



Cattle Producer's Handbook

Range and Pasture Section

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Noxious Weeds on Rangelands

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Weeds, primarily from Eurasia, began making major inroads into western rangelands during the 19th century. In Eurasia they were generally not major problems because they evolved with natural controls such as insect predators, plant pathogens, fungi, other plants that provided competition, and intensive grazing. Plants that arrived here without those control agents have been able to dominate some locations with negative impacts on resource values important to livestock production as well as other uses. The encroachment of noxious weeds is reducing resource values of agricultural croplands and rangelands as well as wildlife habitat and has the potential to decrease property values for both production and recreational uses.

Weeds tend to prefer highly disturbed sites such as river and stream banks, trail heads, road sides, trails, wildlife bed-grounds, overgrazed areas, and campgrounds. Well managed land is the best defense against the spread of weeds, however, natural disturbances provide "safe sites" for weeds to become established even on well managed lands in good condition. Weeds are spread by vehicles, recreationists, distribution of weed contaminated hay, horses, livestock, wind, water, and a wide variety of wildlife including birds.

Noxious Weeds

"Noxious weed" means any weed designated by a state that is injurious to public health, agriculture, recreation, wildlife, or any public or private property. Noxious weeds have become so thoroughly established and are spreading so rapidly on state, county, and federally-owned lands, as well as on private land, that they have been declared by state laws (e.g. ORS 570.505 in Oregon) to be a menace to the public welfare.

Steps leading to eradication, where possible, are necessary. It is further recognized that the responsibility for such eradication and/or intensive control rests not only on the private landowner and operator, but also on the county, state, and federal governments. For more information contact your state's department of agriculture for a listing of noxious weeds in your state.

Integrated Weed Management

The magnitude and complexity of rangeland weeds, combined with their cost of control, necessitates using Integrated Weed Management (IWM). IWM involves the use of several control techniques in a well-planned, coordinated, and organized program to reduce the impact of weeds on rangelands.

Inventory and mapping is the first phase of any IWM program. The second phase includes prioritizing weed problems and choosing and implementing control techniques strategically for a particular weed management unit. Third phase is adopting proper range management practices as a portion of the IWM program. The IWM program must fit into an overall range management plan.

Inventory and Mapping

The goal of inventory is to determine and record the weed species present, area infested, density of the infestation, rangeland under threat of invasion, soil and range types, and other site factors pertinent to successfully managing the infested (and subject to infestation) rangeland. Inventories can be by field surveys, aerial photography, and geographic information systems.

Preventing Weed Encroachment

Preventing the introduction of rangeland weeds is the most practical and cost-effective method for their man-

agement. Prevention programs include such techniques as limiting weed seed dispersal, minimizing soil disturbance, and properly managing desirable vegetation. New weed introductions can be minimized by:

1. Use weed seed-free hay, feed grain, straw, or mulch.
2. Refrain from driving vehicles and machinery through weed infestations. If you must drive through a known weed-infested area, wash the undercarriage of vehicles and machinery after driving from a weed-infested area to an uninfested area.
3. Allow livestock to graze weed-infested areas only when weeds are not flowering or producing seeds, or move them to a holding area for about 14 days after grazing a weed infested area, but before moving them to weed-free areas.
4. Request that campers, hikers, and sportsmen take care in brushing and cleaning themselves and equipment before leaving weed-infested areas.
5. Minimize unnecessary soil disturbance by vehicles, machinery, water flow, and livestock.
6. Manage grasses to be vigorous competitors to weeds.

Detecting and Eradicating New Introductions

Early detection and systematic eradication of weed introductions are central to Integrated Weed Management. Weeds generally encroach by establishing small satellite infestations, which are generally the spreading front of the large infestation. Eradication is achievable on a small scale by employing appropriate management to totally remove the weed from the area.

An eradication program includes delimiting the boundaries of the infestation (on the ground and on maps) and determining the proper control procedures and the number and timing of followup applications. This generally requires aggressive annual applications of herbicides.

Hand weeding of small infestations that have not yet set seed may be effective for some weeds. Revegetation of infested areas may be required to eradicate weeds in areas without an understory of desirable species that can re-occupy the site after weeds are controlled. Eradication of small patches requires continual monitoring and evaluation to ensure successful removal of the weed.

Containing Large-Scale Infestations

Containment programs are generally used to restrict the encroachment of large-scale weed infestations. Studies have shown that containing weed infestations, which are too large to eradicate, is cost-effective because it preserves neighboring uninfested rangeland and enhances the success of future large-scale control programs.

Containment practices are designed to restrict the encroachment of noxious weeds onto adjacent rangelands. The most effective method of containment is to spray borders of the infested areas with an herbicide.

This approach is designed to concentrate efforts on the advancing edge of the weed infestation.

Containment programs typically require a long-term commitment to herbicide application because they are not designed to modify or reduce the infestation level, only to limit its spread. Roadways and railways, where weed infestations often begin, should be under a constant prevention and containment program.

