



# TechLine

Information About Invasive/Exotic Plant Management

Spring 2008



Mike Finch, WA Dept. of Fish and Wildlife, Creston, WA.

## ***Resource Managers Gain on Cheatgrass***

# Finding the Right Balance Elusive When Restoring Native Ranges

By Charles Henry  
TechLine Editor

**W**ashington Department of Fish & Wildlife managers at the Swanson Lakes Wildlife Area near Creston are gradually restoring refuge lands with a blend of new tools and management techniques.

Mike Finch, wildlife area assistant manager, working with Juli Anderson, area manager, has rehabilitated 1,500 acres on wildlife area land and adjoining BLM lands. His management area is comprised of 20,000 acres of state wildlife area and 40,000 acres of BLM managed lands.

"Swanson Lakes was originally dryland small grain farm ground carved out of sagebrush steppe rangeland by the first settlers. The property has come back into state and federal ownership through mitigation agreements from the Bonneville Power Administration (BPA)," Finch explains (*see "Wildlife Areas History" on page 3*).

"Our goals are to return the land around the lakes to healthy native range. The lakes are used by migratory waterfowl, but the surrounding land is also habitat for sharp-tailed grouse (*Tympanuchus phasianellus*) that use these ranges for nesting cover, food plots and breeding leks," Finch says. "We had transplanted sharp-tailed grouse each of the past three years and our second group hatched eggs last year. This encourages us that we can restore these lands for the benefit of the wildlife."

One obstacle to restoring rangeland in the Western U.S. is the prevalence of downy brome or  
**See "Revegetation" on page 2**

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*"Like music and art, love of nature is a common language that can transcend political or social boundaries."*

*...Jimmy Carter, Jr.*

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## “Revegetation”

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cheatgrass. Often, when other undesirable vegetation is removed or controlled, cheatgrass moves in rapidly and dominates sites. “It is fairly easy for us to establish introduced grass species, but more difficult to move on to native grasses and forbs because of the competition from cheatgrass and many other weeds,” Finch says. “We are working with Jerry Benson and several other cooperators evaluating cheatgrass control methods with new and established herbicides applied at different rates and timings.” (See “*Experiments Seek Answers to Revegetation Obstacles*” on page 3.)

Finch explains their typical restoration steps, although these methods may vary depending on the type of land they want to restore. First, they apply glyphosate at rates up to 40 oz/acre to kill existing vegetation and weeds. Second, they moldboard plow the ground (an advantage for their wildlife area because most of their property or that on the BLM is former farm ground

### Wildlife Areas History

There are 22 state wildlife areas in Washington totaling 900,000 acres. These critical habitat lands were created through many different methods. Many of them, like Swanson Lakes WA, were created to mitigate lands lost along the Columbia River when the mainstem dams were built and are now administered by the Bonneville Power Administration (BPA).

Mike Finch, wildlife area assistant manager at Swanson Lake, says some of these lands were broken out by early settlers and then cropped. In the 1950s some of these lands were placed in the Soil Bank Program and seeded with crested wheatgrass or other introduced grass species. The BPA purchased these lands from private landowners in 1980 under direction from Congress to complete the mitigation process from when the dams were built.

The Washington State Fish & Wildlife Department obtained some these lands and serves as the land manager on others.

The condition of these lands covers a broad range with many acres weed-infested and deteriorated to others that are in fairly good condition. It is the goal of the Fish & Wildlife Department to restore or rehabilitate these lands to reintroduce native components and improve their utility by a broad range of wildlife.



(Top) A Bee-Line Cart air drill with harrow coil packers works well at Swanson Lakes Wildlife Refuge. The Bee-Line blows the seed in front of the coil packer.

(Bottom) The front compartment of the drill contains native seed mix. This bin is designed with rubber-like fingers in each opener that helps grab the seed. There is also an agitator shaft that spins approximately three inches above the openers to help reduce bridging.

The rear compartment contains forbs and/or legumes. Since bridging is not of concern with forbs or legumes there are no fingers or agitator shaft. They buy their native seeds pre-mixed with rice hulls and their forbs and legumes come mixed together from the seed company.

and they can use tractor-drawn implements). Third, they will disk to level the seedbed and to incorporate organic matter. Finally the ground will be rod-weeded once before a fall seeding (October or November in their area).

