TechLine

Information About Invasive/Exotic Plant Management Winter, 2002

Management Restores Wildlife Habitats Impacted by Invasives

"The land ethic simply enlarges the boundaries of the community to include soils, waters, plants and animals, or collectively: the land."

...Aldo Leopold

The relationship between wildlife and invasive weed infestations has long been debated. Do noxious and invasive weeds impact big game herds? Are birds, small mammals, and insect species negatively impacted by non-native vegetation? The BLM estimates 4,600 acres of wildlife habitat on public lands are overtaken by weeds every day. Non-native invasives are major reasons that sage grouse breeding populations have dropped from a million to under 200,000 birds.

In the 1999 report, "Declining Mule Deer Populations in Colorado," R. Bruce Gill, Colorado Division of Wildlife biologist, reports, "Exotic plant species have replaced native species throughout many mule deer habitats. Often the exotic species are less palatable to deer and less nourishing.

Grazing by both livestock and deer and elk has favored less palatable and less nutritious species. Loss of habitat to urbanization, excessive suppression of wildfires, deer diseases, competition from elk, predation, and exotic plant infestations have combined to reduce Colorado's mule deer herd to one-half what it was at its peak in the 1950s."

Managing invasives can benefit wildlife. "Removing knapweed from one elk winter range in Montana changed elk distribution patterns, resulting in a 266-percent increase in elk use," says Jerry Asher, natural resource specialist with the BLM (retired).

This issue of *TechLine™ Newsletter* details several successful management programs that have returned wildlife habitat to its natural, healthy state. The complete Colorado Mule Deer Populations Study and other resources mentioned in this issue may be obtained from *TechLine* by calling toll-free 1-800-554-9333.

Inside TechLine

War On Weeds: Winning It For Wildlife

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This article is excerpted with permission from a presentation at the North American Wildlife and Natural Resources Conference, Rosemont, Illinois, March 27, 2000. The complete article and references may be obtained from *TechLine* by calling toll-free 1-800-554-9333.

This article discusses the rapidly accelerating damage that invasive plants are inflicting on wildlife habitat in this country. This problem may seem overwhelming but there are economical, realistic, and effective strategies available to meet this challenge.

I would like to begin with a reminder of our basic land management goal, to maintain or improve the health of the land. This goal really means maintaining a wide variety of healthy grasses, forbs, shrubs and trees distributed across the landscape. Fortunately, well-managed land is the best defense against the spread of weeds. The best way to rate the health of a plant community is by determining the percent of exotic species present (Fegler 1998).

Unfortunately, when we look at the vast public lands in the West, the greatest obstacle to maintaining healthy plant communities and to the restoration of less than healthy communities is the rapid expansion of invasive weeds. Invasions are easy to recognize in hindsight after they have entered an explosive phase. Unfortunately, by this stage, it is difficult or impossibly expensive to control the increase of the invader (Huenneke 1996). An example is The Nature Conservancy's Altamount Prairie in South Dakota which is so badly infested with leafy spurge that it is no longer regarded as worth managing as native prairie and cannot be sold as cropland (Randall 1996).

Permanent Degradation

There are many exemplary weed management efforts underway by private, county, state, university, and federal organizations. To the credit of many dedicated people, the number of successful restoration projects increases every year. However, the amount of wildland being restored is minuscule compared to the amount of land that needs to be restored. Therefore, the term "permanent" is used because, with today's economics and technology, it is impractical to restore most extensive weed infestations, especially in steep or rocky terrain. Furthermore, extensive weed infestations near trees and shrubs, and infestations in riparian areas frequently become permanent because of restrictions on the use herbicides in those areas.

Impacts

There are major impacts of invasive weeds to wildlife habitat, watershed health and endangered species. Studies in Montana show that spotted knapweed invasions reduced available winter forage for elk between 50 and 90% (Duncan 1997) and in some parts of Theodore Roosevelt National Park in North Dakota, leafy spurge reduced bison forage by 83%, and deer and elk forage by 70% (Stalling 1998).

Wildlife habitat in riparian areas is especially vulnerable to devastation by weeds because of the extra moisture for plant growth and the easy transport of weeds into riparian areas by people, animals, and water. Perennial pepperweed, leafy spurge, Russian knapweed and tamarisk (salt cedar) often form near monocultures in riparian areas and adjacent uplands.

