



Keeping Landscapes Working

A Newsletter for Managers of Bay Area Rangelands

Volume 1, Issue 2

University of California Cooperative Extension

Winter, 2003

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A newsletter provided by the UC Cooperative Extension Natural Resources Program in the San Francisco Bay Area. This newsletter provides information to managers of both public and private rangelands. RANGELAND, which is land characterized by natural vegetation, i.e. grass, forbs and shrubs and managed as a natural ecosystem, is the predominant source of OPEN SPACE in the San Francisco Bay Area.

Sheila Barry, UCCE Bay Area Natural Resources Advisor

A Call to War on Weeds

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Excerpts from Rangelands Volume 23, No.3

The continued spread of invasive and noxious weeds across the nation's open space lands is reaching a crisis level. Millions of acres of once healthy, productive rangelands, forestlands and riparian areas have been overrun by noxious or invasive weeds. It is estimated that every day on Federal Lands alone another 4,600 acres becomes infested with noxious weeds. That is an infestation rate of 1.67 million acres/ year. Across the western United States it is estimated that 133 million acres of rangeland are infested with noxious weeds.

Noxious weeds are a national problem that is affecting every citizen either directly or indirectly. It is a major threat to the nation's rangeland and forested lands and the economic well-being of associated industries including livestock production, wildlife, timber, and recreation and open-space experiences.

Noxious and/or invasive weeds are undesirable because:

- they reduce plant and animal diversity including disrupting waterfowl and neo-tropical migratory bird flight patterns and nesting habitats and displacing many other threatened and endangered species.
- they seriously reduce livestock and wildlife carrying capacity by limiting forage production and/or physically restricting access to forage, water or shelter.
- they can serve as abundant fine fuel which may alter normal fire regimes increasing both ecological and economic risks.
- they often alter soil chemistry and nutrient cycles which reduces overall productivity and ecological health.
- they cost millions of dollars in treatment and loss of productivity.

Keeping Landscapes Working

is published through the cooperative efforts of the University of California's Santa Clara County Cooperative Extension Service and the County of Santa Clara

Get Involved with Your Local Weed Management Area

Noxious and invasive weeds are a major concern on private and public lands in the San Francisco Bay Area. There are Weed Management Areas in each county that are coordinating efforts and expertise against common weed species. They are unique because they are working to address agricultural (regulatory) weeds and “wildland” weeds under one local umbrella. To learn about the meetings and activities of a weed management area near you, contact:

Alameda and Contra Costa Counties

Vince Guise, vguis@ag.co.contra-costa.ca.us, (925) 646-5250

San Mateo County

Gail Raabe, smateoag@cdfa.ca.gov, (650) 363-4700

Santa Clara County

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What is a noxious weed?

Legally, a noxious weed is any plant designated by a federal, state or county government as injurious to public health, agriculture, recreation, wildlife or property. (Sheley, Petroff, and Borman, 1999) A noxious weed is also often defined as a plant that is growing out of place (i.e. a rose can be a weed in a wheat field) and is “competitive, persistent, and pernicious.” (James, et al, 1991).

Are invasive plants the same as noxious weeds?

No. Invasive plants include not only noxious weeds, but also other plants that are not native to their location. Because invasive plants are living in an environment they did not evolve in, they usually have no natural enemies to limit their reproduction and spread (Westbrooks, 1998). Some invasive plants can produce significant changes to vegetation, composition, structure, or ecosystem function. (Cronk and Fuller, 1995).

Cronk, Q., and J. Fuller. 1995. Plant Invaders: The threat to natural ecosystems. Chapman & Hall. New York
James, L., J. Evans, M. Ralphs, and R. Child, editors. 1991. Noxious Range Weeds. Westview Press. Boulder, CO.

Sheley, R., J. Petroff, M. Borman, 1999. Introduction to Biology and Management of Noxious Rangeland Weeds, Corvallis, OR.

Westbrooks, R. 1998. Invasive plants, changing the landscape of America: Fact book. Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW). Washington, D.C.

Weed Watch

Barbed goatgrass, *Aegilops triuncialis*

Background: Barbed goatgrass is an introduced annual grass from Europe. It is abundant in parts of Calaveras, San Joaquin, Stanislaus, Yolo and Mendocino counties. Some isolated populations have been found in Alameda, Contra Costa and Santa Clara counties. There are no known infestations in San Mateo County. There are on-going efforts in each of these counties to locate and eradicate or contain new populations.



Identification: Barbed goatgrass is 8 to 16 inches tall with few to many culms. When young, the leaf sheaths contain white hairs, but once matured, they become more or less smooth. The blades are rigid, sharp, pointed, and spreading. Flowers on this grass weed are spiked and grow to about 3 inches in length, including awns. The flowers contain 3-5 spikelets. The grain is about 1/4 inch long, resembling a wheat kernel.

