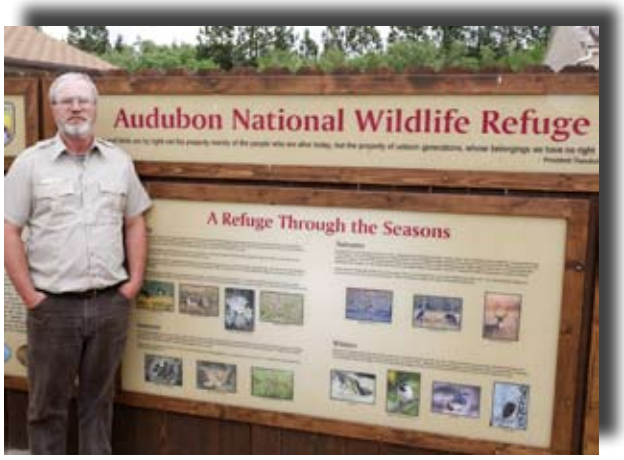
Information About Invasive/Exotic Plant Management — Fall 2008

Rotational Grazing Combined with Integrated Methods Create Success

Imaginative Techniques Improve Audubon National Wildlife Refuge Health

At times, the general public, not conversant about land management, often forces public land managers into thinking that "leaving the land alone" is a sound managment method.

By Charles Henry
TechLine Editor



Craig Hultberg, U.S. Fish & Wildlife Service, Coleharbor, ND.

Craig Hultberg, U.S. Fish & Wildlife Service, Coleharbor, ND would disagree. (***See sidebar, "Audubon National Wildlife Refuge" on page 2***).

"For years all we did was rest the refuge from any sort of intentional management. And the refuge suffered. Why is the refuge's prairie condition now improving and why do we have fewer noxious weeds? Because of active land management," Hultberg answers.

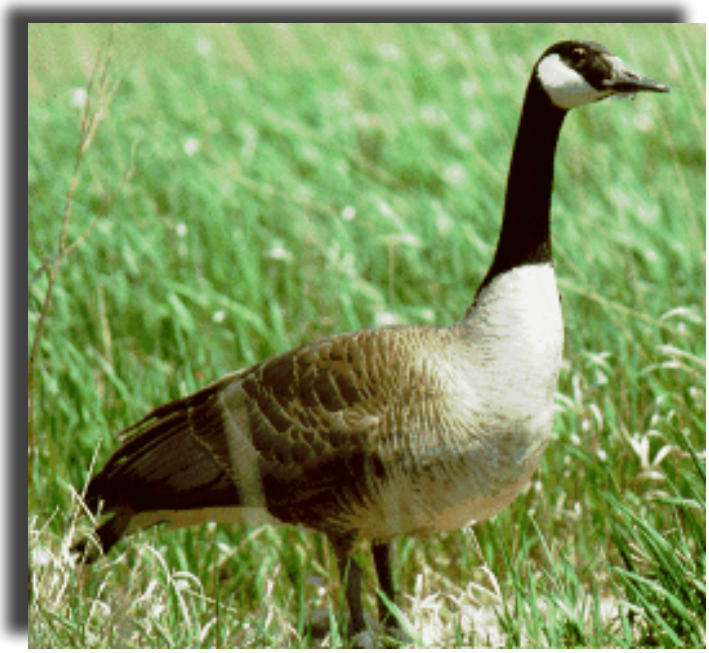
Hultberg says they still have problems with invasives, broadleaf varieties like Canada thistle, leafy spurge, absinth wormwood, and woody species like Russian olive and Chinese elm. On a national wildlife refuge, our objective is converting our prairies back from brome grass and crested wheatgrass to native grass species. Our goal is to increase species diversity.

