ELK CREEK WATERSHED
WEED MANAGEMENT PLAN

Prepared for

ROCKY MOUNTAIN FRONT WEED ROUNDTABLE

By
Mark Korte

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INTRODUCTION

Site Description

Elk Creek is located on Rocky Mountain Front and flows east across the boundary between the Great Plains and the Rocky Mountains. The greater drainage consists of two main tributaries – Ford Creek and Smith Creek. It supports a robust agricultural community consisting mostly of traditional ranch operations that rely mainly on grazing, but also include some small grain/hay production and some Conservation Reserve Program (CRP) acreage. The drainage encompasses a broad range of natural habitat types including fescue and mixed grasslands, riparian zones, aspen woodlands and fescue/Douglas Fir savannah. Biologically these communities are relatively intact and represent unique or distinctive habitat types. The drainage as currently defined contains nearly ?????

WEED MANAGEMENT PLAN OVERVIEW

General Management Philosophy

Weed control is part of overall land management. Where possible, focus will be on the plant species and communities wanted in place of the weed species, rather than simply eliminating weeds. However, in some areas the lack of topsoil may prevent populations of desirable communities from establishing.

Preventative programs will be implemented to keep the area free of species that are not yet established in the area but are known to be pests elsewhere in the region. Priorities will be set to prevent the spread of or control weeds that have already been established, according to their actual and potential impacts on agriculture and desired vegetation communities. The type of management action to be taken will be determined after careful consideration of the soil type, groundwater level, size and type of infestation, land use and accessibility to the site. Priorities will also consider where management actions can be most effective in achieving watershed goals.

Elk Creek weed management will follow an adaptive strategy to:

- Establish management goals for the drainage.
- Identify weed species that interfere with these goals and prioritize them based on their impacts.
- Consider methods for prevention, control or otherwise diminishing weed impacts.
- Set priorities for management actions to most effectively achieve goals.
- Implement management actions and monitor results.
- Evaluate effectiveness of actions in the light of goals, and use the information to revise and improve management goals, priorities and actions.
- Starts the cycle again by establishing new methods/goals.

Goals and Priorities

Most of the Elk Creek watershed is currently weed-free, and the ***primary management goal*** is to maintain existing vegetation communities in their current weed-free condition. Several weed species currently occur in the watershed, and their priorities for management are described in the Existing Weeds section below. Where weeds are established, a ***secondary goal*** is to reduce weed impacts in these areas, where feasible.

To achieve these goals, the ***first priority*** is to prevent new weed species from establishing in the watershed and to prevent existing weed species from spreading. New, small, or isolated infestations are the highest priority for control because they are the fastest growing, have the greatest potential for further spread, and control actions can be highly effective. Finding these new infestations can be a challenge since they are small, but controlling them provides the greatest long-term benefits. Control

along weed vectors such as roads and ditches is also a priority. Regular monitoring of treated patches and surveys of weed vectors are critical for preventing weed spread.

The ***second priority*** is reducing impacts of larger, more established infestations. Chemical control of large established infestations is more expensive and less effective at preventing overall weed spread than control of small patches. However, establishing biocontrol in large patches provides a cost-effective way to reduce weed spread and density over the long term. Where feasible, chemical or mechanical control of large patch perimeters will also help prevent spread to adjacent weed-free areas.

It is also important that priority be given to areas where management effort can be sustained over time. Management actions that are not sustained will likely be ineffective over the long term.

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 land management activities.** It is an attempt to curb weed problems before they exist. Examples include:

- Limiting vehicle/ATV and stock access to weed infestations.
- Washing vehicles regularly, especially after exposure to weed infestations.
- Limiting vehicle/ATV travel for recreational use by clearly defining travel corridors and parking areas that can easily be monitored.
- Avoiding 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 thinking about and looking for new weeds anytime one is working or traveling on the landscape.** In order to do this, it is important to learn how to identify the weeds that are present in adjacent areas or have a high chance of being transported to the drainage from an outside source.

