

Managing Riparian Weeds

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Riparian areas are the green zones¹ along the banks of rivers and streams and around springs, bogs, wet meadows, lakes, and ponds. They are some of the most productive ecosystems in the West, displaying a greater diversity of plant and wildlife species than adjoining uplands.

Healthy riparian systems purify water as it moves through the vegetation and soil by removing sediment and some pollutants. Riparian vegetation absorbs and dissipates the energy of flood waters before it can cause serious damage to high value agricultural lands. Healthy vegetation in riparian zones also reduces on-site streambank erosion.

Livestock and numerous wildlife species are dependent upon the diverse habitats found in riparian areas which provide food, water, and cover. Stream-side vegetation also maintains lower summer water temperatures which are favorable for fish.

Riparian areas are extremely valuable in every ecosystem and should be protected from invasion by noxious weeds. Invasive weed species, such as purple loosestrife, can be extremely competitive in a riparian setting, crowding out valuable native species. Studies have shown that weeds often do not stabilize soils as well as native vegetation, which can lead to soil erosion and degradation of the stream channel.

Managing weeds in riparian zones is difficult. It requires an integrated, well-planned, and coordinated strategy based on the way the area is used. Riparian weed management includes the integration of control methods to prevent new weed introductions, detection and eradication of existing infestations, the proper management of livestock and, in some cases, revegetation.

Prevention and Containment

Limiting weed seed dispersal

Preventing the introduction of weeds into riparian areas is critical to their management. Seeds are dispersed to riparian areas by vehicles along highways adjacent to rivers, in hay, on animals, and down stream flow. Once a single plant becomes established, it produces thousands of seeds which are further dispersed into moving water. Nearly all weed seeds float and spread rapidly along waterways. It is natural for weeds to become established along waterways

because there is always disturbance from spring flooding and constant channel movement. Weed seed dispersal can be minimized by:

- 1) refraining from driving vehicles and machinery through weed infestations,
- 2) washing the undercarriage of vehicles and machinery after driving from a weed-infested area to an uninfested area,
- 3) using weed-free hay or feed,
- 4) requesting that campers, hikers, and sportsmen take care in brushing and cleaning themselves, as well as their animals and equipment when recreating in weed infested areas,
- 5) holding livestock that have been grazing weed-infested areas for 7 to 10 days before allowing access to riparian areas. This will allow ample time for seeds to exit their digestive tracks.

Containing neighboring infestations

Containment programs are generally used to restrict the encroachment of large-scale weed infestations into riparian areas. This requires an aggressive control program (often chemical) on the advancing border of the weed infestation, and elimination of pioneer populations that get started in the riparian zone.

Minimize soil disturbance

Many alien weeds have evolved in overgrazed, highly-disturbed conditions. They have developed many characteristics which provide an ecological advantage over native riparian vegetation in disturbed soil. Minimizing soil disturbance by vehicles, machinery, wildlife, streamflow, and livestock is central to preventing weed establishment. One way to reduce extremes in stream flow is to maintain uplands in good ecological condition. This provides safe capture, storage and a slower release of precipitation.

Properly manage desirable vegetation

Proper management of desirable riparian vegetation is essential to prevent weed encroachment. Competitive riparian plants, such as Nebraska sedge, are capable of limiting weed invasion as long as they are managed to maintain

Montana State University Extension Noxious Weed Specialist-Bozeman, Montana Department of Agriculture Weed Specialist-Helena, and Montana State University Professor of Weed Science-Bozeman, respectively. Montana Agric. Exp. Sta. Journal article No. J-3033.

¹The vegetation in "green zones" remain growing and green throughout the season because they have additional access to water.



Hoary cress along canal in western Montana.

their strength and vigor. Besides preventing weed invasion, these species bind soil that would otherwise erode.

Systematic Surveys and Small-Scale Eradication

Early detection of weed introductions in riparian weed management is critical. Eradication of small weed patches is often possible. Once an infestation becomes established, complete eradication is unlikely. Two or 3 careful surveys along waterways and adjacent roadways EACH YEAR by personnel trained to identify weeds will provide adequate early detection.

