

**UPPER DEARBORN RIVER
WATERSHED WEED
MANAGEMENT PLAN**

Prepared for

ROCKY MOUNTAIN FRONT WEED ROUNDTABLE

By

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I. INTRODUCTION

Description of Site

The upper Dearborn River watershed is located on the southern edge of the Rocky Mountain Front in Lewis & Clark County, Montana. The primary tributaries - Middle and South Fork of the Dearborn, and the main Dearborn River channel (or North Fork), generally flow east from the Continental Divide of the Rocky Mountains, winding through the foothills until merging into the Dearborn River.

The Dearborn watershed supports a robust agricultural community consisting mostly of traditional private ranch operations that rely mainly on grazing for cattle production, but also produce hay and some small grains. In addition to private land ownership, the watershed includes Montana state-owned lands, managed by the Department of Natural Resources and Conservation; and federally-owned lands, managed by the U.S. Forest Service and Bureau of Land Management. The drainage encompasses a broad range of natural habitat types including fescue and mixed grasslands, riparian zones, aspen woodlands and fescue/limber pine savannah. Biologically these communities are relatively intact and represent unique or distinctive habitat types.

II. OVERVIEW OF WEED MANAGEMENT PLAN

A. General Management Philosophy

Noxious weed control is an important part of overall land management. An effective treatment strategy focuses on promoting desired plant species and communities to replace the weed species, rather than simply eliminating weeds. An integrated weed management program is underway in the Upper Dearborn Cooperative Weed Management Area to include awareness and action toward weed prevention to keep the site free of species that are not yet established but are known to be pests elsewhere in the region, and to limit spread of established weeds. Priorities will be set for the control or elimination of weeds that have already been established in the watershed, according to their actual and potential impacts on agriculture and to native species. Action will be taken only when

careful consideration indicates leaving the weed unchecked will result in more damage than controlling it with available methods.

The Dearborn Weed Management Plan will follow an integrated strategy that:

- Establishes and records goals for the drainage.
- Identifies weed species that block progress in achieving the established goals and assigns them priority based on their impacts.
- Considers methods for controlling noxious weed species or otherwise diminishing their impacts.
- Implements the control methods and monitors the results.
- Evaluates the effectiveness of actions in the light of goals and uses the information to modify and improve control priorities, methods and plans.
- Starts the cycle again by establishing new methods/goals.

B. How priorities are set

Priorities are set to eliminate new invaders while patches are small, to consistently monitor and treat aggressively invasive weeds; and in the hope of minimizing the total, long-term workload. Therefore, preventing new infestations and assigning the highest priority to existing isolated, fast-growing infestations that are most disruptive, and affect the most highly valued area(s) of the drainage, is key. Another important consideration is difficulty of control. Higher priority should be given to infestations shown to be manageable with available technology and resources. The first goal is to prevent new weeds from spreading. The second goal is to control the spread of current infestations using herbicide or mechanical means to manage small, isolated patches and bio controls/perimeter containment on large patches. Regular surveys of weed vectors such as ditches, roads, two-tracks and stream corridors should be conducted.

III. INTEGRATED WEED MANAGEMENT METHODS

PREVENTION: Prevention is the most cost effective form of weed control. **It can also be the most difficult to implement because it challenges many established methods of land management.** It is an attempt to curb weed problems before they exist. Examples of prevention strategies for noxious weed establishment or spread:

- Limit vehicle/ATV and stock access to weed infestations.
- Wash vehicles regularly, especially after exposure to weed infestations.
- Limit vehicle/ATV access to property for recreational use by clearly defining travel corridors and parking areas that can easily be monitored.
- Avoid the use of fill or gravel from weed infested sources.

Anything that can prevent new species and new infestations of existing weeds from establishing will be money and effort well spent. Finding new weed infestations early is important and best implemented by regular and systematic surveys. **Prevention also means developing an awareness of noxious weeds and weed issues; and looking for new weeds whenever working or traveling on the landscape.**

MECHANICAL/PHYSICAL. These methods include weed pulling and mowing. This is the method of choice for sensitive areas that are too close to water, dwellings, etc. to use herbicides. It is also the method of choice when weeds have set seed and herbicides are of limited effectiveness. Obviously, these methods are labor intensive and in some cases limited in effectiveness as a long term strategy, so the size and nature of the infestation must be considered when this technique is employed.