Mechanical/Physical

Mechanical and physical methods include weed pulling, mowing, clipping, etc. This is the method of choice for sensitive areas that are too close to dwellings, water, etc. to use herbicides. It is also the method of choice when weeds have set seed and herbicides are of limited effectiveness. 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

Chemical control 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. **TIMING IS CRITICAL! See Section V. – Dates.** Herbicide use can also be limited by the extent of the weed problem and therefore the overall cost. While effective in the short term, herbicides are not necessarily the final answer to long term weed management.

Biological Control

When available, biological control is the best long-term management tool for control of large infestations of weeds or areas hard to access on a regular basis.

Rehabilitation

Rehabilitation 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.

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. Spotted Knapweed (*Centaurea stoebe*) ***High Priority***

Spotted knapweed spreads quickly and easily and have a highly negative impact on native vegetation. It has little or no forage value. Spotted knapweed 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. Common potential 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 this weed. It is well established in the drainage and some nearby areas.

2. Leafy Spurge (*Euphorbia esula*) ***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 of well established infestations 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.

3. Whitetop (*Cardaria draba*) ***High Priority***

Whitetop is locally common in sub-irrigated meadows and disturbed areas in the drainage. 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.

4. Houndstongue (*Cynoglossum officinale*) ***Medium Priority***

Houndstongue is common across the drainage. It typically invades and dominates disturbed sites such as high stock-use areas near buildings, riparian zones, woody vegetation 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 and because it tends to grow among desirable native woody plants, houndstongue is a lower priority species that should be considered for treatment after other high priority species have been treated. In addition there is great promise of an effective bio control for future houndstongue management.

5. Canada Thistle (*Cirsium arvense*) ***Low Priority***

Canada thistle is a common weed in wet meadows. Because these areas are usually not suitable for herbicide application and because the plant spreads widely through wind dispersal of seeds, Canada thistle control is a low priority and should be selective and limited. The RMFWRT will be introducing/monitoring a bio control for Canada thistle in sites across the RMF in 2020.

6. Musk Thistle (*Carduus nutans*) ***Low Priority***

Musk thistle is a fairly common plant in dry disturbed areas in the drainage. It is difficult to prevent seed spread due to its ability to broadcast seed over huge areas by wind, but it is relatively easy to control actively growing plants. It does not seem to form dense monocultures very easily. There are established biocontrols that seem to keep the plant fairly well in check. It is a low priority weed in the watershed.

WATCH LIST

These species have only been just discovered or are not yet known to occur in the ElkCreek drainage and. land managers should familiarize themselves with these plants and report any new infestations to the Rocky Mountain Front Weed Roundtable and the Lewis and Clark County Weed Coordinator. 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 accessed online at: https://www.mtweed.org/weeds/weed-id/

1.Ventenata – This invasive annual grass has been documented in the upper Smith Creek drainage of Elk Creek and likely occurs elsewhere in the drainage.

2. Dalmatian and Yellow Toadflax (*Linaria dalmatica, L. vulgaris*)

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 established in the Dearborn River in Lewis and Clark County and has been recorded in scattered locations across the Front.

3. Sulfur Cinquefoil (*Potentilla recta*)

There are many native cinquefoil species, so getting a positive ID on a sample is very important before control action is initiated. This species is has been recorded in the Dearborn River drainage. It can out-compete desirable range plants.

4. St. Johnswort (*Hypericum perforatum*)

This medicinal plant is very invasive and can form dense monocultures. It is locally common in the Dearborn River drainage. It is most likely to be found in the moister western areas of the drainage. Biocontrols are available, but success has been mixed using this method of control.

5. 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.

INDIVIDUAL WEED SPECIES - GOALS AND MANAGEMENT

1. Spotted Knapweed (*Centaurea stoebe)/*

All areas should be checked for small isolated patches and treated at least once or ideally, twice per year. **SMALL PATCHES, ROADS, DITCHES AND TWO TRACKS ARE A PRIORITY**.