Controlling several of these invasive species has become easier with the introduction of new herbicides which will be discussed later in this article. Hultberg has really stepped out of the mainstream among his colleagues with his management of the prairie segment of the refuge. Hultberg has documented in 10

See "Audubon" on page 2

"Nothing is so embarassing as watching someone do something you said could not be done."
...Sam Ewing

Inside TechLine



Canada goose photo by Craig Hultberg

"Audobon"

Continued from page 1

years of monitoring of the dense nesting cover (DNC) and native grasslands at Audubon that not only does "leave it alone" management fail, it leads to grassland degradation. To the contrary, our public lands need MORE management, he says.

"We have shown that we can induce desirable native vegetation to 'invade' undesirable invasives. In other words, by managing these lands, we can give native species enough of an advantage that they will re-invade areas that are occupied with non-native species," Hultberg explains.

Here's what works at the Audubon refuge. Much of the refuge was previously comprised of brome and crested wheatgrass pastures that were privately owned by local ranchers. First, intensive grazing (1.5 times higher than normal) for a few years and sometimes burning is incorporated to decrease the seed bank and keep the invasives from going to seed. Hultberg then sprays these grasses with a glyphosate herbicide. It may require more than one application to eradicate these invasives. Grazing may also be used after spraying to break up the sod. Soil seed contact is very important for this technique to work. Harvested seed is broadcasted and purchased seed is drilled into the area with a mix of native grass species drawn from a list of 40-60 species that include warm and cool season varieties. They may mix haying the prairie into the burn-rotational grazing cycle if that works better for a particular piece of ground. Because crested wheatgrass is more of a grazing grass than brome grass, more preparation (grazing, burning, and spraying) may be needed.

"Our prairies are utilized for water fowl nesting and also small bird habitat. We found that rotational grazing at different stages of growth was preferred by the small bird species based on bird number counts. Also sustainability of our grasslands for waterfowl nesting worked best with a spring burn followed by two to three years of prescription grazing, haying, resting for one year, and then beginning the cycle over again," Hultberg explains.

Hultberg says that absinth wormwood infestations can be reduced by burning alone, but that the plants usually come back. Bare ground is the key to wormwood control. The less bare ground we have, the less wormwood. He says burning also enhances Canada thistle

Audubon National Wildlife Refuge

The Audubon National Wildlife Refuge (NWR) was established in 1956 to replace wildlife habitat that was flooded when the Garrison Dam was built on the Missouri River. The refuge is near Lake Sakakawea in west central North Dakota. Along with the NWR, area wildlife production areas (WPA) and other satellite refuges comprise over 50,000 fee title acres in six North Dakota counties. Lake Audubon was created to provide a stable water body and it fluctuates less than two feet per year. This provides a more stable wildlife habitat environment as compared to the much large water level fluctuation of Lake Sakakawea.

Audubon NWR is managed for optimum protection and enhancement of wildlife habitat with an emphasis on migratory birds. The landscape is marked by numerous "potholes" or shallow wetlands amidst the grasslands. These areas, along with the many islands of Lake Audubon, provide sanctuaries for many types of nesting birds including waterfowl, shorebirds, and songbirds. Lake Audubon is highly utilized as a refueling area during spring and fall migrations. As many as 150,000 Canada geese may congregate on the river in mid-January.

Since 1956, wildlife species that have utilized the refuge include 246 species of birds, 34 mammal species, five reptiles, four amphibians, and 37 fish species. There are four Threatened and Endangered (T&E) species on the refuge including the piping plover, least tern, whooping crane and bald eagle.

spread, but following with grazing can stress the thistle enough to give a leg up for the desirable grasses. "We view a cow as just a big bug when it comes to thistle control. We really don't kill thistle; we just control it enough to allow the native grasses a chance."

"In the 1970s we utilized 12 grazing cooperators as a source of cows to graze on refuge lands scattered across three different counties. Now we have from 50-60 cooperators who want to use refuge prairies in rotation with their own land. In any one year we are only manipulating 25% of our uplands, so having a flexible group of cooperators is very important to us," Hultberg says. "One thing that has been very satisfying to me is that many of our cooperators are also using some of the high intensity, short duration grazing practices we use on the refuge. We exchange information on what works best for them and, of course, we share what works for us. This means a bigger land base than just the refuge is being managed in this way. And this is the satisfying part – these ranchers are telling us that their pastures are improving in the same way our prairie uplands are. The entire contiguous grass resource is improving," the wildlife biologist explains.