Finch has found a Bee-Line Cart air drill with harrow coil packers works well for them. The Bee-Line blows the seed in front of the coil packer which helps establish the critical soil-to-seed contact that is so necessary for native grass seedlings to work. The cart's bin has two compartments. The front compartment of the drill contains their native seed mix. This bin is specially designed with rubber-like fingers in each opener that helps grab the seed. There is also an agitator shaft that

spins approximately three inches above the openers to help reduce bridging. They mix grass, forbs, and legumes together with rice hulls to aid calibration.

The rear compartment contains forbs and/or legumes. Since bridging is not of concern with forbs or legumes there are no fingers or agitator shaft as in the front compartment. They buy their native seeds pre-mixed with rice hulls and their forbs and legumes come mixed together from the seed company (see **“Typical Rehabilitation Plant List” at bottom right**).

In the spring they wait until the grasses have reached the 2-3 leaf stage before doing any weed control work. While they are experimenting with low rates of glyphosate herbicide (3.5-4.0 oz/acre) described in the

sidebar article on page 4, their usual practice is to use bromoxynil (Buctril herbicide) applied at a rate of 1.5 pt/acre with no surfactant. This herbicide controls many of their broadleaf weeds but does not get the purple mustard or cheatgrass, thus their experimental efforts to find a solution for these weed species in their habitat restoration work.

“The following year we will do whatever spot spraying is required for Canada thistle (*Cirsium arvense*), diffuse knapweed (*Centaurea diffusa*), rush skeletonweed (*Chondrilla juncea*), St. Johnswort (*Hypericum perforatum*), and yellow toadflax (*Linaria vulgaris*). These weeds give them problems to varying degrees on the wildlife area, Finch concludes. 

## Experiments Seek Answers to Revegetation Obstacles

**J**erry Benson (*photo at right*) began his career doing habitat analysis for the Washington State Fish & Wildlife Department. He then returned to the family farm near Moses Lake, WA to pursue the production of seed crops for land restoration/rehabilitation work. BFI Native Seeds Company today specializes in native seed production.

With decades of experience, Benson takes a long-term perspective relative to revegetation. He doesn't feel there is any one answer for all situations, but that land managers are beginning to find the tools and techniques to increase their revegetation success.

“Cheatgrass is certainly one of our greatest challenges. I think that ultimately the best answer will be with some sort of soil microbe such as the deleterious rhizobacteria (DR) that would inhibit cheatgrass while not harming crops or native vegetation. Ann Kennedy with the USDA-ARS in Pullman is working on this approach. And Julie Beckstead and David L. Boose at Gonzaga University in Spokane are working with a fungus that also attacks cheatgrass,” Benson says.

“But their work is still experimental so we must continue to explore different herbicides, rates, and timings to retard cheatgrass growth until introduced grass species and/or native species can gain the upper hand and flourish.”

Benson is currently evaluating plots established at the Swanson Lake Wildlife Area where he is part of a cooperative effort exploring the potential of Milestone® herbicide use in native grass plantings. He says fall,

post-plant treatments of 7 fl oz/acre are providing good suppression of cheatgrass so far. Benson is encouraged because 2006 post grass emergence treatments also showed good desirable grass and forb tolerance although further work is needed.

While his work with Milestone is still in the early **See “Experiments” on page 12.**



### Typical Rehabilitation Plant List

At Swanson Lakes the typical rehabilitation seeding mix is comprised of the following:

- Sherman Big Bluegrass
- Sandberg Bluegrass
- Canby Bluegrass
- Secar Bluebunch wheatgrass
- Whitmar Bluebunch wheatgrass
- Thickspike Wheatgrass
- Idaho fescue
- Blue flax
- Delar Small Burnet
- Sanfoin
- Hairy Vetch
- Ladak Alfalfa
- Magnar Basin Wildrye

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### Editor's Note:

The new invasive plant herbicide aminopyralid (trade name Milestone® herbicide) has been evaluated extensively in university research trials and demonstration plots across the United States in the past seven years.

The results of these trials on a species by species basis will be presented in this and coming issues of TechLine.

