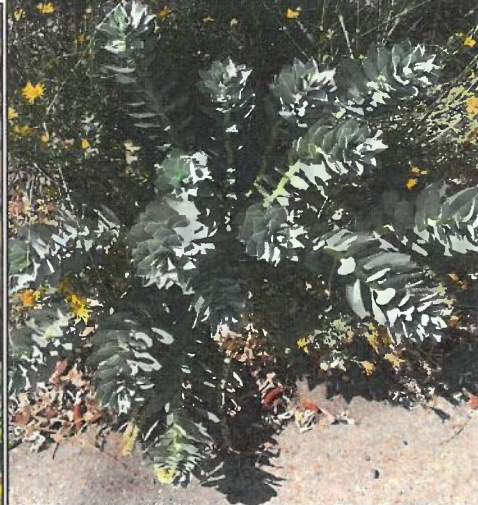
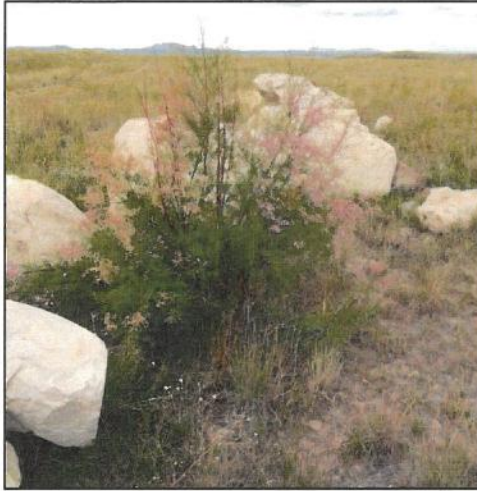




Noxious Weed Management Plan 2021



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Town of Castle Rock Parks & Recreation Commission

Date:

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1.0 INTRODUCTION

1.1 Background

Noxious or invasive, non-native weeds are aggressive plants that are not native to our area; most have come from Europe or Asia either accidentally or as ornamentals that have escaped. These nonnative plants are a concern for landowners and land managers for several reasons including specialized mechanisms developed for survival, rapid spread rate and an advantage over native plants because natural control measures, such as insects, diseases and animals, are not found here. Noxious weeds can quickly establish, and are difficult to eradicate, leading to issues with livestock grazing, farming, property maintenance, recreational access and general biodiversity of the native habitat. Managing noxious weeds can be accomplished by preventing the introduction of new invasive species, eradicating species with limited populations found in isolated areas or numbers and containing species that are well-established and widespread throughout Castle Rock. As noxious weeds can spread to neighboring properties, it is the responsibility of all landowners and property managers to control, manage and eradicate noxious weeds in Castle Rock.

1.2 Management Plan Goals & Objectives

The purpose of the Noxious Weed Management Plan for the Town of Castle Rock is to provide a guide for compliance with the State of Colorado Noxious Weed Act and the Town's Municipal Code. The control and reduction of non-native noxious weeds throughout Castle Rock are important and a wide range of strategies should be considered, while protecting the native plants that live among the invasive ones. Overall management priorities of this plan are as follows:

- a) Manage noxious weeds throughout Castle Rock
- b) Provide information on identification, control and management of noxious weeds found in Castle Rock
- c) Enforce the mandates of the Colorado Noxious Weed Act and Town Municipal Code
- d) Assist private landowners and general public with education and awareness of noxious weeds
- e) Develop a noxious weed advisory board

2.0 COLORADO NOXIOUS WEED ACT

2.1 State Statute and Requirements

To address the need to monitor, control and eradicate noxious weeds that pose a threat to the continued economic and environmental value of the land in the state of Colorado, the Colorado Noxious Weed Act was passed into law in July 1990 (Title 35, Article 5.5, Sections 35-5.5-104.5 to 35-5.5-118). The law requires all Colorado residents, including local land managers, to control noxious weeds using integrated methods to manage those noxious weeds. The law also states that each county and municipality in Colorado adopt a noxious weed management plan and appoint an advisory board for its jurisdiction.

The Colorado Department of Agriculture coordinates the administration of this law and the efforts of local, state and federal noxious weed managers. A state-wide noxious weed program has been developed to control noxious weeds through education and outreach activities, noxious weed identification and mapping, funding and representation through an advisory committee.

2.2 Colorado Noxious Weed List

The statewide noxious weed list identifies all weed species of concern in Colorado and are grouped for eradication (List A), containment (List B) or suppression (List C). The comprehensive statewide list of noxious weeds can be found in Appendix A. This list may be revised by the Colorado Department of Agriculture; updated statewide lists will be replaced and attached to this plan when needed. The following lists assembled from the state list highlight noxious weeds of concern in Douglas County, specifically within incorporated Castle Rock. Additional information for identification and control of noxious weeds of concern in Douglas County, including species photographs and fact sheets, can be found in Appendix B.

2.2.a List A Noxious Weeds

The following List A weed species are required to be eradicated:

African rue (*Peganum harmala*)
Bohemian knotweed (*Fallopia x bohemicum*)
Camelthorn (*Alhagi maurorum*)
Common crupina (*Crupina vulgaris*)
Cypress spurge (*Euphorbia cyparissias*)
Dyer's woad (*Isatis tinctoria*)
Elongated mustard (*Brassica elongata*)
Flowering rush (*Butomus umbellatus*)
Giant knotweed (*Fallopia sachalinensis*)
Giant reed (*Arundo donax*)
Giant salvinia (*Salvinia molesta*)
Hairy willow-herb (*Epilobium hirsutum*)
Hydrilla (*Hydrilla verticillata*)
Japanese knotweed (*Fallopia japonica*)
Meadow knapweed (*Centaurea x moncktonii*)
Mediterranean sage (*Salvia aethiopsis*)
Medusahead (*Taeniatherum caput-medusae*)
Myrtle spurge (*Euphorbia myrsinites*)
Orange hawkweed (*Hieracium aurantiacum*)
Parrotfeather (*Myriophyllum aquaticum*)
Purple loosestrife (*Lythrum salicaria*)
Rush skeletonweed (*Chondrilla juncea*)
Squarrose knapweed (*Centaurea virgata*)
Tansy ragwort (*Senecio jacobaea*)
Yellow starthistle (*Centaurea solstitialis*)

2.2.b List B Noxious Weeds

The following List B weed species are regionally rare but are designated to be eradicated:

Absinth wormwood (*Artemisia absinthium*)
Black henbane (*Hyoscyamus niger*)
Bouncingbet (*Saponaria officinalis*)
Bull thistle (*Cirsium vulgare*)
Canada thistle (*Cirsium arvense*)
Chinese clematis (*Clematis orientalis*)

Common tansy (*Tanacetum vulgare*)
Common teasel (*Dipsacus fullonum*)
 Cutleaf teasel (*Dipsacus laciniatus*)
Dalmatian toadflax, broad-leaved (*Linaria dalmatica*)
 Dalmatian toadflax, narrow-leaved (*Linaria genistifolia*)
 Dame's rocket (*Hesperis matronalis*)
Diffuse knapweed (*Centaurea diffusa*)
 Eurasian watermilfoil (*Myriophyllum spicatum*)
 Hoary cress (*Cardaria draba*)
 Houndstongue (*Cynoglossum officinale*)
 Jointed goatgrass (*Aegilops cylindrica*)
Leafy spurge (*Euphorbia esula*)
 Mayweed chamomile (*Anthemis cotula*)
 Moth mullein (*Verbascum blattaria*)
Musk thistle (*Carduus nutans*)
 Oxeye daisy (*Leucanthemum vulgare*)
 Perennial pepperweed (*Lepidium latifolium*)
 Plumeless thistle (*Carduus acanthoides*)
 Russian knapweed (*Rhaponticum repens*)
 Russian-olive (*Elaeagnus angustifolia*)
Salt cedar (*Tamarix. ramosissima*)
 Salt cedar (*T. chinensis*)
 Scentless chamomile (*Tripleurospermum inodorum*)
 Scotch thistle (*Onopordum acanthium, O. tauricum*)
 Spotted knapweed (*Centaurea stoebe* L. ssp. *micranthos*)
 Spotted x diffuse knapweed hybrid (*Centaurea x psammogena*)
 Sulfur cinquefoil (*Potentilla recta*)
 Wild caraway (*Carum carvi*)
 Yellow nutsedge (*Cyperus esculentus*)
 Yellow toadflax (*Linaria vulgaris*)
 Yellow x Dalmatian toadflax hybrid (*Linaria vulgaris x L. dalmatica*)
 Yellow nutsedge (*Cyperus esculentus*)

2.2.c List C Noxious Weeds

The following List C weed species are common in Castle Rock but should still be controlled or cut/mowed:

Chicory (*Cichorium intybus*)
 Common burdock (*Arctium minus*)
Common mullein (*Verbascum thapsus*)
 Common St. Johnswort (*Hypericum perforatum*)
 Downy brome (*Bromus tectorum*)
Field bindweed (*Convolvulus arvensis*)
 Halogeton (*Halogeton glomeratus*)
 Johnsongrass (*Sorghum halepense*)
 Perennial sowthistle (*Sonchus arvensis*)
Poison hemlock (*Conium maculatum*)

Puncturevine (*Tribulus terrestris*)
Quackgrass (*Elymus repens*)
Redstem filaree (*Erodium cicutarium*)
Velvetleaf (*Abutilon theophrasti*)
Wild proso millet (*Panicum miliaceum*)

2.3 Local Regulations

As of December 2020, the Town of Castle Rock Municipal Code outlines existing requirements of all landowners within incorporated Castle Rock regarding the control and removal of noxious weeds. Chapter 8.12 does not permit or allow the growth of weeds greater than 12” in height. Property owners of parcels less than five contiguous acres are required to cut weeds to a length of 6” or less, with the exception that those larger parcels must have weeds cut within 100 feet of a structure or paved street. This chapter also outlines allowed exemptions, authorization to provide notice to comply, public notice publication and the Town’s ability to remove or cut weeds on properties in violation of this code (Ord. 85-31 §1(part), 1985). Castle Rock Town Council will approve and adopt through an Ordinance this Noxious Weed Management Plan into the Town of Castle Rock Municipal Code. The requirements of the Noxious Weed Management plan will be incorporated into existing sections of Chapter 8.12 of the Municipal Code.

2.4 Douglas County Regulations

The Douglas County Noxious Weed Management Plan was approved by the Board of County Commissioners of the County of Douglas by Resolution No. R-011-100 in 2011. The resolution provides policies and procedures for the establishment and administration of a noxious weed management incentive program as well as enforcement procedures to comply with the Noxious Weed Act on both public and private properties within Douglas County. Although the resolution and management plan outline procedures for County personnel to enter private property for the management of noxious weeds, compliance with the incentive program will be encouraged to be voluntary. Douglas County staff can provide property owners with consultation, formal training and technical information for proper management of noxious weeds on their properties. Any questions about the Douglas County Management Plan should be directed to the county weed manager:

Jonathan Rife, Weed and Mosquito Control Supervisor
Douglas County Public Works – Operations
PO Box 1390
Castle Rock, CO 80104
303-660-7476
jrife@douglas.co.us

3.0 MANAGEMENT OPTIONS/APPROACHES

3.1 Preventative

As it implies, this management option focuses on preventing weeds from starting or going to seed that create new infestations.

- Preventing new infestations of noxious weeds by keeping those plants from going to seed.

- Planting grasses, forbs and shrubs native to Colorado is another technique to control noxious weeds by providing competition for water, sunlight, and nutrients.
- Avoid using commercial seed mixtures unless source and mix are verifiable. Some commercial mixes may contain plant species not native to this area.
- Fertilizing and irrigating desirable plants.
- Using weed-free hay and mulch.
- Preventing livestock from overgrazing.
- Seeding and blanketing areas (with erosion control blankets) where the soil has been disturbed to establish native grasses before noxious weeds.
- Educating the public about weed identification and the need for control measures.

3.2 Eradication

This management option completely removes noxious weeds from an area. It is best used for small areas (less than 100 feet in diameter) and for List A noxious weed species. Restoration or reseeding of the target area with native seed or desirable plants is recommended to prevent future infestation.

3.3 Control

These measures disrupt the growth of noxious weeds at different growth stages such as sprouts, rosettes, roots, flowers and mature plants.

3.3.a Mechanical

Noxious weeds can be controlled by mowing, pulling, tilling, cutting, clipping, hoeing and burning (when appropriate and coordinated with all relevant agencies and jurisdictions). Pulled and cut weeds, especially Diffuse Knapweed, should be bagged for disposal. For instance, appropriately timed mowing of thistles, cheatgrass, and knapweed can effectively reduce seed production.

3.3.b Chemical

Use of herbicides is an effective control strategy for many noxious weeds but are most effective when used in conjunction with other management techniques, such as mowing or pulling. Timing and application rates are critical for increasing the effectiveness of the application. Spot spraying with herbicides is preferred over widespread boom spraying to concentrate control efforts. All herbicides must be applied following label instructions. Any herbicide applications conducted on public land, whether by Town staff or contractors, must comply with the Colorado Pesticide Applicators Act.

The following herbicides are currently used by the Town of Castle Rock Parks and Recreation Department:

- ***Milestone®*** is a specialty herbicide for control of knapweeds and thistle varieties. It can be used on rangeland and pastures, as well as rights-of-way and parklands.
- ***Speedzone®*** is a selective post-emergent broadleaf herbicide that can be used on dandelions, spurge and other weeds found in irrigated parklands from spring through fall.
- ***Glyphosate*** is a broad-spectrum herbicide used selectively in mulch, rock beds and hardscapes to manage weed and grass growth.

3.3.c Biological

Many insect species have been approved by the Colorado Department of Agriculture for controlling diffuse knapweed, leafy spurge and other noxious weeds, such as Knapweed Lesser Flowerhead Weevil (*Larinus minutus*) and Root Boring Weevil (*Cyphocleonus achates*). Grazing animals such as sheep and goats could also be a biological control option to reduce plant quantity. Biological controls should only be done under the direction of the Douglas County Weed Inspector.