Piping plover photo coutesty of the U.S. Fish & Wildlife Service

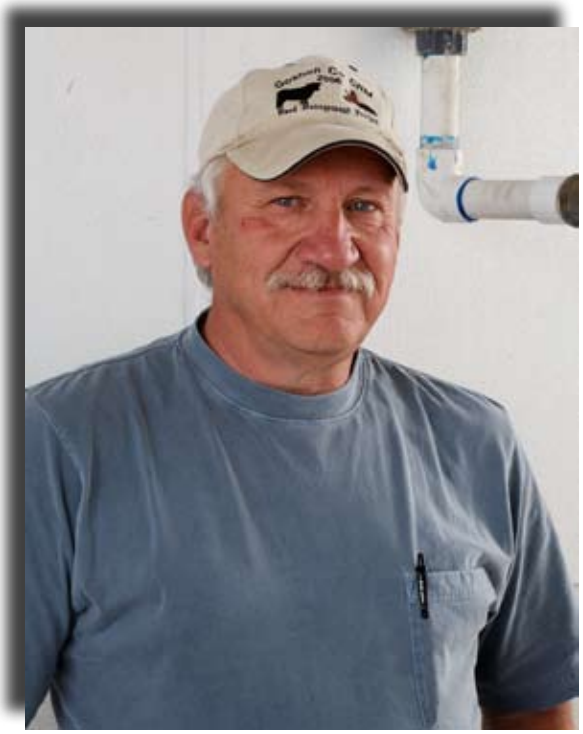
Wilson's Phalarope photo by Craig Hultberg

"However, 'invading the invasives' is a slow process unless you use herbicides," Hultberg says. "Of course some environmental publics would prefer we not use any chemicals. But first, by law, we must control noxious weeds on the refuge, just like all landowners. And we want to be good neighbors. Sometimes we need an immediate control response that can only be achieved with a herbicide. We are using fewer pounds of chemical than we did years ago because we now use products like Milestone® specialty herbicide, which is effective at lower rates than previously used materials."

Hultberg says their control results have been very favorable with Milestone. "One thing that is very important to us is that we can use five gallons of Milestone instead of 20 gallons of previous herbicides. We use Milestone almost exclusively now for Canada thistle and absinth wormwood spot treatment control. We can almost keep Canada thistle at bay with grazing and burning, but we still rely on Milestone in certain situations. We are also experimenting with different application timings to find what works best on the refuge. You have to stay on top of these things to be effective."

"The biggest lesson we have learned," Hultberg concludes, "is that you cannot stop grassland management. In ten years we have gone from poor to good to excellent range conditions on some areas using burning, grazing, and sound weed control. But on land where we stopped, within five to six years the prairie resource went back to poor to fair condition. If you are improving, you can't stop. Once things look good, if management stops, the grassland condition will only get worse."

Critical Watershed Areas Reclaimed from Canada Thistle Impacts



Steve Brill, Goshen County Weed & Pest, Torrington, WY.

By Charles Henry
TechLine Editor

Many weed management programs develop rapidly in their initial stages as cooperator enthusiasm is high, funds are secured, and initial progress keeps everyone involved. But what happens to these programs ten years later? How many can maintain progress and adapt to meet new invasive vegetation challenges over a longer period of time?

The Goshen County Weed & Pest program in southeastern Wyoming is one of those programs that seems to get better with each vegetation management trial. ***(See "Goshen County Weed Program Overview" on the next page.)*** Goshen's weed supervisor, Steve Brill has guided the program through ever-increasing challenges in the past twenty years.