Control: Small populations of Barbed goatgrass can be controlled by hand pulling. Two consecutive late spring burns can provide excellent control. Contact a pest advisor for chemical options.

Ecological Concerns: Barbed goatgrass reduces the abundance of native perennial bunchgrasses and competes with more desirable introduced annuals as well as forbs. Its seed is very adept at germinating, even without soil contact. The seed can send roots down through thatch or through a bunch grass. Unlike many other introduced annual grasses, this species appears to do well on serpentine soils. Generally because serpentine soils are resistant to the spread of annual grass they are a refugia for native plants. In Yolo County, Barbed goatgrass was successful at invading a yellow star thistle site after a transline treatment.

Stinkwort (*Dittrichia graveolens*)

Background: Stinkwort is from the Mediterranean region, but has become naturalized in many parts of southern Australia. It was first identified in California on a levee at the San Francisco Bay Wildlife Refuge in Alameda County in 1995. It is now found on many sites in Alameda County, Contra Costa County, and Santa Clara County. There are also populations of it in San Mateo, Solano, and Yolo Counties. Although it is often the only green plant present during late summer it is unpalatable to livestock.

Identification: Stinkwort is a multi-branched, fall-blooming annual, which is superficially reminiscent of a tarweed. It can grow up to 3 ft. high, although it is usually smaller and branched from the base. The whole plant has fine hairs, sticky, and smells very strongly of camphor. It has alternate leaves, which are narrow and grayish green. Its ray flowers are small and yellow with tiny petals. Its seeds look like the typical spherical fluffy daisy seed heads.

Control: Hand-pulling before seed set may be appropriate to control small infestations of stinkwort. Contact a Pest Control Advisor for chemical options.

Ecological Concerns: Stinkwort can spread rapidly as an invasive weed. The fine hairs of the seeds help with wind dispersal. They also stick to clothing, wool, hair and machinery and spread in contaminated soil. There are reports that there are scattered individuals along most major highways leading inland to the Central Valley from the San Francisco Bay Area. It's been observed to form dense masses on disturbed sites. Since it is a relatively new invasive plant its ability to colonize a range of sites is unknown.



Planned Herbivory

One tool of Integrated Weed Management



Planned Herbivory:

A detailed program worked out beforehand using grazing and or browsing animals to control or eliminate undesirable plants and favor desirable plant species.

Different animal species and classes within species (i.e. yearling calves versus cows), have varying diet preferences and behavior that influence the kinds of plants they graze and even where they graze. Understanding these preferences and their behavior is important in matching the appropriate herbivore (livestock) species to a given weed infestation.

Cattle, goats, sheep, horses and even geese are examples of herbivores that can be used to control weeds. Cattle will graze invasive grasses, can trample inedible weed species, and can incorporate native seeds into the soil. For example, cattle have been used effectively to control medusahead (*Taeniatherum caput-medusae*) and annual ryegrass (*Lolium multiflorum*). Horses can also be used to control invasive grasses, but horses tend to be more selective. Geese are also grass eaters, but are more subject to predation. Predation from coyotes and mountain lions may dictate the type of grazing animals that can be used.

Sheep and goats prefer broadleaf plants and have been used to effectively control yellow starthistle

(*Centaurea solstitialis*), Russian knapweed (*Acroptilon repens*), and toadflax (*Linaria spp.*) When compared to cattle, sheep and goats have more agile lips and the mobile part of their tongue is longer. This enables them to strip twigs, leaves, or flower heads from the fibrous stems of plants. These animals are also often able to neutralize phytochemicals toxic to other animals that are present in many broadleaf and woody plants. Sheep have also been useful in controlling spotted knapweed (*Centaurea maculosa*). Goats have been used to successfully control Canada thistle (*Cirsium arvense*) and can control woody species such as Himalaya blackberry (*Rubus discolor*) and Poison oak. They can browse quite high into the canopy of tall brush as they can climb and stand on their hind legs.

Water Availability

In regards to behavior, distance to water and ruggedness of terrain both contribute to the distribution of herbivores and their use of both desirable and undesirable plants. Specific recommendations on distances between watering points vary with terrain, species, breed and class of animal. The use of watering

sources to improve distribution will be discussed in the next issue of this newsletter. For now, consider the rule of thumb that optimum distance to water ranges from 0.5 mi. on rugged terrain to 2.0 mi. in flat country.

Topography

Next to water distribution, the second most important factor influencing the use areas within a field is topography. Herbivores vary considerably in their willingness to use steep slopes. Large, heavy animals such as mature cattle or horses have difficulty traversing steep, rocky slopes and in general make little use of slopes greater than 10%. Sheep and goats because of their smaller size, greater agility and sure footedness can uniformly use slopes up to 45%. Some wild herbivores have been found to use even steeper slopes. For example, in Oregon, bighorn sheep used slopes up to 80%.

