

NOXIOUS WEED MANAGEMENT PLAN FOR THE PARKDALE QUARRY FREMONT COUNTY, COLORADO

BACKGROUND

It is in the best interest of all landowners in Fremont County to manage or control noxious weeds. The effect of noxious weeds on property values, agricultural productivity, and native plants and animals is well documented. Non-native invasive species displace or compete with crops and native plants, and usurp water otherwise used by desirable plants, wildlife, and agricultural, domestic and recreational uses. Many of these weeds reproduce profusely in the absence of their natural predators while nationally costing billions of dollars in lost agricultural crop production and animal harm each year.

Colorado State law (CRS 35-5.5-101 et seq.) requires all landowners to manage noxious weeds on their property. Fremont County has adopted a Noxious Weed Management Plan and noxious weeds are being aggressively managed on County road rights-of-way, in the cities of Florence and Canon City, and through the efforts of conscientious local landowners and managers. Fremont County has implemented a weed control plan that extends the responsibility of weed management to private landowners within the unincorporated County and establishes a grant-funded Cost Share program to assist landowners with the costs of noxious weed control.

TARGETED SPECIES

Areas associated with the mining operation, including pits, roads, stockpiles, reclaimed areas and surrounding areas will be regularly monitored (at least once annually during the growing season) for the presence of weeds. If present, all Colorado list A and B noxious species (or any species required to be controlled per applicable federal, state, or local regulation) will be treated by an applicator licensed with the Colorado Department of Agriculture at least annually, using appropriate herbicides. Other species may be treated if it is necessary to meet reclamation or other management objectives. If annual treatments are not effective in controlling or eradicating the infestation, then multiple treatments per year may be required. Treatments shall be coordinated with the Bureau of Land Management (BLM) Royal Gorge Field Office (RGFO) weed program lead to ensure compliance with BLM's pesticide application protocols, including use of RGFO approved chemicals, and proper application and monitoring record submission to RGFO, and to ensure effectiveness of treatment.

WEED MANAGEMENT OBJECTIVES

Weed management objectives help ensure that management activities are targeted and will help protect resources within the permit area. The weed management objectives for the site are:

- Focus on priority weed species and natural resources
- Make sure that management resources are used more efficiently
- Establish criteria against which treatment efficacy can be measured

WEED MANAGEMENT PRIORITIES

The following twelve (12) weeds will receive priority for control or eradication in the permit area:

1. Leafy Spurge (*Euphorbia esula*)
2. Russian Knapweed (*Acroptilon repens*)
3. Diffuse Knapweed (*Centaurea diffusa*)
4. Canada thistle (*Cirsium nutans*)
5. Musk Thistle (*Carduus nutans*)
6. Hoary Cress "whitetop" (*Cardaria draba*)
7. Spotted Knapweed (*Centaurea maculosa*)
8. Yellow Toadflax (*Linaria vulgaris*)

9. Dalmation Toadflax (*Linaria genistifolia*)
10. Houndstongue (*Cynoglossum officinale*)
11. Tamarisk (*Tamarisk ramosissima*)
12. Bull Thistle (*Cirsium vulgare*)

Leafy spurge (*Euphorbia esula*) was noted as the primary noxious weed species of concern in the original weed management plan submitted in 1997. The 1997 leafy spurge management plan is attached, and includes management methods for leafy spurge that are also applicable to other noxious weed species of concern.

WEED MANAGEMENT TECHNIQUES

Information specific to the management of the priority noxious weed species listed here, as well as other species of concern are in the publication *Guideline for Weed Management Plans for Fremont and Custer Counties*, a copy of which is attached to this weed management plan. Information specific to the control of leafy spurge is also in the 1997 leafy spurge management plan for the Parkdale Quarry. A variety of management techniques can be used to control weeds. These range from physical control methods to herbicide applications.

Physical control methods include cultivation, mowing, and burning. Cultivation is usually used on croplands where few other options for control are available. Cultivation and mowing would not be appropriate for the areas of weeds located along the Tallahassee Creek embankments, on steep terrain, or other areas where the use of farm machinery would not be feasible. Burning may reduce the viability of weed species, but is not recommended due to the hazard of spread, and because physical damage to species such as leafy spurge causes the plant to produce a hormone that promotes root growth thereby encouraging the continued proliferation of the plant. Some perennial grass species can effectively compete with the priority noxious weed species. Establishment of these species in reclamation areas will be used to manage the spread of noxious species into those areas.

Methods of biological control include insects that feed on a noxious weed species in its native environments and identified pathogens (bacteria and fungi) that attack the roots, crowns, and seedlings. Biological control is not recommended to manage small patches of noxious weed species because these methods work slowly, will not prevent seed production, and will not eradicate the weed.

Chemical control through the use of herbicides is one of the most effective means of controlling or eradicating noxious weed species. When patches of noxious weed species are small and isolated, it is possible to eradicate them with herbicides. However, herbicide application must be consistent for a period of three to five years to assure control. Several herbicides proven to be effective against the listed noxious weed species are commercially available. However, the number that are suitable for applications near water or stream systems such as Tallahassee or Currant Creek are limited. As previously stated, chemical treatment will be conducted by an applicator licensed with the Colorado Department of Agriculture, using appropriate herbicides. Treatments shall be coordinated with the RGFO weed program lead to ensure compliance with BLM's pesticide application protocols, including use of RGFO approved chemicals, and proper application and monitoring record submission to RGFO.

INTEGRATED WEED MANAGEMENT PLAN

In general, weeds cannot be controlled using a single management technique. The process of selecting and integrating different weed management techniques to efficiently and effectively control weeds, with minimal adverse environmental effects, is known as integrated weed management (IWM). The strategies selected will depend on the species, location, and desired outcome. IWM requires knowledge of a weed's biology and ecology in order to target the weed's weaknesses.

Extraction and exportation of rock products from infested areas, as well as equipment operation in these areas, should be avoided to prevent importation of the weed into uninfested areas. Livestock on the property should be managed to avoid the potential spread of weed seeds by these animals.

MONITORING PLAN

Monitoring is a critical component of any weed management plan. The effectiveness of management efforts can only be determined through monitoring. Using the feedback provided by monitoring, management techniques can be modified to improve effectiveness. Although monitoring requires monies and resources that could otherwise be used to treat more acreage, the payoffs of monitoring can be great. Annual monitoring and mapping of noxious weed infestations on the property during the early growth season should be conducted to spot any new infestations and to determine the effectiveness of management strategies. Any new infestation area should be scheduled for control as soon as possible to improve the effectiveness of the treatment and to minimize the size of the area requiring treatment.

Reference:

Colorado Natural Areas Program. 2000. Creating an Integrated Weed Management Plan: A Handbook for Owners and Managers of Lands with Natural Values. Colorado Natural Areas Program, Colorado State Parks, Colorado Department of Natural Resources; and Division of Plant Industry, Colorado Department of Agriculture. Denver, Colorado. 349 pages. (Also available online: http://parks.state.co.us/cnap/IWM_handbook/IWM_index.htm)



FREMONT COUNTY DEPARTMENT OF PLANNING & ZONING

615 MACON AVENUE, ROOM B5
CAÑON CITY, COLORADO 81212

(719) 275-7510

FAX (719) 275-7626

December 22, 1997

Bill Fehr
Agile Stone Systems, Inc.
6435 S. Pontiac Court
Englewood, Colorado 80111

SUBJECT: Leafy Spurge Management Plan

Dear Mr. Fehr:

On December 5, 1997, the Fremont County Department of Planning and Zoning received a letter dated December 2, 1997, from the Fremont County Weed Board regarding Agile Stone Systems, Inc., Leafy Spurge Management Plan.

According to the December 2, 1997, letter, the Fremont County Weed Board approved Agile Stone Systems, Inc., Leafy Spurge Management Plan on November 19, 1997. Based on this letter and the Leafy Spurge Management Plan which was submitted with it, Agile Stone Systems, Inc., has met the criteria and is in compliance with condition "w" of their current Conditional Use Permit which states as follows:

- w. Applicant shall prepare and implement a management plan for the control of undesirable or noxious plants. Such plan shall be submitted to the Department of Planning and Zoning and to the Fremont County Weed Advisory Board for consideration and recommendations. Any recommendations shall be incorporated into the plan unless waived by the Board of Commissioners. The final plan shall become an additional condition of this conditional use permit.*

If you have any questions, please contact the Department of Planning and Zoning.

Sincerely,

Bill Giordano
Planning Director

BG/mh



FREMONT COUNTY WEED BOARD

0248 Dozier Ave. • Cañon City, Colorado 81212

Phone 719-275-4465 • FAX 719-275-3019

December 2, 1997

Fremont Board of County Commissioners
615 Macon Avenue
Canon City, CO 81212

Dear Commissioners,

On July 18, 1997, the Fremont County Weed Advisory Board wrote you to express their concerns regarding the spread of the noxious weed, leafy spurge. Specifically, the Board was worried about Agile Stone Systems, Inc.'s proposal to open a quarry on the Harvey Ranch near Parkdale. Several infestations of leafy spurge exist on this property, and the Board was troubled that the act of hauling rock materials from this site might accelerate the spread of spurge in Fremont County and beyond. Therefore, the weed board recommended that Agile Stone be required to submit a leafy spurge control plan prior to the approval of a mining permit by the Fremont County Commissioners.

Accordingly, Agile Stone Systems, Inc. have developed a "Leafy Spurge Management Plan for the Parkdale Permit Area"; a copy of which is enclosed. This plan received a favorable review from Dr. George Beck, a well known weed control expert from Colorado State University.

The Fremont County Weed Advisory Board has reviewed this leafy spurge management plan, as well as the comments submitted by Dr. Beck. Agile's modified weed management plan was approved at a meeting of the Weed Board held November 19, 1997.

In our opinion, Agile Stone Systems, Inc. has adequately addressed our concerns about the spread and control of leafy spurge within the mining area.

Sincerely,

The Fremont County Weed Advisory Board

A handwritten signature in cursive script, appearing to read "Paul Telck".

Paul Telck, President

A handwritten signature in cursive script, appearing to read "Roy Roper".

Roy Roper, Secretary

Attachment: Agile Weed Mgm't. Plan
RR:bc

McDermott
Law Firm

John A. McDermott

December 3, 1997

Grant W. Lewis
Jolene L. DeVries
Attorneys

VIA FACSIMILE & U.S. MAIL

Mr. Roy Roper, Secretary
Fremont County Weed Advisory Board
248 Dozier Avenue
Canon City, Colorado 81212

Connie Minty
Domoni A. Toler
Thomas H. Dillingsrud
Legal Assistants

Re: Agile Stone Systems, Inc.
Weed Control Plan for the Parkdale Project

Dear Mr. Roper:

Enclosed please find Agile Stone Systems, Inc.'s Weed Management Plan in final form. I have incorporated your suggested changes to the Plan, with my client's approval.