3.4 Temporary Erosion and Sediment Control

The Stormwater Division in the Castle Rock Water Department oversees implementation of erosion and sediment control measures as a standard for all land-disturbance activities to promote environmentally sound construction practices in Castle Rock. These measures are contained within the Temporary Erosion and Sediment Control (TESC) Manual, which can be found at CRgov.com/TESC. These measures are enforced with a TESC Plan and Permit that are reviewed and approved prior to construction. In addition to effective erosion and sediment control measures, the TESC Manual includes recommended seed mixes for seeding and mulching of disturbed areas to reduce erosion and the potential for noxious weed growth.

4.0 IMPLEMENTATION

Enforcement of this management plan and its objectives will be a coordinated effort between the Town of Castle Rock, private landowners within Castle Rock and Homeowners Associations, with recommendations provided by the Colorado Noxious Weed Advisory Committee, Douglas County Noxious Weed Advisory Commission and the Castle Rock Weed Advisory Board. This management plan does not preclude the Town of Castle Rock from entering into intergovernmental agreements with other governmental entities towards managing noxious weeds under the Colorado Noxious Weed Act.

The Noxious Weed Act is a statewide law, as such, this management plan will be applicable to all private lands and properties and facilities currently owned and maintained by the Town of Castle Rock as public lands within incorporated limits of Castle Rock. In addition to public parks, open space areas, drainages, detention/retention ponds, rights-of-way and public buildings managed by the Parks and Recreation Department, Castle Rock Water and the Public Works Department, such as Town Hall and the Castle Rock Community Recreation Center; this plan is also applicable to the Red Hawk Ridge Golf Course and fire stations managed by Castle Rock Fire Department. A full list of public properties and facilities included in this plan can be found in Appendix C.

Private landowners within incorporated Castle Rock are required to abide by the Colorado Noxious Weed Act and Castle Rock Municipal Code. This applies to developed residential addresses, undeveloped lots, commercial properties, HOA managed properties and any other non-Town owned properties. It is the responsibility of the landowner to control noxious weeds on their properties. Private landowners are encouraged to submit potential violations of the state law and zoning code compliance complaints using the Town's online form, which can be submitted anonymously, through the Town's Zoning webpage found at www.CRgov.com/Zoning.

This management plan will be reviewed and updated on a consistent basis. Updates may be influenced from changes in the noxious weed species list, recommendations from the Castle Rock Weed Advisory Board, Colorado Noxious Weed Advisory Board, management control techniques, or as needed.

5.0 PUBLIC EDUCATION/OUTREACH

Public awareness and knowledge of the Colorado Noxious Weed Act as well as local and county regulations are important steps to managing, controlling and preventing noxious weeds throughout Castle Rock. Proper identification of listed noxious weeds and understanding the damage caused by them are also needed tools in the overall management objective and implementation of the management plan. The Town will serve as a primary source of education, outreach and reference, following guidance from the state advisory board, county weed coordinator and local advisory board.

Public education and outreach can include the following measures:

- Develop a noxious weed information webpage hosted on CRgov.com.
- Create educational/informational brochure on the Noxious Weed Act and Town regulations.
- Utilize various Town publications such as Your Town Talk and Recreation Guide to highlight noxious weed awareness and management responsibilities.
- Offer free public educational meetings or classes to the general public.
- Offer free copies of prepared educational brochures at public places, including Philip S. Miller Library, Town Hall, Chamber of Commerce and Castle Rock Recreation Center.
- Meet with Homeowner Associations.
- Create interpretive signage for local parks or high-traffic areas to provide information on noxious weed identification and management techniques.
- Coordinate with the Town of Castle Rock POST Partners Volunteer Program to host noxious weed pull events on open space and trail areas.
- Create a specific noxious weed complaint form to be available on the Town's website.

There are various local organizations and online resources that provide additional information about noxious weeds and their identification, control and management, as well as native plant gardening.

- Colorado Department of Agriculture: <https://Colorado.gov/agconservation/noxiousweeds>
- Colorado Weed Management Association: <https://www.cwma.org>
- CSU Extension Office: <https://extension.colostate.edu>
- Douglas County Master Gardeners: <https://douglas.extension.colostate.edu/horticulture/master-gardener/>

6.0 EVALUATION

6.1 Short Term Goals

The following goals and objectives are directed within a 1-5 year timeframe following final approval of the management plan by the Parks and Recreation Commission and Town Council.

1. Update the Castle Rock Municipal Code to incorporate the management plan.
2. Educate the public about noxious weeds:

- a. Develop an informational webpage for public reference
 - b. Create brochures or handouts for landowners
3. Control noxious weeds on public properties, including parks, rights of way, stormwater ponds and open space areas.
4. Work with the POST Partners Volunteer Program to remove noxious weeds on public property by volunteer groups on annual basis.
5. Develop annual monitoring protocol of weed infestations and control measures on public lands.
6. Create a Weed Advisory Board.
7. Review and update the management plan every five years or as needed based on updates to the Colorado Noxious Weed Act and Colorado Noxious Weed List.

6.2 Long Term Goals

The following goals and objectives are directed within a 5-10 year timeframe following final approval of the management plan by the Parks and Recreation Commission and Town Council.

1. Continue educating the general public regarding the identification and management of noxious weeds.
2. Conduct a review of annual monitoring and mapping inventory to determine effectiveness of various preventative and control measures to reduce weed infestations.

Appendix A

Colorado Noxious Weed List (June 2020)

Colorado Noxious Weeds (including Watch List), effective June, 2020

List A Species (25)

<i>Common</i>	<i>Scientific</i>
African rue	(<i>Peganum harmala</i>)
Bohemian knotweed	(<i>Fallopia x bohemicum</i>)
Camelthorn	(<i>Alhagi maurorum</i>)
Common crupina	(<i>Crupina vulgaris</i>)
Cypress spurge	(<i>Euphorbia cyparissias</i>)
Dyer's woad	(<i>Isatis tinctoria</i>)
Elongated mustard	(<i>Brassica elongata</i>)
Flowering rush	(<i>Butomus umbellatus</i>)
Giant knotweed	(<i>Fallopia sachalinensis</i>)
Giant reed	(<i>Arundo donax</i>)
Giant salvinia	(<i>Salvinia molesta</i>)
Hairy willow-herb	(<i>Epilobium hirsutum</i>)
Hydrilla	(<i>Hydrilla verticillata</i>)
Japanese knotweed	(<i>Fallopia japonica</i>)
Meadow knapweed	(<i>Centaurea x moncktonii</i>)
Mediterranean sage	(<i>Salvia aethiopis</i>)
Medusahead	(<i>Taeniatherum caput-medusae</i>)
Myrtle spurge	(<i>Euphorbia myrsinites</i>)
Orange hawkweed	(<i>Hieracium aurantiacum</i>)
Parrotfeather	(<i>Myriophyllum aquaticum</i>)
Purple loosestrife	(<i>Lythrum salicaria</i>)
Rush skeletonweed	(<i>Chondrilla juncea</i>)
Squarrose knapweed	(<i>Centaurea virgata</i>)
Tansy ragwort	(<i>Senecio jacobaea</i>)
Yellow starthistle	(<i>Centaurea solstitialis</i>)

List B Species (38)

<i>Common</i>	<i>Scientific</i>
Absinth wormwood	(<i>Artemisia absinthium</i>)
Black henbane	(<i>Hyoscyamus niger</i>)
Bouncingbet	(<i>Saponaria officinalis</i>)
Bull thistle	(<i>Cirsium vulgare</i>)
Canada thistle	(<i>Cirsium arvense</i>)
Chinese clematis	(<i>Clematis orientalis</i>)
Common tansy	(<i>Tanacetum vulgare</i>)
Common teasel	(<i>Dipsacus fullonum</i>)
Cutleaf teasel	(<i>Dipsacus laciniatus</i>)
Dalmatian toadflax, broad-leaved	(<i>Linaria dalmatica</i>)
Dalmatian toadflax, narrow-leaved	(<i>Linaria genistifolia</i>)
Dame's rocket	(<i>Hesperis matronalis</i>)
Diffuse knapweed	(<i>Centaurea diffusa</i>)
Eurasian watermilfoil	(<i>Myriophyllum spicatum</i>)
Hoary cress	(<i>Cardaria draba</i>)
Houndstongue	(<i>Cynoglossum officinale</i>)

Colorado Noxious Weeds (including Watch List), effective June, 2020

List B Species Continued (38)

Common	Scientific
Jointed goatgrass	(<i>Aegilops cylindrica</i>)
Leafy spurge	(<i>Euphorbia esula</i>)
Mayweed chamomile	(<i>Anthemis cotula</i>)
Moth mullein	(<i>Verbascum blattaria</i>)
Musk thistle	(<i>Carduus nutans</i>)
Oxeye daisy	(<i>Leucanthemum vulgare</i>)
Perennial pepperweed	(<i>Lepidium latifolium</i>)
Plumeless thistle	(<i>Carduus acanthoides</i>)
Russian knapweed	(<i>Rhaponticum repens</i>)
Russian-olive	(<i>Elaeagnus angustifolia</i>)
Salt cedar	(<i>Tamarix. ramosissima</i>)
Salt cedar	(<i>T. chinensis</i>)
Scentless chamomile	(<i>Tripleurospermum inodorum</i>)
Scotch thistle	(<i>Onopordum acanthium</i>)
Scotch thistle	(<i>O. tauricum</i>)
Spotted knapweed	(<i>Centaurea stoebe</i> L. ssp. <i>micranthos</i>)
Spotted x diffuse knapweed hybrid	(<i>Centaurea x psammogena</i>)
Sulfur cinquefoil	(<i>Potentilla recta</i>)
Wild caraway	(<i>Carum carvi</i>)
Yellow nutsedge	(<i>Cyperus esculentus</i>)
Yellow toadflax	(<i>Linaria vulgaris</i>)
Yellow x Dalmatian toadflax hybrid	(<i>Linaria vulgaris</i> x <i>L. dalmatica</i>)

List C Species (16)

Common	Scientific
Bulbous bluegrass	(<i>Poa bulbosa</i>)
Chicory	(<i>Cichorium intybus</i>)
Common burdock	(<i>Arctium minus</i>)
Common mullein	(<i>Verbascum thapsus</i>)
Common St. Johnswort	(<i>Hypericum perforatum</i>)
Downy brome, cheatgrass	(<i>Bromus tectorum</i>)
Field bindweed	(<i>Convolvulus arvensis</i>)
Halogeton	(<i>Halogeton glomeratus</i>)
Johnsongrass	(<i>Sorghum halepense</i>)
Perennial sowthistle	(<i>Sonchus arvensis</i>)
Poison hemlock	(<i>Conium maculatum</i>)
Puncturevine	(<i>Tribulus terrestris</i>)
Quackgrass	(<i>Elymus repens</i>)
Redstem filaree	(<i>Erodium cicutarium</i>)
Velvetleaf	(<i>Abutilon theophrasti</i>)
Wild proso millet	(<i>Panicum miliaceum</i>)

Colorado Noxious Weeds (including Watch List), effective June, 2020

Watch List Species (19)

<i>Common</i>	<i>Scientific</i>
Baby's breath	(<i>Gypsophila paniculata</i>)
Caucasian bluestem	(<i>Bothriochloa bladhii</i>)
Common bugloss	(<i>Anchusa officinalis</i>)
Common reed	(<i>Phragmites australis</i>)
Garden loosestrife	(<i>Lysimachia vulgaris</i>)
Garlic mustard	(<i>Alliaria petiolata</i>)
Himalayan blackberry	(<i>Rubus armeniacus</i>)
Hoary alyssum	(<i>Berteroa incana</i> L.)
Meadow hawkweed	(<i>Hieracium caespitosum</i>)
Onionweed	(<i>Asphodelus fistulosus</i>)
Siberian elm	(<i>Ulmus pumila</i>)
Scotch broom	(<i>Cytisus scoparius</i>)
Swainsonpea	(<i>Sphaerophysa salsula</i>)
Syrian beancaper	(<i>Zygophyllum fabago</i>)
Tree of Heaven	(<i>Ailanthus altissima</i>)
Ventenata grass	(<i>Ventenata dubia</i>)
White bryony	(<i>Bryonia alba</i>)
Yellow bluestem	(<i>Bothriochloa ischaemum</i>)
Yellow flag iris	(<i>Iris pseudacorus</i>)

Appendix B

Noxious Weed Identification

NOXIOUS WEED IDENTIFICATION

LIST A WEED SPECIES – DESIGNATED FOR ERADICATION



Hairy willow-herb (*Epilobium hirsutum*)

DESCRIPTION: Tall semi-aquatic plant that can grow up to 6 feet and is covered with fine, soft hairs. Leaves attach directly to the stem by clasping the base with showy pink flowers with four notched petals. **BLOOMS:** Perennial. June to August. **REPRODUCES:** By seeds and rhizomes. A mature plant can produce up to 70,000 seeds, which can be wind-dispersed thanks to a tuft of long white hairs on the oblong and flattened seeds.



Myrtle spurge (*Euphorbia myrsinites*)

DESCRIPTION: Low growing, 4-8" tall with 18" spread. Flowers yellow-green with heart-shaped bracts. Trailing stems with fleshy blue-green alternate leaves. Taproot. Leaves and stems have toxic milky sap that is poisonous; can cause skin irritations, nausea, vomiting, and diarrhea. **BLOOMS:** Perennial. Early spring, March-May. **REPRODUCES:** By seed and can spread vegetatively. Seed heads are explosive and can project seeds up to 15 ft.



Orange hawkweed (*Hieracium aurantiacum*)

DESCRIPTION: Plant grows 10 to 20 inches in height. Flowers have 5 to 35 red-orange-yellow heads with petals with strap-shaped with notched tips. The flowers generally grow in clusters, and look similar to dandelions. **BLOOMS:** Perennial. June to July. **REPRODUCES:** From runners, rhizomes, sporadic root buds, and seed.