"Two of the biggest problems that we face today are Russian olive and salt cedar infestations along the North Platte River and invasive weeds impacting critical water resources in the county," Brill states from his office in Torrington, WY. "The invasive trees never seemed to be a big priority until they reached infestation levels that negatively impacted wildlife habitat and began to constrict water supplies in our creeks and the river. ***(See article "Russian Olive and Salt Cedar Projects" on page 6.)***

Brill says the problem of Canada thistle infestations spreading out of control around Hawk Springs Reservoir and along Bear Creek and Horse Creek was due to not having the right herbicide available until recently to attack the problem. Hawk Springs Reservoir is used by the Horse Creek Conservation District for irrigation and is also utilized for recreation. The Wyoming Game and Fish Department also manages valuable wildlife habitat around the reservoir and along the creek riparian areas.

"We just could not maintain control because the weeds had grown into a 600 acre monoculture and most of it was near a riparian resource or trees or the reservoir," Brill explains. "We tried different herbicides, but were hampered by where we could apply them."

Two years ago Brill's crews began applying Milestone® specialty herbicide at a rate of 7.0 oz/acre in two segments. Milestone is not a restricted use herbicide and can be applied up to the water's edge, Brill says, so they finally had a product that fit their problematic area. They aerially applied Milestone with a fixed wing spray plane in the fall after the cottonwood trees and willows near the thistle infestation were dormant.

"We observed no tree damage two years after application," Brill states. "We achieved nearly 90% control with the first application and returned this year with ATV-mounted sprayers to clean up any skips," he explains. "In our area we have found it most effective to apply Milestone in mid-summer or even a bit later. We have successfully treated thistle that was 'fuzzing out'. We keep treating so we hit the rosettes that are underneath the taller vegetation. It pays not to go too early with Milestone," he concludes.

"I think it has been our ability to adapt to changing conditions that has enabled us to keep our program going strong for so many years. We adopt new

techniques and products like Milestone as rapidly as possible and have come to understand that we will face new vegetation management challenges each year. To be successful over the long term, we have to keep creating new solutions to solve them to keep our landowner and public support strong."

Aerial Application of Milestone herbicide on theThaler Ranch, Goshen County, WY. Photo courtesty of Brandy Thaler Evans.

Goshen County Weed Program Overview

Goshen County, Wyoming is comprised of nearly one million acres in an area 32 by 78 miles wide. The county is nearly equally divided by the North Platte River. North of the river most of the land is dryland. South of the river most land is irrigated farmland or public land. In 1994 the first of several Coordinated Resource Management (CRM) areas was created and funding secured through one of the first "Pulling Together" grants through the Bureau of Land Management (BLM).

The river corridor is the focus of much of their vegetation work. They work in cooperation with not only the BLM but also Wyoming Game & Fish, the NRCS, Wyoming DOT, Burlington Northern RR, several conservation districts and more than 160 private landowners.

The county supports a 50-50 cost share program with landowners that will pay up to $500 for herbicides if the landowner does their own application or up to $2,000 if the landowner contracts the weed control with a private applicator.

Public concern over weeds on game and fish refuges as well as on pheasant farms, irrigation systems, recreation lakes and ponds and the habitat along miles of streams drove the original formation of the Goshen County CRM. Landowner support remains strong nearly 15 years after the formation of the first CRM.

They formed a special leafy spurge management area where this species is concentrated along Rawhide, Bear, and Horse Creeks in the county.

They began mapping the weed infestations in the county in 1994 and have now completed mapping all three Cooperative Resource Management areas in the county. Every two years they remap everything to measure their progress. By demonstrating progress on an ongoing basis they are better able to maintain landowner and public support of the program.

North Platte River Russian Olive and Salt Cedar Control Projects

Two years ago, Goshen County began several projects to fight Russian olive and salt cedar infestations. The infestataions had gradually increased in density along the North Platte River to the point of drastically degrading wildlife habitat and diminishing the water yield of the river. According to Weed & Pest Supervisor Steve Brill, these tree invaders were not a high priority for the county until infestations reached such habitat-impacting levels.