CHEMICAL. This is the most common and usually the most effective short-term method for dealing with weed infestations. Its effectiveness can be limited by the weed species in question as well as the location of the infestation, and timing of the application. **TIMING IS CRITICAL! See Section V. below where dates for guidance on timing of herbicide application are listed.** Herbicide use can also be limited by the extent of the weed infestation and overall cost. While effective, herbicides are not necessarily the final answer to long term weed management.

BIOLOGICAL. When available, release of biological control agents are the best long-term management tool for control of large infestations of weeds. Biological control insects are available for a number of noxious weed species, and some insects are more aggressive than others. For instance, root-boring weevils have been shown to work very well in controlling spotted knapweed infestations, but development of a thriving, reproducing population of weevils can take many years. And the number of years to build an effective population of weevils depends on a variety of factors, including soil type, elevation, and shade, to name a few. In the meantime, the knapweed patch is expanding. This is why herbicide treatment of the perimeter of large patches of knapweed is recommended, in an effort to slow the expansion while biological control insect numbers are building. On the other hand, releases of leafy spurge flea beetles along the Rocky Mountain Front have proven very effective in reducing or eliminating patches in just a few years (with some variables, of course.) Biological control agents should be thoroughly researched prior to release into the watershed.

REHABILITATION. This is an important part of any integrated weed management plan and simply recognizes that when weeds are removed from an area, some desirable vegetation should take their place to ensure that the site does not become re-infested. In most cases, simply thinning weed densities to allow desirable plants to regain their competitive advantage is enough to get the process started. Reseeding a site may be necessary but can be very challenging. In these cases, landowners/managers should contact local experts in regard to the extent of a rehabilitation project and then which grass species to plant and continuing care of the planting for best success.

IV. OVERVIEW OF WEEDS and SETTING PRIORITY LEVELS

EXISTING WEEDS -

High priority species significantly impact desired communities; strategic management action can be effective in reducing spread and achieving watershed goals.

Medium priority species have fewer impacts or spread more slowly than high priority species; management of these species should occur after high priority species are addressed or in limited strategic areas.

Low priority species may have fewer impacts or be more widespread and difficult to effectively control; control of these species is a low priority except possibly in limited strategic areas.

1. *Ventenata* **High Priority**

Ventenata is an annual grass that spreads rapidly, can form dense monocultures and has no forage value. It can be difficult to recognize from a distance. It spreads readily in hay bales being transported across the state. It is well established in other parts of Montana and has become established in at least one area along Highway 200 in the Middle Fork of the Dearborn River drainage.

2. **Spotted Knapweed and Diffuse Knapweed** **High Priority**

Spotted knapweed spreads quickly and easily and has a highly negative impact on native vegetation. It has little or no forage value. It can form dense monocultures, particularly in drier sites and seeds can lay dormant at least 10 years before germination. Control efforts at each site must be repeated for at least this long to ensure permanent control of this species. Knapweed patches are generally fairly easy to control by chemical or hand pulling, when done according to the best known practices. Common spread vectors for this species include vehicles, birds and practically any animal (or human) that passes through a patch while it is dropping seed or when the ground is muddy. Frequent surveys will be important to locate new patches and limit the spread of both spotted and diffuse knapweeds. Spotted knapweed occurs throughout the drainage, from small, remote patches to large patches which range from sparsely to densely populated with knapweed plants. Diffuse knapweed has not been documented at one site along the Dearborn River, so continued surveys are important to reduce spread and encourage treatment.

3. **Leafy spurge** **High Priority**

Leafy spurge has a highly negative impact on desirable vegetation and can form dense monocultures when well established. Because it is a deeply rooted perennial plant, control with herbicides can be difficult and mechanical control is nearly impossible. Common spread vectors for this plant include birds, vehicles, ATVs and flowing water in ditches and streams. It is well established and widespread in the drainage and is considered somewhat toxic to most grazing animals.