A small-scale eradication program should be implemented once an invasive weed is detected in a riparian area. The eradication program should include careful delineation of the infested area, the best control methods to use, the approximate number of years that will be needed for control, a revegetation plan (when desirable plant populations do not increase in response to control), and a long-term monitoring program. In many cases, it is useful to estimate the cost of the eradication program for future budgeting.

Grazing Management

Proper livestock grazing is essential to maintain competitive riparian vegetation and streambank stability. Proper livestock class and stocking rates can help prevent weeds from encroaching on riparian areas. Sheep tend to spend less time on riparian areas than cattle, which allows land managers greater control of grazing. Cow-calf pairs tend to concentrate in riparian areas, yearlings generally spend more time on the uplands.

Short duration-high intensity grazing forces livestock to graze weeds as well as desirable riparian vegetation. This helps maintain a balance between plant species within the riparian plant community. Some weeds, such as leafy spurge, can be grazed by sheep or goats in riparian areas. This may shift the competitive balance to desirable species. In southwestern Montana, a rest/rotation grazing system

has been successful for improving riparian vegetation. Under this grazing system, pasture use is rotated so that at least one pasture receives a year-long rest from livestock grazing each year. Try, however, to leave enough stream-side stubble to trap sediment in high water events.

Chemical Control

Herbicides must be used with care in riparian areas in order to protect non-target vegetation and prevent water contamination. Use only herbicides that are labelled for riparian areas.

Careful hand applications and spot treatments will help protect non-target vegetation. Time applications when runoff is unlikely, use short-lived or rapidly bound herbicides with low water solubility, and apply above the high water mark to reduce the possibility of water contamination. Prevent herbicide drift by wind onto non-target plants or nearby water by using low pressure systems and coarse-spray nozzles.

Guidelines for selected herbicides for use in riparian areas.

2,4-D

Various labels. Do not apply directly to water except under specific label directions. Some labels allow for overspray on irrigation canal ditchbanks. A Montana Special Local Need Label allows use of PBI/Gordon Amine 400® for use on purple loosestrife around water. Always refer to the labels for specific directions.

fosamine

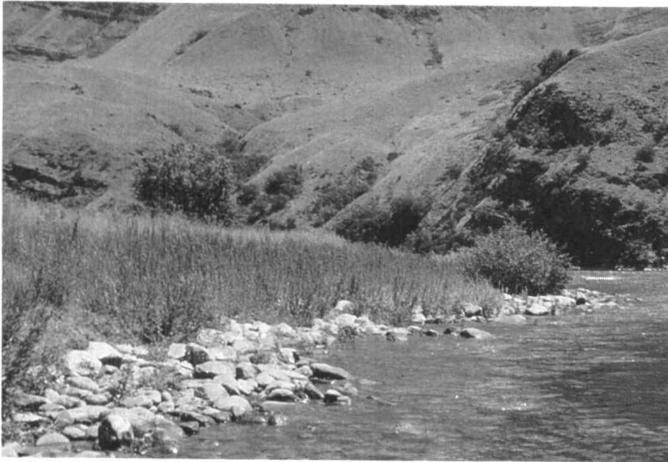
Krenite®. Noncropland uses. It is permissible to treat ditch banks, seasonally dry flood plains, deltas, marshes, swamps, bogs, and transition areas between upland and lowland sites. Do not apply to open water, fresh water wetlands when water is present, or areas where the herbicide is likely to move into water. Krenite® provides effective control of many woody and brushy species. Use care in riparian areas to protect non-target woody species.

glyphosate

Rodeo® label only. May be applied along ditches, lake and pond banks, streams, and rivers. Do not apply within 1/2 mile of a potable water intake. Non-selective; use care around non-target vegetation.

triclopyr

Garlon®. It is permissible to treat non-irrigation ditchbanks, seasonally dry wetlands, flood plains, deltas, marshes, swamps, bogs, and transitional areas between upland and lowland sites. Do not apply to open water or to water present in fresh water wetlands, reservoirs, rivers, streams, or creeks, below the mean high water mark.