Brill and his crews decided to travel the entire length of the North Platte River in Goshen County from the western county line to the Nebraska-Wyoming state line. This initial effort targeted salt cedar since the trees were smaller and less frequent than Russian olive. They treated every salt cedar tree they could find on both sides of the river with Garlon® 4 herbicide using a basal bark application method in a 3:1 Garlon to basal bark blue oil mixture. "We treated more than 100 miles of riverbank except for two miles that we skipped where we had released a salt cedar defoliating insect," Brill says. "We began in September and finished in May and lost two months due to weather. All work was done on foot with backpack sprayers."

"It is amazing what you see in a river corridor if you walk it the way we did," Bill explains. "We observed deer, turkeys, and even a mountain lion. But strangely enough what we saw more than anything was shoes – dozens and dozens of shoes," he laughs.

This initial effort was so successful that they decided to tackle Russian olive next. They secured funds from the Wyoming Wildlife Trust, Wyoming State Funds, NRCS, BLM, and Wyoming Fish & Game. They mapped out a strategy to treat Russian olive on the north side of the river from the Nebraska line upstream as far as their funds would take them. They also targeted all Russian olive and any remaining salt cedar in the target area.

Since this riverbank area was relatively flat, they began by cutting trees with a tree shear mounted on a track hoe. Stumps were then treated with Garlon 4 in a 3:1 mix with basal bark blue oil. Brill says that the stump treatments made in April may have been too early and so they returned in September to retreat sprouting stumps.

The track hoe windrowed the trees in some areas and piled them into slash piles in areas where they could be burned. The windrowed trees are ground with a tub grinder by a landscaper in exchange for the mulch.

"This work has improved wildlife habitat on pub-

(Left at top) Since this riverbank area was relatively flat, Goshen County contracted to have trees removed with a tree shear mounted on a track hoe. Stumps were then treated with Garlon 4 in a 3:1 mix with basal bark blue oil. The track hoe windrowed the trees in some areas and piled them into slash piles in areas where they could be burned.
(Left at bottom) In other areas, the windrowed trees are ground with a tub grinder by a landscaper in exchange for the mulch.

lic lands and vastly increased forage production on the private lands where we worked," Brill states. "We did get a flush of Canada thistle and musk thistle in some areas that had to be treated with Milestone herbicide. We are caught up on the main river corridor, so next year we will continue on the tributaries. Even with the current drought, we already see increased water flows in areas where we controlled the Russian olive and salt cedar."

(Right) Russian olive trees along Goshen County, Wyoming road before removal. (Below) After invasive tree removal.

(Below left) North Platte River shoreline pastures after invasive Russian olive and salt cedar are removed. Native cottonwoods remain. (Below right) Slash piles await burning or grinding into mulch.

Weed Management Must Involve All Resources Available To Insure Success

By Charles Henry
TechLine Editor

Since 1992 the Lolo National Forest in western Montana has undertaken 30 aerial weed treatment projects on the forest's big game winter ranges, according to Andy Kulla. Kulla wears two hats as the Lolo NF Weed Program Leader and the Missoula Ranger District Resource Staff Officer, based in Missoula.

"Only 3% (70,000 acres) of the Lolo National Forest's 2.1 million acres is classified as bunchgrass big game winter range. These sites are bunchgrass habitats on south facing slopes under 5,000 ft elevation. They are limited and critical to wintering big game, so these sites are a high value resource on the forest," Kulla explains. "They are also very susceptible to noxious and non-native weed invasion since they are dry, open sites with very little weed-limiting shade."

This article reviews weed management efforts on these winter game sites to determine what was learned and what barriers still to success exist.

Individual weed species monitored on these sites are typically spotted knapweed (*Centaurea maculosa*), sulfur cinquefoil (*Potentilla recta*), St. Johnswort (*Hypericum perforatum*), Dalmatian toadflax (*Linaria dalmatica*), leafy spurge (*Euphorbia esula L.*), houndstongue (*Cynoglossum officinale L.*), and cheatgrass (annual *Bromus spp.*), according to Kulla. He says all tools in the integrated management toolbox are used on these sites including biological control insects, herbicides, hand pulling, education and prevention, and revegetation seedings and fertilizers where appropriate. Goat and sheep grazing will be added to the Lolo National Forest weed management toolbox in the next Lolo National Forest Weed EIS. The Lolo completed a Final EIS and Record of Decision in 2008.