4. Yellow Toadflax/Dalmation Toadflax *High Priority*

Both species are perennials with extensive root systems that make them extremely hard to control once they are established. Both have bright yellow showy flowers (resembling garden variety “snap dragons”) with orange “beards.” Dalmatian toadflax is generally taller, 3 feet, with broad-based clasping leaves. Yellow toadflax is shorter, 6” to 24”, with long narrow leaves. Yellow toadflax has been recorded in many areas along the Front. Dalmatian toadflax is not known to be established in the upper Dearborn River in Lewis and Clark County, but has been recorded in scattered locations across the Front.

5. Hoary Alyssum *High Priority*

Hoary alyssum is an annual, biennial, or perennial in the mustard family and can grow up to three feet tall. It is a newer listing to the Montana state list and is believed to be a plant that became more pronounced and invasive due to the recent drought in most of southern Montana. The plant flowers from early June until fall, and continues to produce seed all season. This tap rooted plant reproduces only by seed, and spreads rapidly. Aggressive treatment is important for this plant, while its actively growing in the spring, prior to flowering. Hoary alyssum has been identified in several locations in the upper Dearborn, generally moving south from Wolf Creek along Highway 434.

6. St. Johnswort *High Priority*

Though established on some lands near Highway 200, surveys have found that St. Johnswort has not yet expanded greater than one mile from the highway. Aggressive control action has been initiated by several landowners, using both biological control insects and herbicide application. All known St. Johnswort weed infestations will continue to be aggressively treated with herbicide and biological control agents, per willing landowners. Continued inspections, treatment, and biological control will be necessary to successfully manage this weed.

7. Sulphur Cinquefoil *High Priority*

There are many native cinquefoil species so getting a positive ID of a sample is very important. The key features of this plant include pointed hairs which protrude outward at right angles from the stem and leafstalk. Leaves of sulfur cinquefoil have green coloring rather than silver on the underside of the leaf. Sulfur cinquefoil can be spread through seed and by root. This species has been positively identified at several locations in the Dearborn, with a rather large infestation found during the CIG project work

8. Whitetop *Medium Priority*

Whitetop is locally common in sub-irrigated meadows and disturbed areas in the drainage including roadways. The full scope of this weed's distribution is not known. It can form dense monocultures and can be hard to manage long term. It spreads slowly, however, and therefore is considered a lower priority species that should be considered for treatment after other high priority species have been treated. Probably the most important spread vector for whitetop is contaminated hay.

9. Russian Knapweed *Medium Priority*

Russian knapweed is rhizomatous perennial plant that spreads rather slowly and is found in several isolated locations in the Dearborn drainage. Similar to leafy spurge, it is difficult to eradicate. It is relatively easy to control with herbicides. Prime spread vectors include vehicles, contaminated gravel and hay. It should be aggressively treated but not until other higher priority weeds are managed properly.

10. Houndstongue *Medium Priority*

Houndstongue is locally common across the drainage. It typically invades and dominates disturbed sites such as high stock-use areas near buildings, riparian zones and naturally disturbed sites such as ground squirrel burrows. It spreads readily on animals and people.

Because it does not easily invade healthy native grassland, houndstongue is a lower priority species that should be considered for treatment after other high priority species have been treated. Biological control agents are likely the best option for comprehensive treatment now, but currently no insects are approved for release.

II. Canada Thistle Low Priority

Canada thistle is a common plant in the drainage. It is an extremely difficult species to control because seed can be broadcast over huge areas by the wind. Although its rate of spread is great, it is most easily established in disturbed areas such as roadsides. Where it is established in natural areas, it does not seem to spread quickly. Canada thistle often grows in wetter areas where use of herbicide may not be advisable. Because of difficulties in controlling seed dispersal and environmental issues related to herbicide control Canada thistle is lowest priority weed in the drainage.