Please send us your letter of approval for the December 2, 1997 Weed Management Plan so that we can provide a copy of it and the final form of the Weed Management Plan to the Fremont County Department of Planning and Zoning in accordance with the CUP.

Very truly yours,

McDERMOTT LAW FIRM

John A. McDermott/ll

John A. McDermott

JAM/ll

Enclosure

cc: Bill Fehr (w/enclosure)
✓ Mitch Albert (w/enclosure)

LEAFY SPURGE MANAGEMENT PLAN
FOR THE PARKDALE PERMIT AREA

1. Since leafy spurge is present primarily as relatively small isolated patches along the embankments of Tallahassee Creek, control and eradication will be conducted through herbicide and/or biological applications. Because of the terrain involved and the proximity of growth sites within or adjacent to the Tallahassee Creek floodplain, herbicide applications will be made with the use of handheld or backpack type sprayers to avoid excessive application or unnecessary overspray. 2,4-D Amine with an aquatic label (or other similar herbicide approved by Fremont County) or a biological agent will be used in all areas within or near the Tallahassee Creek floodplain. An application rate of approximately 2 quarts of herbicide per acre will be applied at 3-week intervals during the growing season (or other rate approved by Fremont County) which is suitable for leafy spurge control. A surfactant approved for aquatic sites should also be added to the spray solution to obtain the best results. In areas where patches of leafy spurge are present an area of an extra 10 to 15 feet around each patch will be treated to control spreading roots and seedlings.
2. Applications shall be continued on an annual basis for at least 3 to 5 years until control reaches 90 percent or more to prevent the rapid reinfestation of leafy spurge.
3. Annual monitoring and mapping of leafy spurge on the property during the early growth season will be conducted to spot any new infestations and to determine the effectiveness of management strategies. Any new infestation area will be scheduled for herbicide/biological application as soon as possible to improve the effectiveness of herbicide/biological application to minimize the size of the area requiring treatment.
4. Extraction and exportation of rock products from infested areas, as well as equipment operation in these areas, will be avoided to prevent importation of the weed into uninfested areas. Livestock on the property will be managed to avoid the potential spread of leafy spurge seed by these animals. Also, livestock grazing will be managed so as to increase the competitiveness of desirable plants.
5. Fremont County weed specialists and County Extension agents shall be consulted to ensure the effectiveness of the leafy spurge management plan. Access for this purpose will be permitted through the growing season.
6. Production employees shall be made aware of the leafy spurge problem and be able to recognize leafy spurge.
7. Agile Stone Systems will use suitable herbicides on areas 17 and 18 and a combination of biological and chemical controls will be used on the other areas. Chemicals will be used only if it is known (based upon current scientific information) that no environmental contamination or liabilities will occur because of their use.
8. Hay with leafy spurge will not be shipped from the site.

November 19, 1997

**McDermott
Law Firm**

John A. McDermott

November 14, 1997

Grant W. Lewis
Jolene L. DeVries
AttorneysVIA FACSIMILE

Mr. Howard Wertsbaugh, Weed Control Coordinator
Fremont County Weed Advisory Board
248 Dozier Avenue
Canon City, Colorado 81212

Connie Minty
Domoni A. Telen
Thomas H. Dillingstad
Legal Assistants

Re: Agile Stone Systems, Inc.
Weed Control Plan for the Parkdale Project

Dear Howard

After reflecting on our telephone conversation on Wednesday regarding the soundness of the weed management plan and the Board's primary concern being with exportation off-site, I have the following thoughts to share

First, enclosed is a photocopy of a "draft letter" dated October 15, 1997 to the Board from Bill Fehr and Mitch Albert of Agile Stone Systems, Inc. This had been forwarded to me, and I had decided, instead of using it, to prepare my own cover letter, which is the letter dated November 10, 1997 that I faxed to you

On reflection, I probably should have either sent the draft letter along previously, or finalized it and sent it along. I enclose it at this time however, in view of your comments, to draw your attention to paragraph two of that letter wherein the survey sites are summarized with the notation that 23 of the 26 identified locations where leafy spurge is found to one degree or another at the present time are along Tallahassee Creek are areas in which there will be no operations

Of the three remaining sites, one will be within an area of "operations," but in point of fact, not within an area of actual ground disturbance. This leaves two very small sites within the gravel mining area where mining will occur, but ground disturbance will only occur several years into the future. By then, we expect to have killed off the leafy spurge in those two areas.

Secondly, it occurs to me and my clients that with the areas of leafy spurge infestation that presently exist being along the banks of Tallahassee Creek, and obviously having spread there from upstream, I think it is appropriate at this time to inquire as to what the Board is either requiring or requesting of our fellow landowners upstream from the Harvey Ranch to eradicate leafy spurge or otherwise prevent the reinfestation of my client's property. If there are any written plans in place, I would appreciate getting my hands on copies of those so that I can supply them to my client. I want to be able to assure my client both that the county is treating everyone

McDermott Law Firm

RE: Howard W. Wadsworth, Weed Control Coordinator
Fremont County Weed Advisory Board
November 14, 1997
Page 2

the same in its efforts to help control the problem and, further, that our expenditure of manpower and money to control the problem is, in fact, of long term benefit to the Fremont County ranching community and others who are concerned with the spread of leafy spurge.

Please contact me at your earliest convenience so that we can discuss whether this additional information obviates the need for a recommendation that the weed control plan that we have proposed should be modified

Very truly yours,

MCDERMOTT LAW FIRM



John A. McDermott

JAM/II

Enclosure

cc Bill Fehr
Mitch Albert

CEDAR CREEK
ASSOCIATES, INC.



916 Willshire Ave. • Fort Collins, Colorado 80521 • (970) 493-4394

September 23, 1997

Bill Fehr
Agile Stone Systems, Inc.
6435 Pontiac Court
Englewood, CO 80111

Dear Bill:

At your request Cedar Creek Associates, Inc. revisited Agile Stone Systems, Inc.'s Parkdale Permit Area on September 14, 1997 to determine the extent of leafy spurge (*Euphorbia esula*) infestation on the property. Previous field surveys conducted by Cedar Creek in April 1997 identified small inclusions of leafy spurge, primarily along Tallahassee Creek, but did not specifically address the total extent of its presence.

The purpose of this follow-up survey was to determine the distribution and extent of leafy spurge over the entire permit area. The field survey consisted of walking or driving transects to provide a visual overview of the entire property and to identify areas where leafy spurge was present. In areas where leafy spurge was located, the approximate size of the infestation area was estimated by pacing, and the percent cover provided by leafy spurge within each growth area was determined by ocular estimates. The following text and attachments (Table and Map) provide a summary of the findings.

In general, the September 14th survey confirmed Cedar Creek's findings from the April 1997 site visit. Leafy spurge is present primarily as small growth pockets along the embankment areas of Tallahassee Creek. The approximate distribution and extent of leafy spurge within the property is graphically portrayed on the attached map. A site by site summary of the extent of leafy spurge presence is summarized in the attached table. Overall leafy spurge is not a dominant species in the permit area, but within the sites where the weed was present, total cover contributed by leafy spurge could be as high as 70 percent. Within the Tallahassee Creek floodplain, leafy spurge was found primarily along the more protected portions of the stream embankment where either higher topographic position or stands of other vegetation, especially woody species, provide some protection from scouring stream flows. Leafy spurge was also present within the creek floodplain on alluvial benches that are slightly elevated above the primary stream channel. Except for three sites outside of the Tallahassee Creek floodplain, no leafy spurge growth areas were located within the upland portions of the property. These three areas are identified as sites 17, 18, and 22 on the attached map. These three growth sites were topographic depressions within or adjacent to irrigation ditches in upland pasture areas.

Bill, this letter summarizes the findings of the September field survey. A leafy spurge control plan will be developed and submitted in the near future. If you have any questions or require additional information, please give me a call.

Sincerely,
CEDAR CREEK ASSOCIATES, INC.

T. Michael Phelan
Principal

enclosures

**LEAFY SPURGE MANAGEMENT PLAN
FOR THE
PARKDALE PERMIT AREA**

Prepared
for

Agile Stone Systems, Inc.
Denver, Colorado

Prepared
by

CEDAR CREEK ASSOCIATES, INC.
Fort Collins, Colorado

September 1997

BACKGROUND

Leafy spurge (*Euphorbia esula*) is a deep-rooted, long-lived perennial weed that is native to Eurasia and is extremely difficult to control. In North America, leafy spurge is very competitive and can cause the displacement of native vegetation. Large areas of pure stands result in reductions in plant diversity, loss of wildlife habitat, and reduction in land values. Livestock carrying capacity of infested land is very low because forage production is reduced and because cattle and some wildlife will not graze in infested areas. The following information in this section is summarized from Lajeunesse et al (1995).

Leafy spurge begins growing in early spring from buds on the crown (the junction between root and stem) and roots, as well as from seed. Some seed germination can occur any time adequate moisture is available. Flowering begins in late spring and is usually completed by mid-summer. Seeds develop for 20 to 30 days after flowering. Calendar dates vary with climate and geographic location, and flowering and seed production can occur throughout the summer if soil moisture is available.

Each flower produces a lobed capsule containing three seeds. When the stem matures, the capsules explode, projecting seeds up to 15 feet. Part of each crop of leafy spurge seeds can remain dormant and viable for as long as 8 years. Dormancy can last even longer if seeds are deeply buried.

Leafy spurge seeds are dispersed several ways. The seeds float on water, often resulting in new infestations along ditches, rivers, and in areas that are periodically flooded. Seeds can be spread by animals in the mud on their feet or are eaten by sheep, goats, rodents or birds and then deposited in dung. Seeds and sometimes root pieces can also be widely spread as contaminants in crop seed, feed grain, or hay and on vehicles and equipment.

Shoots develop from leafy spurge's numerous stem and root buds as well as from seeds. Stem buds cause branching of stems, while new shoots develop from root buds when older shoots are removed or the crown is damaged.

The root system is comprised of both vertical and horizontal roots. Main vertical roots can grow to depths of 26 feet. Horizontal roots, which grow near the soil surface, can extend 15 feet per year from the parent plant. Each root bud is capable of producing a new, independent plant. Root buds have been found at depths of 10 feet or more. The depth, extent, and thick corky bark of the roots enable leafy spurge to survive during periods of drought, grazing, or herbicide applications. In addition, the roots contain a large food reserve that can sustain the plant for years and can provide the energy needed for new shoots to emerge from buds after chemical or mechanical treatments. The deep and extensive root system makes leafy spurge especially difficult to control.