Purple loosestrife is another exotic that thrives in riparian and wetland habitats. In its native habitat in Europe it only comprises one to four percent of the native vegetation, but in North America densities of up to 80,000 stalks per acre have been recorded (Strefer 1996). Thus, purple loosestrife outcompetes native plant species and reduces biodiversity (Nyvall 1995).

Fibrous rooted native plants hold soil in place, reduce erosion, promote infiltration and slow release of water, and provide resilience against fire and drought. Many invasive weeds, in contrast, have a taproot that does not have those beneficial characteristics. In a study area in Montana, runoff and sediment yield were 56 percent and 192% higher, respectively, for areas dominated by spotted knapweed than for native bunch grass vegetation types (Lacey 1989). That increased

runoff, early in the season, results in lower summer flows with higher stream temperatures. This higher temperature, coupled with increased sedimentation, degrades water quality and fish habitat.

Numerous studies demonstrate reduced numbers and/or diversity of birds, reptiles, small mammals, and insects in stands of non-native plant species (Huenneke 1996). For example, kangaroo rat and ground squirrel populations were severely reduced on sites infested with Russian knapweed in a study in Wyoming (Johnson et. al. 1994).

Four vegetative characteristics commonly used to evaluate wildlife habitat quality include: horizontal plant diversity, vertical plant diversity, amount of edge, and the degree of interspersion (degree plant species are scattered at intervals across a landscape).

As weed infestations become severe, diversity declines and wildlife habitat quality degenerates (Olson 1995).

Research concerning chukar partridge habitat use and availability in the severely infested lower Salmon River Canyon of Idaho, revealed that chukars selected against (avoided) habitats with higher yellow starthistle ground cover (Lindbloom 1998). Another study showed that when chukar partridge were given free access to all the medusahead caryopses (seed) they could eat, along with other dietary requirements, they suffered dramatic losses in body weight (Savage et al, 1969).

The impact to endangered species is significant. In Bureau of Land Management (BLM) managed land, there are currently 236 federally listed species, 50 proposed for listing and another 1000 plant and animal species in the sensitive category (Lawton 1999). Using sage grouse for example, in nine states having long term data, breeding populations have declined by 17-47% from the long term average (Connelly et al. 1997). Sage grouse need a wide variety of grasses, forbs and shrubs for foraging and nesting. However, on BLM lands near Idaho Falls, we see that leafy spurge is forming a near monoculture – taking over some critical grouse habitat.

Looking at a larger perspective, I do not know of any weed that is all bad. For example, many bird species like tallow seeds. So there is some benefit from this tree. However, regarding insectivorous migratory birds, research shows that there are significantly fewer insects on tallow than on the native oak. Furthermore, while caterpillars are an important food source for migrant birds, caterpillars cannot be found on the exotic tallow tree. Caterpillars are, however, abundant on native trees and other plants (W. Barrow personal communication: 1999).

Also, foraging migrant birds, as a group, avoided tallow trees (Barrow et al, 2000).

So, while there is some value to the exotic tallow tree, like other invasive exotic plants, it commonly grows into extensive monocultures, especially after fires, floods or hurricanes. Each wildlife species has specific habitat requirements for feeding and cover — which are different for different animals. Therefore, instead of monocultures of weeds, the native vegetation must be diverse to support the full wildlife community.

Rate of Spread

Why did I say: "Wildlife habitat in thousands of public land watersheds is rapidly undergoing the greatest permanent degradation in its recorded history?" It is because so many lands are in the *process* of becoming infested. Wildland weeds increase on average about 14 percent per year. That is an exponential doubling every five years. In one research area in Colorado, Dalmatian toadflax increased 1,200 percent over a six-year period (Beck 1998). Similarly, field inventory data in the South Fork of the Shoshoni drainage in northwest Wyoming showed that Dalmatian toadflax increased from four acres in 1985 to 2,000 acres in 1997 (Christy 1998).

Solutions

With big game, bird, fish and endangered species habitat undergoing rapid, accelerating and often permanent degradation from weed infestations, on a grand scale, what are the solutions? The magnitude of this problem can leave one feeling overwhelmed. But, if we had just discussed wildlife management, or recreation management, everywhere — all at once — like we just discussed weeds, we would also feel overwhelmed.