WATCH LIST - New Invaders

Watch List weed species listed below are not known to occur or have not been documented in the upper Dearborn River watershed, but have been recorded elsewhere on the Rocky Mountain Front. Land managers and private land owners should familiarize themselves with these plants and report any new infestations to the Lewis and Clark Weed District and/or the Rocky Mountain Front Weed Roundtable.

Orange and Meadow (Yellow) Hawkweed (*Hieracium aurantiacum*, *H. pratense*)

These are common weeds in the wetter forested portions of Montana west of the Continental Divide. Like St. Johnswort, they would most likely be found in the moister, western portions of the drainage. It has been reported in Cutbank and Dupuyer Creeks as well as the Two Medicine drainage. They can form mat-like monocultures and seed is broadcast widely by wind.

Management goals for these species are prevention, and in the case of new infestations, eradication. Useful weed identification guides can be found at Lewis and Clark County Weed Coordinator's office or through the Montana Weed Control Association website at: <https://www.mtweed.org/weeds/weed-id/>

V. INDIVIDUAL WEED SPECIES - GOALS AND MANAGEMENT

Generally, weeds are best controlled when actively growing. Of course, this can vary greatly between upper and lower elevations of an individual watershed. Effective application dates for target weed species can range from June 1 to July 10 for early summer application, and September 1 to September 30 for fall application. **Phenology of the target weed should be of greater consideration than suggested calendar dates.** Overall, treatment is typically ineffective between July 15 and August 31 along the Rocky Mountain Front because plants are not actively growing. One exception, would be an unusually wet late summer that would extend active plant growth. Fall treatments are most effective when adequate moisture is available to promote fall re-growth before first hard frost.

Individual Weed Species Recommendations –

1. ***Ventenata (Ventenata dubia)***

Ventenata is the highest priority weed in the Dearborn River drainage. All known infestations should be treated aggressively.

Goals: Eradicate existing infestations. Survey roads and other spread vectors.

Treatment: Prevention, herbicide. It is imperative that all existing infestations are treated at least once per year and closely monitored.

Herbicide: Imazapic applied @ 5.oz per acre in the fall after moisture or early spring at green up.

Dates: Ventenata is a winter annual so herbicide treatments are most effective in fall after significant moisture or in early spring following green up. .

2. **Spotted knapweed (*Centaurea stoebe*)**

All known patches should be checked and treated at least once or ideally, twice per year. **SMALL PATCHES, ROADS, DITCHES AND TWO TRACKS ARE A PRIORITY.** Large patches that are not cost-effective to treat with herbicides should be treated with biological control agents, while the perimeter of the patch should be prevented from expanding with use of herbicides.

Goals: Limit spread. Manage all known patches. Regular surveys. Map any new starts, treat and re-visit.

Treatment: Prevention, Herbicide, Mechanical, Biological control. Prevention of knapweed spread and new starts can best be achieved by limiting vehicle use off roads and with possible changes in livestock management to prevent transport of weed seeds. Herbicide will be used on nearly all patches in the drainage.

It is imperative that all infestations treated with herbicide be visited at least once and ideally twice per year to achieve maximum control.

Plants that have set seed can be pulled and bagged.

Biological controls will be used on riparian infestations on the east end of the project area; and on large knapweed infestations.

Herbicide: Transline (clopyralid) @ 2/3 pint/acre for rangeland; and highly suggested for use in woody/timbered areas. Use non-ionic surfactant.

Milestone (aminopyralid) @ 5-7 fluid ounces/acre for rangeland or limited use near water. Use non-ionic surfactant.

Dates: Knapweed can be effectively controlled with herbicides when plants begin to bolt thru bud stage. Although weather/moisture dependent, this means treatment in early June thru mid-July.

Any plants in bloom or past bloom should be hand-pulled and bagged. Spraying fall re-growth has been shown to be very effective when done prior to first hard frost.

3. Leafy spurge (*Euphorbia esula*)

Goals: Limit spread. Manage all known patches with either herbicide (small patches) or biological control insects (large patches). Survey spread vectors. Map new infestations and treat. Monitor effectiveness.