DISTRIBUTION WITHIN THE PERMIT AREA

At Agile Stone Systems, Inc.'s request, Cedar Creek Associates, Inc. surveyed the Parkdale Permit Area on September 14, 1997 to determine the extent of leafy spurge infestation on the property. Previous field surveys conducted by Cedar Creek in April 1997 identified small inclusions of leafy spurge, primarily along Tallahassee Creek, but did not specifically address the total extent of its presence.

The September survey was conducted to determine the distribution and extent of leafy spurge over the entire permit area. The field survey consisted of walking or driving transects to provide a visual overview of the entire property and to identify areas where leafy spurge was present. In areas where leafy spurge was located, the approximate size of the infestation area was estimated by pacing, and the percent cover provided by leafy spurge within each growth area was determined by ocular estimate. The following text and attached table and map provide a summary of the findings of the survey.

Leafy spurge is present primarily as small growth pockets along the embankment areas of Tallahassee Creek. The approximate distribution and extent of leafy spurge within the property is graphically portrayed on the attached map. A site by site summary of the extent of leafy spurge presence is summarized in the attached table. Overall, leafy spurge is not a dominant species in the permit area, but within some sites where the weed was present, total cover contributed by leafy spurge was estimated as high as 70 percent. Within the Tallahassee Creek floodplain, leafy spurge was found primarily along the more protected portions of the stream embankment where either higher topographic position or stands of other vegetation, especially woody species, provide some protection from periodic scouring stream flows.

Leafy spurge was also present within the creek floodplain on alluvial benches that are slightly elevated above the primary stream channel. Except for three sites outside of the Tallahassee Creek floodplain, no leafy spurge growth areas were located within the upland portions of the property. These three areas are identified as sites 17, 18, and 22 on the attached map. These three growth sites were topographic depressions within or adjacent to irrigation ditches in upland pasture areas.

MANAGEMENT CONSIDERATIONS

Control of leafy spurge is possible, but only with aggressive and continuing efforts. The four methods available to manage leafy spurge include: physical control, plant competition, biological control, and chemical control. Aspects of these four methods were reviewed and evaluated with respect to their applicability to infestation sites in the permit area.

Physical control methods include cultivation, mowing, and burning. Cultivation is usually used on croplands where few other options for control are available. Cultivation and mowing would not be

appropriate for the permit area since most areas of infestation are located along the Tallahassee Creek embankments where the use of farm machinery would not be feasible. Burning may reduce the viability of the leafy spurge seed crop during the flowering season but is not recommended. Burning and other physical damage to leafy spurge causes the plant to produce a hormone that promotes root growth thereby encouraging the continued proliferation of the plant (pers. comm., Larimer County Weed Control agent).

Some perennial grass species can effectively compete with leafy spurge, but establishment of these species in most areas of infestation in the permit area would be difficult due periodic scouring stream flows in Tallahassee Creek.

Methods of biological control include insects that feed on leafy spurge in its native environments and identified pathogens (bacteria and fungi) that attack leafy spurge roots, crowns, and seedlings. Biological control is not recommended to manage small patches of leafy spurge because these methods work slowly, will not prevent seed production, and will not eradicate the weed.

Chemical control through the use of herbicides is one of the most effective means of controlling or eradicating leafy spurge. When patches of leafy spurge are small and isolated, it is possible to eradicate them with herbicides. However, herbicide application must be consistent for a period of 3 to 5 years to assure control of leafy spurge. In sites where seed production has occurred, these areas should be monitored for a minimum of 8 years with herbicide application cycles reinitiated in areas where regrowth is detected. Several herbicides proven to be effective against leafy spurge are commercially available. However, the number that are suitable for applications near water or stream systems such as Tallahassee Creek are limited.

SUGGESTED MANAGEMENT PLAN

1) Since leafy spurge is present primarily as relatively small isolated patches along the embankments of Tallahassee Creek, it is recommended that control and eradication be conducted through herbicide application. Because of the terrain involved and the proximity of growth sites within or adjacent to the Tallahassee Creek floodplain, it is recommend that herbicide applications be made with the use of hand-held or backpack type sprayers to avoid excessive application or unnecessary overspray. It is recommended that 2,4-D Amine with an aquatic label (or other similar herbicide approved by Fremont County) be used in all areas within or near the Tallahassee Creek floodplain. An application rate of approximately 2 quarts per acre applied at 3-week intervals during the growing season (or other rate approved by Fremont County) is suitable for leafy spurge control. A surfactant approved for aquatic sites should also be added to the spray solution to obtain the best results. In areas where patches of leafy spurge are present, an area of an extra 10 to 15 feet around each patch should be treated to control

spreading roots and seedlings.

2) Herbicide applications should be continued on an annual basis for at least 3 to 5 years until control reaches 90 percent or more to prevent the rapid reinfestation of leafy spurge.

3) Annual monitoring and mapping of leafy spurge on the property during the early growth season should be conducted to spot any new infestations and to determine the effectiveness of management strategies. Any new infestation area should be scheduled for herbicide application as soon as possible to improve the effectiveness of herbicide application and to minimize the size of the area requiring treatment.

4) Extraction and exportation of rock products from infested areas, as well as equipment operation in these areas, should be avoided to prevent importation of the weed into uninfested areas. Livestock on the property should be managed to avoid the potential spread of leafy spurge seed by these animals. Also, livestock grazing should be managed to increase the competitiveness of desirable plants.

5) Fremont County weed specialists and County Extension agents should be consulted to ensure the effectiveness of the leafy spurge management plan.

REFERENCES CITED

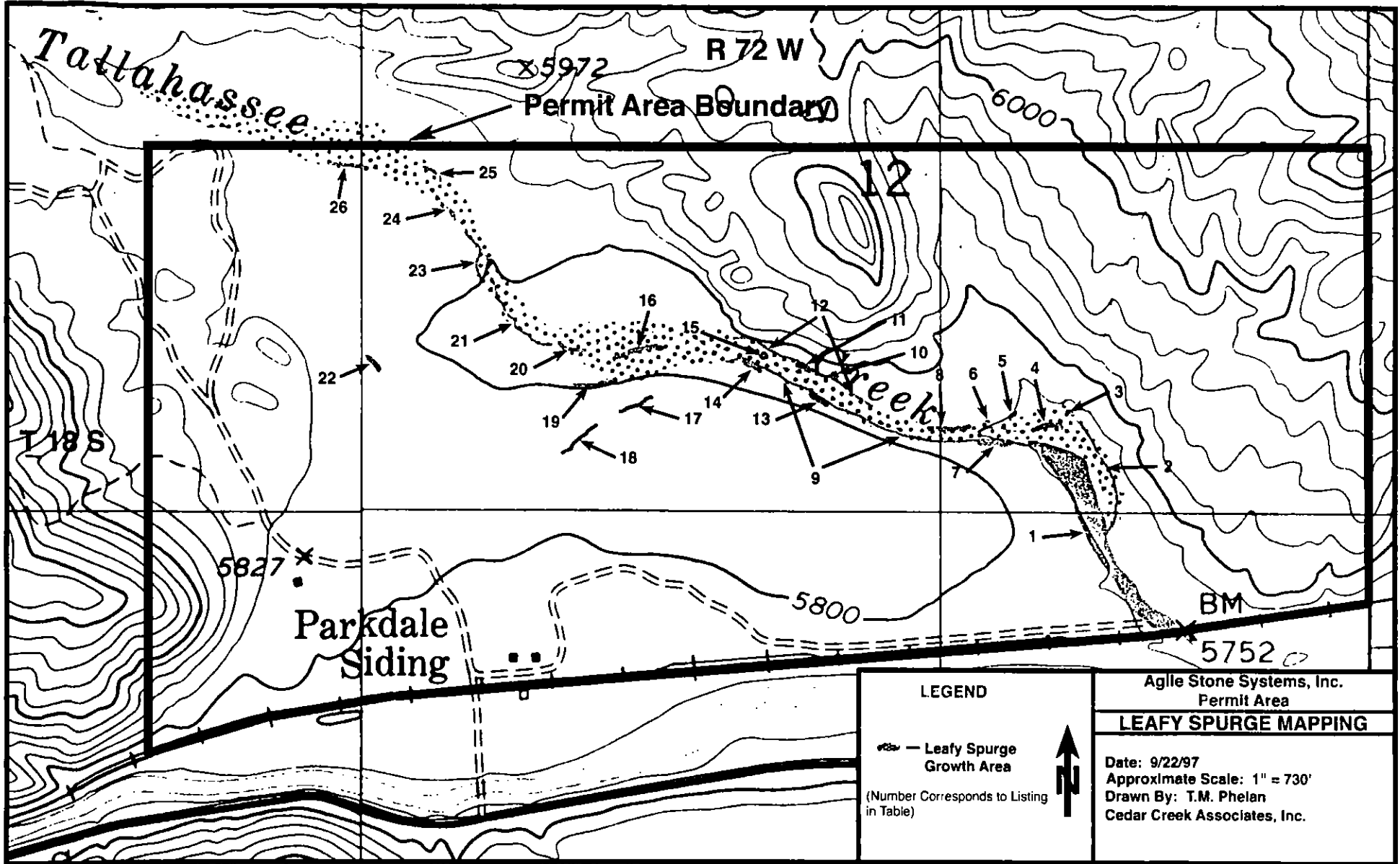
Lajeunesse, S., R. Sheley, R. Lym, D. Cooksey, C. Duncan, J. Lacey, N. Rees, and M. Ferrell. Leafy spurge: biology, ecology and management. Montana State University Extension Service, publication EB 134. July 1995. 25 pp.