However, at the local watershed level where someone is responsible for every piece of land, cooperative weed management can be a reasonable, effective and rewarding endeavor. About 90% of the 350 million acres of western public lands, are not significantly infested — yet. And, there is a readily available, effective and widely accepted strategy called Integrated Weed Management that includes: prevention, for

See "Winning for Wildlife" on page 12

Integrated Methods Control Yellow Starthistle at Fort Hunter Liggett

By Charles Henry
TechLine Editor

Many land managers contend with a vast array of obstacles when managing invasive and noxious weed infestations. Rough terrain, off-target vegetation, short application windows, and other environmental site restrictions are common challenges. Art Hazebrook adds unexploded ordinance and live-fire exercises from heavy armor to his list. Hazebrook is the Land Rehabilitation and Maintenance Coordinator at Fort Hunter Liggett (FHL) in Central California.

Despite the impacts of military training and other past and present human activities, FHL is one of the most protected tracts of land in California and remains a sanctuary for diverse plant and animal species and communities (see sidebar "Fort Hunter Liggett). Many areas of the installation remain relatively pristine. The Army is dedicated to preserving the land occupied by FHL and has developed the Land Condition Trend Analysis (LCTA) and Land Rehabilitation and Maintenance (LRAM) components of the Integrated Training Area Management Program (ITAM) as tools that will contribute to this effort.

Art Hazebrook is the Land Rehabilitation and Maintenance Coordinator at Fort Hunter Liggett (FHL) in Central California.

Despite the impacts of military training, FHL is one of the most protected tracts of land in California and remains a sanctuary for diverse plant and animal species and communities.

Yellow starthistle infests 20,000 acres at FHL (left).

"Make no mistake – military use of this land takes priority," Hazebrook explains. "In fact our management of yellow starthistle was initiated because of the plant's negative impacts on training. The weed creates an excessive fire danger. When wildfires breakout, training is interrupted. The weed also punctures parachutes and tears the material after drops. Thus, we needed to control it. The side advantage is an incredible increase in the health of the overall resources at FHL that benefits all species (see sidebar "Fort Hunter Liggett's Resources)."

Hazebrook says yellow starthistle infests 20,000 acres of FHL at 30-50% density covering five major ecosystems. "These include coast live oak woodlands and blue oak and valley oak savannas, valley grasslands composed of non-native annual and native perennial

Fort Hunter Liggett

Fort Hunter Liggett (FHL) is a U.S. Army Reserve training installation that is under the command of Fort McCoy, Wisconsin. It serves as a training center for the U. S. Army Reserves, the National Guard, and other branches of the Army, Navy, Air Force and Marines, as well as civilian organizations such as the FBI and Department of Justice. Armored vehicle maneuver practice, live fire exercises, survival and fitness training, and testing of experimental weapons systems are among the activities that take place at this installation.

FHL is located in southern Monterey County, California, 18 miles south of King City. It occupies over 162,000 acres that are largely undeveloped and provides spacious training grounds. The terrain ranges from open or wooded valleys and gentle hills to steep slopes densely covered by chaparral and forest. The installation is divided into the cantonment area and 29 training areas.

bunch grass stands, stream corridors, and vernal pools. Two-thirds to three-fourths of these habitats are treatable."

Management Matches Each Site

"Each of these areas contain separate plant and animal communities and FHL, in cooperation with California Dept. of Food and Agriculture officials and University of California at Davis researchers, have developed integrated management plans for each," Hazebrook says. "Burning coupled with judicious herbicide use has proven the most effective combination so far. Several threatened species also occur in these habitats and weed management aims to protect these species as well (see sidebar "FHL T&E Species"). Yellow starthistle is the most dominant invasive at FHL. However, tamarisk (saltcedar) (*Tamarisk ramosissima* Ledeb.), French broom (*Genista monspessulanwa*), downy brome (*Bromus tectorum*) and pampas grass (*Cortaderia jubata*), and tree of heaven (*Ailanthus altissima*) infestations also occur."

Hazebrook says they treat large valley bottoms with Transline* herbicide applying 8 fluid ounces/acre (0.188 lb. a.i./acre clopyralid) in 10 gallons of water with a helicopter for precise placement. They treat in February or March when the yellow starthistle is in the 3 to 5-leaf, pre-rosette growth stage. Around vernal pools they rope wick Rodeo® herbicide and then Roundup® herbicide out to 30 meters from the pools where they begin applications of Transline. No herbicide residues have been found at the limits of detection from extensive soil and water monitoring sites maintained outside sprayed areas.

"We achieved 96.1% percent control with 8 fluid ounces of Transline and 71.9% control when we reduced the rate to 4 fluid ounces per acre. In one 192-acre site, we achieved 99% control with the higher rate," Hazebrook explains. "We began in 1999 and to date we have treated 1,732 acres with this program. This level of success has prompted us to attempt treating up to 1,000 acres per year."