Purple loosestrife (*Lythrum salicaria*)

DESCRIPTION: Can grow in multiple four-sided stems between two and eight feet tall. Reddish-purple flowers are tightly grouped in long, vertical heads. Leaves are lance-shaped. Taproot. **BLOOMS:** Perennial. Late June through September. Blooms from the bottom up. **REPRODUCES:** Primarily by seed. Seeds can remain viable in the soil for up to 20 years.

NOXIOUS WEED IDENTIFICATION

LIST B WEED SPECIES – DESIGNATED FOR CONTAINMENT & SUPPRESSION



Bouncingbet (*Saponaria officinalis* L.)

DESCRIPTION: Tall forb that can grow up to 3 feet when mature. Showy flowers form in a cluster at the end of an upright stem and have five petals that are generally light pink to white and slightly notched at the apex. **BLOOMS:** Perennial. June through September. **REPRODUCES:** By seed and roots. Bouncingbet contains saponin, which when wet produces lather, and thus is also known as soapwort.



Bull thistle (*Cirsium vulgare*)

DESCRIPTION: The gumdrop-shaped disk flowers are pinkish to dark purple in color and 1 ½ to 2 inches in diameter. Bull thistles are the only thistles in Colorado that are prickly hairy on the top and are cottony-hairy on the undersides of the spiny leaves. **BLOOMS:** Biennial. June-July. **REPRODUCES:** Spiky rosette first season then flowers second season. Mature plants can produce up to 4,000 seeds per plant.



Canada thistle (*Cirsium arvense*)

DESCRIPTION: Perennial that can grow 2-4 feet tall. Unlike other non-native thistles which have a solitary flower at the end of each stem, Canada thistle flowers occur in small clusters of 1 to 5 flowers, which are tubular shaped, and vary from white to purple in color. **BLOOMS:** May-August. **REPRODUCES:** By seed and creeping horizontal roots called rhizomes.



Common teasel (*Dipsacus fullonum*)

DESCRIPTION: A tall plant that can grow over 6 feet tall when mature. The flowers are purple or white with spiny, awned bracts at the base. The flower head is generally egg-shaped, with a square base. The stem is rigid and also lined with several rows of downward turned prickles and has leaves that are simple, opposite, net-veined, stalkless, and clasp the stem. **BLOOMS:** Biennial. April-September. **REPRODUCES:** By seed. Can produce up to 2,000 seeds that can remain viable for up to 14 years.

NOXIOUS WEED IDENTIFICATION

LIST B WEED SPECIES – DESIGNATED FOR CONTAINMENT & SUPPRESSION



Dalmatian toadflax (*Linaria dalmatica*)

DESCRIPTION: Tall plant that can grow 2-4 feet. The flowers are snapdragon-shaped, 1½" long, bright yellow, sometimes with orange centers. The leaves are thick, waxy, heart-shaped, and clasp the stem. **BLOOMS:** Perennial. May through September. **REPRODUCES:** By seed and creeping roots. A single plant produces 500,000 seeds, most of which fall within 18 inches of the parent plant. Seeds can remain viable for at least 10 years.



Diffuse knapweed (*Centaurea diffusa*)

DESCRIPTION: Can grow 1 to 3 feet tall, and is diffusely branched above ground, giving the plant a ball-shaped appearance and tumble-weed mobility when broken off at ground level. Flowers are mostly white, sometimes purple and are located on each branch tip. Leaves are small, and are reduced in size near the flowering heads. **BLOOMS:** Biennial. June-August after rosette stage bolts in early spring. **REPRODUCES:** By seed. Can produce up to 18,000 seeds per plant.



Leafy spurge (*Euphorbia esula*)

DESCRIPTION: Creeping perennial that can grow 1-3 feet tall. Flowers are yellowish-green and have a pair of yellow-green heart-shaped bracts. Leaves narrow, 1-4" long. Stems are smooth, pale green, and thickly clustered. Roots brown with pink buds. Contains white, milky latex that is toxic to the skin and can cause blisters in the mouth of cattle and wildlife. **BLOOMS:** April-July. **REPRODUCES:** By seed and extensive lateral root system. Seeds can explode out from their capsule, flying up to 15 feet away from plant.

NOXIOUS WEED IDENTIFICATION

LIST B WEED SPECIES – DESIGNATED FOR CONTAINMENT & SUPPRESSION



Musk thistle (*Carduus nutans*)

DESCRIPTION: Tall plant that can grow 2-6 feet. Flowers are pinkish-purple, with pinecone-like prickly bracts below. Multiple stems from base, highly branched above, one flower per stem. Dark green leaves are waxy, alternate, deeply lobed, spiny with white edges and midribs. **BLOOMS:** Biennial. Spiky rosettes first season, flowers second season, late May-June. Seeds set in June-July. **REPRODUCES:** Solely by seed.



Saltcedar or tamarisk (*Tamarix spp.*)

DESCRIPTION: Deciduous evergreen shrub or small tree that can grow up to 20 feet tall. Leaves are small, blue-green in color with tiny pink or white five-petaled flowers. Found primarily along creeks, ditches and floodplains due to its heavy use of water. **BLOOMS:** Will bud in February or March and flower between April and August. **REPRODUCES:** By seed and vegetatively. A mature plant can produce 600,000 seeds per year.

NOXIOUS WEED IDENTIFICATION

LIST C WEED SPECIES – RECOMMENDED FOR MANAGEMENT



Common mullein (*Verbascum thapsus*)

DESCRIPTION: Biennial forb that grows as a basal rosette with long, light-green, woolly, alternate and overlapping leaves that bolts in its second year into an erect stem that be 2-6 feet tall. The sulfur-yellow flowers have five petals and are found on the upper part of the plant. **BLOOMS:** June to August. **REPRODUCES:** By seed. Can produce 100,000 to 250,000 seeds per plant.



Field bindweed (*Convolvulus arvensis*)

DESCRIPTION: Deep-rooted perennial that grows low to the ground but readily spreads up to 6 feet out. Leaves have an arrowhead shape and the flowers are bell or trumpet-shaped, white to pink in color, and are about 1 inch long. **BLOOMS:** June-September. **REPRODUCES:** By seed and numerous rhizomes spreading from a deep taproot.



Poison hemlock (*Conium maculatum*)

DESCRIPTION: Tall plant that typically grows 4 to 8 feet in its second year after starting as a large rosette in its first year. Has smooth, hollow stems that are rigid with distinct purple spots and shiny green leaves that are pinnately compound, multi-stemmed and have a fern-like appearance. The flowers have 5 petals, clawed, notched and are white, umbrella-like clusters. **BLOOMS:** June-July. **REPRODUCES:** By seed. All parts of the plant are poisonous.

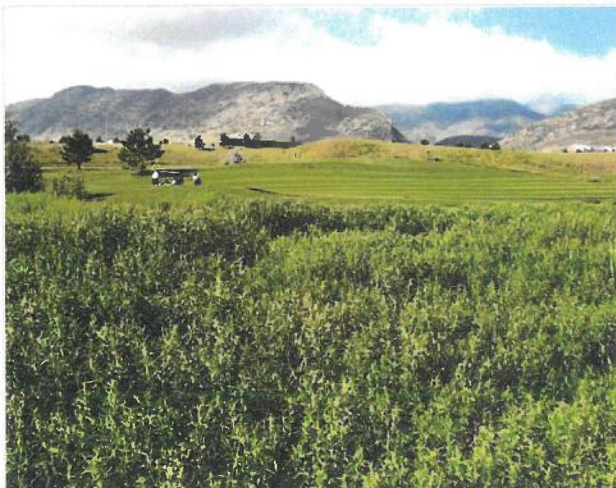


Redstem filaree (*Erodium cicutarium*)

DESCRIPTION: Low-growing winter annual in the Geranium family also known as storksbill. Grows from a rosette stage 3" to 2 feet tall. The stems are hairy and red in color. The leaves are opposite and finely divided with toothed or lobed margins that grow on short stems. The five-petaled flowers are a purplish-pink in color and are in clusters of 2 or more. **BLOOMS:** Early bloomer March to April. **REPRODUCES:** Primarily by seed.



Hairy willow-herb (*Epilobium hirsutum*) is a perennial, semi-aquatic plant also known by the names “codlins and cream” and “European fireweed.” The plant grows up to 6 feet tall and can reproduce via seeds or rhizomes. Each mature plant can produce up to 70,000 seeds, which can be wind-dispersed thanks to a tuft of long white hairs on the oblong and flattened seeds. The entire plant is covered with fine, soft hairs. Leaves are mostly opposite, lanceolate to oblong-lanceolate in shape, with sharply serrated margins. Leaves attach directly to the stem, are often clasping at the base, and grow from 2-5 inches long and 1/2-1 inch wide. The showy pink flowers are 3/4 inch across with four notched petals, four sepals, and eight stamens. Flowers occur in racemes in the upper leaf axils and are present in July and August.



Front Range infestation in a golf course wetland.

Hairy willow-herb is native to Eurasia and North Africa and was likely introduced to the U.S. as an ornamental. Some reports suggest it may have also arrived in ship ballast. The plant is typically found in water-logged soils and easily tolerates inundation. It does not tolerate shaded areas during seedling establishment, but once established can be somewhat shade-tolerant. Infestations can clog small waterways and displace native vegetation, increasing bank erosion and degrading wildlife habitat. Hairy willow-herb spreads easily into undisturbed areas and can form monotypic stands in wetland areas. Seeds require a soil pH for 5.5 or higher for germination and are thought to remain viable for several years in the soil. Site monitoring should be carried out for at least ten years after the last flowering adult plants have been eliminated.

The key to effective control of hairy willow-herb is to prevent establishment through proper land management. Maintain healthy riparian corridors, wetlands and rights-of-way, and continually monitor your property for new infestations. Be aware that there are several native species of *Epilobium* in Colorado. Make sure to identify plants correctly before taking action to control them.

Hairy willow-herb is a designated “List A” species in the Colorado Noxious Weed Act. It is required to be eradicated wherever found in the state. The following page provides management recommendations. For more information please visit: www.colorado.gov/ag/weeds or call the State Weed Coordinator at the Colorado Department of Agriculture, at 303-869-9034.



© www.nttlphoto.com



© Kings County, WA



Key ID Points

1. Bright pink flowers have 4 notched petals, 4 sepal, & 8 stamens.
2. Leaves mostly opposite & sessile on the stem.
3. Seeds have white, silky tuft in long seedpod.
4. Entire plant covered with soft hairs.

Hairy willow-herb *Epilobium hirsutum*

Integrated Weed Management Recommendations

Hairy willow-herb *Epilobium hirsutum*

Preventing the spread of this plant in Colorado is crucial since it is known to exist only in a few locations, mostly in the Denver Metropolitan area. Monitoring your land for infestations, especially lands near water and downstream of known sites, can significantly aid in detecting the species early and eradicating it quickly. Herbicide timing is important in controlling this species. Follow timing recommendations closely.



CULTURAL

Prevent the establishment of new infestations by minimizing disturbance and seed dispersal, eliminating seed production, and maintaining healthy native communities. Survey regularly for noxious weeds on your property. Be sure to completely remove any seedlings or newly established plants by hand pulling the plants as early as possible in their development.



BIOLOGICAL

Biocontrol agents are not included in the prescribed management plans by the State. Eradication is the management objective for all List A's. No biocontrol agents for hairy willow-herb is available. For more information on the use of biocontrol agents to control weeds in Colorado, please contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916.



© King County, Washington, Noxious Weed Program

MECHANICAL

Small infestations can be dug by hand and should be performed prior to seed set. It is very important to remove the entire rootstalk and any existing rhizomes of the plant to avoid regrowth from root fragments. Composting of this species is not advised, and vegetation should be destroyed on site or contained in heavy-duty trash bags and disposed of in a landfill.



CHEMICAL

NOTE: The following are recommendations for herbicides that can be applied along riparian and wetland areas to treat hairy willow-herb. Rates are approximate and based on smaller infestation, spot-spraying techniques. Please read label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the LAW!

HERBICIDE	RATE	APPLICATION TIMING
Imazapyr* (Habitat**, Arsenal** for aquatic use)	0.5-1% v/v (0.6-1.3 oz. imazapyr/gal water) + 0.25% v/v non-ionic surfactant	Apply evenly over leaf surface "to wet," not dripping. Treat in the pre-bud to flowering stage. (June to August).
Glyphosate (Rodeo**, AquaMaster**, Aqua-Neat** for aquatic)	Up to 5% v/v (Up to 6.4 oz. glyphosate/gal)	Apply evenly over leaf surface "to wet," not dripping. Treat in the pre-bud to flowering stage. (June to August; at least half of foliage should still be green).

Note: * Imazapyr is NOT for use in ornamental or turf settings.

****These herbicide products are non-selective and will kill any vegetation contacted.**

Other species herbicide recommendations: <https://goo.gl/VFPCUv>



Colorado Department of Agriculture - Conservation Services

305 Interlocken Parkway

Broomfield, CO 80021

(303) 869-9030

www.colorado.gov/ag/weeds



Myrtle spurge

List A Species

Rangeland, pasture, and riparian site recommendations

1

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us



Key ID Points

1. Low growing plant with blue-green, waxy leaves.
2. Flowers are yellow-green petal like bracts that appear from March to May.

Updated on:
7/2015

Myrtle spurge Identification and Management



Identification and Impacts

Myrrtle spurge (*Euphorbia myrsinites*) is a low growing perennial with trailing fleshy stems. The leaves are fleshy, blue-green and alternate. Flowers are inconspicuous with yellow-green, petal-like bracts that appear from March to May. Myrtle spurge spreads by seed and plants are capable of projecting seeds up to 15 feet. The plant grows from a taproot, with new stems emerging in early spring and dying back in the winter. Plants can grow up to 8-12 inches high and 12-18 inches in width.

Myrrtle spurge contains a toxic, milky sap which can cause severe skin irritations, including blistering. This plant is poisonous if ingested; causing nausea, vomiting and diarrhea. Wearing gloves, long sleeves, shoes, and eye protection is highly recommended when in contact with myrtle spurge, as all plant parts are considered poisonous.