Previous species covered and the TechLine issues in which they appeared include:

- Spotted knapweed, Russian knapweed, and orange hawkweed – Winter 2005-2006
- Canada thistle – Spring 2006
- Yellow starthistle – Late Summer 2006
- Absinth Wormwood – Early Winter 2006
- Scotch Thistle – Spring 2007

## Rush Skeletonweed Research

# Efficacy and Application Timing of Milestone® herbicide on Rush Skeletonweed

By Charles Henry  
TechLine Editor

**R**ush skeletonweed (*Chondrilla juncea*) invades dry rangelands in the Western United States, displacing native species and reducing forage for livestock and wildlife, according to written findings of the Washington State Noxious Weed Control Board. Rush skeletonweed is native to parts of Europe, Asia, and Africa. It spreads from rangeland to cropland by seed. Once established on roadsides adjacent to croplands, mechanical injury to the plant can produce shoots from any part of the main root, from the lateral roots, and from root fragments at least four feet deep.

Skeletonweed is a perennial forb that can grow to four feet tall. Sharply lobed leaves occur as a basal rosette. The many branching stems appear coarse and the stem leaves are inconspicuous, giving the plant a leafless appearance. Stems and leaves produce a milky sap when broken and the lower 4-6 inches of stem is covered with coarse brown hairs. Flowers are small and yellow, according to Dr. Joe Yenish, associate professor in the Department of Crop and Soil Science at Washington State University in Pullman.

Initially rush skeletonweed spreads by seed, with the ability to travel long distances on wind currents. It spreads from roadside to croplands when the plant is mechanically injured. Once established in wheat-fallow systems, cultivation is the major factor of spread, and control is no longer feasible. Crop yields are reduced, and grain harvest is difficult due to the latex sap. Rush skeletonweed



Dr. Joe Yenish, Washington State University, Pullman



Rush skeletonweed photo by Gary L. Piper, Washington State University, Bugwood.org

biotypes adapt to out-compete beneficial species for limited resources, including moisture and nitrogen. The biological control agents are very specific to plant biotypes, making long term biocontrol programs difficult to manage.

In the fall of 2005, Yenish began trials to evaluate the efficacy and application timing of Milestone® herbicide on rush skeletonweed. Treatments of Milestone were compared to the previous standard herbicides used for rush skeletonweed control, Tordon® 22K, Transline® herbicide, and Redeem® R&P herbicide. Treatments were made with a CO2 sprayer applied in 10 gpa of water to 10x40-ft. plots replicated four times. A non-ionic surfactant was included with each herbicide application.

Yenish made applications when the rush skeletonweed was in the fall rosette growth stage in November 2005 and then in separate plots at spring bolting in May 2006. The skeletonweed was growing in established stands on channeled scabland rangeland comprised of silt loam soils over basalt. The area receives from 12 to 14 inches of annual precipitation.

Milestone herbicide was applied at rates of 3.0 fl oz/acre, 5.0 fl oz/acre, and 7.0 fl oz/acre. These treatments were compared to recommended label rates of Transline herbicide at 16 fl oz/acre; Redeem R&P herbicide at 1 qt/acre; and Tordon 22K herbicide at 1 qt/acre. Remaining foliage was evaluated at one week, four weeks, seven weeks, 11 weeks, and 443 days after application.

“At one year after treatment (YAT) the spring and fall applications looked very similar in the level of control provided by Milestone (see Chart 1). The fall application might have graded a bit better. However, our evaluations after the second full growing season showed that the spring application of Milestone was better. We achieved one year of good control with both spring and fall applications,” explains Yenish. “But two years of precipitation dissipated the Milestone reducing the second year of control. Thus, you can gain control into that second year with the spring application, but the extra season of moisture with the fall application causes control to decrease.”

Yenish says that it takes the higher rate of Milestone (7.0 fl oz/acre) to achieve the best control, but this is also true of the other standard herbicides evaluated. It also requires their higher recommended labeled rate to achieve equivalent control. But with Milestone the amount of active ingredient per acre is lower than other standard herbicide rates.

“Re-establishment in the plots came from new germination of rush skeletonweed seeds, not from treated plants re-sprouting. Milestone has a good window for application although timing was more critical than with Tordon 22K by comparison,” Yenish concludes. “From the time you see yellow blooms, it is time to spray in the spring. From seed set right up to the first hard frost are the best fall timings.” 

