

Noxious weeds are spreading rapidly in Montana, outcompeting and displacing many native and desirable plants. It is estimated that we are losing about 5,000 acres per day across the west to weeds. Their seeds are spread by wild animals, domestic livestock, pets, people and vehicles. In Montana alone spotted knapweed is estimated to cost \$42 million dollars each year in control efforts, crop and forage losses, land rehabilitation, and loss of wildlife habitat. Control efforts consist of the following: educating the public to the consequences of noxious weed infestations and how they might control the spread of weeds, mapping and inventorying infestations to plan control efforts, and treating weeds using herbicides and biological means (insects). Public land users are asked to wash undercarriages of vehicles to remove weed seeds and also to feed their horses weed free hay when they are riding onto public lands.

Noxious weeds cause the loss of wildlife habitat. Dense infestations of noxious weeds reduce wildlife forage, alter thermal and escape cover and change water flow and availability to wildlife. Areas dominated by leafy spurge have been found to receive less use by deer (3 times less use) and bison (4 times less use) compared with similar uninfested areas. Elk use in some areas has increased about 4 times after controlling the dense spotted knapweed infestation on study sites. Noxious weeds alter the functioning of Riparian (wet land) areas. These weeds often lower water tables and, in some areas, has eliminated surface water and native vegetation needed by wildlife.

Noxious weeds displace native plant species. Noxious weeds outcompete most native plants for soil nutrients and soil. The invasion of our range land by noxious weeds poses a serious threat to the conservation of native plant communities. Noxious weeds lower plant diversity. Plant diversity is needed to maintain healthy plant communities that resist weed invasion. Many noxious weeds such as Russian knapweed, leafy spurge, and spotted knapweed, reduce plant diversity of native range land. Noxious weeds change the way a plant community works. Each plant community has evolved certain ways to cycle nutrients, cycle water, capture energy from sunlight, and store energy in a form usable by animals. Noxious weeds alter the way these processes work. By increasing surface erosion, noxious weeds cause a loss of organic matter and nutrients that are normally concentrated in soil surface layers. The removal of organic matter also reduces infiltration capacity, thereby making water less available for plants. Because many noxious weeds have relatively sparse plant canopies, more water evaporates from the soil surface, which makes even less moisture available for plant growth.

Noxious weeds reduce forage production for livestock and crop production. For example, leafy spurge and spotted knapweed can render many range sites useless for cattle production by displacing valuable forage. Grazing capacities for livestock can be reduced 65% to 90% from the original productivity. Noxious weeds increase soil erosion and soil sedimentation. Protecting and conserving the surface soil are critical to the long-term sustain ability of healthy, functioning ecosystems. Soil provides nutrients and moisture necessary for plant growth and is fundamental to all life. When spotted knapweed invades range land dominated by native bunch grass, protection of soil and water resources is compromised.

Noxious weeds affect recreational value and uses. For most recreationists, the enjoyment of being outdoors is diminished in areas dominated by noxious weeds. Riding horseback through houndstongue promotes husbandry problems for horses when seeds attach to the hide. The invasion of spiny weeds,

such as Canada thistle and musk thistle, limits river access and the sharp spines make walking difficult. Noxious weeds that displace non-game wildlife lower the quality of the outdoor experience for many recreationalists. Loss of habitat for game animals and fish decreases success of hunters and anglers. This reduces the value to and the use of noxious weeds infested areas recreationists.

Noxious weeds cost many Montanans and people from other states millions of dollars every year. It has been estimated that the economic impact of leafy spurge in Montana, North and South Dakota, and Wyoming totals \$129.5 million each year and may result in the loss of 1,433 jobs. In Montana alone, spotted knapweed is estimated to cost \$42 million each year. If this weed is allowed to expand to its fullest range, it could cost Montanans over \$155 million each year. Noxious weeds reduce the value of land. Realtors are seeing more potential buyers scrutinize weed infestation and management practices before closing. On production-oriented land, noxious weeds are usually considered in land appraisals.

Why are many weeds difficult to eliminate?

They produce many seeds and thus spread rapidly.

They have deep roots thus they are hard to kill.

They are not palatable to livestock and wildlife therefore, these grazers eat the other desirable plants first, leaving the weeds to flourish.

They are invader species. They are adapted to rapidly colonize disturbed areas.

They have allelopathy- they give off chemicals that inhibit the growth of other plants.

They have waxy leaves so herbicides don't stick to the plant and can't kill it.

Efforts to control and reduce noxious weeds

To prevent weeds spreading via vehicles, driving should take place exclusively on well-established roads and trails, and driving through weed infested areas should be avoided. If driving has to be done through weeds, the undercarriage, tires, and body of the vehicle should be thoroughly washed and sprayed with water as soon as possible.

To prevent weeds spreading through animals, horses and pack animals should be fed animal certified weed free food for four days before riding or moving it to a new weed free area. Coats and hooves should be brushed and cleaned thoroughly before the trip and only weed free feed should be carried on a trip. Also, weed free hay or straw should be used for bedding in animal trailers.