Controlling Seed Dispersal

Some weed seeds, like spotted knapweed (*Centaurea maculosa*), remain viable after passing through the digestive tract. Animals that are used for weed management should

therefore not be brought to a weed-free area until all seeds have passed through their digestive tract (5-9 days). Weed seed can also be transported in the hair, wool or mud on an animal. Animals moved out of an infested area should be inspected for weed seed.

Plant availability, hunger, and previous experience can determine an animal's selection of food plants. Differences in vegetation quality may cause an animal to eat one species in one situation and to ignore the same species in another. A period of adjustment is generally required to get a grazing animal to eat a new type of forage. It is therefore helpful to find animals with previous experience consuming a target weed.



Timing

Animals should be brought into an infested area at a time when they will be most likely to damage the invasive species without significantly impacting the desirable species. Grazing during seed or flower production can be useful, but some weeds are only palatable during the earlier part of the growing season. For example, medusahead and foxtail barley can be grazed by cattle and horses before the seed heads develop, but are avoided by livestock after they have set seed because the stiff awns can puncture mouth and throat tissue. Grazing especially of broad leaf and woody plants may initially lead to an increase in stem density and root

buds. In fact grazing yellow starthistle during the rosette stage only can lead to increase in yellow starthistle cover. Repeated grazing is often necessary to reduce stem density.

Grazing must be closely monitored and the animals removed when the proper amount of control has been achieved and/or before desirable native species are impacted. A successful program depends on adaptive management. The land manager must be flexible and have control over livestock movements. Lack of control can result in overgrazing of desirable species, which may enhance weed infestations or allow new weeds to become established.

Regardless of the animal species, native or domestic, overgrazing can occur when animals are concentrated in an area for too long or if they are brought back to an area and grazing is instigated again before the plants have had sufficient time for recovery. Concentrating livestock for the appropriate period of time offers opportunities for weed management. When animal numbers are concentrated on smaller parcels for shorter time periods, they tend to be less selective in their eating habits, which helps encourage animals to eat the less palatable weeds. Intense management of grazing is especially critical in situations of high intensity grazing. Animals must be moved to new pastures before damage occurs to the desirable plant community.

It is particularly interesting to note that domesticated livestock will sometimes prefer diets of our most

scorned noxious weeds rather than native plants. This preference may be tied to locations where these animals originated, and the plant species prevalent in their native lands. We see the same phenomenon in our native wildlife ungulates, which usually will not graze in areas infested with high densities of Eurasian weeds.

What are the keys to success?

From a weed management perspective, there are several grazing principles and benefits to consider:

- ✓ Focus timing of grazing (season of use and duration) to be detrimental to weeds to remove flowering/seed-producing structures before viable seeds are produced.
- ✓ Plan timing of grazing to benefit the desired vegetation and promote competition with weeds, and
- ✓ Provide adequate time for desirable vegetation to recover between grazings.
- ✓ Watering facilities, appropriate fencing, monitoring, accessibility, and transportation also need to be considered before beginning a grazing program.

More Research!

It is important to recognize that grazing is only one method for management. By itself, grazing will rarely, if ever, completely eradicate invasive plants. However, when grazing treatments are combined with other control techniques, such as herbicides or biocontrol, severe

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Cattle Handling Guidelines – As Determined by Whom?

From Cow-Calf Weekly, by Joe Roybal, January 3, 2003

Dr. Grandin is an Associate Professor at Colorado State and is known world-wide for her expertise in livestock handling.

Animal behaviorist and handling expert, Temple Grandin of Colorado State University recently remarked that it isn't a matter of whether the U.S. beef industry will have cattle handling guidelines but who will write them.

"It's like pressure building behind a dam. We as an industry can either direct that pressure into something constructive, or can just let the pressure build until the dam breaks and we have a complete mess," said Grandin. "We in the beef industry can develop our own guidelines or have someone else do it for us. One way or the other, the industry will have handling guidelines."

"Europe," she says, "serves as a good example of the havoc well-intentioned outsiders with little or no practical experience within an industry can create. In Europe, they've developed some very unrealistic animal handling guidelines. For instance, they require so many rest stops for cattle in transport that the practice may actually stress the cattle more than the rest."

While beef safety audits have been a staple of the giant fast-food chains for more than a decade, the move to animal handling and welfare audits is relatively new. It began four years ago when McDonald's and Wendy's began conducting their own animal welfare audits of suppliers. They were joined a couple of years later by Burger King. Recently, however, the restaurant chains have begun

shifting that responsibility to commercial auditing companies, with the restaurants continuing to cover the costs.