**Chart 1**

**Percent Control of Rush Skeletonweed with Milestone® herbicide**

**1 Year After Treatment (YAT)**  
Ounces per acre

Application	3 fl oz	5 fl oz	7 fl oz
Spring	76	86	88
Fall	76	92	95

**2 Years After Treatment (YAT)**  
Ounces per acre

Application	3 fl oz	5 fl oz	7 fl oz
Spring	69	78	90
Fall	13	40	40

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 State restrictions on the sale and use of Transline apply. Consult the label prior to purchase or use for full details.  
 Not all products are labeled or available for use in all states or areas. Contact your dealer, distributor, applicator or Dow AgroSciences representative for alternative recommendations.

# Finding the Right Tools, One Step at a Time

By Charles Henry  
TechLine Editor

**K**evin Goldie has a lot of competing tasks in his position as a wildlife biologist for the U.S. Fish & Wildlife Service's Mid-Columbia River National Wildlife Refuge (NWR) Complex, based in Richland, WA. Goldie not only does wildlife surveys and habitat restoration but he is also responsible for much of the invasive species management program throughout the refuge complex. The Mid-Columbia Refuge Complex was formed in early 2007 and is comprised of 280,870 acres in seven National Wildlife Refuges (Columbia NWR, McNary NWR, Umatilla NWR, Cold Springs NWR, McKay Creek NWR, Toppenish NWR, and Conboy Lake NWR) and the Hanford Reach National Monument. These eight distinct public land entities are run by one central administrative staff (and, in the case of the Mid-Columbia Complex, one biological staff and one fire services staff).

The Hanford Reach National Monument is just one distinct entity within the overall Complex. The Monument is the largest of these entities on an acreage basis at 195,497 acres (165,022 acres under U.S. Fish & Wildlife Service (USFWS) management and the remainder still under DOE, though all is technically still "owned" by DOE).

The Monument encompasses nearly 50 miles of the Columbia River as well as large expanses of upland habitats. Management of the Monument is challenging due to its size and landscape setting, but the Monument has a long list of cooperators who bring to the management mix diverse requirements for how the Monument should be managed (*see "Hanford Reach National Monument Partners" on next page*).

"The Hanford Monument varies from riparian lands to irrigation waterways, uplands, and sagebrush steppes. The refuge provides critical habitat for elk, whitetail and mule deer, owls, black and white tail jackrabbits and is on a major waterfowl flyway. The black and whitetail jackrabbits are species of concern which is a step away from being listed as threatened and endangered," Goldie says.

In recent years a fire, cheatgrass, fire cycle has repeat-

edly burned parts of the Monument. This cycle created openings for not only the ever-spreading infestations of cheatgrass, but also yellow starthistle, Russian and diffuse knapweeds, Russian olive (*Elaeagnus angustifolia*), purple loosestrife (*Lythrum salicaria* L.) and phragmites (*Phragmites australis*), Tumble mustard (*Sisymbrium altissimum*), salt cedar or tamarisk (*Tamarix ramosissima* Ledeb.), and Russian thistle (*Salsola kali*).

The Monument was created in 2000 by Presidential Proclamation, according to Goldie. Before that the lands that now comprise the Monument were run by the Washington Dept. Fish and Wildlife, the U.S. DOE and the BPA, the Corps of Engineers, and the BLM, among others, and each was treating invasive weeds to meet their respective agency purposes. In 2003 the Monument finalized its "Invasive Plant Species Inventory and Monitoring Plan" in cooperation with The Nature Conservancy. This plan serves as a tool to direct weed treatment on the Monument to meet the purposes of the Monument. This plan was developed in part from information provided by the former land managers (i.e., what they had been doing on Monument lands and what had succeeded or failed) and on information provided by the other Refuges in what is now the Complex. These other refuges had also been treating weeds on their lands for decades before the Monument was created.

For the last three and half years, Goldie has focused



Kevin Goldie, U.S. Fish & Wildlife Service, Mid-Columbia River National Wildlife Refuge Complex, Richland, WA

on the Monument. When he speaks about weed treatments he is focused solely on what had been done on the Monument. The other Refuges have done some amazing work to combat invasive weeds, and have been doing this work for decades, according to Goldie. The Monument is a startup when it comes to weed management on the Monument for its goals and purposes. The rest of the Complex and the partners are very experienced at weed treatment.