LEAFY SPURGE SUMMARY TABLE - PARKDALE PERMIT AREA

Leafy Spurge Location No.*	Description and Comments
1	Large floodplain bench above main creek channel. Scattered pockets of leafy spurge ranging from 1 ft in diameter to approximately 600 sq ft pockets. Within pockets cover by spurge ranged from 15% to 70%. Total cover by spurge in area less than 1%.
2	Streambank along north side of creek. A total of 25 small pockets (1 to 3 ft in diameter) of spurge were counted within this narrow cutbank portion of the stream channel. Percent of spurge cover in these pockets ranged from 30% to 60%.
3	Larger pocket of spurge along north streambank. Area of 30 ft by 15 ft supporting 35% cover by spurge.
4	Larger pocket of spurge along north streambank. Area of 100 ft by 10 ft supporting 5% cover by spurge.
5	Larger pocket of spurge along north streambank. Area of 55 ft by 10 ft supporting 35% cover by spurge.
6	Larger pocket of spurge along north streambank. Area of 30 ft by 4 ft supporting 45% cover by spurge.
7	Larger pocket of spurge along south streambank. Area of 110 ft by 5 ft supporting 40% cover by spurge.
8	Larger pocket of spurge along north streambank. Area of 120 ft by 10 ft supporting 20% cover by spurge.
9	Streambank along south side of creek. A total of 26 small pockets (1 to 3 ft in diameter) of spurge were counted within this narrow cutbank portion of the stream channel. Percent of spurge cover in these pockets ranged from 30% to 50%.
10	Larger pocket of spurge along north streambank. Area of 40 ft by 30 ft supporting 70% cover by spurge.
11	Larger pocket of spurge along north streambank. Area of 36 ft by 4 ft supporting 10% cover by spurge.
12	Streambank along north side of creek. A total of 17 small pockets (1 to 3 ft in diameter) of spurge were counted within this narrow cutbank portion of the stream channel. Percent of spurge cover in these pockets ranged from 20% to 45%.
13	Larger pocket of spurge along south streambank. Area of 55 ft by 4 ft supporting 10% cover by spurge.
14	Larger pocket of spurge along south streambank. Area of 45 ft by 4 ft supporting 12% cover by spurge.
15	Pocket of spurge within stream channel. Area of 50 ft in diameter supporting 5% cover by spurge.
16	Larger pocket of spurge within stream channel. Area of 250 ft by 50 ft supporting 8% cover by spurge.
17	Depression in upland area adjacent to small irrigation ditch. Area of 185 ft by 30 ft supporting less than 5% cover by spurge.
18	Depression in upland area adjacent to small irrigation ditch. Area of 250 ft by 40 ft supporting 15% cover by spurge.
19	Narrow tributary channel feeding into main creek channel. Area of 250 ft by 4 ft supporting 15% cover by spurge.

LEAFY SPURGE SUMMARY TABLE - PARKDALE PERMIT AREA (continued)	
Leafy Spurge Location No.	Description and Comments
20	Larger pocket of spurge along south streambank. Area of 130 ft by 20 ft supporting 5% cover by spurge.
21	Streambanks along both sides of creek. A total of 27 small pockets (1 ft in diameter) of spurge were counted within the narrow cutbank portions of the stream channel. Percent of spurge cover in these pockets ranged from 15% to 60%.
22	Irrigation ditch area in upland. Area of 50 ft by 30 ft supporting 20% cover by spruge.
23	Larger pocket of spurge along south streambank. Area of 140 ft by 4 ft supporting 20% cover by spurge.
24	Section along south streambank supporting small pockets of spurge ranging in size from 3 ft to 6 ft in diameter. Cover by spurge in pockets ranged from 5% to 10%.
25	Larger pocket of spurge along north streambank. Area of 50 ft by 4 ft supporting 30% cover by spurge.
26	Larger pocket of spurge along south streambank. Area of 100 ft by 20 ft supporting 15% cover by spurge.

* Location numbers are keyed to growth sites on the attached map



2.15 ESTIMATED TIMETABLE OF RECLAMATION ACTIVITIES

	<u>1998</u>	<u>2000</u>	<u>2005</u>	<u>2010</u>	<u>2015</u>	<u>2020</u>	<u>2030</u>	<u>2035</u>
Mine Development & Start Up	XX							
Permanent Berm Construction/Vegetation	XXXXXXXX							
Reclaim Phase IA Gravel Pit			XXX					
Complete Granite Quarry Final Highwall North End, Phase I				XXXX				
Reveg Granite Quarry Benches, Phase I				XXXXX				
Reclaim Phase II, Gravel Pit				XXXXXXXX				
Complete Granite Quarry Final Highwall North Boundary Phase II & Quarry Floor Phases I & II					XXXXXX			
Revegetate Quarry Benches Phase II					XXXXXXXX			
Reclaim Phase III Gravel Pit						XXXXXX		
Complete Granite Quarry Final Highwall North/East Boundaries Phase III							XXXXX	
Reclaim Quarry Benches Phase III and Floor								XX
Remove Railway to Quarry, Roads, Crossings								X

GUIDELINE FOR WEED MANAGEMENT PLANS

FOR FREMONT AND CUSTER COUNTIES



**SO MANY WEEDS, SO LITTLE TIME
APRIL 2015**

THIS GUIDELINE WAS PREPARED BY FREMONT COUNTY WEED MANAGEMENT & PARTNERS

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~ F O U R T H E D I T I O N ~

INTRODUCTION:

SO MANY WEEDS, SO LITTLE TIME ...

This has been developed to be used as a tool to address noxious weed infestations in the greater Fremont and Custer County areas. Herbicide recommendations and other control methods are based on observations and research efforts throughout the western United States including local research results and applied experience.

*Brand names and families of herbicides are shown for reference only as similar formulations developed by numerous manufacturers and providers may also be substituted. **FOR CHEMICAL CONTROL, ALWAYS READ THE LABEL. THE LABEL IS THE LAW!!!***

The invasive species to the right may be listed for control or eradication with Fremont and Custer Counties. Other plants not found on this list can be submitted to the Fremont County Weed Management Director for recommendations. Please submit all plant parts in good condition or email photos to jana.rapetti@fremontco.com.

The following pages address management of the individual weed species listed here. Many recommended control methods include biological, chemical, cultural, and mechanical methods and are suggested to offer the landowner/manager an opportunity to incorporate a variety of options. The invasive plants in this document are listed in alphabetical order by common name. Photographs are also included.

Biological controls include insects and plant pathogens. The Colorado Department of Agriculture's Insectary in Palisade develops host-specific organisms for weed control. Keep in mind that bio-controls are not a viable option when full eradication is the goal (as with A-list species); they will never completely eliminate their host. Bio-controls are included in this guideline when applicable; however, bio-control options have limited availability and vary in success.

The preferred method of control ***is highlighted and shown in italics.*** These methods are used by Fremont County Weed Management.

The last few pages of this document contain "Integrated Weed Management Forms" to track control measures you choose to take in your weed management efforts. Enjoy!

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This list of noxious weeds is organized to be used with “Weed Management Preferences” chart dated April, 2015.

BOUNCINGBET



Management

Bouncingbet is most often found in rights-of-way, meadows and disturbed areas. It is an escaped ornamental and has become increasingly common in Colorado. Bouncingbet is a B list weed in Colorado and is toxic to grazing animals. In Fremont and Custer Counties it has been designated for eradication.

Mechanical Control of Bouncingbet

Mechanical control is not recommended because the plant reproduces clonally from its root system. Hand pull or dig only single plants/new infestations when soil is moist to make sure the entire root system is excavated.

Cultural Control of Bouncingbet

Prevent the establishment of new infestations by minimizing disturbance and seed dispersal.

Chemical Control of Bouncingbet

Telar XP herbicide (chlorsulfuron) can be used at a rate of 0.5 to 1 ounce/acre. Apply during late spring to mid-summer when plants are at bolting to bud-growth stage.

Fremont County Weed Management has also has success treating bouncingbet with Perspective herbicide (aminocyclopyrachlor), however, this chemical is not currently labeled for rangeland use.

Biological Control of Bouncingbet

Currently, no biological controls are available for bouncingbet control through the Palisade Insectary.

BULL, MUSK, AND SCOTCH THISTLES



Scotch Thistle



Musk Thistle



Bull Thistle

Mechanical Control of Musk thistle, Bull thistle, & Scotch thistle

These thistles will not tolerate tillage and can be removed easily by severing its root below ground with a shovel or hoe. Mowing can effectively reduce seed output if plants are cut when the terminal head is in the late-flowering stage. Gather and burn mowed debris to destroy any seed that has developed.

Cultural Control of Musk thistle, Bull thistle, & Scotch thistle

Maintaining pastures and rangeland in good condition is a primary factor for musk thistle, bull thistle and scotch thistle management. To favor pasture and rangeland grass growth, do not overgraze. Fertilize when necessary and according to soil testing recommendations. To successfully manage musk thistle, prevent seed formation.

Also, Robin Young with the CSU Extension in Custer County currently utilizes goats for localized grazing on musk thistle in Custer County.

Chemical Control of Musk thistle, Bull thistle, & Scotch thistle

In Fremont and Custer Counties, Range Star at 1.5 pints to 2 quarts/acre and Milestone at 3 to 5 ounces/acre have shown to be more effective on bull and musk thistles than other herbicides. These herbicides perform best before seed production. Labels recommend using non-ionic surfactants.

Escort XP (metsulfuron) or Telar XP (chlorsulfuron) also can be used. Use Telar XP in noncrop areas only and Escort XP in pastures, rangeland or non-crop areas. Research from Colorado State University and the University of Nebraska shows that Telar XP or Escort XP prevents or dramatically reduces viable seed formation when applied in spring, up to early flower growth stages. The latest time to apply these herbicides is when developed terminal flowers have opened up to the size of a dime. Apply Telar XP at 1 ounce/acre or Escort XP at 0.5 ounce/acre. Add a good nonionic surfactant at 0.25 percent v/v2 to Escort XP or Telar XP treatments for greater success.

Perspective herbicide (aminocyclopyrachlor) at a rate of 3 to 4.5 ounces/acre is effective, though this chemical is not yet labeled for rangeland.

Biological Control of Musk thistle, Bull thistle, & Scotch thistle

There are not currently any biological controls available for bull thistle or Scotch thistle. There is seed head weevile available for musk thistle through Colorado Department of Agriculture's Palisade Insectary. There is some concern with the weevil, as it also hosts on native thistles.

CANADA THISTLE



Photo to right from New Mexico
State University:
weeds.nmsu.edu



Management

The key principle to Canada thistle control is to stress the plant and force it to use stored root nutrients. Canada thistle can recover from almost any stress, including control attempts, because of root nutrient stores. Therefore, returning infested land to a productive state occurs only over time. Success requires a sound management plan implemented over several years.

Mechanical Control of Canada thistle

Mowing hay meadows can be an effective tool if combined with herbicide treatments. Mowing alone is not effective. Always combine mowing with cultural and chemical control. Mowing at hay cutting time stimulates new Canada thistle shoots to develop from its root system.

In irrigated grass hay meadows, fall herbicide treatments that follow mowing can be an effective management system because more Canada thistle foliage is present after cutting to intercept herbicide. Additionally, root nutrient stores decrease after mowing because the plant draws on them to develop new shoots.

If a Canada thistle infestation exists in a field that will be rotated to alfalfa, control the weed before seeding alfalfa. Alfalfa is an effective competitor only after it is established. It will not adequately establish in a well-developed Canada thistle infestation. A Canada thistle management system can start with crop or grass competition combined with herbicides, with the field rotated to alfalfa when the management plan ends.