Other Integrated Techniques

Hazebrook says they do limited mowing for yellow starthistle control due the danger of unexploded ordinance and the apparent minimal success mowing has as a control measure. Grazing also has been cited as a useful management tool; grazing was discontinued in 1991 due to prolonged drought, lack of installation control over grazing, and inadequate planning. He would like to reintroduce and assess limited controlled grazing to augment other methods.

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"We deplete the yellow starthistle seed bed in the soil more quickly with these burns," Hazebrook explains. "However, burning is always a setup. We burn, treat, monitor for skips and check for annual and perennial grass promotion. We always try treatment regimes on small areas first to determine success, and then expand to larger areas.

Burning is a very viable tool at FHL, Hazebrook says. Historically, the military routinely burned training areas before exercises, so unplanned wildfires would not disrupt activities, thus FHL has an extensive fire team that can set and manage fires. Now, Hazebrook times these burns whenever possible as setup treatments for herbicide applications or biocontrol releases. Burning removes thatch so the herbicide can reach seedlings, releases nutrients to flush seedlings, and removes the seed source on dead dry matter.

"We deplete the yellow starthistle seed bed in the soil more quickly with these burns," Hazebrook

See "Fort Hunter Liggett" at bottom of page 6

Fort Hunter Liggett T&E Species

Eight federally listed animals are known to occur or have potential to occur at FHL:

- **Arroyo toad *(Bufo microscaphus californicus)***
- **Bald eagle *(Haliaeetus leucocephalus)***
- **San Joaquin kit fox *(Vulpes macrotis mutica)***
- **Vernal pool fairy shrimp *(Branchinecta lynchi)***
- **California condor (*Gymnogyps californianus)***
- **American peregrine falcon *(Falco peregrinus anatum)***
- **Least Bells vireo *(Vireo bellii pusillus)***
- **California red-legged frog *(Rana aurora draytoni)***

In addition, there are seven species that are candidates for federal listing that could potentially inhabit FHL.

Fort Hunter Liggett Resources

Two rivers, the San Antonio and the Nacimiento, as well as numerous smaller creeks and streams, course through FHL. In addition, there are approximately 30 artificial reservoirs of different sizes. These aquatic bodies provide water for wildlife as well as supporting migratory waterfowl, fish, amphibians, and aquatic invertebrates. A number of these reservoirs and a portion of San Antonio Lake are within FHL boundaries and are open to public fishing. FHL is cut off from buffering coastal influences by the Santa Lucia mountain range. Daytime temperatures may rise well above 100˚ F in the summer and nighttime temperatures often drop below freezing in winter. Rainfall averages approximately 20 inches annually but may be less than 10 inches in dry years.

FHL supports multiple non-military uses of the land. Recreational hunting and fishing are allowed in all but the high impact areas of the installation. Cattle grazing, which took place from the mission era until the early 1990s, may be introduced again in the near future.

An impressive variety of animal and plant species and communities can be found at Fort Hunter Liggett. The number of plant taxa (including subspecies and varieties) occurring on FHL is estimated to be between 1,000 and 1,200 (Colorado State University, 1998), and 18 distinct vegetation communities have been described. A number of rare animals and plants inhabit FHL. Santa Lucia mint *(Pogogyne clareana),* which is federally listed as endangered, is only known from FHL. Purple amole *(Chlorogalum purpureum* var. *purpureum),* which was recently federally listed as threatened, was only known from FHL until recently when it was discovered at Camp Roberts, approximately 20 miles southeast of FHL.

Vernal pools and marshes are found at FHL. These ephemeral wet areas support numerous macroinvertebrates and planktonic animal and plant species, which in turn serve as food for migratory waterfowl and shorebirds (Silveira, J.G, 1992). Many species of specialized flowering plants grow around the margins of these pools. These plants begin their life cycle in a semi-aquatic state and complete it on dry land.

Tule Elk Herd

The Fort Hunter Liggett tule elk herd was established in December of 1978 when 22 elk from the Tupman Tule Elk Reserve were relocated to FHL. Two additional bull elk were relocated from San Luis National Wildlife Refuge in September 1979. In April 1981, James M. Willison, a student from California Polytechnic State University, San Luis Obispo, was contracted by CDFG to determine the herd's status. He reported 15 known mortalities, 14 of which were all illegally harvested.