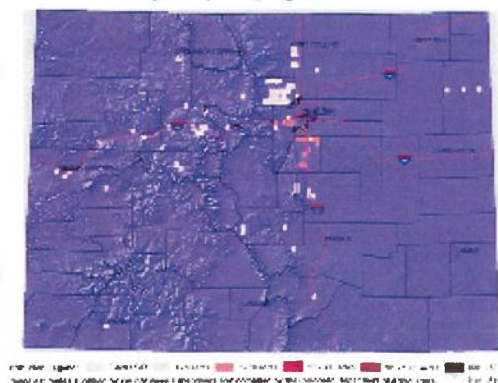
Myrrtle spurge is an invasive Ornamental that is native to Eurasia. It is popular with xeriscapes and rock gardens, preferring sunny to partly sunny areas and well drained soils. Myrtle spurge rapidly escapes gardens and invades sensitive ecosystems, out competing native

vegetation and reducing wildlife forage. Alternatives to planting myrtle spurge include native plants such as sulphur flower (*Erigeron umbellatum*), Kinnikinnick (*artcostaphylos uvursi*), or creeping mahonia (*Mahonia repens*). The soil seed reserve of myrtle spurge is estimated to be eight years. The site must be monitored for at least nine years after the last flowering adult plants have been eliminated and treatments repeated when necessary.

The key to effective control of myrtle spurge is to remove plants prior to seed set and to detect and remove new populations in natural areas early on. Small areas can be easily removed by mechanical means but should be done early to prevent triggering seed launching. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Myrrtle spurge is designated as a "List A" species in the Colorado Noxious Weed Act. It is designated for statewide eradication. For more information visit www.colorado.gov/ag/weeds and click on the Noxious Weed Management Program. Or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.

Map of myrtle spurge infestation.



Photos © Kelly Uhing, Colorado Department of Agriculture and (above) Crystal Andrews, Colorado Department of Agriculture.

Euphorbia myrsinites



CULTURAL

Keeping desirable vegetation healthy and thick will help keep invaders out. Prevent the establishment of new infestations by minimizing disturbance and seed dispersal. Survey your land regularly to detect new invaders and eradicate any new populations quickly.



BIOLOGICAL

Biocontrol is not an approved method of control for State List A species. Eradication as the management objective for all List A species. For more information on insect biocontrol in Colorado, please contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916



MECHANICAL

Hand pull or dig when soil is moist. Make certain to pull all the roots and wear rubber gloves and eye protection to protect yourself from the toxic milky sap. Treatment follow up is important to check root fragment resprouts that will occur when the tap root is severed too shallow.

Integrated Weed Management:

Since Myrtle spurge spreads mainly by seed, it is very important to prevent seed production and deplete the seed bank. Remove mature plants prior to setting seed and seedlings whenever present.

Populations can be managed mechanically and by spot treatment of herbicides. It is important to be persistent with follow up treatments for many years.

Myrtle spurge

HERBICIDES

NOTE: The following are recommendations for herbicides that can be applied to range and pasturelands. Rates are approximate and based on equipment with an output of 30 gal/acre. Please read label for exact rates. **Always read, understand, and follow the label directions. The herbicide label is the LAW!**

Herbicide	Rate	Application Timing
2,4-D ester	2 qt./acre + 1% v/v methylated seed oil	Use a 2,4-D ester formulation that has a 4.0 lbs. active ingredient/acre. Apply during spring or during fall regrowth.
Dicamba + 2,4-D	1 pint/acre dicamba + 2-3 pints/acre 2,4-D (amine or ester)	Use a 2,4-D formulation that has a 4 lbs. active ingredient/gallon. Apply during spring or during fall regrowth.
Picloram (Tordon/Picloram 22K - Restricted use pesticide) + 2,4-D	20 oz./acre + 2-3 pints/acre 2,4-D (amine or ester)	Apply at flowering growth stage during spring or to fall regrowth. DO NOT use near trees, desirable shrubs, water, or high water table.
Additional herbicide recommendations for other species can be found at: https://goo.gl/VFPCUv		

Top to bottom photos © Unknown, A. Murray, Univ. of Florida; USDA ARS Archive; and unknown.

Orange hawkweed

List A Species

Rangeland, pasture, and riparian site recommendations

1

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us

Orange hawkweed Identification and Management



Identification and Impacts

Orange hawkweed (*Hieracium aurantiacum*) is a perennial plant originating from Europe. It reproduces from runners, rhizomes, sporadic root buds, and seed. Leaves are basal with one or two small leaves occasionally occurring on the bristly stem. Rosette leaves are four to six inches in length, spatula shaped and have finely toothed margins. The plant grows 10 to 20 inches in height. Flowers have 5 to 35 red-orange-yellow heads with petals that are strap-shaped with notched tips. The flowers generally grow in clusters, and look similar to dandelions. They range from 1/2 to 3/4 inches in size. The plant also contains a milky juice.

Habitat for orange hawkweed include disturbed areas, ski-fields, grasslands, pastures, rangelands, woodlands, alpine meadows and yards. It grows in temperate and mountain regions and can tolerate a variety of conditions.

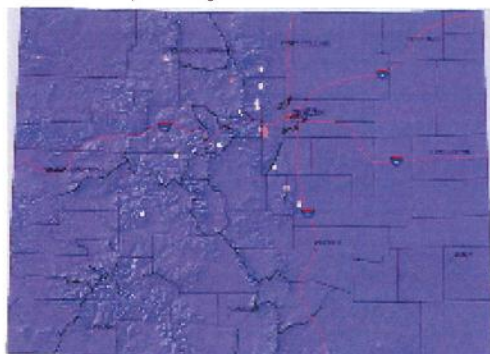
Orange hawkweed displaces native vegetation and reduces livestock and wildlife forage. The plants quickly form dense infestations which dominate the site with a solid mat of rosettes or seedlings. Orange hawkweed readily escapes gardens and becomes a serious problem in

natural areas. The seed viability of orange hawkweed is seven years. The site must be monitored for at least eight years after the last flowering adult plants have been eliminated and treatments repeated when necessary.

The key to effective control of orange hawkweed is preventing the establishment of plant communities through sound land management practices. Maintain healthy pastures and rangeland and continually monitor your property for new infestations. If plant populations of orange hawkweed exist, combining herbicides and cultural control methods can be effective. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Orange hawkweed is designated as a "List A" species in the Colorado Noxious Weed Act. It is required to be eradicated wherever found in the State. For more information visit www.colorado.gov/ag/weeds and click on the Noxious Weed Management Program. Or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.

Map of orange hawkweed infestation.



Photos © Bottom 2 lower left: Kelly Uhing, Colorado Department of Agriculture; Top Left and Top Center: Michael Shephard, USDA Forest Service; Above map: Crystal Andrews, Colorado Dept. of Ag



Key ID Points

1. Basal leaves with 1 or 2 small leaves.
2. Red-orange flower heads with petals that are strap-shaped with notched tips.
3. Hairy leaves and stems.

Updated on:
7/2015

Hieracium aurantiacum

**CULTURAL**

When native forbs and grasses are already present, assisting plant competitiveness by supplementing fertilizers can be an effective cultural control method. This proves to be most successful on pasture and rangelands where soil nitrogen levels may be depleted.

**BIOLOGICAL**

Biocontrol agents are not included in the prescribed management plans by the State for List A Species. Eradication is the management objective of all List A's. No biocontrol agent for Orange hawkweed is available. For more information on biocontrol in Colorado, please contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916.

**MECHANICAL**

NOT recommended because of the weed's ability to reproduce by stolons, rhizomes and root fragments. This often renders mechanical control obsolete.

Integrated Weed Management:

Since orange hawkweed has been identified in small quantities around Colorado, preventing the populations from spreading is important in management of the weed. Using a combination of control methods proves to be the most effective way to control populations. Using cultural and herbicide control methods together proves to be key in eradicating established infestations.

HERBICIDES

NOTE: The following are recommendations for herbicides that can be applied to range and pasturelands. Rates are approximate and based on equipment with an output of 30 gal/acre. Please read label for exact rates. **Always read, understand, and follow the label directions. The herbicide label is the LAW!**

Herbicide	Rate	Application Timing
Aminopyralid (Milestone)	6-7 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply when plants are in rosette to bolting stage. (Spring to early summer)*
Clopyralid (Transline)	1.33 pint product/acre + 0.25% v/v non-ionic surfactant	Apply when plants are in the rosette growth stage. (Spring to early summer)*
Clopyralid + 2,4-D (Curtail)	2 qt. product/acre + 0.25% v/v non-ionic surfactant	Apply when plants are in the rosette growth stage. (Spring to early summer)*

Note: *Ideally treat in the reproductive stage, which is bolting to flowering. Fall treatments are ineffective.

Additional herbicide recommendations for other species can be found at:
<https://goo.gl/VFPCUv>

Photos, © Top: Tom Heutte, USDA Forest Service; Others: Kelly Uhing, Colorado Department of Agriculture.

Orange hawkweed

Colorado
State
University



Purple loosestrife

List A Species

Rangeland, pasture, and riparian site recommendations

1

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us

Purple loosestrife Identification and Management



Identification and Impacts

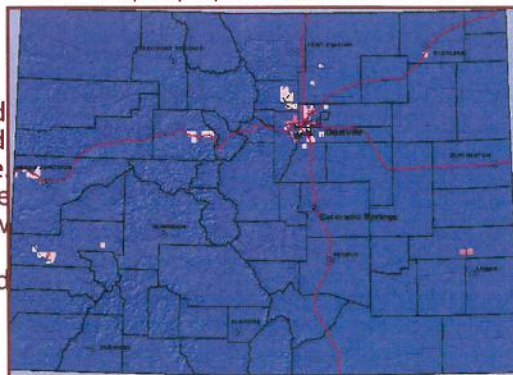
Purple loosestrife (*Lythrum salicaria*) is a non-native, tap-rooted, perennial forb. It is native to Europe and was introduced to North America as an ornamental plant for gardens. It has escaped into natural areas such as streambanks and shallow ponds. Purple loosestrife reproduces primarily by seed. A single, mature plant can produce up to three million seeds per year. These seeds can remain viable in the soil for 5 to 20 years. Pieces of roots or stems also can produce new plants. Purple loosestrife produces multiple four-sided stems that can grow two to eight feet tall. Leaves are two to five inches long, lance-shaped and whorled on the stems. Flowers are tightly grouped in long, vertical heads; they bloom from the bottom up. They are reddish-purple in color, about one inch long, and have five to seven petals. Flowers appear from late June through September.

immediately and consider a substitute. There are many planting alternatives that are better suited to Colorado and beneficial to wildlife. Alternatives include spotted gayfeather, Rocky Mountain Penstemon, beebalm, purple coneflower, and Colorado Columbine. For more information refer to Colorado Native Plant Society's website, www.cnps.org.

The key to effective control of purple loosestrife is early detection when infestations are small. It is fairly easy to control small numbers of loosestrife plants when the seed bank in the soil is low. Eradicating large populations is much more difficult. Persistent management and monitoring of site is a long-term program to ensure eradication. Small loosestrife infestations should be eradicated by hand-pulling/cutting in combination with herbicide application. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Purple loosestrife is designated as "List A" species on the Colorado Noxious Weed Act. It is required to be eradicated wherever found in the State. For more information visit www.colorado.gov/ag/csd and click on the Noxious Weed Program link or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.

Map of purple loosestrife infestation.



Key ID Points

1. Showy rose-purple flowers bloom in long vertical racemes.
2. Lance-shaped leaves have smooth edges.

Purple loosestrife can be found along riverbanks, ditches, and wet meadows throughout the state. Infestations rapidly replace native vegetation, can impede water flow in canals and ditches, and have little wildlife habitat value. Infested wetlands eventually become a monoculture of loosestrife.

If purple loosestrife is growing in your garden, remove plants

All photos © Kelly Uhing. Infestation map above, Crystal Andrews, Colorado Department of Agriculture.

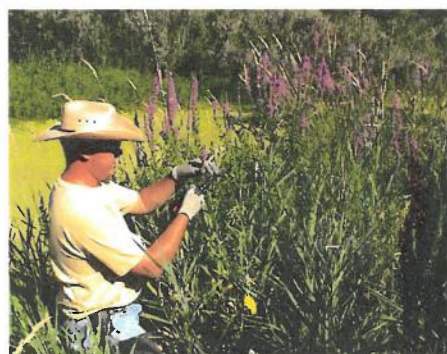
Lythrum salicaria

**CULTURAL**

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

**BIOLOGICAL**

Biocontrol agents are not included in the prescribed management plans by the State for List A Species. Eradication is the management objective of all List A's. For more information on biocontrol in Colorado, please contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916.

**MECHANICAL**

Hand removal of isolated individuals can be effective on small infestations. Hand removal should be performed prior to seed set. It is important to remove the entire rootstalk of the plant to avoid regrowth from root fragments. During the flowering stage, flowerheads must be cut and disposed of properly before a herbicide is applied. This will prevent or reduce seed production.

Integrated Weed Management:

Since purple loosestrife has been identified in Colorado, preventing the populations from spreading is important in management of the weed. Prevent new seeds from being added to the seed bank by managing purple loosestrife before it flowers or by clipping and disposing of the flowerheads prior to seed set and using herbicides to control plants.

Followup control efforts the same growing season and for several years afterwards. Maintain a healthy cover of perennial plants.

HERBICIDES

The following are recommendations for herbicides that can be applied to range and pasture lands. Always read, understand, and follow the label directions. Rates are approximate and based on equipment with an output of 30 gallons per acre. Please read label for exact rates. The herbicide label is the LAW!