Treatment: Herbicide for small patch management and large patch containment. Release biological control insects for large patch management.

Herbicide: **Tordon** (picloram) @ 1-2 quarts/acre depending on plant growth and environmental conditions. Use non-ionic surfactant.

Plateau (imazapic) @ 4 oz./acre combined with Tordon @ 1 oz./acre. Imazapic is only recommended for fall treatments. Use non-ionic surfactant.

Dates: Surveys can be in conjunction with other weed surveys. Herbicide use should be at full flower – mid-June thru early July or in fall prior to hard frost. Fall treatment has proven to be very effective in reducing spurge infestations.

4. Yellow Toadflax/Dalmation Toadflax (*Linaria vulgaris* and *L. dalmatica*)

Goals: Eradication. Prevent new starts through monitoring, especially of previously known yellow toadflax sites. Immediate and timely treatment. Continue annual inspections.

Treatment: Proper identification while in early infestation levels. Herbicide.

Herbicide: **Tordon 22K** (picloram) @ 1 – 2 quarts/acre (use the 2 quarts recommendation on yellow toadflax for spot treatment). Do not apply to groundwater areas.

Telar (chlorsulfuron) 1 - 1.25 oz./acre. Apply in fall with non-ionic surfactant.

Dates: Use Tordon at full flower or in the fall on actively growing plants. Telar should also be a fall application, to actively growing plant prior to first hard frost.

5. Hoary Alyssum (*Berteroa incana*)

Goals: Eradication. Prevent new starts through monitoring, with education for improved identification and treatment options. Immediate and timely treatment. Continue annual inspections and treatments where currently identified; with high attention to eradication of travel corridors such as interior ranch roads, county gravel roads and State highways.

Treatment: Herbicide. Systematic surveys.

Herbicide: **Escort** (metsulfuron methyl) **or Telar** (chlorsulfuron) @ 1 fluid oz./acre. Use non-ionic surfactant.

2,4-D+ dicamba (dimethylamine salt of 2,4-D) @ 1 quart + 1 quart/acre.

Dates: Herbicide Cimarron or Telar should be applied rosette to late bud on actively growing plants; the 2,4-D mix should be applied rosette to early bolt. Extreme caution should be taken with dicamba, please reference all labels. Surveys can be in conjunction with other land management activities.

6. St. Johnswort (*Hypericum perforatum*)

Goals: Limit spread. Manage all known patches with either herbicide (small patches) or with biological control agents (large patches). Prevent new starts through monitoring, with education for improved identification and treatment options. Immediate and timely treatment.

Treatment: Herbicide. Biological control insects. Systematic surveys.

Herbicide: Milestone (aminopyralid) @ 5 - 7 fluid .oz/acre. Use non-ionic surfactant.

Tordon 22K (picloram) @ 1 – 1.5 pint/acre. Use non-ionic surfactant.

Dates: Herbicide should be applied pre-bloom on actively growing plants. Do not apply to shallow groundwater areas.

Surveys can be in conjunction with other land management activities.

7. Sulfur Cinquefoil (*Potentilla recta*)

Goals: Eradication. Treat all known plants and patches minimum once per year with annual inspections. Prevent new starts through monitoring, with education for improved identification and treatment options. Immediate and timely treatment.

Treatment: Herbicide. Systematic surveys.

Herbicide: Milestone (aminopyralid) @ 4 - 6 fluid .oz/acre. Use non-ionic surfactant.

2,4-D @ 2 quarts/acre. Rosette to bud. Apply before flower growth stage.

Tordon22K (picloram) @ 1 pint/acre. Use non-ionic surfactant.

Dates: Herbicide should be applied pre-bloom to bloom on actively growing plants. Surveys can be in conjunction with other land management activities.

8. Whitetop (*Lepidium draba*)

Whitetop can best be controlled by herbicide and eliminating the use of contaminated hay.

Goals: Control existing patches. Control spread. Monitor effectiveness.