Only four cow elk were present on FHL in December 1981 (Willison 1986). In December 1981, 26 tule elk from the Owens Valley Goodale-Tinemaha herd were relocated to FHL. Nine of these elk were fitted with radio transmitters mounted on neck collars and were monitored by a student from California Polytechnic State University, San Luis Obispo until October 1983 (Willison 1986). Fort Hunter Liggett's tule elk herd is now estimated at 300-400 animals.

Mule Deer Herd

Currently, the FHL deer herd is managed cooperatively by Fort Hunter Liggett and the CDFG. Harvest data is being analyzed to calculate population

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"Fort Hunter Liggett"

Continued from page 5

explains. "However, burning is always a setup. We burn, treat, monitor for skips and check for annual and perennial grass promotion. We always try treatment regimes on small areas first to determine success, and then expand to larger areas. We have a dedicated group of cooperators working at FHL that provide us with research and management direction (see sidebar "FHL Cooperators").

Hazebrook says one problem at FHL is that reinfestation will probably always occur from rough terrain areas that are difficult to reach and roadside spread from maintenance operations. "One plus is that most areas with optimal soils are already infested, so the rate of spread is slowing. And since we began spraying, we are gaining the upper hand on returning these areas to a more diverse set of plant and animal communities, while concurrently enhancing training opportunities."

Complete references for this article may be obtained from TechLine by calling toll-free 1-800-554-9333.

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estimates and trends, and to guide harvest strategy for the hunting program. Routine spotlight surveys for deer are conducted by the Army seasonally. The following summarizes population trend information.

The deer of FHL are managed by CDFG as part of the Santa Lucia Herd. Deer of the California central coast are highly resident, generally occupying home ranges of less than one square mile (Longhurst et al. 1952, Taber and Dasmann 1958); consequently, the herd management boundary is arbitrary. This being the case, advantages in herd management have been realized for the FHL subunit.

Specifically, the military has enacted an antlerless and doe harvest strategy, designed to improve herd conditions in a density dependent relationship (McCullough et al. 1990). Since the military has great control over access, CDFG and installation biologists have been able to gather relatively complete harvest records, obtaining age-sex data which is of central importance to the management plan (Pine 1984, McCullough et al. 1990).

The FHL deer population has been monitored for three decades. Summer herd composition counts (age-sex ratios) and composition and condition measurements from harvest records were collected by Army biologists in the early 1960s (Fields and Cook 1960, Cook and Fields 1961).

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No herbicide residues have been found at the limits of detection from extensive soil and water monitoring sites maintained outside sprayed areas.

Fort Hunter Liggett Cooperators

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Cooperating Agencies, Roles and Responsibilities:

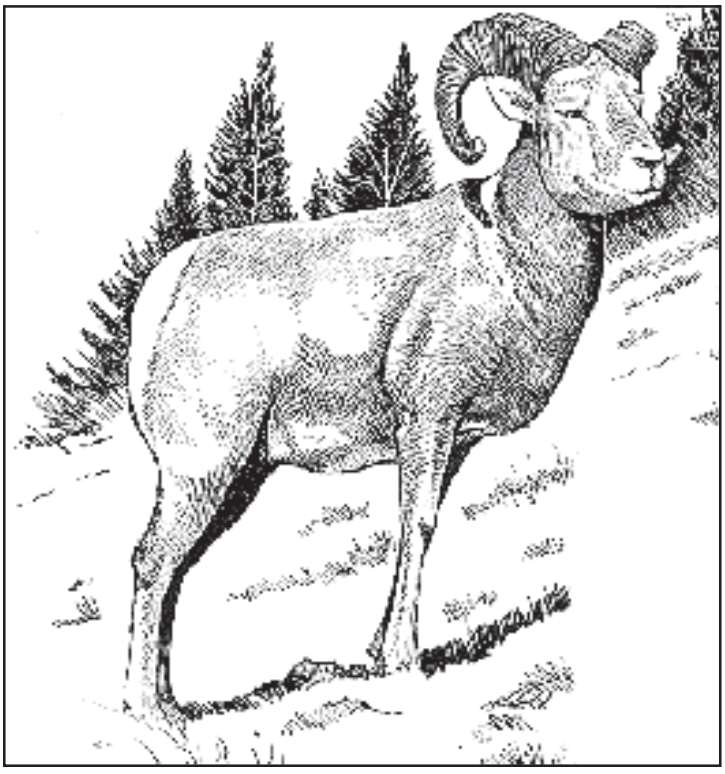
- **California Department of Food and Agriculture:**
  Program development and oversight, biological control activities, monitoring.
- **University of California, Davis:**
  Program development and oversight, plant population and control evaluation, monitoring.
- **Fort Hunter Liggett Integrated Training Area Management (ITAM)**
  Directorate of Plans and Training Installation Coordination:
  Chemical applications and revegetation
- **Fort Hunter Liggett Environmental Division, Directorate of Public Works:**
  Burning and mowing activities
- **Monterey County Department of Agriculture:**
  Local agency coordination, outreach, chemical application safety assurance