Herbicide	Rate	Application Timing
Triclopyr (Garlon 3A)	6-8 qt./acre OR 1.3-1.9 oz./gal water + 0.25% v/v non-ionic surfactant	Apply in summer. If plants are flowering, cut and properly dispose of flowerheads before applying Garlon 3A.
Glyphosate (Rodeo*, Habitat* - aquatic safe)	4 qt./acre OR 1.3-1.9 oz./gal water + 0.25% v/v non-ionic surfactant	Apply in summer during the flowering stage. Cut and properly dispose of flowerheads before applying Rodeo.
Aquatic 2,4-D Amine	1-2 qt./acre or 1.3-2.5 oz./gal water + 0.25% v/v non-ionic surfactant	Early spring - prevents seed formation only. Retreatment will be necessary. DO NOT apply when outside temperatures will exceed 85 degrees.
Note: *These herbicide products are nonselective and will kill any vegetation contacted.		
Additional herbicide recommendations for other species can be found at: https://goo.gl/VFPCUv		

Purple loosestrife

Bouncingbet Identification and Management

List B



© Mike LeValley

Bouncingbet (*Saponaria officinalis* L.) is a perennial forb in the Caryophyllaceae family, also known as soapwort or sweet William.

Mature plants grow up to three feet tall. Like other plants in the Carnation family, the leaves are opposite and smooth, about 2 to 4 inches long, and have an ovate to elliptic shape. Leaves have three very distinct deeply cleft parallel veins, with smaller lateral faint veins. They are fused at the base around the stem, which forms swollen nodes, similar to carnations. Like the leaves, the stems are smooth and erect. They are sparingly branched.

Showy bouncingbet flowers form at the end of an upright stem to form a cyme. Flowers are usually in pairs. Each flower has five petals per corolla; cultivar petals vary. The petals have a distinct notch on the petal margin, making it bi-lobed.

Petals are usually pink to white and are recurved to reflexed, which makes the stamens exposed and the two styles centrally protruding. Within one season, flowers transition from a smaller paler staminate-phase to a larger pinker pistillate-phase, likely to avoid self-pollination (Davis et al. 2014). The five sepals are fused at the base to form a tube-like calyx. In Colorado, bouncingbet greens up in April, flowers emerge starting in June, and sets seed through October. Bees and wasps pollinate bouncingbet flowers (Davis et al. 2014). The fruits are capsules with dull black roundish to kidney-shaped seeds. Seed longevity is unknown. Bouncingbet forms densely thick taproot and rhizomes. With its robust root structure, bouncingbet can form dense colonies. It spreads by root and seed.

Originally, bouncingbet was introduced from Europe as a garden ornamental. In Colorado, bouncingbet occurs mainly municipal areas as a cultivated ornamental and escapee, such as in residential gardens, abandoned lots, exurban areas, and other sites that offer moist, well-drained soil, full to partial sun, such as roadsides and wetlands (EDDMapS 2018).

Bouncingbet contains saponin, which when wet produces lather, and thus was cultivated for this purpose (Chal-linor and De Voss 2012). Other chemical compounds in bouncingbet are investigated for "cytotoxic activity against human cancer cell lines" and other pharmacological or homeopathic uses (Chal-linor and De Voss 2012). While generally unpalatable to livestock, in large doses bouncingbet can be poisonous to livestock. The sapogenic glycosides can cause gastrointestinal irritation and destroy red blood cells when absorbed in the blood streams of grazing animals. In humans, it can be toxic when overdosed, however may be a culinary additive in some cultures (Wikipedia 2018).



© Ellen Rathbone



© Davis et al. 2014



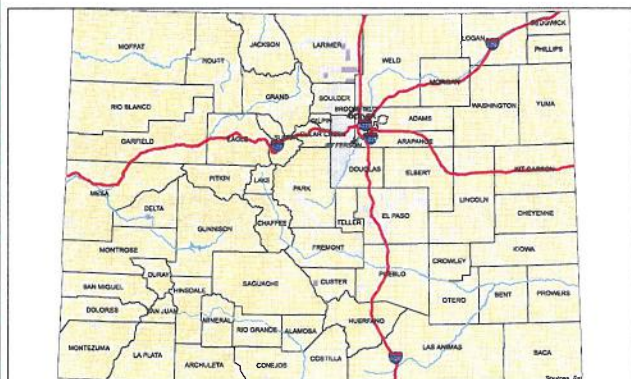
Bouncingbet

Saponaria officinalis L.

bouncingbet
Saponaria officinalis

2016 Statewide Distribution in Colorado
Based on 2016 Quarterquad and EDDMapS Field Survey Data

Approximately 1,170 Infested Acres



Acres selected by County Weed Supervisors and Other Data Sources, Compiled by Colorado Department of Agriculture
0 acres 1-10 acres 11-50 acres
COLORADO Department of Agriculture
Source: Colorado Department of Agriculture

Key ID Points

1. Five petals with notched margins
2. Pale staminate flowers and pinker pistillate flowers
3. Three parallel veins in leaves
4. Opposite leaves fused at the base with swollen nodes

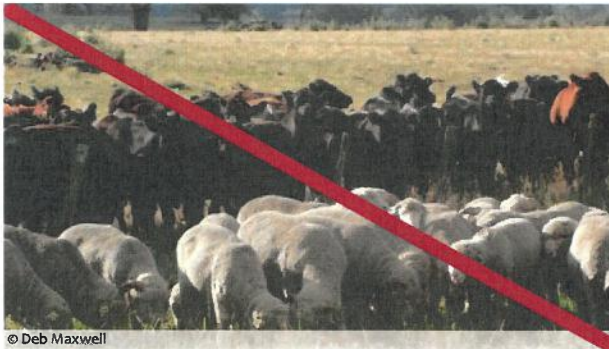
Integrated Weed Management Recommendations

Effective integrated management means using a variety of eradication methods in the same site along with restoration, prevention of seed production and dispersal, and monitoring. Maintain robust healthy native landscapes. Restore degraded sites. Avoid soil disturbance. Prevent seed production and seed dispersal, e.g. on contaminated equipment. Rest sites until restored. Modify land use practices. Use methods appropriate for the site, including land use practices.



CULTURAL

Most bouncingbet seeds remain close to parent plants; spread is mainly by root or ornamental introductions. Cultural methods should follow other methods. Maintain or restore a competitive assemblage of shrubs, forbs, cool and warm season grasses that form large root biomass to crowd out bouncingbet roots. Implement whole site restoration of soils, plants and water regimes where dense colonies exist. Use locally adapted species that are ecologically appropriate for the site to improve competitiveness, including annual and perennial species. Incorporate soil amendments, soil microbes and mycorrhizal fungi in restoration efforts for natives. Minimize soil compaction and disturbance, especially in wetlands and moist soil.



© Deb Maxwell

BIOLOGICAL

Bouncingbet is not palatable to sheep, cattle or horses because of its saponin chemical content. If grazed, bouncingbet may resprout. Properly managed grazing can improve vigor of desired species and indirectly prevent bouncingbet. There are no biological control agents for bouncingbet authorized in Colorado that would effectively control it. For more information about biological control agents, visit the CDA Palisade Insectary website at: www.colorado.gov/ag/biocontrol



MECHANICAL

Mechanical methods are best for residential areas or small infestations, and best applied in early season or newly established plants. Completely remove all roots and root fragments in addition to above ground biomass. Repeat through the season. Mowing, chopping and deadheading leaves roots behind, stimulates more flower production; these methods require consecutive years of season-long treatments and only control but not eradicate it. Mowing when plants are flowering or producing seed disperses flowers and seeds, which expands the size of the infested area. Collect, bag, and dispose of or destroy flowers; seeds could mature and germinate if left on the ground. Low severity prescribed fires may damage above ground vegetation, leaving roots and seeds unaffected. High severity prescribed fire may not damage native plant roots; pile slash on bouncingbet to increase fire temps.



CHEMICAL

NOTE: Herbicide recommendations to control bouncingbet in pastures and rangeland are found at: <https://goo.gl/TvWnv9> Rates are approximate and based on equipment with an output of 30 gal/acre. Follow the label for exact rates. Consult local turf and ornamental experts for herbicides appropriate for residential settings. Always read, understand, and follow the label directions. The herbicide label is the LAW!

Bouncingbet
Saponaria officinalis L.



Bull Thistle Identification and Management

List B



© Iowa Plants

Bull thistle, *Cirsium vulgare* (Savi) Ten., is a biennial forb that was introduced to North America as a seed contaminant. Flowers are in a raceme arrangement. The gumdrop-shaped disk flowers are pinkish to dark purple in color and 1 ½ to 2 inches in diameter. The pappus has feather-like bristles; the receptacle is densely bristly. The flower bracts are somewhat tapered and covered with spines 2-5 mm long. Leaves are alternate with deeply lobed margins that are spiny. In mature plants the base of the leaves clasp the stem and extend down the stem to the lower node. The plant has one short, fleshy taproot with several lateral roots. There is debate about the effectiveness of self-pollination in bull thistle; outcrossing though pollination produces an abundance of viable seed. Flower buds and heads that are removed from the stalk can still mature and become viable. Seeds are capped with a circle of plume-

like white hairs. Seeds remain viable for approximately three years. Mature plants can produce up to 4,000 seeds per plant. Bull thistle generally needs soil temperature between 50° and 80°F, moisture and canopy gaps to germinate seeds.

Bull thistle invades dry to moist environments. It prefers nitrogen-rich soils, and it grows on gravelly to clay-textured soils. It thrives in areas such as pastures, overgrazed rangeland, roadsides, and logged areas. Bull thistle infestations are heaviest in the northwestern portion of Colorado. It is widespread throughout the United States and parts of Canada.

Hheavy infestations reduce livestock forage. The presence of bull thistle in hay decreases the forage value and lowers the market price. It is an aggressive weed, but it will not withstand cultivation. Bull thistle is often a transient species, appearing in recently disturbed areas and becoming a dominant species for several years if left untreated. It can cause hay fever in some individuals.

Maintaining healthy pastures and rangeland, guarding against disturbance or overuse is the best prevention measure against bull thistle. As with most biennials, limiting seed production is critical to effective control. Chemical control is the most effective and efficient method of eradication if applied during the rosette stage, spring or early fall. To reduce seed production, plants with buds or flowers should be collected and

bagged, disposed of or destroyed. Mechanical control, such as pulling, has limited effectiveness.

Bull thistle is designated as a "List B" species in the Colorado Noxious Weed Act. It is required to be eradicated; some populations may be contained or suppressed depending on state regulations. For state regulations described for each county, refer to the most recent Rule, or visit www.colorado.gov/ag/co-weedcontacts for details.



© Bruce Ackley, OH State University



© Steve Dewey, UT State University



Bull thistle
Cirsium vulgare (Savi) Ten.

2015 Quarter Quad Survey

Bull Thistle
Cirsium vulgare

2015 Quarterquad Field Survey Data
Distribution in Colorado

Approximately 6,681 Infested Acres



0 acres 1-10 acres 11-50 acres 51-300 acres No Data Reported
Acres estimated by County Wild Supervisors; Compiled by Colorado Department of Agriculture

0 20 40 Miles

Key ID Points

1. Flowers arranged in a raceme; flower is gum-drop shaped.
2. Base of leaves clasp the stem & extend down the stem to node below
3. Top surface of leaves have stiff, rough hairs

Integrated Weed Management Recommendations

Bull thistle *Cirsium vulgare* (Savi) Ten.

Effective integrated management means using a variety of eradication methods that also includes restoration, prevention of seed production and dispersal, and monitoring. Maintain robust healthy native landscapes and restore degraded sites. Avoid soil disturbance. As with most biennials, prevent seed production in the first and second year of bull thistle growth. Prevent seed from dispersing, such as on contaminated equipment. Rest sites until they are effectively restored.



© Bonnie Millon, NPS

CULTURAL CONTROL METHODS

Since bull thistle germinates in canopy gaps, maintain or restore a competitive forb and cool and warm season grass assemblage to reduce spacing between plants. Use locally adapted and ecologically appropriate seeds whenever possible to improve competitiveness. Ensure annual species are included in the native seed mix as well as perennial. Incorporate soil amendments, soil microbes and mycorrhizal fungi in restoration efforts. Manage land uses so they do not cause soil disturbance or create bare mineral soil.



© Eric Coombs, OR Dept of Agriculture

BIOLOGICAL CONTROL METHODS

Horses, goats and sheep may eat flower heads on a few young individual plants, but seeds likely pass through their digestive tracks unaltered; cattle avoid bull thistle. Dense stands and large plants are usually avoided. Thus, bull thistle can become an "increaser" in over-grazed systems. Properly managed grazing can improve vigor of desired plants and indirectly reduce bull thistle. There is a biological control agent for this species, the bull thistle gall fly, *Urophora stylata*, but it was found to be ineffective in Colorado. Since it is not ethical to promote ineffective non-native insects in the state, this fly is not available in Colorado. For more information, visit the Colorado Department of Agriculture's Palisade Insectary website at www.colorado.gov/ag/biocontrol.



© UAF Cooperative Extension

MECHANICAL CONTROL METHODS

Methods, such as hoeing, tilling and digging, are best for infestations smaller than 0.5 acres. Sever roots below the soil surface during the first year before the plant stores energy, and in the second year before seed production. Mowing, chopping and deadheading stimulates more flower production; these methods require consecutive years of season-long treatments. Flower heads and buds must be collected, bagged, and disposed of or destroyed; seeds will mature and germinate if left on the ground. Prescribed fire that leads to high soil burn severity can damage roots and above ground biomass of bull thistle but also damages desired plants. Fire favors bull thistle and is not recommended.

CHEMICAL CONTROL METHODS

NOTE: The following are recommendations for herbicides that can be applied to pastures and rangeland. Rates are approximate and based on equipment with an output of 30 gal/acre. Follow the label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the LAW!