“We are always aware of the cheatgrass component. We don’t want to control one weed species just to give cheatgrass the opportunity to flourish,” Goldie says. “We do as much re-seeding and revegetation work as our budget allows each year. This includes drill seeding, aerial seeding, aerial hydromulching in highly erodible areas, and bare root plantings of shrubs (sagebrush, bitterbrush, and rabbit brush).”

“We are always looking for new herbicides that will give us selective weed control and also be gentle on the desirable vegetation. Last year we used Milestone® herbicide for the first time for Russian knapweed control. We treated in the fall applying the recommended label rate of 7.0 fl oz/acre. The following year none of the knapweed came up at all. We did seven years of previous treatments that did not work nearly as well as the Milestone after one year,” he says.

“We lost a little over 35% of the Complex to wild-fire this year (about 100,000 acres or over 156 square miles burned),” Goldie explains. “About 40% of the Monument (50% of the Monument lands managed by USFWS) burned in three fires, including much of the lands that previously burned in the big 2000 fire, and including the sites where we had used Milestone. So far we still haven’t seen any regrowth in the areas that were treated with Milestone. Elsewhere we are attempting to capitalize on the opportunity that the utter lack of vegetation represents to treat other infested areas.”

Columbia NWR staff (specifically Randy Hill and some of their cooperators) are using Milestone to treat some of their Russian knapweed infestations. They are also pre-treating against cheatgrass, something which Jerry Benson has been studying, according to Goldie.

“We are debating a similar plan on the Monument. For right now, we are considering trials comparing other herbicides in varying soil conditions/land-use histories/pre-fire vegetation conditions, with varying follow-up treatments,” he says.

“We are focused on integrated management and using a combination of techniques to achieve weed control. We are borrowing ideas from everyone and trying to



White bluffs of the Hanford Reach  
Photo by Rich Steele

make them fit our unique eco-systems on the refuge. It helps to find the right tools,” he concludes. 🧩

## Hanford Reach National Monument Partners

US Fish & Wildlife Service  
US Department of Energy  
Washington Department of Fish & Wildlife (WDFW)  
National Oceanic and Atmospheric Administration National Marine Fisheries (NOAA Fisheries)  
Benton County  
Franklin County  
Grant County  
Adams County  
Two irrigation districts  
Bureau of Reclamation  
Army Corps of Engineers  
Bonneville Power Administration  
Private landowners  
The Nature Conservancy of Washington  
Bureau of Land Management (adjoining lands)  
American Indian Tribes  
Umatilla  
Yakima  
Nez Perce  
Colvilles  
Wanapums

# Landowners Partner with BLM to Fight Noxious Weeds in a Challenging Environment

By Charles Henry  
TechLine Editor

**T**he Coos County (Oregon) Weed Advisory Board proves that it is never too late to begin the battle against noxious weeds. First formed in the 1950s, the Advisory Board and their weed control activities went inactive in the '70s. In 2002, Steve Wickham, Plum Creek Timber Co., asked the county to reactivate the weed board, according to Helen Franklin and Sharon Waterman, current Coos County Weed Board members. The Coos County Commissioners agreed that reinstating the weed board was a good idea and did so in 2002. In 2005 the Weed Advisory Board initiated a weed control program and has been increasing its efforts as funding allows.

"Coos County is incredibly diverse, thus our vegetation challenges are as well," explains Franklin, "and our resources are still somewhat limited. We are trying to do a lot with a little."

Coos County is a southwestern Oregon coastal county where elevations run from sea level to 2,000 ft. in the coastal mountains. Annual precipitation ranges from 56 to 72 inches. The county is comprised of lowland agricultural lands that produce cattle, sheep, dairy, cranberries and organic vegetables. There are tide-gated stream systems that provide habitat for a variety of salmon species where salinity is an issue, as well as forested timberlands in both private and public ownership. In addition, the local beaches and sand dunes attract a high number of tourists and recreationists. Most landowners own small acreages and hold jobs in towns and have little experience with vegetation management or herbicides.