After 16 years of large-scale weed treatments, what can be learned from these efforts? Kulla answers this question by first stating the initial goal of the winter range weed control program – to deplete the weed soil seed bank over time so that infestations (primarily of spotted knapweed, the weed covering the most acreage) would not reoccur.

"I thought a 10-12 year program of re-treating with herbicides every three growing seasons would accomplish our goal, since that is the soil seed life of spotted knapweed," he says. "Each weed manager should carefully consider the soil seed life of their target weeds when developing a weed management strategy for their particular land areas. However, within public land agencies there have been changes in recent years that make this goal difficult to reach."

Andy Kulla, Lolo National Forest, Missoula, MT

Securing long-term funding to maintain re-treatment schedules has been difficult. Severe fire seasons, greater competition for limited or reduced funding, and the transfer of administrative duties down to field staffs all create a lack of consistent, long-term funding for weed control projects on public land that may span an eight to 12-year time frame. Even with grants, donations, and cost share from other organizations, public land agencies have found it difficult to maintain long-term momentum.

"So the first lesson we have learned is to match our

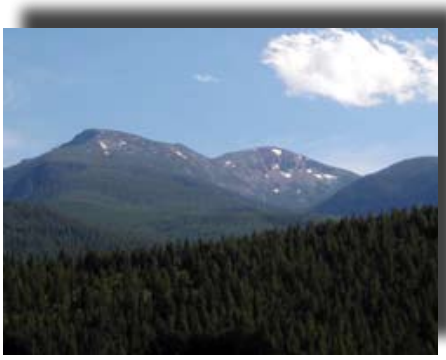
proposed project load to the amount of funding we think we can maintain over a longer time period," Kulla says. "This means a program may not cover as many acres, but the acres where treatments are begun can be maintained."

The next lesson they have learned, Kulla says, is that public land agency weed managers cannot handle the whole weed problem alone. Federal land management agencies have had staff reduced in recent years, leaving more of the work load to spread over fewer field project personnel. "This means each resource manager – engineers, fire management officers, recreation staff, timber management officers, and fisheries biologists and wildlife specialists – need to help with weed management. Projects in all these resource areas can disturb soil and vegetation and contribute to weed spread.

The staff employees who can help the most with integrating weed management into their resource areas are the program managers. They have to be involved in the actual weed management as well as prevention, mitigation, education, and awareness efforts, according to Kulla.

"To this end we sent four program managers (two engineers, a fire management officer, and a recreation manager) to a week-long weed short course last spring. In the past we have sent our district rangers and a forest supervisor and other staff officers. After the course, they could see how weed management is part of their area of expertise too. Involving your line officers and specialists in courses like this takes time and effort. You have to plan ahead to make sure they can fit weed-related courses into their tight schedules. We can reduce the impacts of staff reductions by integrating weed management into everyone's job. One of the greatest barriers to meeting our weed management goals is single resource managers who see only their resource and nothing else. When every discipline is involved, it is a win-win for everyone's resource."

The third lesson Kulla imparts is that weed management efforts can play a valuable role in helping a National Forest meet Environmental Management System (EMS) standards and subsequent audits. This new audit program evaluates each forest to measure if they are meeting their stated environmental goals. The EMS on the Lolo National Forest for fire management now includes many weed management and prevention practices. These include such practices as washing vehicles for weeds before they arrive at a fire and when they leave and keeping heli-bases and heli-spots as well as staging and cargo and crew locations weed-free. These practices reduce the chance that wildfires and wildfire fighting will introduce weeds into a burned area.



The fourth lesson learned is that they still do not have all the tools they need to successfully manage grass weeds on the Lolo National Forest. While they have achieved excellent broadleaf weed control with current herbicides, the downy brome or cheatgrass syndrome still does not have a good solution.