Goals: Limit spread. Manage all known patches with either herbicide (small patches) or biocontrol (large patches). Survey spread vectors. Map new infestations. Monitor effectiveness. Regular surveys. Map any new starts.

Treatment: Prevention, Herbicide, Mechanical, Biocontrols. Prevention of knapweed can best be achieved by limiting vehicle use off roads and proper livestock management. 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 by pulled and bagged. Biocontrols will be used on large infestations and on riparian infestations in the project area.

Herbicide: **Transline** (clopyralid) @ 1 pint/acre for rangeland or woody/treed areas. **Milestone** (aminopyralid) @7 ounce/acre for rangeland or limited use near water.

Dates: Knapweed can be effectively controlled with herbicides when plants begin to bolt thru bud stage. Although weather and moisture dependent, this generally means early June through mid July. Any plants in bloom or past bloom should be hand-pulled and bagged. Spraying fall re-growth can effective prior to first hard frost.

2. Leafy Spurge (*Euphorbia esula*)

Herbicide provides the most consistent and efficient control of patches. Biological control has been also found to be effective although it takes more time to work.

Goals: Limit spread. Manage all known patches with either herbicide (small patches) or biocontrol (large patches). Survey spread vectors. Map new infestations. Monitor effectiveness. Regular surveys. Map any new starts.

Treatment: Herbicide for small patch management and large patch containment. Biocontrol for large patch management.

Herbicide: **Tordon** (picloram) @ 2 quarts/acre.
Plateau (imazapic) @ 8 oz/acre (fall)

Dates: Surveys can be in conjunction with other weed surveys. Herbicide use should be pre-bloom to bloom from early June thru early July or fall prior to hard frost.

3. Whitetop *(Lepedium draba)*

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

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

Treatments: Prevention**.** Herbicide.

Herbicide: **Escort** (metsulfuron) @ 1-2 oz per acre.

Dates: Herbicides should be applied pre-bloom. This generally means mid to late May. Do not feed or transport contaminated hay.

4. Houndstongue (*Cynoglossum officinale)*

Houndstongue can best be controlled by keeping stock away from existing patches and free from seeds. Proven and effective bio controls are expected to manage this plant in the future.

Goals: Control existing patches at important sites. Limit spread. Monitor effectiveness.

Treatments: Prevention, especially through livestock management. Herbicide. Hand-pulling.

Herbicides: **Escort** (metsulfuron) @1-2 oz/acre.

Dates: Herbicides should be applied when the plant is at the bolt stage, generally 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.

5. Canada Thistle (*Cirsium arvense*)

Canada thistle is a common weed in wet meadows. Because these areas are not suitable for herbicide application and because the plant spreads widely through wind dispersal of seeds, Canada thistle control should be limited to small areas of high importance. Herbicide treatments can vary widely in effectiveness.

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

6. Musk Thistle (*Carduus nutans*)

Musk thistle is a common plant in dry disturbed areas and roadsides. It is easily controlled with herbicides or mechanical treatments like mowing. There are biocontrols established.

Goals:	Limit further spread. Monitor effectiveness.
Treatment:	Musk thistle is susceptible to mechanical treatments. Mowing or livestock trampling can significantly reduce weed densities in sensitive areas. Herbicide is also effective. Biocontrols are well established.
Herbicide:	**Milestone** (aminopyralid) @ 7 oz/acre. **Transline** (clopyralid) @ 1 pint/acre for rangeland or woody/treed areas.
Dates:	Mowing/trampling at bloom before seed set. Herbicide is best applied at the bolt thru pre-bloom stage, usually mid to late June.

APPENDICES

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:

Mark off a known area to spray. Spray the area, recording the time it takes. Spray into a container for the same amount of time, and measure the amount of liquid sprayed. Use the following 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 you 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.

To calibrate by spraying a different sized area than 18.5 x 18.5 feet use the following equation:

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

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

Appendix 2. Maps