Lately, Grandin says she's seen a surge in commercial firms providing such auditing services. She says she's worked with representatives from five different commercial auditing companies, teaching them



how to perform the American Meat Institute's (AMI) Objective Scoring System, a system she designed. This system is currently beginning used by about 90% of U.S. slaughter plants. The system allows scorers to attach a numeric value to the quality of animal handling rather than just making general subjective observations. The system involves scoring employees of a plant in their handling of 100 head of livestock. Scores are determined according to the percentage of those 100 head that: 1) Are stunned correctly on the first shot, 2) Vocalize during the handling and stunning process, 3) Are electrically prodded by their handlers, 4) Remain insensible after being stunned, 5) Fall down during handling

"In four years, I've seen tremendous improvement in the handling of animals by the major packers," Grandin says. "And the gratifying thing is that the improvement has been made without spending a lot of money or doing capital improvement to the facilities. It's been a matter of management, training employees and maintaining facilities."

For example on vocalization, 92% of the 54 plants rated excellent or acceptable, which means less than three out of 100 head vocalized during the handling process. "Four years ago, if I'd told people that this type of result in animal vocalization was possible, they would have told me I was crazy," Grandin says.

In fact, she says that of 54 AMI plants audited for animal welfare and handling in 2002, 94% scored excellent or adequate. Only three plants failed, but Grandin says these were smaller plants undergoing their first audit. "These plants basically didn't know what to expect and this was a learning audit for them. They will do better next year," she says. "A lot of activists like to attack the Big Three (Tyson, Excel and Swift) on animal handling but that isn't where the problem is."

Grandin says the U.S. beef industry should take notice of what the Food Marketing Institute (FMI), the trade association for U.S. grocery retailer, is considering—moving auditing from the packer further down towards the farm. She points out

that McDonald's, Wendy's and Burger King are already auditing producers of broilers and eggs. "And they're getting started on pigs," she says. Feedlots will be the first to experience auditing, Grandin says. She says she recently conducted a handling and welfare audit for one feedlot company. The form she uses is available on her website- www.grandin.com under "animal welfare guidelines."

"In my feedlot audit, I watched several hundred cattle going through the squeeze chute. I rated prodding, any cattle falling, and the speed with which they came out of the squeeze chute. I don't want more than 25% speeders out of the chute—running and jumping. They should come out in a walk or a trot. Those are my big three categories but I'll also look at head extender use—cases where the extender catches the animal's mouth. I also score the animals' vocalization in getting into the chute and being caught, but not their vocalization while they're in the squeeze chute. Any animal will moo when their ears are caught in the squeeze," she says. Grandin says it's unlikely all U.S. ranches will be subject to animal handling audits due to their sheer number. Ranch audits will likely be on a random basis—larger ranches being the most likely targets—with specific guidelines being a condition of doing business with segments further up the production chain. Beef industry segmentation and the isolation of some operations is one factor holding back the beef industry's move to development of animal handling guidelines, she says.

"What seems to be happening is that the progressive people are in favor

of such guidelines. The National Cattlemen's Beef Association, for instance, has put together an excellent committee of very knowledgeable people that has studied this issue and drawn up some excellent guidelines. "But there are some groups within the organization totally against any guidelines whatsoever. And that's

just not realistic in today's world. It is our customers that are driving this, and we will have them one-way or the other," she says. "Getting these programs in place now will save a lot of pain later."



Dr. Temple Grandin will be at Oakdale Producer's Livestock Marketing Association on March 26, 2003. In North America, almost half of the cattle are handled in a center track restrainer system that she designed for meat plants. In addition, her curved chute and race systems are used worldwide and her writings on the flight zone and other principles of grazing animal behavior have helped many people to reduce stress on their animals during handling.

Lunch will be served at noon, with Dr. Grandin's presentation to begin at 1:00pm. Cost is \$10 before March 19th, or \$15 at the door. For more information contact Theresa Ward at (209)525-6800. Checks, made payable to UC REGENTS, can be mailed to 3800 Cornucopia Way, Suite A, Modesto, CA 95358. Oakdale Producer's Livestock Marketing Association is located at 6001 Albers Rd, Oakdale, CA. This meeting is sponsored in part by: Conlin Supply, Oakdale Producer's Livestock Marketing Association, Pfizer Animal Health, UC Cooperative Extension, and Walco International.

Planned Herbivory

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infestations can be reduced and small infestations may be eliminated. For example, Colorado State University researchers, Drs. George Beck and Larry Rittenhouse noted an interaction between grazing and the occurrence of previously established seed head flies on a population of diffuse knapweed. Plants that were grazed twice had twice the number of larvae per seed head than plants grazed once or not at all.

Scientific research and experience has demonstrated that the most effective control strategies integrate



several tools (Integrated Weed Management). While the need for research continues, we must take our available

knowledge and apply it to our current problems. The weeds will not wait until we have all the answers.

Not only do we need to understand what effects each weed management tool has on the target weed, but we also must try to recognize the manner in which the combined tools interact with each other.

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