Treatment: Prevention. Herbicide.

Herbicide: Escort/Cimarron (metsulfuron) @ .5-1 oz./acre. Use non-ionic surfactant.

Dates: Herbicides should be applied pre-bloom. In the Dearborn River watershed this generally means mid- to late May. Do not feed livestock contaminated hay.

9. Russian knapweed (*Acroption repens*)

Russian knapweed can best be controlled by limiting spread and aggressively treating existing patches with herbicide.

Goals: Control existing patches. Control spread. Monitor effectiveness.
Treatment: Prevention. Herbicide.
Herbicide: Milestone (aminopyralid) @ 5 .oz/acre.
Dates: Spring, pre-bloom when plants are actively growing.

10. Houndstongue (*Cynoglossum officinale*)

Houndstongue can best be controlled by keeping stock away from existing patches and free from seeds.

Goals: Control existing patches. Control spread. Monitor effectiveness.
Treatments: Prevention thru stock management. Herbicide. Hand-pulling.
Herbicides: Escort/Cimmaron (metsulfuron) @ 1-2 .oz/acre.
Dates: Herbicides should be applied when the plant is at the bolt stage – anywhere from early June thru early July. Plants are best hand-pulled when mature, but before seed set. Plants that are pulled after seed set should be bagged and properly disposed of.

11. Canada thistle (*Cirsium arvense*)

Canada thistle is a common weed in wet meadows. Because these areas are not suitable for herbicide application and because of the way the plant spreads widely through wind dispersal of seeds, it is recommended that Canada thistle control be selective and limited. The RMF Weed Roundtable will be implementing a biocontrol program along with a monitoring program in 2020.

Goals: Limiting further spread of Canada thistle. Monitor effectiveness.
Treatment: Canada thistle is susceptible to mechanical treatments. Mowing or live-stock trampling can significantly reduce weed densities in sensitive areas. Herbicide is also effective.
Herbicide: Milestone (aminopyralid) @ 7.oz/acre. **Only at appropriate sites.**
Dates: Mowing/trampling - bloom before seed set. Herbicide is best applied at the bolt thru pre-bloom stage, usually mid to late June.

12. Watch List - New Invaders (listed on page 8)

Goal: Eradication
Treatment: Proper identification. Herbicide treatment.
Herbicide: Varies depending on species; please contact local Montana State University Extension office or Lewis and Clark County Weed District to confirm identification and for herbicide recommendations.

VI. APPENDICE

S Appendix 1.

Calibration

Spray equipment will need to be calibrated at the beginning and middle of each spray season. Here is a brief description of the procedure:

- Measure and mark off an area 18.5 x 18.5 feet.
- Spray area uniformly with water and record the number of seconds this takes.
- Spray water into a container for this amount of time.
- Amount of water in fluid ounces equals spray volume in gallons per acre.

This tells you the volume of liquid your sprayer puts on the ground. You can then figure out how much chemical to put in your tank. For example, if the spray rate was 100gal/acre, and you wanted to spray 1 quart Tordon/acre, you would add 1 quart Tordon to 100 gallons of water in the tank, or 1 pint to 50 gallons, etc.

The long version of the above equation is as follows:

$$\frac{43,650 \text{ ft}^2}{\text{ounces sprayed (oz.)}} \times \frac{1 \text{ gallon}}{\text{gallons}} \times \text{1 acre} \times \text{area sprayed (ft}^2\text{)} \times 128 \text{ oz.} = \text{acre}$$

Useful Measurements and

Conversions 3 teaspoons = 1

tablespoon

2 tablespoons = 1 fluid ounce

8 fluid ounces = 1 cup

1 cup = 16 tablespoons

2 cups = 1 pint

2 pints = 1 quart

4 quarts = 1 gallon

128 fluid ounces = 1 gallon

128 - 18.5 ft.x18.5 ft. plots = 1acre

43,560 square ft. = 1 acre

ALWAYS REMEMBER TO READ THE HERBICIDE LABEL BEFORE APPLYING ANY HERBICIDE.