Cultural Control of Canada thistle

Grasses and alfalfa can compete effectively with Canada thistle if their growth is favored by good management. Maintain fertility and, if possible, moisture at optimum levels to favor grass or alfalfa growth. Soil analysis can easily determine fertility needs. Be cautious with nitrogen fertilizers, because excess available soil nitrogen may favor weed growth. These are essential management steps to ensure optimum desirable plant growth and competition. However, competition alone seldom is effective against Canada thistle.

Chemical Control of Canada thistle

Recent research at Colorado State University shows that the performance of Milestone (aminopyralid) to control Canada thistle can be improved when preceded by other control methods including mowing. ***When Canada thistle infestations occur in most areas, apply Milestone at 5 to 7 ounces/acre in summer or in fall about one month after crop mowing. Follow this regimen for two to three consecutive years. This is the most effective herbicide to date.***

Biological Control of Canada thistle

The Palisade Insectary, through the Colorado Department of Agriculture, is currently in the trial phase for a Canada thistle rust. Please visit the Insectary website for more information.

<https://www.colorado.gov/pacific/agconservation/biocontrol>

CYPRESS SPURGE



Management

Cypress spurge has been found in Colorado in limited areas. It is an introduced species and an **A list** weed in Colorado. Cypress spurge is an escaped ornamental, popular in xeriscaping and rock garden. It is toxic to horses and cattle, and caustic and irritating to human skin. The best way to manage the spread is to prevent establishment. Eradication is required by Colorado State law.

Mechanical Control of Cypress spurge

Hand pulling or digging is a viable option when managing new, small infestations. Tillage may encourage the spread. Wear rubber gloves, long sleeves, long pants and eye protection to minimize contact with skin and irritation.

Cultural Control of Cypress spurge

Keep desirable vegetation healthy and thick.

Chemical Control of Cypress spurge

RangeStar (2,4-D plus dicamba) at 2 quarts/acre. Applied flowering stage (springtime) can be effective. Similarly, E-2 herbicide (a combination of 2,4-D, dicamba and fluroxypyr) can be used to treat Cypress spurge as well. Adding methylated seed oil will help the chemical break into the waxy leaf surface. Escort XP (metsulfuron) may be effective at 1 ounce/acre when combined with a methylated seed oil; Or Perspective (aminocyclopyrachlor) at 3 to 4.5 ounces/acre when used with a methylated seed oil. Perspective is not currently labeled for rangeland use.

Biological Control of Cypress spurge

Currently, no biological controls are available for Cypress spurge control through the Insectary. Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Since Cypress spurge is designated for eradication, bio-control is not a viable option.

DALMATIAN TOADFLAX



Management

This differs from yellow toadflax principally in being larger and having differently shaped leaves. Clumps of stems are 3 to 4 feet tall. Waxy leaves are broad, ovate, sometimes heart shaped and upper leaves clasp the stem (an important difference). Seeds are irregular in shape, angular, somewhat flattened, thin-edged, strongly netted, tan-gray and 1/24 to 1/16 inch across. It is not as common, but is more aggressive than yellow toadflax. It is reported in various parts of the state from 5,000 to 7,000 feet.

All toadflax species are very difficult to control and management plans should integrate as many strategies as possible to increase potential for success. Assess the condition and composition of the existing plant community in an infested area then determine the approximate composition of the desired plant community needed to achieve land management goals and objectives. Create a management plan that combines various control strategies to foster development of the desired plant community.

Chemical and Cultural Management of Dalmatian toadflax

The combination of spraying and seeding competitive grasses controlled dalmatian toadflax better than spraying alone. Three years after treatments were started, control of dalmatian toadflax ranged from 61 percent to 86 percent where grasses were seeded in April and from 76 percent to 95 percent from the August seeding, compared to no control from spraying alone. ***Dalmatian Toadflax can also be treated using Escort XP (metsulfuron) at 1.5 to 2 ounces/acre or Telar XP (chlorsulfuron) at 2 to 3 ounces/acre. A fall application is best in Fremont and Custer Counties and a non-ionic surfactant is recommended.***

Biological Control of Dalmatian toadflax

There is currently a bio-control available at Colorado Department of Agriculture's Insectary in Palisade, Colorado for Dalmatian toadflax control; a toadflax-feeding noctuid moth. The moth larvae feed extensively on leaves and flowers of toadflax, severely damaging the plants. It is established in Colorado and is available upon request through the Insectary. A stem boring weevil that has also shown success for control of Dalmatian toadflax also exists. It kills the above-ground plant by boring into and killing the stems where the larvae live and feed. These beetles have proven very effective against Dalmatian toadflax at a number of sites around the state. We now have collection sites where we can obtain large enough numbers for redistribution. Please visit the Insectary website for more information.

<https://www.colorado.gov/pacific/agconservation/biocontrol>

DIFFUSE AND SPOTTED KNAPWEED



Diffuse Knapweed



Spotted Knapweed

Management

Diffuse and spotted knapweed can be managed similarly to Russian Knapweed. They are readily controlled with herbicides. However, the weeds will reinvade unless cultural techniques are used.

Mechanical Control of Spotted Knapweed and Diffuse knapweed

If desirable grass competition is evident in diffuse or spotted knapweed stands, judicious herbicide application that does not injure grasses may allow them to compete effectively with the weeds. Irrigation (where possible) may help stimulate grass competition in these cases. However, infested rangeland or pastures often are degraded, allowing knapweed invasion, and herbicides alone will not restore the land to a productive state. Seeding suitable perennial grasses is necessary to prevent weed reinvansion.

Chemical Control of Spotted Knapweed and Diffuse knapweed

Spotted knapweed and diffuse knapweed generally occupy the same plant communities in Colorado, so the same herbicide treatments can be applied. ***Weed scientists locally indicate that 5 to 7 ounces/acre of Milestone should control spotted knapweed for several years, but the weed may reinvade the area unless other management techniques are used.*** RangeStar herbicide (2,4-D plus dicamba) can be used in other areas (such as on BLM lands) at a rate of 4 to 6 pints/acre when plants are actively growing. Likewise, Perspective herbicide (aminocyclopyrachlor) is effective at 4.75 to 8 ounces/acre; however this chemical is not currently labeled for rangeland use.

Biological Control of Diffuse knapweed

There are currently bio-controls available for spotted and diffuse knapweed through the Colorado Department of Agriculture's Insectary in Palisade, Colorado. These include root boring beetles, seed head feeding flies, seed head feeding weevils and seed head feeding moths. Several of these are well established in Colorado. Please visit the Insectary website for more information.

<https://www.colorado.gov/pacific/agconservation/biocontrol>

DOWNY BROME OR “CHEAT GRASS”



Management of Downy brome

Downy brome (also known as cheat grass), is an introduced plant and is a C list weed in the Noxious Weeds of Colorado book. It is a problem weed state wide, in dry land agriculture, forests, rangeland, pastures and rights-of-way. Downy brome grows in dense stands that can become a fire hazard.

Cultural Control of Downy brome

Grazing can help with management of Downy brome. It does not compete well with established perennial grasses. Downy brome provides good quality forage for 6-8 weeks early in the growing season. Putting grazing animals out in the spring for a high intensity, short duration grazing period and again in the fall when green will help reduce the density and size.

Mechanical Control of Downy brome

Hand pulling, cutting, or digging work best for small infestations, Tillage or disking may further stimulate growth since disturbance coupled with a well-altered seedbed favors downy brome. If disking is done repeatedly it may be effective if the seed is at least buried 4-6 inches deep.

Prescribed burnings can be a highly disruptive tool in Downy brome stands, but it often leads to a displacement of native desirable plants and an increase in dominance and density of downy brome.

Chemical Control of Downy brome

Imazapic (Plateau) at 2-12 ounces product/A. plus 1 quart methylated seed oil applied during the fall or spring. Glyphosate (RoundUp Pro, Rodeo) at .5-1 pint product/A. applied early spring after downy brome emerges and before native perennial seedlings emerge. Sulfometuron methyl and Chlorsulfuron (Landmark XP) at 1-1.5 ounces/ 100 gallons of water applied during warm moist conditions following application accelerates herbicide activity.

Biological Control of Downy brome

Currently, no bio-control agents are available for downy brome at the Palisade Insectary.

ELONGATED MUSTARD



Management

Elongated mustard is an **A-list** species in the state of Colorado. The only known location of this species currently occurs in Wellsville, Colorado on the Chaffee-Fremont County line. It can be found on the north and south sides of the Arkansas River and Highway 50. It is believed to have been transported unintentionally on mining equipment. Elongated mustard grows in very cliffy, craggy, rocky soils. Due to the rough terrain, this plant is very difficult to access during control efforts. The seeds spread a number of ways: high winds in the area cause the weed to snap off at the base and tumble; flooding has occurred, causing a flush of new plants; and the highway and river corridors are vectors for spread, as well. Eradication is required by Colorado State law.

Mechanical and Cultural Control of Elongated Mustard

Because this is the only known infestation in the state, experience with treatment options is limited. Due to the extensive root system (see picture to the left), hand-pulling is not a viable option. Other mechanical methods (such as mowing) would be impossible, due to the terrain and inaccessibility. Keeping ground disturbance to a minimum and thoroughly cleaning possibly contaminated equipment before leaving a contaminated site is of utmost importance. Also, spotting new infestations before they proliferate will help prevent further spread.

Chemical Control of Elongated Mustard

Fremont County, Chaffee County, Bureau of Land Management, and Colorado Department of Agriculture have been joining efforts to chemically treat elongated mustard. ***A spot-spray method is recommended using a tank-mix of 2,4-D at 1 quart/acre and Escort XP (metsulfuron) at 1 ounce/acre with a good surfactant has proven successful in accessible areas.*** Because this species is designated for eradication, multiple treatments per year will be necessary.

Biological Control of Elongated Mustard

Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Since elongated mustard is designated for eradication, bio-controls are not a viable option.

FIELD BINDWEED



Management

Establishment of selected, aggressive grasses can be an effective cultural control of field bindweed. Contact your local Colorado State University Extension office or Natural Resources Conservation Service office for seed mix recommendations. Good grazing management will stimulate grass growth and keep pastures healthy. Healthy pastures may be more resistant to field bindweed invasion. Bare spots caused by overgrazing are prime habitat for weed infestations.

Mechanical and Cultural Control of Field bindweed

Cutting, mowing, or pulling has a negligible effect unless the plants are cut below the surface in the early seedling stage. Well-established populations have a large seed bank in the soil that can remain viable for over 40 years.

Chemical Control of Field bindweed

The following are recommendations for herbicides that can be applied to range and pasturelands. Optimum results occur when the plants have recently received moisture and are actively growing.