To prevent weeds spreading by humans, wild flowers that may be noxious weeds should not be picked. Everyone can do their part in weed prevention by recognizing noxious weeds and knowing what to do when they are found. Weed identification can be done in many ways on this web site, either from the main Weed Index, the gallery page with Weed Pictures, or from the Plant Identification Key page. Weeds found that lack flowers and seeds can simply be pulled up and left there. However, if the weeds do have flowers and seeds, they should be put in a plastic bag and burned or disposed of in a landfill. If a weed

infestation is found, the owner or land managing agency should be contacted so they can take measures to control the infestation and spread of the weed.

To help maintain weed free crops, lawns, or pastures should be well irrigated, fertilized, and not overgrazed. Strong, healthy grass, alfalfa, and other kinds of plants are more likely to stop weed development. Weeds spread much faster in thin, stringy grass. The best lawn weed prevention is a thick, healthy, and well-cultivated turf. Poor fertilizing, mowing, irrigation, watering, drainage, insect or disease outbreaks, and bad soil compaction can all lead to a thin, unhealthy turf. Using correct mowing height, fertilization and irrigation methods, soil drainage, and other cultural methods will develop a dense, healthy turf that will naturally ward off weeds. Keeping lawnmower blades and other lawn management equipment clean is another prevention measure. If the lawn or field must be seeded or reseeded, only high quality seeds should be bought, so there is a less chance of also planting some weed seeds. Certified weed free seed will ensure that the seeds are of very high quality. Pastures should not be overgrazed because permanent damage to the grass can occur and weeds will then easily spread. Probably the most important step of prevention is early detection. Weeds are far easier to control in the early stages of development. If the weeds do get a strong foothold, they will grow extremely deep roots that make it very hard to control and remove.

Preemergence herbicidal weed control is a weed control and prevention method that is used for annual grasses and annual broadleaf weeds. There are several different herbicides that are specific to different weeds. The weed should be correctly identified, and then the correct herbicide bought. The herbicide is applied a few weeks before seed germination. For summer annuals it is applied in the spring, and for winter annuals applied in the fall. For maximum effectiveness many steps can be taken to ensure the herbicide reaches the soil where the weed seed is. The lawn can be thoroughly raked to remove any trash, leaves, and dead grass that could block the herbicide from reaching the soil. Mowing also greatly maximizes the amount of herbicide that reaches the soil. The lawn should be irrigated thoroughly after application, so that the water will carry the herbicide down into the soil. If not watered, the herbicide will remain on the surface and be degraded by sunlight.

The best weed control in gardens is to prevent weeds from even getting a foothold. Prior to planting, all the seeds and the garden soil should be checked to be all weed free. The type of vegetables planted in the garden can be the best weed prevention method. Vegetables that grow fast and are effective at shading (suppressing) weeds is the best way to naturally prevent weeds. Shading is most effective when the vegetable rapidly germinates and sprouts before the weeds. Common vegetables that can serve as weed-suppressing crops include: sweet corn, melons, Irish potatoes, pumpkins, squash, beans, southern peas, cucumbers, sweet potatoes, and tomatoes. If proper cultural methods of prevention are taken, these weed-suppressing crops can prevent weeds from germinating in future garden generations. They should be planted in the fall and killed in the spring before the desired garden vegetables are planted. Rye, ryegrass, and other straw residues from the smother crops can prevent early germination of some weeds by up to 75% or more. However, this method should not be used if small seeded vegetables such as lettuce will be grown because their germination will be reduced. Also, the weed-suppressing crops and vegetables should be rotated in where they are being planted in the garden. If the same crops are

grown in the same area every year, then the amount of weeds will increase. Weeds can also be suppressed by controlled burning of weed-infested areas.

Mulches can be used to prevent weed germination and growth in gardens. Organic mulches consist of plant matter and naturally decompose in the soil. Those that are commonly used in gardens include manure, bark chips, ground corncob, sawdust, leaves, straw, etc. However, straw that contains weed seeds should not be used as mulch. If the straw does contain weed seeds, it should be watered until the seeds germinate and then air-dried repeatedly until the seedlings are killed. When applying the mulch in the garden soil, the mulch should be spread evenly three to four inches deep around the base of the vegetable. To water and fertilize the vegetables, the organic mulch should be raked back and then returned after watering. Inorganic mulches such as plastic and weed fabrics can also be used as an effective weed suppression mulch and can last for twenty years when buried in soil. Organic mulches are mainly used in the latter part of the spring when the soil is warmer. If organic mulch is applied to cold soil, the soil warms more slowly and the vegetable growth rate is slower. Inorganic mulches are much more effective in the early spring when the soil is cooler, because they can raise the soil temperature up 6 to 8 degrees F.

Biological control agents such as insects will only eat the specific weed they have been tested for. Many biological control agents are ecological specialists. That means that they eat only one type of plant (the weed) and often even feed on only one part of one type of plant. These agents have been rigorously scientifically tested to be sure that they are species specific feeders (i.e. are safe) before import and release.