During the last two years, Glenn Harkleroad, Coos Bay Bureau of Land Management's (BLM) District Noxious Weed Program Coordinator, has assisted the Advisory Board by sharing the Bureau's resources and information. He has helped the local landowners bring the county program back to life.

It is important to understand why the BLM is involved in the county weed advisory board as most of the lands the BLM manages, nationally, are far from an ocean,



(Left to Right) Glenn Harkleroad, Coos Bay BLM Area Noxious Weed Program Coordinator, and Helen Franklin, Coos County Weed Board member discuss noxious weed issues for Coos County, Oregon.

according to Harkleroad. "The BLM was formed in 1946 through the combining of the U.S. Grazing Service and the General Land Office. Most of the land managed by these agencies was in the arid western portion of the United States, places like Nevada and Colorado. Most of the lands managed by BLM in Coos County are revested Oregon and California Railroad grant lands, which came under BLM's charge as a result of the Oregon and California Railroad and Coos Bay Wagon Road Grant Lands Act (O&C Act). In southwestern Oregon a fair portion of the O&C lands are relatively close to the ocean, something uncommon for BLM lands. As a result the Coos Bay District of the BLM manages some very scenic and biologically valuable coastal public lands. Adding to the challenge of managing this land is the fact that the land ownership patterns of the revested railroad land are checkerboarded. The original land grant gave the railroads every other section of land. This makes working with our neighbors very important."

Another strike against Coos County is that it is still recovering from the loss of federal timber sale revenue that flowed to the county as result of Federal timber sold within the County. The harvest of Federal timber decreased 15 years ago when sales were stopped

to protect spotted owl and other habitat values. The loss of receipts to the County decreased the funding availability for many programs, including noxious weed management. A county long dependent on the timber industry had to re-invent itself and items such as the county weed program was just not in the budget in those days.

Congress sought to mitigate the loss of funding from Federal timber sale receipts through the passage of the Secure Rural Schools and Community Self Determination Act of 2000. The Act appropriated funds to pay impacted counties entitlements that could be used for schools and roads. The reactivated weed board applied for and received \$60,000 of these funds in their first year back in business, and has received a total of \$350,000 over the last six years.

Himalayan blackberry (*Rubus discolor*), Scotch broom (*Cytisus scoparius*), and gorse (*Ulex europaeus L.*) are the weed species that plague BLM-managed lands and Coos County roads the most. Scotch broom and gorse can even dominate vegetative communities in the harsh sand dune environment. Japanese knotweed (*Polygonum cuspidatum*) and meadow knapweed (*Centaurea pratensis*) relatively new invaders, are making inroads within the County as well. On private lands Canada thistle (*Cirsium arvense*), milk thistle (*Silybum marianum*) distaff (woolly) thistle (*Carthamus lanatus*), and Scotch thistle (*Onopordum acanthium*) cause the most problems for landowners.

“When we revived the county weed program, we knew we had to find a way to involve landowners and help them since many were still suffering from the changing economy. Also, this public had no education or experience in herbicide application. Our citizens really needed a boost to involve them,” Franklin explains.

The answer was a cost share program (50-50) on herbicides and Weed Wrenches (see **“Weed Wrench for Woody Species” at right**). They coupled this with extensive training sessions on sprayer calibration and the correct use of herbicides. “The advent of Milestone® herbicide this past year has given our program a real lift,” Franklin says. “The ‘Caution’ signal word on the Milestone label and being non-restricted use are huge assets with our type of landowner. It is simple to calibrate and produces terrific results on the thistles and other pasture weeds that are our most damaging problems.”

Franklin says 17 landowners participated the first year of their cost share program and within two years that number had climbed to 75 new ones and 90 total in the program. “I believe it takes three years to get your message disseminated in a situation like ours.

We have continued to increase public involvement through an annual county fair weed booth, youth crew involvement in pulling projects, and replanting and restoration projects,” she concludes. 

## Weed Wrench for Woody Species

Scotch broom and gorse are severe problems along many roads and within the coastal dune areas of the Pacific Coast. Herbicide control options work well, but do not fit all situations. The Weed Wrench is a hand tool that comes in three sizes. It was invented and is sold by Tom Ness, Grants Pass, OR ([www.weedwrench.com](http://www.weedwrench.com)). The largest model has a 2.5 inch jaw opening and a 60-inch lever. The smallest Wrench has a 1-inch jaw and a 24-inch lever. There are two models in between.