HERBICIDE	RATE	APPLICATION TIMING
Aminopyralid* (Milestone)	6 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply to rosettes through bolting stage in spring, or to fall rosettes. *Product not permitted for use in the San Luis Valley.
Chlorsulfuron** (Telar)	1 oz. product/acre (0.75 oz. active ingredient/acre) + 0.25% v/v non-ionic surfactant	Spring from bolting to bud stages. **This herbicide has residual soil activity that will affect all broadleaf seedlings germinating after application has occurred.
Clopyralid (Transline)	0.67-1.33 pints product/acre + 0.25% v/v non-ionic surfactant	Apply to rosettes through flower bud stage in spring, or to fall rosettes.
Aminocyclopyrachlor + chlorsulfuron (Perspective)*	4.75-8 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply from the seedling to the bolting stage. IMPORTANT: Applications greater than 5.5 oz. product/acre exceeds the threshold for selectivity. DO NOT treat in the root zone of desirable trees and shrubs. Not for use on grazed or feed forage. *Product not permitted for use in the San Luis Valley.



Colorado Department of Agriculture - Conservation Services

305 Interlocken Parkway

Broomfield, CO 80021

(303) 869-9030

www.colorado.gov/ag/weeds



Canada Thistle Identification and Management

List B



Canada thistle (*Cirsium arvense*) is a non-native, deep-rooted perennial that spreads by seeds and aggressive creeping, horizontal roots called rhizomes. Canada thistle can grow 2 to 4 feet in height. The leaves are oblong, spiny, bright green, and slightly hairy on the undersurface. Unlike other noxious biennial thistles which have a solitary flower at the end of each stem, Canada thistle flowers occur in small clusters of 1 to 5 flowers. They are about 1 cm in diameter, tubular shaped, and vary from white to purple in color.

Canada thistle emerges from its root system from late April through May. It flowers in late spring and throughout the summer. It produces about 1,000 to 1,500 seeds per plant that can be wind dispersed. Seeds survive in the soil for up to 20 years. Additionally, Canada thistle reproduces vegetatively through

its root system, and quickly form dense stands. Each fragmented piece of root, 0.25 inch or larger, is capable of forming new plants. The key to controlling Canada thistle is to eliminate seed production and to reduce the plant's nutrient reserves in its root system through persistent, long-term management.

Canada thistle is one of the most troublesome noxious weeds in the U.S. It can infest diverse land types, ranging from roadsides, ditch banks, riparian zones, meadows, pastures, irrigated cropland, to the most productive dryland cropland. Large infestations significantly reduce crop and cattle forage production and native plant species. It is a host plant to several agricultural pests and diseases. Canada thistle prefers moist soils, but it can be found in a variety of soil types. It has been found at elevations up to 12,000 feet.

Effective Canada thistle control requires a combination of methods. Prevention is the most important strategy. Maintain healthy pastures and rangelands, and continually monitor your property for new infestations. Established plants need to be continually stressed. Management options become limited once plants begin to produce seeds. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Canada thistle is designated as a "List B" species as described in the Colorado Noxious Weed Act. It is required to be either eliminated, contained, or suppressed depending on the local infestations. For more information visit www.colorado.gov/ag/weeds and click on the Noxious Weed Program link or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, (303) 869-9030.



Key ID Points

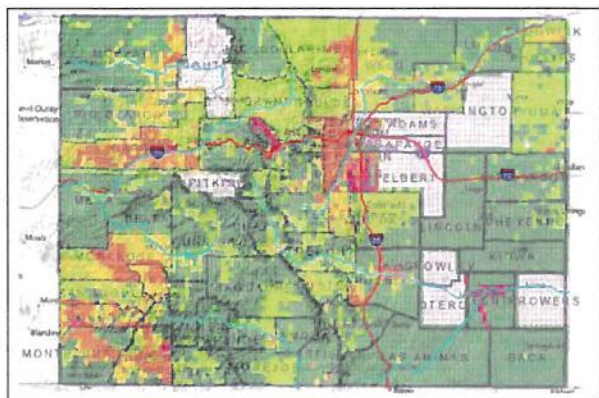
1. Cluster of 1-5 white to purple flowers on a stem.
2. Floral bracts are spineless.
3. Small flowers that are 1 cm in diameter.
4. Perennial, rhizomatous plant with spiny, oblong, green leaves.

2013 Quarter Quad Survey

Canada Thistle *Cirsium arvense*

2013 Quarterquad Survey
Distribution and Abundance
in Colorado

129,572+ Infested Acres



Distribution Legend: 0 acres, 1-10 acres, 11-50 acres, 51-100 acres, 101-500 acres, 501-1000 acres, >1000 acres, Not Reported

Acres estimates supplied by County Weed Coordinators and compiled by the Colorado Department of Agriculture

Canada thistle
Cirsium arvense

Integrated Weed Management Recommendations

Integrated weed management is imperative for effective Canada thistle control. This weed needs to be continually stressed, forcing it to exhaust root nutrient stores, and eventually die. Mowing or grazing can be followed up with herbicide application. Avoid hand-pulling and tilling which can stimulate the growth of new plants.



CULTURAL

Prevention is the best control strategy. Maintain healthy pastures, riparian areas, and rangelands. Prevent bare ground caused by overgrazing, and continually monitor your property for new infestations. Establishment of select grasses can be an effective control.



BIOLOGICAL

Cattle, goats, and sheep will graze on Canada thistle when plants are young and succulent in the spring. Follow up grazing with a fall herbicide application. Insects are available, and provide limited control. Currently, collection and distribution methods for Canada thistle rust (*Puccinia punctiformis*) are being refined. For more information on Canada thistle biocontrol, contact the Colorado Department of Agriculture - Palisade Insectary at (970) 464-7916.



MECHANICAL

Due to Canada thistle's extensive root system, hand-pulling and tilling create root fragments and stimulate the growth of new plants. Mowing can be effective if done every 10 to 21 days throughout the growing season. Combining mowing with herbicides will further enhance Canada thistle control.



CHEMICAL

The table below includes recommendations for herbicides that can be applied to rangeland and some pastures. Treatments may be necessary for an additional 1 to 3 years because of root nutrient stores. Always read, understand, and follow the label directions.

Herbicide	Rate	Application Timing
Aminopyralid* (Milestone)	5-7 oz. product/acre + 0.25% v/v non-ionic surfactant OR 1 teaspoon product/gal water + 0.32 oz./gal water	Apply in spring at the pre-bud growth stage until flowering and/or to fall regrowth. Can also add chlorsulfuron (Telar) at 1 oz./acre to the mix.
Clopyralid + Triclopyr (Prescott; Redeem; others)	3 pints product/acre + 0.25% v/v non-ionic surfactant OR 1.25 oz. product/gal water + 0.32 oz./gal water	Apply until flowering and/or fall regrowth.
Aminocyclopyrachlor + chlorsulfuron (Perspective)*	5.5 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply to spring rosette to flower bud growth stage; or fall. IMPORTANT: Applications greater than 5.5 oz. product/acre exceeds the threshold for selectivity. DO NOT treat in the root zone of desirable trees and shrubs. Not for use on grazed or feed forage.
Note: *Product not permitted for use in the San Luis Valley.		
Additional herbicide recommendations for this and other species can be found at goo.gl/TvWnv9		

Canada thistle

Cirsium arvense

Common Teasel Identification and Management

List B



© Steve Dewey, UT State University, Bugwood

Common teasel, *Dipsacus fullonum* L., is a biennial or sometimes short-lived perennial forb. Mature plants can grow up to or over six feet tall and have a taproot. Common teasel has simple lanceolate to oblanceolate basal and stem leaves. Both leaves are conspicuously veined, wrinkled and have rough surface. Leaf margins are crenate. Stems leaves are lined with stiff prickles along the midrib. Stem leaves are opposite, net-veined, stalkless, and clasp the stem. The stem is rigid and also lined with several rows of downward turned prickles.

Flowers are range from white to violet. The flower head is generally egg-shaped, with a square base. The long thin stiff floral bracts at the base of the inflorescence are generally longer than the flower head; these also have prickles. It flowers from April to September. This species reproduces by seed. In a Canadi-

an study, common teasel resprouted 50% of the time after mechanically removing above ground vegetation. Common teasel can produce more than 2,000 seeds per plant. Plants die after production of seed has occurred. Seeds can stay viable for up to 14 years. Seeds germinate and establish readily, however, seeds don't generally disperse far from the parent plant. The fruits are a four-angled achene, each containing a single seed.

Common teasel is native to Europe where historically it had many uses. Common teasel is spreading rapidly in America. It is common along major travel corridors and previously disturbed areas. It is invasive in moist soils, such as wetlands, fens and riparian corridors. This includes roadsides, swales, irrigation ditches. Upland dry sites are also vulnerable. These include open, sunny habitats such as abandoned fields, pastures, meadows and woodlands.

Restoration of infested and degraded sites is one of the keys to eradicating common teasel. Wetlands are important but very sensitive environments. Methods and techniques used in infested wetlands should follow best management practices, such as those available at <https://www.colorado.gov/pacific/ag-conservation/noxious-weed-publications>. Preventing seed production is necessary to curtail the spread of this forb. Eradication efforts will need to continue for multiple consecutive seasons until the seed bank is depleted. Once eradication is complete, monitoring will be needed.



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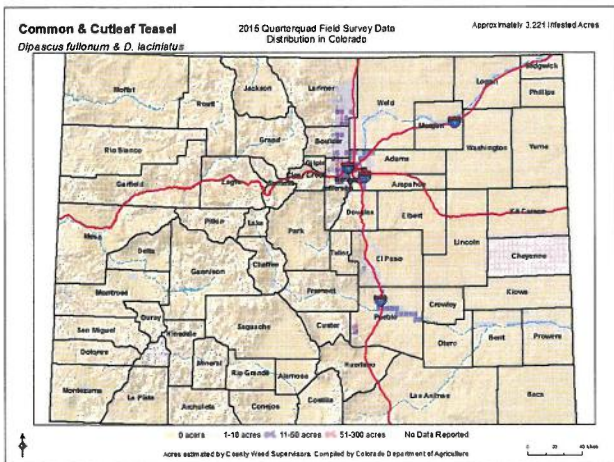
© Chris Evans, IL Wildlife Action Plan



© Wikimedia Commons

Common teasel *Dipsacus fullonum* L.

2015 Quarter Quad Survey



Common teasel is designated as a "List B" species in the Colorado Noxious Weed Act. It is required to be eradicated; some populations may be contained or suppressed depending on state regulations. For state regulations described for each county, refer to the most recent Rule, or visit www.colorado.gov/ag/co-weedcontacts for details.

Key ID Points

1. Long slender floral bracts extend beyond the top of the flower head.
2. Leaves are crinkled and have prickles.
3. Stems are stiff and have rows of prickles.

Integrated Weed Management Recommendations

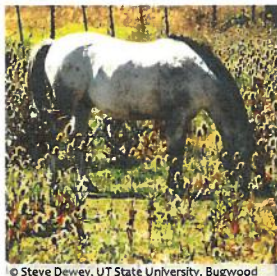
Effective integrated management means using a variety of eradication methods along with restoration, prevention of seed production and dispersal, and monitoring. Maintain robust healthy native landscapes. Restore degraded sites. Avoid soil disturbance. Prevent seed production in the first and second year. Prevent seed from dispersing, e.g. contaminated equipment. Rest sites until restored. Change land use practices. Use methods appropriate for the site; disturbing wetlands, fens and riparian areas is generally not advised without proper training.



© City of Watsonville

CULTURAL CONTROL METHODS

Maintain or restore a competitive assemblage of forbs, cool and warm season grasses. Implement whole site restoration of soils, plants and water regimes where stands of common teasel exist. Use locally adapted species that are ecologically appropriate for the site to improve competitiveness (e.g. wetland plants or upland plants). Include annual as well as perennial species. Incorporate soil amendments, soil microbes and mycorrhizal fungi in restoration efforts. Minimize soil compaction and disturbance, especially in wetlands and moist soil. Acquire permits for wetland restoration, if required.



© Steve Dewey, UT State University, Bugwood

BIOLOGICAL CONTROL METHODS

Common teasel is not palatable to domestic livestock in part because of the abundance of prickles. Properly managed grazing can improve vigor of desired species and indirectly reduce common teasel. There are no biological control agents for common teasel authorized in Colorado that would effectively control common teasel. For more information about biological control agents, visit the Colorado Department of Agriculture's Palisade Insectary website at <https://www.colorado.gov/pacific/agconservation/biocontrol>



© Lady Barbaras Garden, Pinterest

MECHANICAL CONTROL METHODS

Mechanical methods are best for infestations smaller than 0.5 acres; weigh this against other plants present, ecology and site condition. Sever roots below the soil surface during the first year before the plant stores energy, and in the second year before seed production. Mowing, chopping and deadheading stimulates more flower production; these methods require consecutive years of season-long treatments. Flower heads must be collected, bagged, and disposed of or destroyed; seeds will mature and germinate if left on the ground. Fire effects are unknown. Vegetation may not carry fire. Low severity prescribed fires may only kill the above ground vegetation, leaving roots and seeds unaffected. High severity prescribed fire may kill common teasel, but could damage native species and is not recommended.

CHEMICAL CONTROL METHODS

NOTE: The following are recommendations for herbicides that can be applied to pastures and rangeland. Rates are approximate and based on equipment with an output of 30 gal/acre. Follow the label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the LAW!

HERBICIDE	RATE	APPLICATION TIMING
Metsulfuron (Escort XP)	1 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply when in rosette or bolting growth stage. (Spring or fall rosettes, or early summer bolting)
Aminopyralid (Milestone)*	4-7 oz. product/acre (start with 7 oz.) + 0.25% v/v non-ionic surfactant	Apply when in rosette or bolting growth stage. Best choice of herbicide to use in riparian areas. (Spring or fall rosettes, or early summer bolting) *Not permitted for use in the San Luis Valley.
Imazapic (Plateau)	8-12 oz. product/acre + 2 pints/acre methylated seed oil	Apply when in rosette or bolting growth stage. Good choice of herbicide to use in riparian areas. (Spring or fall rosettes, or early summer bolting)
Aminocyclopyrachlor + chlorsulfuron (Perspective)*	4.75-8 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply from the seedling to the bolting stage. IMPORTANT: Applications greater than 5.5 oz. product/acre exceeds the threshold for selectivity. DO NOT treat in the root zone of desirable trees and shrubs. Not for use on grazed or feed forage. *Product not permitted for use in the San Luis Valley.