Purple loosestrife in the Snake River-Hells Canyon National Recreation Area.

More persistent herbicides, herbicides that readily leach, and herbicides with strict label prohibitions against contamination of water should only be used where one can be assured that they will not drift or each into nearby water of the riparian area. These herbicides include (but are not limited to): clopyralid (Stinger®, Transline®), dicamba (Banvel®), metsulfuron (Ally®, Escort®), and picloram (Tordon®).

Always read and follow label directions and heed their warnings. Discuss your chemical weed control plan with an authority in your state before taking action. Lastly, maintain written records, including the date, location, time, chemical, and rate applied.



Purple loosestrife.



Spotted knapweed along a river in Montana.

Biological Control

Ideally, natural enemies are well-suited for controlling weeds along riparian areas because they may not impact water quality. Most biological controls, however, only impose stress on weeds. This often results in reduced seed production, but does not KILL the plants. A main objective in riparian weed management is to control weeds IMMEDIATELY to prevent seed production and rapid dispersal by moving water.

Some weeds, such as diffuse and spotted knapweed, have natural enemies which are effective in reducing seed production. For example, seed-gall flies have been reported to reduce knapweed seed production by up to 80%. Establishing seed-feeding biological control agents may limit seed production enough to slow the spread of weeds. Plants should be controlled by other means, however, or the infestation can increase. Biological controls may be somewhat useful on otherwise unmanaged weed infestations. Sole reliance on present biological control agents typically results in little impact on riparian weed infestations.

Mechanical Control

Hand-pulling or grubbing can be an effective method for controlling weeds in riparian areas. This method is especially useful for control of newly established weeds that have not produced seeds or developed an extensive root system. Grubbing each year for 10 to 15 years is required to deplete root and/or seed reserves of well established plants. Perennial plants with extensive root systems, such as leafy spurge and Canada thistle require grubbing once or twice a month for many years to deplete root reserves.

Mowing and cultivation are not recommended in riparian areas. In many cases, mowing does not effect root reserves and may actually increase weed seed production in wet areas by "pruning" the weeds. Cultivation can be an effective weed control method in agricultural lands, but is usually not recommended in riparian areas because of the

risk of erosion. Cultivation is usually required on 3 to 4 week intervals for at least two consecutive years to provide effective control for many perennial weeds.

Revegetation

Riparian vegetation is generally resilient because the habitat is fertile and moisture is abundant. Normally, recovery is rapid after weeds are controlled and proper management is restored. However, residual (suppressed) understory grasses and sedges must be present for recovery. In areas without residual riparian vegetation, revegetation may be necessary to close the plant community and prevent re-invasion by weeds.

Most revegetation programs require spraying glyphosate (Rodeo®) early in the spring, after the majority of the weeds have emerged. Fall herbicide applications increase the risk of erosion because of the loss of stabilizing vegetation during the rainy season. Rodeo® is non-selective and kills most species, therefore spray should be applied

directly to target plants. In areas where a heavy residual weed stand exists, it may be necessary to disk or plow to create a quality seedbed. After the Rodeo® application, the desired seed mixture should be drill seeded. If the site is inaccessible to equipment, broadcast seeding may be used. This method is less effective, and may require repeated attempts. Revegetation programs should be implemented on small units over a series of years to minimize risk of large-scale erosion if seedling establishment is poor.

The seed mixture used depends on the specific site. A local soil or range conservationist can recommend a good seed mixture. In general, reseeding with sedges and grasses is desirable because retreatment with 2,4-D amine, a broadleaf herbicide, may be necessary to control newly emerging weed seedlings. After 3 years, a strong grass or sedge stand should be able to limit invasion by weeds, and re-establishment of broadleaved, and shrubby (willow, cottonwood) riparian species may be possible.