“In Coos County, the Weed Wrench enabled us to involve the general public, conservation groups, youth organizations and private landowners in weed control work. By pulling Scotch broom, gorse, and other woody species with this device we can remove individual plants, and gain about three years of control on small infestations. Since Scotch broom and gorse have such long lived seeds, our goal is to gradually deplete the seed source that feeds re-infestation. It is labor intensive, but for small scattered plants, it works really well,” Glenn Harkleroad, BLM Coos Bay District Office restoration specialist explains. “Our county cost shares with landowners who want to have a weed wrench of their own in the garage. We’ve also established a “rent-a-wrench” weed wrench loan program for the public with two local watershed councils. For folks who choose not to use herbicides these devices are proving to be quite beneficial and popular.”



## Weeds Managed Over Large Areas with Aid of GIS System

**A**reas of the west that contain little population can still be highly infested with non-native invasive weed species that need to be controlled. And areas that contain the top or beginnings of a major watershed carry an additional responsibility to control weeds since most infestations move down a watershed.

Fremont County, Wyoming is comprised of nearly six million acres and has had an effective county Weed & Pest District for decades. But one area of the county – the upper Wind River watershed around Dubois – was not receiving the attention it deserved, according to Fremont County’s weed supervisor, Lars Baker. Even though that portion of the county covered 1.5 million acres or 2,300 square miles, the vast acres of National Forest and other public lands precluded much human habitation. Baker had a hard time finding skilled labor to cover that end of the county or anyone who wanted to live in such a beautiful, yet isolated part of Wyoming.

Five years ago that changed when Baker found Bob Finley, who was from Dubois and was building houses with his brother. Finley took on the task of weed management in that portion of the county and has not looked back.

“The first thing they did was help form the Dubois-Crowheart Weed Management Area (DCWMA). It was like everyone was waiting for someone else to take the first step. Because when they had their first meeting, everyone was eager to participate,” Finley explains. “Every public land agency in the area, the Arapaho and Shoshone tribes, and the communities of Dubois and Crowheart jumped right in.”

The next task was getting a handle on the 60,000 acres of land infested with Russian knapweed (*Acroptilon repens*), and even more acres of Canada thistle. Other weeds present in the DCWMA included leafy spurge, perennial pepperweed, hoary cress (whitetop) (*Cardaria draba*), and scattered small infestations of spotted knapweed, houndstongue and toadflax.

“The upper end of the DCWMA on the Shoshoni

National Forest is relatively clean of weeds, but anytime you have an area like that, you want to keep it that way,” Finley says. “Fremont County has always had a progressive mapping program, but we needed to get this portion of the county mapped and into the system. Our winters are long, so much of the mapping and all of the weed control has to be accomplished during our short summers.”

Using a herbicide that provides reliable control is critical. The area is just too big to allow going back to treat weeds that were not controlled the first time. “We switched to Milestone® herbicide last year,” Finley says. “We apply Milestone at a labeled rate of 7.0 fl oz/acre for both Russian knapweed and Canada thistle. We couldn’t be happier with the results. Our landowners and the public land agencies also like Milestone because it can be used up to water’s edge and does not carry a ‘Restricted Use’ tag.”

“Our biggest tool is education. Since we are far from our Weed & Pest District warehouse, whenever a landowner needs a herbicide, we deliver it since we have a cost share program. This means I can visit with each person individually and tailor control options for their exact weed problem and site situation. At the same time I can enter their data into our GIS system so we can monitor results,” Finley states. “We try to let the landowner own their weed problem. We are here to help, but ultimately if they are not involved, they don’t do as much.”