Herbicide rate, application and timing include using Clarity + 2,4-D Amine at a rate of 1 quart/acre for each product in the Spring at or just after full-bloom and/or fall. DO NOT apply when outside temperatures will exceed 85 degrees. DO NOT apply near or under trees or where soils have rapid permeability or where water level is high. Roundup Ultra (glyphosate) is a non-selective herbicide and will kill all vegetation, so spot-treatment is advised. Apply 4 to 5 quarts/acre at full-bloom and/or in the fall. Adding a non-ionic surfactant will improve control. Use caution when applying near grasses or other desirable vegetation. Roundup will possibly kill surrounding vegetation.

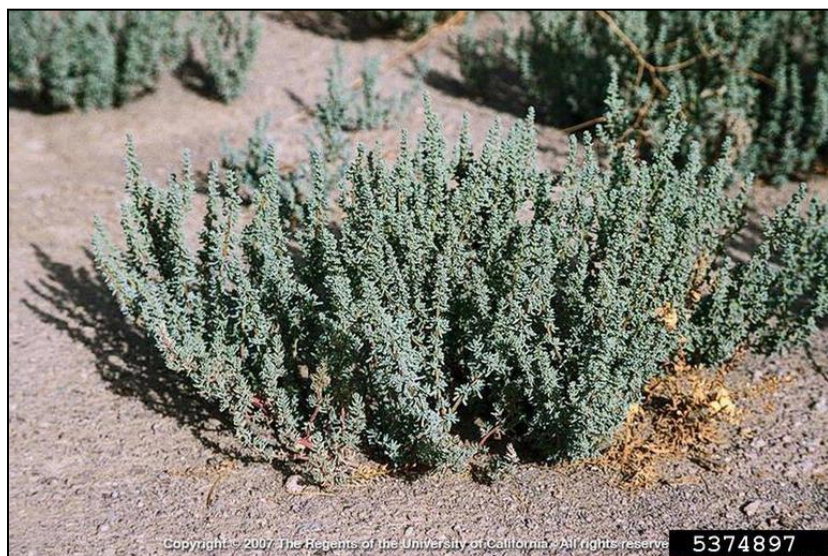
Cultural Control of Downy brome

Due to the population of this common weed throughout Colorado, ***Fremont County recommends good grazing management, reducing areas of disturbance and seeding grasses for competition.***

Biological Control of Field bindweed

There is currently a bio-control for field bindweed control available through Colorado Department of Agriculture's Insectary in Palisade, Colorado. It is a mite that produces galls and stunts the plant's ability to reproduce. A defoliating moth is also available.

HALOGETON



Management of Halogeton

Halogeton is a poisonous C-list noxious weed. It was introduced from Eurasia into the United States in the early 20th century. Halogeton can be found along rights-of-way and in rangeland. It is very toxic to sheep and cattle. Animals commonly avoid halogeton because of its bitter taste, but can be problematic if other forage is limited. Consumption of less than 1.5 pounds of halogeton can result in death. Salt from the soil accumulates in the plant tissue and leaches from dead plants and roots back onto the soil surface increasing salinity and favoring establishment of halogeton over other species. Halogeton plants are prolific seed producers and thrive on disturbed sites. Halogeton has recently been found to be forming dense infestations in Fremont County.

Mechanical Control of Halogeton

Halogeton can be controlled by tillage. For long term control reseeding of desirable plants must occur.

Cultural Control of Halogeton

The best control method for halogeton is prevention. This can be achieved by not disturbing the soil in potential infestation sites. If disturbance of a site is required, follow disturbance by planting with species adapted to the harsh environment. Reclamation species include crested wheatgrass, Siberian wheatgrass, Russian wildrye, tall wheatgrass and forage kochia. Native species options include thickspike and steambank wheatgrass, Sandberg bluegrass, slender wheatgrass, western wheatgrass, bottlebrush squirreltail, sand dropseed, saltbush and globemallow species.

Chemical Control of Halogeton

Apply Escort XP (metsulfuron) or Telar XP (chlorsulfuron) at 0.5 ounces product/acre. to actively growing plants with a surfactant. 2,4-D LV ester can be applied at 2 pints/acre when plants are actively growing before bloom stage in mid-summer. RoundUp (glyphosate) can be used to spot-treat small infestations as well.

Biological Control of Halogeton

Currently, no biological controls are available for halogeton control through the Insectary.

HOARY CRESS OR "WHITE TOP"



Management

Hoary cress is typically found on generally open, unshaded, disturbed ground. Hoary cress grows well on alkaline soils that are wet in late spring and generally does better in areas with moderate amounts of rainfall. It is widespread in fields, waste places, meadows, pastures, croplands, and along roadsides. Hoary cress is commonly found with saltcedar, antelope bitterbrush, bluebunch wheatgrass, big sagebrush, and Wyoming big sagebrush. Hoary cress flowers from May to June, are self-incompatible, and are pollinated by insects. Hoary cress will set seed by mid-summer. If conditions are favorable, a second crop of seeds can be produced in the fall. Hoary cress spreads by creeping roots and by seeding.

Mechanical Control of Hoary cress

Mowing 2-3 times a year for several years may slow the spread and reduce seed production of hoary cress. Mowing may increase the effectiveness of subsequent herbicide application. Mowing should be conducted during the bud stage and repeated when the plants re-bud. The effectiveness of a mowing program can be increased by planting perennial grasses as competitors. Burn Control of Hoary cress is not recommended since Hoary cress has a rapid growth rate when compared to non noxious weeds.

Chemical Control of Hoary cress

Hoary cress is most commonly controlled with herbicides. However, multiple applications are usually needed to provide lasting control. The best time to apply herbicides is in May or June before or at flowering. The non-crop herbicides Escort XP (metsulfuron) and Telar XP (chlorsulfuron) are the most effective herbicides as long as the plants still have green tissue. It is important to use a non-ionic surfactant with the herbicide. 2,4-D+dicamba (RangeStar or WeedMaster) is somewhat effective when applied during the early pre-bud stage (late April through early June). ***Locally, Escort XP has been an effective control when applied at 0.5 to 1 ounce/acre with a non-ionic surfactant. Telar XP has proven effective at 0.5 to 1 ounce/acre.*** Perspective can be used at 3 to 4.5 ounces/acre; however this chemical is not currently labeled for rangeland use.

Biological Control of Hoary cress

Currently, no biological controls are available for hoary cress control through the Insectary.

HOUNDSTONGUE



Management

Houndstongue contains toxic alkaloids that stop liver cells from reproducing. Therefore, houndstongue reduces livestock and wildlife forage and grazing animals should be kept away. Animals may live six or more months after eating a lethal dose of houndstongue. Houndstongue is an early sucessional species on recently disturbed sites. Houndstongue is common on gravelly, alkaline soils. ***Maintaining a healthy population of native perennials is the best way to prevent the establishment and spread of Houndstongue.***

Mechanical Control of Houndstongue

Mowing second year plants during flowering but before seed maturation reduces seed production and may kill the plant.

Chemical Control of Houndstongue

Escort XP (metsulfuron) applied at a rate of 1 ounce/acre in spring provides control of houndstongue. Spring treatments with metsulfuron are more effective than fall treatments. Telar XP (chlorsulfuron) applied 1 to 1.33 ounces/acre gave complete control when applied any time beginning with the rosette stage until the bolted plant had attained 10 inches in height.

Biological Control of Houndstongue

Currently, no biological controls are available for houndstongue control through the Insectary.

JAPANESE KNOTWEED



UGA5205098

Management

Japanese knotweed has been found in Colorado in limited areas and is an **A list** weed in Colorado. Japanese knotweed is native to Japan and was brought to the US from Britain in the late 1800's as an ornamental. It produces allelopathic chemicals from the roots which inhibits the germination of surrounding plants. Japanese knotweed can be found in non-wetlands and wetlands and is currently known to occur in three isolated location in Cañon City, Colorado. Eradication is required by Colorado State law.

Mechanical Control of Japanese knotweed

Mechanical control is effective for small populations or in environmentally sensitive areas. Digging or pulling will eliminate a portion of the root system but not all. Hand cutting, mowing, or other methods must be applied every two to three weeks from April to August to prevent seed production.

Chemical Control of Japanese knotweed

Since Japanese knotweed generally occurs near water care must be taken to select the proper treatment. Aquatic-approved glyphosate (such as Aquamaster or Rodeo) can be used as a broadcast foliar treatment at 4 quarts/acre. at post emergence to foliage in mid-summer to autumn. Repeat applications will be necessary. Glyphosate is nonselective and will injure or kill other plants growing near treated areas. Imazapyr (Habitat or Polaris) can be used as a broadcast foliar treatment at 3-to pints/acre at post emergence to foliage in mid-summer to autumn when plants are fully leafed out.

In Fremont County, varied success has been achieved with herbicide alone. Best results have occurred when using a combination of mechanical and chemical methods. Shoots have been cut with a weed trimmer, then burned to prevent re-rooting. Then the freshly cut stems have been treated with Rodeo herbicide according to the label on uplands only.

Biological Control of Japanese knotweed

Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Because Japanese knotweed is designated for eradication, bio-controls are not a viable option.

JOINTED GOATGRASS



Management

Jointed goatgrass is an introduced species and is a B list weed. It is a major problem in winter wheat because of their similarities in appearance, seed size, growth pattern and genetics. It is mainly found in wheat fields or other cropland areas including alfalfa fields and pasture. Jointed goatgrass can be found in waste areas along roadways, railroad tracks and other rights-of-way. It is found between 820 and 6,500 feet in elevation. Increased populations have been noted in Fremont County along rights-of-way.

Mechanical Control of Jointed goatgrass

Hand removal is acceptable, but difficult. It is an option for sparse or low density populations. Deep tillage with a moldboard plow or V-sweep can deter seed germination, mowing can be effective in late winter to early spring.

Cultural Control of Jointed goatgrass

Sowing Jointed goatgrass-free seed wheat thoroughly cleaning machinery before moving from infested to non-infested areas will help decrease the spread of Jointed goatgrass.

Chemical Control of Jointed goatgrass

Glyphosate (such as RoundUp or Rodeo) can be applied at a rate of 1 quart/acre. for young plants <6" tall and 1.5 to 4 quarts/acre for larger plants or plants under stress at post emergence in late winter to early spring. Plateau (imazapic) can be applied at a rate of 4 to 6 ounces/acre at pre emergence in fall or post emergence in early spring, depending on timing of surrounding wheat harvests.

Biological Control of Jointed goatgrass

Naturally occurring bacterial strains that infect annual brome and Jointed goatgrass but have no effect on wheat have been isolated in Kansas and Washington State. Currently, no biological controls are available for jointed goatgrass control through Colorado's Insectary.