"If we find 15-20 percent cheatgrass infestation among the other weeds on a winter range in our pre-treatment evaluation, we are deferring the broadleaf weeds until we can learn how to better manage the cheatgrass problem. Broadleaf treatment can allow the cheatgrass to spread and replace the broadleaf weeds," Kulla says. "We are not only missing cheatgrass control, but also have problems with moth mullein, wooly mullein, and tumble mustard control on winter range sites."

"Of course, our standards are higher now that we have been working on it for 15 years. We keep raising the bar for how we define successful winter range weed control as we constantly learn and apply new knowledge to future treatments," he states.

With these lessons learned, how does Kulla define weed management success on the Lolo National Forest now?

Success now means:

1. Keeping new and potential invaders off the Forest.
2. Containing or reducing the most problematic weed infestations so their spread is slowed.
3. Controlling wide-spread weeds in areas of high resource value when we can maintain long- term control efforts.
4. Keeping areas of concentrated public use weed free to prevent the coming and going of weed species with human activity.

"I am not discouraged, just more realistic about what we can accomplish with the staff and funding available," Kulla concludes. "We can achieve our definition of success when we learn our lessons well and apply that new knowledge to future weed management projects."

Riparian Area Habitat Improved, Forage Grasses Increased

Treating Invasives Without Damaging Desirable Species

Keith Culver, NRCS District Conservationist, Newcastle, WY

By Charles Henry
TechLine Editor

Finding a method to control invasive weed species without damaging desirable off-target species was a problem without a solution in Weston County, WY until recently. Keith Culver, District Conservationist for the NRCS in Newcastle, says that public land managers and private landowners were discouraged. Many had almost stopped treating Canada thistle, Russian knapweed, spotted knapweed, leafy spurge and hoary cress in areas along streams, in riparian meadows or dryland hay meadows. This was because of the collateral damage nearby trees received from traditional herbicide treatments.

"Our county consists of 1.5 million acres comprised of open grasslands and Black Hills forest lands," Culver explains. "We were having pretty good success along most rights-of-way and in the non-forest areas of the county. But we were certainly falling behind wherever we had woody species near weed infestations."

Culver says they have had varying degrees of success against leafy spurge as they moved away from herbicides that damaged woody species to biological insect controls. So they turned their attention to finding a herbicide that would control their other priority species without damaging desirable nearby woody vegetation. Dick Rayburn and his successor, Hale Redding with the county Weed & Pest District, obtained samples of Milestone® specialty herbicide two years ago, and Culver began establishing test plots to evaluate the new product.

"We established plots along a mile of creek bottoms and applied Milestone at the rate of 7.0 oz/acre with ATV-mounted boom sprayers and handguns. We treated some plots in late spring and continued applications at set intervals up through the bloom stage of Canada thistle and the knapweeds," Culver says.

"We had researched Milestone beforehand and were expecting it to work, but we achieved 98% control the first year and have not observed one incident of tree or shrub damage," Culver explains. "We can spray right up to water's edge along streams and there was no observed volatility – it doesn't rise up in the heat of the day like the products we previously used did."

Culver also observed forage response before and after controlling Canada thistle with Milestone. "First, there was no grass damage at all and we achieved nearly a 100% forage increase when the thistle was removed."

Culver says that logging activity can create weed problems on deck landings, skid trails or slash piles. Again these areas are surrounded by desirable tree and shrub species so he sees Milestone being a good fit for controlling thistle and the knapweeds after logging activity. "This herbicide has answered real critical needs for us," he concludes.

No tree or shrub damage was observed and there was no grass damage in pastures treated by Keith Culver and Hal Redding, Newcastle, WY.

The lower photo shows the nearly 100% increase in forage obtained after the noxious weeds were controlled with Milestone herbicide.

Coming in future issues of TechLine:

- Forb Species Diversity Studies from Montana, Colorado, North Dakota, and California
- Wildlife Management Areas Weed Control Programs that Protect Habitat
- Using Utility Terrain Vehicles (UTV) Instead of ATVs
- Application Guidelines and Research Results for Treating Invasive Tree Species

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