Finley’s pickup is equipped with a Garmin GPS V that feeds directly into a laptop computer mounted in his cab. Running ArcMap and ArcPad software, Finley has real time GPS that shows his exact location at all times. He uses a computer stylus (pointer pen) or



**Bob Finley, Fremont County weed supervisor, Dubois, WY**

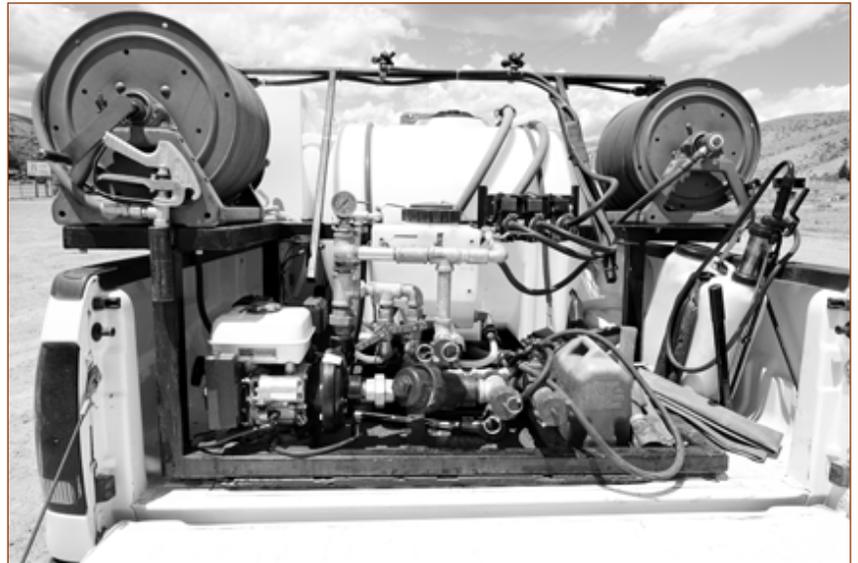
mouse to draw infestations directly into the map on the computer screen. When he must leave the truck, he carries a Dell PDA with a GPS card adapter that fits into the Compact Flash (CF) slot, and he carries the Garmin GPS to record tracks as he maps infestations.

When spraying, this same system is used to map as

he sprays either from the truck or with a backpack or ATV sprayer. At the end of each week the track logs are saved as Shape files and sent to Kim Johnson in Riverton who manages the county's GIS systems. Johnson then sends maps back to Finley so he can track his progress throughout the season. 

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**Photo 1:** Findley's spray truck can be unbolted from the truck box with four bolts. The truck is plumbed to spray with either two hand guns at once (out of three mounted on the truck), boomless nozzles set to spray from 15 to 35 ft. as needed, two mix tanks and a fresh water tank. The truck can resupply water by drawing from canals or streams.



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**Photo 2:** The Fremont County spray truck rides on an adjustable air bag and shock suspension that irons out spraying over the roughest terrain.



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**Photo 3:** Finley's pickup is equipped with a Garmin GPS V that feeds directly into a laptop computer mounted in his cab. Running ArcMap and ArcPad software, Finley has real time GPS that shows his exact location at all times. He uses a computer stylus (pointer pen pictured) or mouse to draw infestations directly into the map on the computer screen. When he must leave the truck, he carries a Dell PDA with a GPS card adapter that fits into the Compact Flash (CF) slot.



## “Experiments” Continued from page 4

stages there are several other techniques he has found that can minimize cheatgrass in revegetation plantings. Benson is finding success with very low rates of a glyphosate herbicide (3.5-4.0 oz/acre) applied when cheatgrass is at the 2-3 leaf stage. It is important to use a glyphosate formulation that contains the least amount of surfactant and not to add additional surfactant. Application should be made early in the season when days are no warmer than the mid-40 degree range. If daytime temperatures reach the 50s and nighttime temperature dip into the 20s, this will also work.

“The glyphosate is absorbed within hours by the cheatgrass but the native seeds, which are smaller, are not actively growing and will not pick up the herbicide,” Benson explains. “We have controlled 85-90 percent of the cheatgrass with this method without harming the desirable species. After three years the natives are

very well established,” he concludes.

Benson is also evaluating the experimental use of pendimethlin (Prowl 3.3 herbicide) on stands of existing native grasses that are one year or older and that are not real vigorous where cheatgrass occupies interspaces in the seeding. He is trying to reduce the competition for moisture and nutrients between the desirable species and the cheatgrass. When applied in the fall (September to October in the Pacific Northwest) and before fall moisture arrives, pendimethlin works because the cheatgrass will germinate into the pendimethlin before the native grasses. This allows the natives to set seed and flourish. 

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