LEAFY SPURGE



Management

Leafy spurge is difficult to manage and can recover from almost any control effort. Therefore, a management scheme that combines control methods over four to five years is recommended. Even after that time, one must monitor infestations for recurrence and adopt a long-term maintenance program.

Cultural Control of Leafy spurge

Vigorous grass growth is an important aspect of leafy spurge control. Overgrazing stresses grasses and makes them much less competitive with weeds, leafy spurge in particular. Irrigation, where applicable, may favor grass growth and make it more competitive with leafy spurge. Sow perennial grasses in late fall to provide competition. Reducing grazing during summer months is also preferred.

Chemical Control of Leafy spurge

For optimum leafy spurge control, proper timing of herbicide application is imperative. ***Local favorable results have been obtained using RangeStar (dicamba+2,4-D). Fall application to leafy spurge regrowth also is the preferred timing for these herbicides. In addition, Plateau herbicide at 8 to 12 ounces/acre is effective in the fall.*** Perspective herbicide at a rate of 4.75 ounces/acre is effective, though this chemical is not yet labeled for rangeland.

Note: Avoid using soil-active herbicides near windbreak plants or other desirable woody vegetation. Plant injury or death can occur. Also, do not allow any herbicide to drift onto desirable woody vegetation for the same reasons. Plateau (imazapic) is registered to control leafy spurge. It can be used safely around trees but may temporarily injure cool-season perennial grasses. Apply Plateau at 8 or 12 ounces/acre in fall, followed by 4 ounces/acre the following spring at flowering. Add a methylated seed oil at 2 pints/acre to the spray solution.

Biological Control of Leafy spurge

Bio-controls help reduce the need for chemical use. Colorado Department of Agriculture's Insectary in Palisade, Colorado develops host-specific organisms for weed control. Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. ***A leafy spurge flea beetle is available through the Insectary. It hosts on the leafy spurge root system. It has proven very successful in some areas of Fremont and Custer Counties, and not as successful in others. It is also very site-specific and requires certain conditions.***

MYRTLE SPURGE



Management

Myrtle spurge, also known as donkey tail or creeping spurge is an **A-list** weed in the state of Colorado. It is a native of Eurasia and was introduced as an ornamental and is often found in rock gardens. Myrtle Spurge is poisonous to touch and if digested causes nausea, vomiting and diarrhea. The milky sap can cause swelling, redness and blistering of the skin and irritation to the eyes. Myrtle spurge is usually spread by seed and root fragments. Eradication of this weed is required by Colorado State Law.

Cultural and Mechanical Control of Myrtle spurge

This plant can be found in many rock gardens in the state of Colorado. Myrtle spurge can be controlled mechanically by hand digging or pulling. Eye protection, long sleeved shirt and gloves are required to prevent sap from contacting eyes and skin. To control infestations, remove as much of the root as possible and the area should be monitored in future years to prevent reinfestation.

Chemical Control of Myrtle spurge

Colorado State University has suggested that 2,4-D applied at a rate of 2 to 3 pints/acre will control myrtle spurge. RangeStar (2,4-D plus dicamba) will provide added control. Use a good non-ionic surfactant to help the chemical penetrate the waxy leaf. Annual reinspection of the areas infested is also recommended.

Biological Control of Myrtle spurge

Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Since eradication is the goal for this A-list species, bio-controls are not a viable option. Currently, no biological controls are available for myrtle spurge control through Colorado's Insectary.

PERENNIAL PEPPERWEED OR “TALL WHITE TOP”



Management

Perennial pepperweed is most often found in open, unshaded areas on disturbed, and often saline soils. It is most common in seasonally wet areas from 5,500 to 9,000 feet. Areas along the South Platte River, in the San Luis Valley are, and communities of the Piceance Basin of Colorado are susceptible to Perennial pepperweed. Locally, early detection and rapid response is planned. Best management is to treat as soon as found.

Mechanical Control of Perennial pepperweed

Periodic mowing and spring burning have reduced perennial pepperweed density in Utah (FEIS 1996)

Chemical Control of Perennial pepperweed

RoundUp (glyphosate) at 4 quarts/acre will control perennial pepperweed, as will or Landmaster (glyphosate plus 2,4-D). Other herbicides that proved to be effective include Habitat/Polaris (imazapyr) as well as Escort XP (metsulfuron) and Telar (chlorsulfuron). ***Fremont County Weed Control has experienced success controlling this species using Escort XP and Telar XP at a rate of 1 ounce/acre.*** Perspective herbicide can be effective when applied at a rate of 3 to 4.5 ounces/acre, although this chemical is not currently labeled for rangeland use.

Biological Control of Perennial pepperweed

Currently, no biological controls are available for perennial pepperweed control through Colorado's Insectary.

RUSSIAN KNAPWEED



Management

Like other creeping perennials, the key to Russian knapweed control is to stress the weed and cause it to expend nutrients stored in its root system. An integrated management plan should be developed that places continual stress on the weed. Currently, the best management plan includes cultural control combined with mechanical and/or chemical control techniques. A single control strategy, such as mowing or an herbicide, usually is not sufficient.

Cultural Control of Russian knapweed

Russian knapweed typically invades degraded areas, dominating the plant community and desirable plants (e.g. perennial grasses). Seeding competitive, perennial grass species after Russian knapweed has been stressed by other control measures (set-up treatments) is essential. Set-up treatments may include chemical or mechanical methods.

Russian knapweed tends to form monocultures and usually eliminates other plants. Therefore, sowing desirable plant species is necessary after the weed is controlled. Smooth brome will compete with Russian knapweed. Research shows that streambank wheatgrass, thickspike wheatgrass, crested wheatgrass and Russian wildrye established after Russian knapweed was suppressed with herbicides. Sod-forming perennial grasses, like streambank or thickspike wheatgrasses, help prevent reinvasion better than bunch grasses like crested wheatgrass.

If the Russian knapweed stand is not too old and grasses are still present, stimulating grass growth by irrigation (where possible) should increase grass competition with knapweed and keep the weed under continual stress.

In most circumstances, herbicides alone will not effectively manage Russian knapweed. However, there may be situations where desirable plants within a Russian knapweed infestation may compete effectively with the weed if it is stressed with a single weed management technique. When integrating chemical and cultural control, avoid using herbicide rates that injure grasses because effective competition will be reduced.

For Telar XP (chlorsulfuron), a noncrop herbicide that controls Russian knapweed, application timing is critical. Apply 1 ounce/acre when Russian knapweed is in the bloom to postbloom stage. Earlier applications do not control the weed effectively. Fall is a good time to apply Telar XP, but it may injure smooth brome or other brome species. Always add a good non-ionic surfactant at 0.25 to 0.5 percent v/v to the spray solution. ***Milestone is labeled for pasture and rangeland use. Apply it at 5 to 7 ounces/acre with a good nonionic surfactant. Optimum timing for Milestone is similar to Telar XP.*** Perspective herbicide can also be an effective treatment at 4.75 ounces/acre; however this chemical is not yet labeled for rangeland use.

Biological Control of Russian knapweed

Currently, no biological controls are available for Russian knapweed control through Colorado's Insectary.

RUSSIAN OLIVE



Management

Russian olive tolerates a wide range of soil and moisture conditions, from sand to heavy clay, and can withstand flooding and silting. It grows best in deep sandy or loamy soils with only slight salt and alkali content. Russian olive can withstand temperatures ranging from -50 degrees F to 115 degrees F. It is also shade tolerant, which means it can grow under larger trees. Russian olive reproduces by seed, which is usually produced after trees are four to five years old. It generally flowers from May through June. The fruits mature from August to October and remain on the tree throughout the winter.

Seeds are ingested with the fruit by birds, bears, small animals and dispersed in their droppings. Russian olive is a rapid growth rate tree with growth up to six feet a year. Control methods vary with tree size, habitat, and use of the area. Removal should be undertaken before seeds are fully developed to prevent further spread of seeds. Control is difficult once trees mature, so early detection and control are important.

Mechanical Control of Russian olive

Russian olives with small diameters can be pulled out with a weed wrench when soils are moist. In certain situations larger trees can be removed using a tractor/chain. Any remaining exposed roots should be cut off below ground level and buried. Grinding and cutting are not effective controls by themselves. The tree may resprout below the cut area or along root line.

Cultural Control of Russian olive

In Fremont County, Darrell Deling with Canon City Area Recreation and Park District reports successful use of goats on Russian olive.

Chemical Control of Russian olive

Most translocating herbicides (e.g., glyphosate) are effective at label strength when applied during the growing season. Some dormant-season herbicides (e.g., imazapyr as Habitat or Polaris) are labeled for Russian olive control. Foliar spraying with Habitat has been successful, as has injecting herbicide capsules around base of trunk. When injecting herbicides into the tree, monitoring should occur to ensure that the entire tree is affected. When cutting the stump should be as close to the ground as possible and treated with 5 –10 cc of RoundUp or Rodeo (glyphosate) applied at full strength. Frill application should be applied to trees debarked at the base and herbicide sprayed or brushed immediately on the area at 25-100% concentration. Brushing on herbicide is the most effective application for Russian olive.

In Fremont County, the Hydro-Axe has been very effective at cutting the trees in one growing season. Habitat herbicide is then applied to the regrowth in the following growing season along with a suitable surfactant. Mid-summer is best. Fremont County Weed Management has found that a combination of Habitat (imazapyr) plus Rodeo (glyphosate) provides greater control.

Biological Control of Russian olive

Currently, no biological controls are available for Russian olive control through Colorado's Insectary.

SALT CEDAR OR "TAMARISK"



Management

After managing saltcedar infestations, other vegetation must be established to prevent re-invasion. Competitive grasses and planted cottonwood cuttings have proven to be effective at reducing the chances of re-invasion. Contact your local Colorado State University Extension office or Natural Resources Conservation Service office for proper seed mix recommendations.

Mechanical and Chemical Control of Saltcedar

A bulldozer or prescribed fire can be used to open up large stands of saltcedar. These methods must be followed up with an herbicide treatment of the resprouts when they are 1 to 2 meters tall. Locally, a Hydro-Axe shredding machine has been very effective in initial dry matter removal. This method followed by resprout spraying in the next growing season using Habitat (imazapyr) herbicide is also successful.

Chemical Control of Saltcedar

For large stands of saltcedar that would essentially be monotypic, foliar applications of Habitat/Polaris (imazapyr) herbicide plus Roundup are effective. Late summer/early fall are optimum treatment times. This is recommended for areas that have little to no desirable shrubs and trees. In areas where woody native plants are present and their continued existence is desired, it may be necessary to cut and treat saltcedar stumps with a herbicide. This is referred to as the cut-stump method. Cuts should be made within 2 inches of the ground surface, immediately followed by an herbicide application to the perimeters of the cut-stems. The products Habitat and Garlon are effective but must be applied within a few minutes after cutting because wound healing occurs very quickly and decreases herbicide penetration.