By Charles Henry
TechLine Editor

Bighorn Sheep Habitat Improved with Weed Control

One hundred years ago if a big game herd's habitat was destroyed, the herd simply moved to greener pastures. Today, some herds become stranded in "island habitats" cut off from migration by encroaching human development, highways, catastrophic wildfires, or other disturbances. More and more individual elk, deer, and bighorn sheep herds are confined to limited ranges. When non-native invasive weeds infest these ranges, and forage capacity declines, herds no longer have the option of "moving on."

"We had a healthy year-round range for a herd of 46-60 California Bighorn Sheep in the Mt. Hull area of the Okanogan National Forest," explains Duane Van Woert in the Tonasket Ranger District, Tonasket, WA. "This herd was planted in 1970 and maintained a healthy population a few years ago. This area had not burned for 70-80 years resulting in decadent forage. In addition, diffuse knapweed was beginning to invade and that caused us much concern."



Carol Ogilvie, noxious weed coordinator for the Tonasket Ranger District, says an old logging road through the area had been closed for decades, but ATV riders, hikers, horseback users, hunters, and other recreationists slowly brought diffuse knapweed into the area. Smaller infestations of St. Johnswort (goatweed) and houndstongue along with the diffuse knapweed were slowly choking out native populations of Idaho fescue and bluebunch fescue.

"Only about 5% of the sheep range was infested, but we wanted to get in there before there was a crisis. We could see that left unchecked, we could potentially lose this range. And this herd is isolated there – they have no alternative," she explains.

The Rocky Hull wildfire that burned through most of the range in 2000 prompted action on the weed problem. That fire began slowly, but was burning at the hottest, driest time of year and high winds created a run through 9,100 acres in one day. Nearly 3,000 of those acres were in the bighorn sheep range.

"Initially, the fire was good for the habitat. It cleaned out excess fuels and released nutrients although it did destroy 47 structures nearby. It also released the diffuse knapweed," explains Patti Baumgardner, partnership coordinator for the district. "After fire, diffuse knapweed can potentially outcompete vegetation in the entire habitat."

The district had begun working on the weed problem in 1998 with support from a broad network of cooperators (see sidebar "Mt. Hull Bighorn Sheep Cooperators). They began with a strong educational component bringing everyone together to describe the problem and to help with control work and monitoring.

The district completed mapping and inventory and tiered the forest Environmental Assessment (EA) to the project area. Then they began three years of herbicide spraying hiring a local contract applicator. Due to the roughness of the terrain, the applicator used ATV and backpack sprayers. Crews treated with Tordon* 22K herbicide at 1.5 pints per acre and 1.0 pint per acre on rockier sites. Rodeo herbicide at 1 quart per acre was applied along the one riparian area in the sheep habitat. Two plots were created for

(Near right) Patti Baumgardner, Duane Van Woert, and Carol Ogilvie examine treatment results on the Mt. Hull Weed Control Project. (Far right) Technicians await a GPS satellite signal to mark a biocontrol release site location.

monitoring effectiveness of treatments each year.

"We obtained very effective control," Ogilvie explains. "Control with Tordon herbicide was outstanding and we still have residual control. There is less than 1/5 of an acre of diffuse knapweed remaining – which is a 99.83 percent reduction in infested acres."

To support their herbicide work, Ogilvie and Coppock also released *Chrysolina hyerici* beetles on the St. Johnswort infestations. They obtained the beetles from the Quad Counties Biocontrol Group headed by Dan Faggerty, Washington Cooperative Extension agent in Ferry County. Handpulling is also done whenever personnel are in the area since the terrain is rough and difficult to reach.

"Only about 5% of the sheep range was infested, but we wanted to get in there before there was a crisis. We could see that left unchecked, we could potentially lose this range. And this herd is isolated there - they have no alternative," Ogillvie explains.

Ogilvie says the control phase of the project is complete and they are now only monitoring. "We were very concerned with the burned areas, but we have met our diffuse knapweed control objectives even in those areas. We will continue to treat any new infestations, but I think we have successfully protected this bighorn sheep habitat. With a healthy range, we should have healthy sheep."