Colorado Department of Agriculture - Conservation Services

305 Interlocken Parkway
Broomfield, CO 80021
(303) 869-9030
www.colorado.gov/ag/weeds



Dalmatian toadflax

List B Species

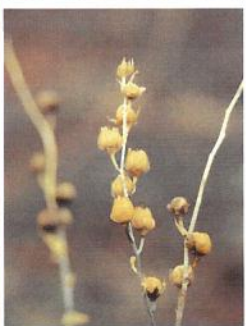
Rangeland, pasture, and riparian site recommendations

1

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us



Key ID Points

1. Showy yellow snapdragon-like flowers with an orange throat on elongated racemes.
2. Thick, waxy, bluish heart-shaped leaves that wrap the stem.

Updated on:
07/2015

Dalmatian toadflax Identification and Management



Identification and Impacts

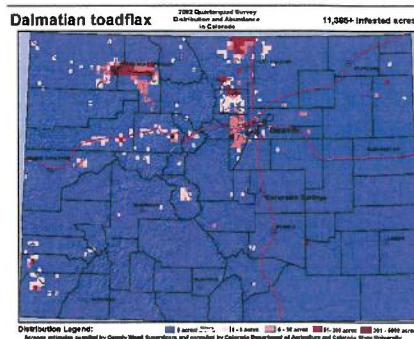
Dalmatian toadflax (*Linaria dalmatica*) is a non-native, perennial forb introduced from the Mediterranean region as a folk remedy, fabric dye and ornamental. It reproduces both by seed and by extensive, creeping rhizomes. A single plant produces 500,000 seeds, most of which fall within 18 inches of the parent plant. Seeds can remain viable for at least 10 years. Dalmatian toadflax grows to 3 feet, and has bright yellow snapdragon-like flowers with an orange throat on elongated racemes. The alternate leaves are broad, with a thick, waxy cuticle and a bluish cast. Each leaf is heart-shaped and wraps the stem.

Habitats for Dalmatian toadflax include disturbed open sites, fields, pastures, rangeland, roadsides, cropland and forest clearings. Infestations can begin in small disturbed sites, then spread even to rangeland and wildlife habitats in excellent condition. Dalmatian toadflax is a highly aggressive plant that can genetically adapt to varied environmental conditions and herbicide controls. Its extreme competitiveness is due to early spring regeneration from vegetative buds on roots that are not dependent on soil moisture or native plant competition. Once established, toadflax quickly overruns native plants and becomes

a monoculture that severely reduces forage, productivity, biodiversity and wildlife habitat.

The key to effective control of Dalmatian toadflax is prevention and integrating as many management strategies as possible. Prevention is always desirable when dealing with Dalmatian toadflax. Early detection and eradication can keep populations from exploding, making more management options available. With the plants varying genetically using many different approaches is important such as; chemical, mechanical, cultural and biological methods. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Dalmatian toadflax is designated as a "List B" species in the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local infestations. For more information visit www.colorado.gov/ag/csd and click on the Noxious Weed Management Program. Or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.



Clockwise, from lower left, photos © John M. Randall of The Nature Conservancy; and Linda Wilson and Susan Turner of Invasive.org. Infestation map by Crystal Andrews, Colorado Department of Agriculture.

Linaria dalmatica

**CULTURAL**

It is imperative to seed managed areas with competitive grasses such as thickspike wheatgrass and streambank wheatgrass. The combination of herbicide spraying and seeding competitive grasses controls Dalmatian toadflax better than spraying alone. (K.G. Beck, CSU)

**BIOLOGICAL**

Calophasia lunula, a predatory noctuid moth, feeds on leaves and flowers of Dalmatian toadflax. Eteobalea intermediella, a root boring moth, and Mecinus janthinus, a stem boring weevil, are also available. For more information, contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916.

**MECHANICAL**

For small infestations, pulling toadflax by hand can be effective. Pull every year for 5 to 6 years to deplete the reserves of the root system. Monitor the site for 10 - 15 years to remove seedlings produced from dormant seeds.

Integrated Weed Management:

Because of the high genetic variability of the toadflax species, it is critical to integrate as many management strategies as possible into the control program. Two local populations may respond differently to the same herbicides.

Keys to management are to prevent seed formation and vegetative spread by roots. Controlling toadflaxes is expensive and difficult, prevention is the best option.

HERBICIDES

NOTE: The following are recommendations for herbicides that can be applied to range and pasturelands. Rates are approximate and based on equipment with an output of 30 gal./acre. Please read label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the **LAW!**

Herbicide	Rate	Application Timing
Aminocyclopyrachlor + chlorsulfuron (Perspective)*	4 oz. product/acre + 1% v/v methylated seed oil	Apply <u>when flowering</u> in spring and/or in the fall regrowth. IMPORTANT: Applications greater than 5.5 oz. product/acre exceeds the threshold for selectivity. DO NOT treat in the root zone of desirable trees and shrubs. Not for use on grazed or feed forage.
Picloram* (Tordon/Picloram 22K - Restricted use pesticide)	1-2 qts./acre + 1% v/v methylated seed oil	Apply <u>when flowering</u> in spring and/or in the fall regrowth. DO NOT use near trees, desirable shrubs, water, or high water table.
Chlorsulfuron** (Telar)	1.5-2 oz./acre + 1% v/v methylated seed oil	Apply <u>when flowering</u> in spring and/or in the fall regrowth.
Note: *Not permitted for use in the San Luis Valley. **This herbicide has residual soil activity that will affect all broadleaf seedlings germinating after application has occurred.		
Additional herbicide recommendations for this and other species can be found at: goo.gl/TvWnv9		

Top photo, © Kelly Uhing, Colorado Department of Agriculture. *Calophasia lunula* larva photo © Bob Richard, USDA APHIS, Invasive.org. Handpulling toadflax photo © Lake Tahoe Environmental Education Coalition.

Dalmatian toadflax



Diffuse knapweed

List B Species

Rangeland, pasture, and riparian site recommendations

1

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us



Key ID Points

1. Floral bracts have yellow spines with teeth appearing as a comb and a distinct terminal spine.
2. Flowers are white or lavender.
3. Seedlings have finely divided leaves

Diffuse knapweed Identification and Management



Identification and Impacts

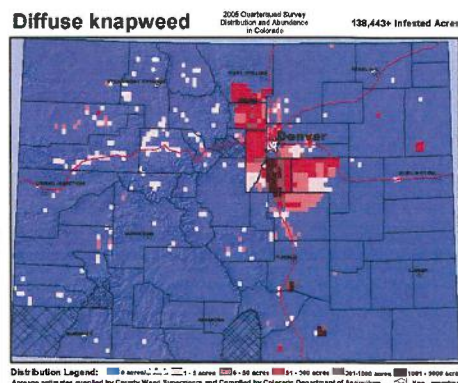
Diffuse knapweed (*Centaurea diffusa*) is a non-native biennial forb that reproduces solely by seed. A biennial is a plant that completes its lifecycle within two years. During the first year of growth, diffuse knapweed appears as a rosette in spring or fall. During the second year in mid to late spring – the stem bolts, flowers, sets seed, and the plant dies. Once the plant dries up, it breaks off at ground level and becomes a tumbleweed which disperses the still viable seeds over long distances. A prolific seed producer, diffuse knapweed can produce up to 18,000 seeds per plant. Therefore, the key to managing this plant is to prevent seed production. Diffuse knapweed can grow 1 to 3 feet tall, and is diffusely branched above ground. This gives the plant a ball-shaped appearance and tumble-weed mobility when broken off. Leaves are small, and are reduced in size near the flowering heads. Flowers are mostly white, sometimes purple, urn-shaped, and are located on each branch tip. Bracts that enclose the flowerheads are divided like the teeth of a comb, and are tipped with a distinct slender spine. Upon drying, the bracts become rough, rendering them injurious to the touch. Flowers bloom July through August. Seed set usually occurs by mid-August.

Diffuse knapweed tends to invade disturbed, overgrazed areas. Other habitats may also include rangeland, roadsides, riparian areas, and trails. It is a tough competitor

on dry sites and rapidly invades and dominates disturbed areas. Once established, diffuse knapweed outcompetes and reduces the quantity of desirable native species such as perennial grasses. As a result, biodiversity and land values are reduced, and soil erosion is increased.

The key to effective control of Diffuse knapweed is to prevent the plant from flowering and going to seed. An integrated weed management approach dealing with Diffuse knapweed is highly recommended. There are many options of mechanical, chemical, and biological controls, available. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Diffuse knapweed is designated as a "List B" species on the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local infestations. For more information, visit www.colorado.gov/ag/csd and click on the Noxious Weed Program link or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division at 303-239-4100.

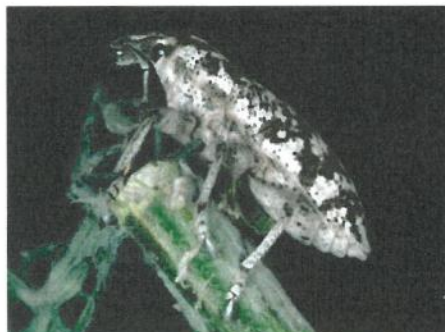


Plant photo, top © Kelly Uhing. Infestation map above, Crystal Andrews. Flower photo © Cindy Roche. Rosette and leaf photos © Dale Swenarton.

Centaurea diffusa

**CULTURAL**

Establishment of selected grasses can be an effective cultural control of diffuse knapweed. Contact your local Natural Resources Conservation Service for seed mix recommendations. Maintain healthy pastures and prevent bare spots caused by overgrazing. Bareground is prime habitat for weed invasions.

**BIOLOGICAL**

The seedhead weevil (*Larinus minutus*) and the root weevil fly (*Cyphocleonus achates*) provide fair to good control when used in combination with each other. Expect to wait at least 3 to 5 years for the insects to establish and achieve optimum results. This is an option for large infestations. To obtain the insects, contact the Colorado Department of Agriculture, 970-464-7916.

**MECHANICAL**

Any mechanical or physical method that severs the root below the soil surface will kill diffuse knapweed. Mowing or chopping is most effective when diffuse knapweed plants are at full-bloom. Be sure to properly dispose of the flowering cut plants, since seeds can mature and become viable after the plant has been cut down.

Integrated Weed Management:

Diffuse knapweed is best controlled in the rosette stage. It is imperative to prevent seed production. Do not allow diffuse knapweed flowers to appear. Management must be persistent in order to deplete the seed bank in the soil.

HERBICIDES : The following are recommendations for herbicides that can be applied to range and pasturelands. Always read, understand, and follow the label directions. Rates are approximate and based on equipment with an output of 30 gal/acre. Please read label for exact rates. **The herbicide label is the LAW!**

Herbicide	Rate	Application Timing
Aminocyclopyrachlor + chlorsulfuron (Perspective)*	4.75-8 oz. product/acre + 0.25% non-ionic surfactant	Pre-emergence or from seedling to mid-rosette stage. IMPORTANT: Applications greater than 5.5 oz. product/acre exceeds the threshold for selectivity. DO NOT treat in the root zone of desirable trees and shrubs. Not for use on grazed or feed forage.
Aminopyralid* (Milestone)	5-7 oz./acre + 0.25% non-ionic surfactant	Spring at rosette to early bolt stage and/or in the fall to rosettes. Add 1 qt./acre 2,4-D or 3 oz. Perspective when treating in the bolting to flowering growth stages.
Clopyralid (Transline)	0.67-1.33 pints/acre + 0.25% non-ionic surfactant	Apply to spring/fall rosettes before flowering stalk lengthens. Add 1 qt./acre 2,4-D when treating in the bolting to flowering growth stages.

Note: *Not permitted for use in the San Luis Valley.

Additional herbicide recommendations for this and other species can be found at:
goo.gl/TvWnv9

Diffuse knapweed

Colorado
State
University



Leafy Spurge

Fact Sheet No. 3.107

Natural Resources Series | Range

by K.G. Beck*

Leafy spurge (*Euphorbia esula* L.) is a creeping, herbaceous perennial weed of foreign origin that reproduces from seed and vegetative root buds. It can reduce rangeland cattle carrying capacity by 50 to 75 percent. About half of this loss is from decreased grass production. Cattle won't graze in dense leafy spurge stands and these areas are a 100 percent loss to producers.

A 1990 survey found 44,000 acres in Colorado infested with leafy spurge. In 2002, the Colorado Department of Agriculture conducted a follow-up survey and found more than 73,800 infested acres of leafy spurge (Figure 1).

Leafy spurge is an erect plant that grows 1 to 3 feet tall. Leaves are bluish-green with smooth margins, 0.25 inch to 0.5 inch wide, and 1 inch to 4 inches long (Figures 2 and 3).

Umbel flowers are surrounded by heart-shaped, showy, yellow-green bracts. (An umbel looks like the stays of an umbrella if it is held upside down. Figure 4.) Flowers occur in many clusters toward the top of the plant (Figure 5). Seeds are round to oblong, about 1/12 inch long, gray or mottled brown with a dark line on one side.

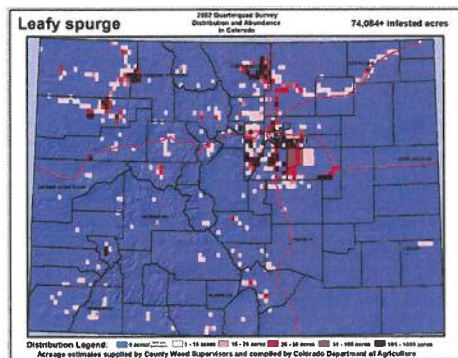


Figure 1: Leafy spurge distribution in Colorado, 2002.

Leafy spurge contains a white milky latex in all plant parts. Latex distinguishes leafy spurge from some other weeds (e.g., yellow toadflax), particularly when plants are in a vegetative growth stage.