Habitat/Polaris (imazapyr) have replaced Arsenal as the EPA approved riparian area herbicide of choice. Thousands of acres have been treated utilizing spot treatment and aerial application in the Upper Arkansas drainage basin. A methylated seed oil is recommended.

Biological Control of Saltcedar

Biological control helps reduce the need for chemicals. Keep in mind that bio-controls will never completely eliminate their host. ***There is currently a bio-control available through the Insectary. The tamarisk leaf beetle hosts on the foliage of tamarisk. After repeated defoliations, the plant is often stressed enough to shut down completely. The tamarisk beetle has proven highly successful in Fremont County.***

SPREADING DOGBANE



Management

Spreading dogbane is a native to Colorado and is not a listed weed in Colorado. In Fremont and Custer Counties, it has been forming monocultures and displacing surrounding vegetation. It can be poisonous to livestock and also can be a host for several Prunus (plum) viruses.

Chemical Control of Spreading dogbane

RangeStar (2,4-D plus Dicamba) can be used, but Fremont County Weed Management has success using E-2, which contains the active ingredients 2,4-D, dicamba and fluroxypyr. A good non-ionic surfactant is recommended to help the chemical absorb into the woody tissue and waxy leaf, or possibly even a methylated seed oil.

Biological Control of Spreading dogbane

Currently, no biological controls are available for spreading dogbane control through Colorado's Insectary

YELLOW STAR THISTLE



Management

Yellow starthistle is an **A-list** weed in Colorado. It can be a serious problem in rangeland pastures and rights-of-way in the Western United States. It has the potential to become Colorado's worst weed problem, however, weed managers across the state are actively working toward eradication. Eradication is required by Colorado State law.

Mechanical Control of Yellow Starthistle

Manual removal of yellow starthistle is effective for small infestations. Mowing can also help prevent seed production, but the plant has been known to then grow prostrate and flower low to the ground within the same growing season.

Cultural Control of Yellow Starthistle

Intensive grazing by sheep, goats, or cattle prior to the plant producing spiny seed heads can be effective. The spines will deter cattle and sheep. Keep in mind, that yellow starthistle is designated for eradication. Grazing is a control measure, but will not completely eliminate the infestation.

Chemical Control of Yellow Starthistle

2,4-D applied post-emergence at 2 pints/acre can be effective. In addition, Perspective (aminocyclopyrachlor) is also effective at 3 to 5 ounces/acre. ***Fremont County Weed Management recommends Milestone (aminopyralid) at 7 ounces/acre plus a non-ionic surfactant to be applied to actively growing plants.*** Transline (clopyralid) can also be an effective management tool.

Biological Control of Yellow Starthistle

Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. Since this is an A-list species and eradication is mandated by the State, bio-controls are not an appropriate option for control. Several insects and pathogens have been established in some states, but there are not currently any biological controls available for yellow starthistle through the Palisade Insectary.

YELLOW TOADFLAX



Management

All toadflax species are very difficult to control and management plans should integrate as many strategies as possible to increase potential for success. Condition and composition of the existing plant community in an infested area determines the approximate composition of the desired plant community needed to achieve land management goals and objectives. Create a management plan that combines various control strategies to foster development of the desired plant community.

Mechanical and Chemical Control of Yellow Toadflax

Mowing combined with spraying did not improve control in an experiment conducted near Hesperus, Colorado. Yellow toadflax control was the same (85 percent) whether chemical treatments were combined with mowing or not.

Chemical Control of Yellow Toadflax

Yellow toadflax appears to be more difficult to manage than dalmatian toadflax. Telar XP may be used to control yellow toadflax in non-crop areas. In an experiment conducted in Middle Park near Parshall, ***Telar XP at 1.25 ounces/acre applied during flowering or in fall controlled 84% of yellow toadflax one year later.*** Plateau applied in the fall at 12 ounces/acre can also be effective.

Escort XP (metsulfuron), 2,4-D Amine, Banvel (dicamba), and Paramount (quinclorac) controlled from 5% to 24% of yellow toadflax one year after single treatments were applied at flowering. Plateau showed some potential to control yellow toadflax in another Colorado experiment where 8 ounces /acre applied once in fall controlled 59% of yellow toadflax one year later. While this level of control is unsatisfactory, sequential treatments may increase control but experiments must be conducted to test this hypothesis.

Biological Control of Yellow Toadflax

Biological control helps reduce the need for chemical controls and is a vital component to integrated pest management. Keep in mind that bio-controls are not a viable option when full eradication is the goal; they will never completely eliminate their host. There is currently a bio-control available at the Palisade Insectary through Colorado Department of Agriculture for yellow toadflax control. A toadflax-feeding noctuid moth. The moth larvae feed extensively on leaves and flowers of toadflax, severely damaging the plants. It is established in Colorado and is available upon request through the Insectary.

GLOSSARY

2,4-D – a general use broad-leaf selective herbicide that is produced under a variety of trade names. It is also an active ingredient in RangeStar and E-2, as mentioned in this document.

Allelopathy –a toxin released by a plant which inhibits growth of surrounding vegetation.

Aminocyclopyrachlor – is a low use rate, broad-spectrum herbicide for difficult-to-control species such as leafy spurge, knapweeds, and thistles. This chemical is produced under the trade name Perspective. It is not currently labeled for rangeland use.

Biological Control – management methods that include microbial and microbial agents such as insects or pathogens used to minimize infestations. Note: Biological controls are used for suppression, never eradication.

Broadleaf – Having rather broad leaves, as opposed to grasses and sedges (which are more blade-like).

Chemical Control – application of an herbicide to weeds to control germination or growth.

Chlorsulfuron (such as Telar XP) and **Metsulfuron** (such as Escort XP) – are systemic, residual herbicides that kill broad-leaf weeds and some grasses. They inhibit cell formation in shoots and roots and have very low toxicity to mammals, birds, fish, and insects.

Clopyralid – a general use selective herbicide produced under the trade name Transline.

Cultural Control – management methods including grazing or grazing avoidance, fertilizing, encouraging plant competition, watering, re-seeding, etc.

Dicamba – is a pre- and post-emergent selective herbicide produced under product names such as Banvel, RangeStar, or WeedMaster.

Fluroxypyr – an active ingredient in certain general use chemicals such as Vista and E-2.

Glyphosate - a general use broad-spectrum, non-selective systemic herbicide. Trade names for products containing glyphosate include Roundup, Rodeo, and Pondmaster. It is useful on essentially all annual and perennial plants including grasses, sedges, broad-leaved weeds and woody plants.

Imazapic – a selective herbicide used for both pre- and post-emergence control produced under the trade name Plateau. Controls many broad-leaf weeds and controls or suppresses some grasses.

Imazapyr - a broad-spectrum herbicide manufactured under the product names Habitat, Polaris, and Arsenal Powerline. Imazapyr is non-selective therefore care must be taken of other non-targeted plants.

Integrated Pest Management (IPM) – an economical and environmentally-sensitive approach to pest management that implements any combination of chemical, biological, cultural, and/or mechanical control measures. It takes into consideration factors such as site, economics, environmental concerns and other potential hazards.

Mechanical Control – management methods including mowing, tilling, burning, hydro-axing, pulling, etc.

Metsulfuron (such as Escort XP) and **Chlorsulfuron** (such as Telar XP) – are systemic, residual herbicides that kill broad-leaf weeds and some grasses. They inhibit cell formation in shoots and roots and have very low toxicity to mammals, birds, fish, and insects.

Pre-emergent – of or relating to seedlings, before emerging or appearing before ground.

Post-emergent – emerged plants.

Quinclorac – trade name Paramount; has a supplemental rangeland label.

Selective – an herbicide other than broad-spectrum (example: 2,4-D is a “selective” herbicide, as it will not damage native grasses when applied correctly).

Surfactant –lowers the surface tension between the chemical and the plant tissue, helping the chemical absorb better into the plant.

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INTEGRATED WEED MANAGEMENT RECORD		
Name:		
Location of Application:		
Date:	Start Time:	End Time:
Target Pest:		
Site Type:		
Wind Speed:	Wind Direction:	
Temperature:	Clear, Cloudy, or Overcast:	
CHEMICAL CONTROL		
Trade Name of Herbicide Applied:	EPA Registration Number:	Dilution Rate (amt of product per unit of vol)
Trade Name of Surfactant Applied	EPA Registration Number:	Dilution Rate (amt of product per unit of vol)
Application Rate (total volume of the tank mix applied / unit area ... GPA)		
Amount Applied:		
Acres Treated:		
BIOLOGICAL CONTROL		
Bio-agent used:	Amt. Applied:	
Notes:		
CULTURAL CONTROL		
Notes (re-seeding mix, grazing, etc.):		
MECHANICAL CONTROL		
☐ Mowing / weed eating	☐ Tilling	
☐ Prescribed Burn	☐ Pulling	
☐ Chainsaw	☐ Other: _____	
Notes:		
MONITORING		
Date of Post-Treatment Monitoring:		
Notes:		

INTEGRATED WEED MANAGEMENT RECORD		
Name:		
Location of Application:		
Date:	Start Time:	End Time:
Target Pest:		
Site Type:		
Wind Speed:	Wind Direction:	
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Bio-agent used:	Amt. Applied:	
Notes:		
CULTURAL CONTROL		
Notes (re-seeding mix, grazing, etc.):		
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Target Pest:		
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Bio-agent used:	Amt. Applied:	
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Temperature:	Clear, Cloudy, or Overcast:	
CHEMICAL CONTROL		
Trade Name of Herbicide Applied:	EPA Registration Number:	Dilution Rate (amt of product per unit of vol)
Trade Name of Surfactant Applied	EPA Registration Number:	Dilution Rate (amt of product per unit of vol)
Application Rate (total volume of the tank mix applied / unit area ... GPA)		
Amount Applied:		
Acres Treated:		
BIOLOGICAL CONTROL		
Bio-agent used:	Amt. Applied:	
Notes:		
CULTURAL CONTROL		
Notes (re-seeding mix, grazing, etc.):		
MECHANICAL CONTROL		
☐ Mowing / weed eating	☐ Tilling	
☐ Prescribed Burn	☐ Pulling	
☐ Chainsaw	☐ Other: _____	
Notes:		
MONITORING		
Date of Post-Treatment Monitoring:		
Notes:		



FREMONT COUNTY WEED MANAGEMENT

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CUSTER COUNTY WEED BOARD

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