The Tonasket Ranger District team says they would change one aspect of the Mt. Hull Bighorn Sheep Project. They began by contacting national groups, figuring that was the best source of funding. But looking back, they say they should have worked locally first. The local residents who belonged to the national wildlife groups were ultimately the key to obtaining funding and support at the national level. And local residents were more vested in the project, so they kept the project rolling with their own labor and support.

"The cooperation of the adjoining landowners was fantastic," Baumgardner says. "Sheilah Kennedy, Okanogan County's weed supervisor, sent educational packets to all adjoining landowners and followed up with specific control recommendations for each landowner. These landowners did a great job spraying diffuse knapweed on their land so the sheep habitat was not reinfested," she concludes.

Mt. Hull Cooperators

National Fish & Wildlife Foundation
Foundation of North American Wild Sheep
Washington Dept. of Fish & Wildlife
Island Empire Wildlife Council
Okanogan County Weed Board
Bureau of Land Management
Oroville-Tonasket Irrigation District
Range Permittee – Dan Dagnon, Tonasket
Adjoining Private Landowners

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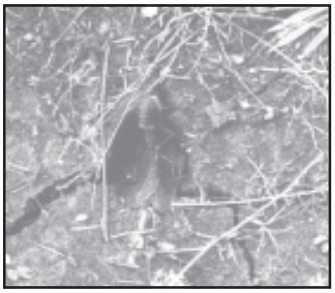
Tordon 22K is a federally Restricted Use Product

Land Users Restore Roosevelt Elk Range

By Charles Henry
TechLine Editor

Wayne Fitzwater, Washington DNR land manager, and Cathy Lucero, Clallam County weed coordinator, examine new elk forage growing where meadow knapweed previously dominated. Fresh elk tracks (left) demonstrate that the big game animals have returned to utilize once the knapweed is controlled.

One thoughtless act of vandalism and land abuse by a small group of off-road vehicle users nearly scuttled years of Roosevelt elk habitat restoration on the Olympic peninsula of Washington. The 5,000 acres of WA Department of Natural Resources (DNR) land was home to a resident elk herd, and also spotted owls and marble murreletts, a sea bird that nests on shore in large spruce trees. Wayne Fitzwater, DNR land manager, explains that DNR lands are trust lands that benefit schools, counties, and universities. As such, they are managed for a wide range of uses including timber, recreation, watershed protection, and wildlife habitat.



"Over time more than 47 miles of roads and trails were created in this area, but the elk seemed to co-exist with the heavy recreational use as long as they had forage," Fitzwater explains. Hikers, hunters, bicyclers, horseback riders, and motorcycle and ATV riders all used the area."

Cathy Lucero, Clallam County weed coordinator, says the expansion of meadow knapweed and oxeye daisy was seriously impacting the elk's grazing meadows and it was obvious that the lack of quality forage at higher elevations would become more important over time. "These elk seasonally migrated over a wide area ranging from lower valley meadows to forest land in the mountains."

Encroaching urban development forced the elk to spend more time at higher elevations until a series of bad winters and heavy predation by rising cougar populations prompted them to move back down again. By now the only areas where they could find food was on agriculture land and in urban backyards. Their movement through the valley became a serious safety issue as elk, attempting to get to fields across a major highway, caused several human fatalities. Also elk killed on the roads seemed to be the lead animals.

Without their leaders, the herd did not know how to move back to the mountains becoming instead year-round valley residents. We had to restore that habitat to have any chance of moving them back."

Meadow knapweed (*Centaurea jacea XC. nigra*) and oxeye daisy (*Leucanthemum vulgare*) infested most of the road and trailsides and many of the grass meadows and wetlands. Some areas were nearly 100% infested, significantly reducing the only consistent sources of forage for the Roosevelt elk, according to Lucero. They decided to concentrate on the meadow knapweed, since it was the greatest forage robber.

Weed control efforts began two years ago, funded in part by a Rocky Mountain Elk Foundation habitat restoration grant. The DNR contracted with a commercial applicator to treat the knapweed with Transline* herbicide using backpack and ATV-mounted sprayers. The Transline herbicide was applied at a rate of 1.33 pint per acre. Rodeo® herbicide was applied around wetland edges. Roadsides were treated with Curtail* herbicide, with excellent control.