Large-Scale Weed Control

Most successful large-scale weed control programs are completed in a series of steps. Weed control areas should be divided into smaller units to make them more manageable. Weed control should be carried out unit by unit at a rate compatible with economic objectives.

Initially, large-scale weed control should focus on range sites with an understory of residual grasses and the highest potential productivity. Suppressed grasses have the greatest chance of reestablishing dominance on these sites. These areas must be spot treated each year to ensure control and minimize reinvasion. In most cases, some percentage of the management unit will require repeated control measures until the weed seed bank and root reserves are exhausted.

Next, control efforts should focus on the sites adjacent to those initially treated to minimize reintroduction of the weeds. Usually, large-scale control is most effectively applied from the outside of the weed management unit inward toward its center.

Selection and application of weed control techniques in large-scale control programs depends on the specific circumstances for each portion of the management unit. Control techniques used in one area of the management unit may be inappropriate for another area. For example, sheep grazing leafy spurge in one area may provide cost-effective control, but sheep do not readily eat spotted knapweed and herbicides may be more appropriate. Similarly, the most effective herbicide for a particular weed species may not be labeled for use in an environmentally sensitive area.

Selection of a control method will depend on:

1. The weed species,
2. Effectiveness of the control technique,
3. Availability of control agents or grazing animals,
4. Use of the land,
5. Length of time required for control,
6. Environmental considerations, and
7. Relative cost of the control techniques.

Herbicide Control

Herbicides are an effective, necessary, and environmentally sound tool for the control of weeds and brush on rangelands when properly used. As a result, chemical control has been a widely used means of removing unwanted or noxious plants from rangeland.

Herbicidal control has distinct advantages over other plant control methods. These general advantages include:

1. Herbicides can functionally be used where mechanical methods are impossible, such as on steep, rocky, muddy, or many timbered sites, particularly with aerial application;
2. Herbicides provide a variety of application methods ranging from individual plant treatment to aerial broadcasting;
3. Herbicides provide rapid control of weeds;
4. Herbicide application may have low labor and fuel requirements;
5. Phenoxy herbicides are generally cheaper than mechanical control methods;
6. Most herbicides are selective or can be selectively applied so that damage to desirable plant species can be minimized;
7. Herbicides can maintain a grass and litter cover that reduces soil exposure to erosion;
8. They are safe and reliable when proper safeguards are followed;
9. They can often utilize regular farm and ranch spray equipment; and
10. Soil-applied herbicides for brush control can be applied over a relatively long time period.

Disadvantages of using chemicals to control undesirable range plants include:

1. No chemical control has yet proven fully satisfactory for some noxious plant species;
2. The improper use of chemicals can be hazardous to nontarget plants in the stand and to cultivated crops or other nontarget sites nearby, or may contaminate water supplies;
3. Lack of selectivity may result in killing associated forbs and shrubs important for livestock and/or wildlife; and
4. The effective time period for applying foliage-applied herbicides can be quite restricted.

When using herbicides, it is critical to follow the manufacturer's label. Misuse of herbicides may result in losing them as tools for weed control.

Biological Control

Classical biological control involves the introduction and management of selected natural enemies of a weed. After infestations of noxious weeds are out of control, it is often assumed that biological control will solve the problem. However, biological control is a slow process,

and its effectiveness is highly variable. Many of the agents are so new that their ability to control their host weed has not yet been determined, and they have to be rigorously tested to ensure they are host-specific.

Biological control of St. Johnswort and tansy ragwort and a few other weeds has been quite successful, and agents are being evaluated for many other noxious weeds. However, it may be quite some time before results are known. Most weed scientists feel that biological control will be effective primarily as a complement to other weed control tools.

Biological control agents impact weeds in two ways: directly and indirectly. Direct impact destroys vital plant tissues and functions. Indirect impact increases stress on the weeds, which may reduce their ability to compete with desirable plants. It can be combined with other practices such as competitive plantings to reduce weed populations. Biological control will not eradicate weeds because the agents depend on their host, so residual weeds should be expected.

For further information about potential use of introduced biological agents for control of weeds in your area, you should contact your state department of agriculture. Agencies may be able to provide you with an approved agent, or they may be willing to release agents on your property on an experimental basis.

Another biological control option may be sheep or goats. Sheep have long been a favorite for general suppression of weeds on ranchsteads and other building sites. They have also been found effective for control of tansy ragwort in Oregon and leafy spurge in Montana.

Because of their ability to utilize and destroy coarse forages, goats are well suited to brush control efforts. They have been used successfully for controlling or suppressing such species as gorse, acacia, eucalyptus, groundsel, Gambel's oak, juniper, shin oak, hackberry, and pricklyash. They are currently being investigated at the U.S. Sheep Experiment Station in Dubois, Idaho, for leafy spurge control and are successfully employed on public lands in Montana for that purpose.

Revegetation

Revegetation with desirable plants may be the best long-term alternative for controlling weeds on sites without an understory of desirable species. Establishing competitive grasses can minimize the re-invasion of rangeland weeds and provide excellent forage production. Contact your county Cooperative Extension System or local Natural Resources Conservation Service office for seeding recommendations.