In addition to controlling their weeds, the DNR was also in the process of creating a comprehensive recreation plan for the entire Burnt Hill area. Under the plan, some of the trails in the treated area might have required closure or restrictions to allow the rehabilitation to succeed. Frustrated by what they perceived as an attempt by the DNR to eliminate motorized use of the area, a small group of local

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residents gradually trashed the treated areas with four-wheel drive vehicles, motorcycles, and ATVs. This damage was capped off by activities during a single annual event when virtually all the newly treated elk forage areas were literally plowed up in one day with the vandals leaving ruts as deep as five feet in wetter areas. A local newspaper article actually glorified what had occurred.

"Two very vocal public meetings commenced after the vandalism, and the DNR and county decided to give users the opportunity to correct the problem. Merrill and Ring Timber Company, a private landowner within Burnt Hill whose holdings had also suffered extensive damage, pitched in to sponsor a cleanup day," Lucero explains. "Local loggers, who were also responsible off-road vehicle enthusiasts, donated the use of four dozers, an excavator, trucks and trailers. One logger brought a dozer with a brush blade. The Pacific Northwest Four Wheel Drive Association put out a call for volunteers and their members responded by sending workers from as far away as 300 miles. They joined local residents in the cleanup."

The brush blade was used to re-level the main meadow, although some ruts remain because the ground was too wet to work. Next, volunteers hand seeded the area and access trails with a meadow grass mix and dry fertilizer. As workers finished and withdrew, tank traps were dug to close roads and trails and signs posted prohibiting motorized access. The DNR will now cite and prosecute violators caught behind the signs.

"In just four months we achieved excellent grass establishment and there are few weeds in the treated and rehabbed areas. We still have some small patches along the meadow edges and on some roads. We will spot spray these next year," Lucero explains. "The best news is that we see strong sign of elk use. They are using the area extensively for the first time in years."

In addition to the herbicide treatments, seed head weevils (*Urophora affinis* and *quadrifascienta*) were released on remaining meadow knapweed infestations. These insects are collected and distributed together although only one works on meadow knapweed, Lucero says. And the Forest Service

See "Burnt Hill" on page 12

Burnt Hill Elk Project Cooperators

Clallam County
WA Dept. of Natural Resources
Olympic National Forest
WA Dept. of Fish & Wildlife
Citizens Elk Group (local)
Merrill and Ring Timber Company
Rocky Mountain Elk Foundation
Boy Scouts of America
Point No Point Tribal Council
Pacific Northwest Four Wheel Drive Assn.
Burnt Hill Focus Group
Sequim Elk Committee
Olympic Trailblazers
Olympic Peninsula Motorcycle Club
Olympic Peninsula Bicyclists
Back Country Horsemen
Just Jeep Junkies
Citizens Group (Burnt Hill property owners)
Peninsula Trails Coalition

(Clockwise beginning above) A brush blade was used to re-level the main meadow, although some ruts remain because the ground was too wet to work. Next, volunteers hand seeded the area and access trails with a meadow grass mix and dry fertilizer. As workers finished and withdrew, tank traps were dug to close roads and trails and signs posted prohibiting motorized access. The DNR will now cite and prosecute violators caught behind the signs.

"Winning for Wildlife"

Continued from page 3

education, detection, control, restoration and monitoring. However, to be effective, cooperation among all landowners, user groups and agencies is critical. That is why cooperative weed management areas are so urgently needed in so many landscapes. A county, state and federal effort produced the Guidelines for Coordinated Weed Management: Development of Weed Management Areas (1999) (available from regional Forest Service and state BLM offices). These guidelines can help people learn how to initiate and implement cooperative weed management areas.

The key to winning the war on weeds is to put top priority on keeping relatively uninfested land from becoming seriously infested. In conjunction with Integrated Weed Management Strategies, this is an effective, economical and realistic approach.

"Burnt Hill"

Continued from page 11

has also achieved success on other nearby elk forage sites where volunteers hand pulled Canada and bull thistle plants.

"A large number of private citizens, public agencies, and user groups came together to correct a situation caused by a few. We thought we had lost the elk habitat to weeds, and then to careless use. In the end, we think we have preserved the elk habitat and also won a few converts for wiser land stewardship," Lucero concludes.

Need More Information? Call *TechLine* at 1-800-554-WEED (9333)

This issue of *TechLine™ Newsletter* details several successful management programs that have returned wildlife habitat to its natural, healthy state. The complete Colorado Mule Deer Populations Study, the Winning for Wildlife article, more information on the program at Fort Hunter Liggett, complete references for these articles, and other resources mentioned in this issue may be obtained from *TechLine™ Newsletter* by calling toll-free 1-800-554-9333.

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