Leafy spurge has an extensive root system that is abundant in the top foot of soil, and it may grow 15 feet deep or more. Roots contain substantial nutrient reserves that allow the weed to recover from stress, including control efforts. Many vegetative buds along roots grow into new shoots. This contributes to its persistence and spread.

Phenology

Leafy spurge shoots originate in early spring from crown tissue just below the soil surface and from sporadic buds along the root system. Leafy spurge is very competitive, one of the first plants to emerge each spring, and uses moisture and nutrients that otherwise would be available for more desirable vegetation.

Flowering occurs primarily in April and May but may occur through fall. Bracts emerge about two weeks before flowers and give leafy spurge the appearance of flowering. For optimum herbicide application timing, it is important to recognize true flower emergence.

Each flowering shoot produces an average of 140 seeds. Seeds are expelled up to 15 feet when capsules dry. They are viable up to eight years in soil. Water, birds, animals and people aid seed dispersal. Seeds readily float and waterways are good sources for new infestations.

Peak seed germination generally occurs in May (Figure 6). Seedlings quickly acquire the ability to reproduce vegetatively by developing buds on roots within 10 to 12 days after emergence. Perennial leafy spurge is more difficult to control than seedlings.



Quick Facts

- Leafy spurge (*Euphorbia esula* L.) is a creeping perennial that reproduces from seed and vegetative root buds.
- It can reduce cattle carrying capacity of rangeland or pastures by 50 to 75 percent.
- Leafy spurge is difficult to control. Its extensive root system has vast nutrient stores that let it recover from control attempts.
- Combine control methods into a system to achieve best results.

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*Colorado State University Extension weed science specialist and professor, bioagricultural sciences and pest management. 11/2013



Figure 2: Leafy spurge stems and leaves.



Figure 3: Leafy spurge in bolting growth stage; note leafy spurge seedlings.



Figure 4: Leafy spurge in the early flower stage; note the heart-shaped bracts beneath developing flowers.

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, monitor infestations for recurrence and adopt a maintenance program.

Cultural control. Vigorous grass growth is an important aspect of leafy spurge control. Over-grazing 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.

Chemical control. For optimum leafy spurge control, proper timing of herbicide application is imperative. Research from North Dakota-State University indicates that Tordon 22K (picloram) 2,4-D, Banvel/Vanquish/Clarity (dicamba) are most effective when applied in spring when true flowers emerge (not just bracts). Fall application to leafy spurge regrowth also is good timing for these herbicides. Refer to Table 1 for rates and application timings and always read the herbicide label before using the product.

Tordon is one of the most effective herbicide for leafy spurge control. Treat large, readily accessible areas for three to four consecutive years. For more remote locations, Tordon can be spot sprayed at

2/quarts/A but not more than 50% of an acre can be treated in any year. Monitor infestations after treatment and retreat with 1 quart/A of Tordon when shoot control is less than 75 percent.

Tordon may be tank-mixed with 2,4-D to provide adequate control. Apply 1 to 1.5 pints of Tordon with 1 to 1.5 quarts/A of 2,4-D in spring when leafy spurge flowers. When this application is made for three to five consecutive years, leafy spurge shoot control is generally 80 to 90 percent and cattle will feed in the area again.

Plateau (imazapic) can be used to control leafy spurge in pastures, rangeland, and non-crop areas. It can be used safely around trees but may temporarily injure cool-season perennial grasses. Apply Plateau in fall while milky latex still is present in the plant. Add a methylated seed oil to the spray solution. A liquid nitrogen fertilizer solution may be added to the spray mixture to increase weed control, but it may increase cool-season perennial grass injury. Injury tends to increase with late fall applications.

Perspective control of leafy spurge is similar to Tordon. CSU research indicates that multiple years of treatment with Perspective may be necessary but not always as consecutive year applications—a single application may control leafy spurge for two growing seasons and then a repeat application may be needed.

Table 1. Herbicide rates and application timings to control leafy spurge.

Herbicide	Rate (Product/A)	Application timing	Comments
Tordon	1 quart	Spring at flowering growth stage; or fall	May need treatment 3 to 4 years
Plateau	8 to 12 fl oz	Early fall (August through October) before loss of latex	Use higher rate for older and dense stands; adds 1.5 to 2 pint/A of methylated seed oil; high rate or consecutive year treatments may injure cool season grasses
Paramount	16 oz	Spring at prebloom (yellow bract stage) or in fall	Add 1.5 pt/A of a methylated seed oil or 2 pt/A of a crop oil concentrate
Perspective	5.5 oz	Spring at flowering growth stage; or fall	Methylated seed oil or crop oil concentrate may aid leaf absorption of Perspective at 0.5 to 1% v/v; or use of a non-ionic surfactant at 0.25 to 0.5% v/v also is recommended
Banvel, Vanquish, or Clarity (dicamba)	2 quarts	Spring at flowering growth stage; or fall	Fall applications most consistent results; may need re-treatment 2 to 4 years
Roundup	1 quart each application; 2 quarts total	Apply sequentially; first application first of June and second one month later	Must be combined with grass seeding

Be certain to monitor treated sites for leafy spurge recovery and retreat when control appears to be 70% or less. A methylated seed oil or crop oil concentrate may aid leaf absorption of Perspective and often improves control. However, a non-ionic surfactant also can be used instead of the seed or crop oil.

Paramount (quinclorac) is a highly selective herbicide and can be used to control leafy spurge in pastures, rangeland and non-crop areas. CSU research indicates that Paramount caused the least injury to desirable/native forbs and shrubs. It should be used in conjunction with a methylated seed oil or crop oil concentrate.

Banvel/Vanquish/Clarity also is effective against leafy spurge. When applied in spring at flowering for three consecutive years. Often control is not very good in the first year but improves over the next two years. At that time, a maintenance schedule that uses low rates of Banvel/Vanquish/Clarity + 2,4-D (4 to 8 ounces + 0.5 to 1 quart/A), or Tordon + 2,4-D (1 pint + 1 quart/A) as needed can be used to keep infestations under control. **Note: Avoid using soil-active herbicides such as Tordon, Perspective, or Banvel/Vanquish/Clarity 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.

Roundup (glyphosate) is most effective when applied sequentially at one month intervals, coupled with fall grass seeding. Make the first application at the beginning of June and a second application one month later. Occasionally, leafy spurge will recover from these Roundup treatments. An application of 2,4-D (2.0 quart/A) in September can control regrowth. Sow perennial grasses in later fall as a dormant seeding (seed later enough that grass seedlings will not emerge until following spring).

Biological control. Sheep or goats can be used to help control leafy spurge. Research from Montana State University indicates sheep may consume up to 50 percent of their diet as leafy spurge. Introduce sheep to leafy spurge in early spring when the weed is succulent. Goats will consume leafy spurge at almost any time during the growing season.

Rotate pastures to prevent seed production and allow desirable forage plants to regain vigor. If livestock graze leafy spurge after seed formation, hold animals in a corral for at least seven days before moving them to an uninfested area. This reduces viable seed passage. Sheep or goats followed by fall herbicide treatment may be an effective, integrated means to use infested ground and control the weed.

The Colorado Department of Agriculture insectary has four flea beetles (*Apthona nigriscutis*, black-dot flea beetle; *A. cyarissiae*, brown-dot spurge flea beetle; *A. czwalinae*, black spurge flea beetle; and *A. flava*, copper spurge flea beetle) available for release. Their larvae feed on leafy spurge root hairs and within roots, while adults feed on foliage. Other insects may become available in the future. Most likely, a combination of insects will be necessary to adequately control leafy spurge. Insects would be most advantageous in areas where herbicide use is difficult or risky.

Recent research completed by Colorado State University showed that six to eight sheep per acre grazing for 10 days in July over a period of five years decreased leafy spurge density about 90 percent. When flea beetles grazed simultaneously in July with eight sheep per acre for 10 days over five years, leafy spurge density was decreased to zero.

Habitat requirements of the flea beetles vary. While all requirements are not well understood, it is known that *A. nigriscutis* prefers open, dry sites and coarse soils low in organic matter. *A. cyarissiae* prefers soils higher in moisture than



Figure 5: Leafy spurge nearing seed set growth stage; note three-lobed seed capsules above bracts.



Figure 6: Leafy spurge seedlings.

A. nigriscutis, but still prefers moderately coarse-textured soils such as sandy loams and open sites. *A. flava* does well in coarse soils with high water tables in open and shaded conditions. *A. czwalinae* prefers moist, clay soils.

Regardless of the management system used, a combination of methods is essential to return leafy spurge-infested ground to a productive state. The key to control leafy spurge or any creeping perennial is to exhaust the root nutrient stores, causing it to collapse. Persistence is imperative to gain control.

Musk Thistle Identification and Management

List B



© Bruce Ackley, OH State University

Musk thistle *Carduus nutans* L. is a non-native biennial forb that reproduces solely by seed. During the first year of growth, a rosette forms in spring or fall. During the second year in mid to late spring, the stem bolts, flowers, sets seed, and the plant dies.

Musk thistle can grow up to 6 feet tall. The leaves have spines, are waxy, and dark green in color with a prominent light green to white midrib that can be seen from a distance. Leaves are dentately lobed; leaf bases sometimes extend down below the point of attachment. The terminal flower heads are purple, large in size (1.5 to 3 inches in diameter) and bend over as if nodding. These flower heads are made up of only disk flowers. They are surrounded by numerous, wide and stout lance-shaped, spine-tipped bracts that resemble an open pineapple. The pappus has

plumose bristles that appear barbed under magnification. Musk thistle produces many flower heads. The tallest shoots flower first; lateral shoots develop in leaf axils. A robust plant may produce 100 or more flowering heads. Reproduction is usually via out-crossing through insect pollination, but self-pollination also occurs. Flowers emerge in May through September. Seeds develop shortly after flowers emerge. Flower buds can contain viable seeds from self-pollination. Seeds can mature on severed bud and flower-heads. Seeds remain viable in the soil for up to about 14 years. Seeds can germinate and emerge from spring through fall.

Musk thistle habitat is found in a variety of environments extending from shortgrass prairie to alpine. It is strongly associated with heavily disturbed sites, where over-use occurs or where site conditions are poor due to land management practices. This includes over-grazed areas, large fires, trails, ditches and roadsides. Infested livestock pasturs suffer from significantly decreased carrying capacity.

Because musk thistle reproduces solely from seed, the key for successful management is to prevent seed production. Once flowers emerge and start to produce seed, effective management options will become limited. Once sites are infested, musk thistle can form dense stands. Prevention, adjusting land management practices, a robust integrated treatment plan and restoration are critical to eliminating this species.



© Chris Evans, University of IL

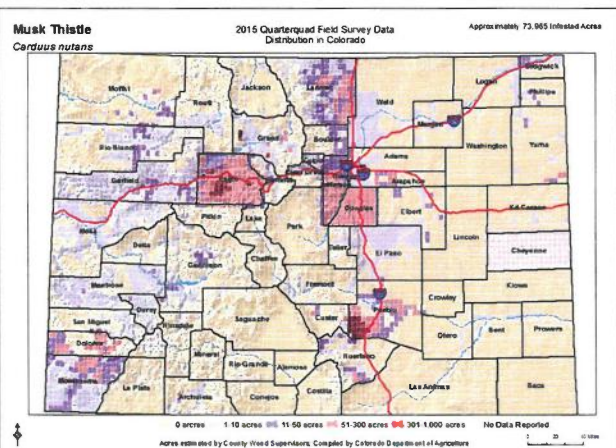


© Les Mehrhoff, DiscoverLife.org



Musk thistle *Carduus nutans* L.

2015 Quarter Quad Survey



integrated treatment plan and restoration are critical to eliminating this species.

Musk thistle is designated as a "List B" species in the Colorado Noxious Weed Act. It is required to be eradicated; some populations may be contained or suppressed depending on state regulations. For management directions for each county, refer to the most recent Rule, or visit www.colorado.gov/ag/weedcontacts for details.

Key ID Points

1. Leaf with white midrib and leaf margins with spines.
2. Pappus with plumose barbed bristles.
3. Wide, stout lance-shaped bracts with spiny tips.

Integrated Weed Management Recommendations

Musk thistle *Carduus nutans* L.

Effective integrated management means using a variety of eradication methods that also includes restoration, prevention of seed production and dispersal, and monitoring. Maintain robust healthy native landscapes and restore degraded sites. Avoid soil disturbance. As with most biennials, prevent seed production in the first and second year of musk thistle growth. Prevent seed from dispersing, such as on contaminated equipment. Rest sites until they are effectively restored. Change land use practices. Use methods appropriate for the site.



© Norman E. Rees, USDA Ag. Research Service

CULTURAL CONTROL METHODS

Musk thistle is not tolerant of competition and needs light to germinate seeds. Cultural methods should aim to maintain or restore a competitive assemblage of forbs, cool and warm season grasses. Implement whole site restoration of soils, plants and water regimes where stands of musk thistle exist where needed. Use locally adapted species that are ecologically appropriate for the site to improve competitiveness. Include annual as well as perennial species. Incorporate soil amendments, soil microbes and mycorrhizal fungi in restoration and land management efforts. Minimize soil compaction and disturbance, especially in wetlands and moist soil. Irrigation can increase competitive species.



© Eric Coombs, OR Dept of Agriculture

BIOLOGICAL CONTROL METHODS

Although horses, cattle, goats and sheep may eat flower heads on a few plants, seeds pass through their digestive tracks unaltered and spread. The leaf and stalk spines can cause domestic livestock to avoid mature musk thistle. Thus, musk thistle can become an "increaser" in over-grazed systems. Properly managed grazing can improve vigor of desired species and indirectly reduce musk thistle. *Trichosirocalus horridus* is the only biological control agent available for musk thistle in Colorado. The other species, *Rhinocyllus conicus*, is not host specific and will damage native thistles, and therefore cannot be released as an agent in Colorado. For more information, visit the Colorado Department of Agriculture's Palisade Insectary website at www.colorado.gov/ag/biocontrol.



© Friends of NV Wilderness Stewardship Team

MECHANICAL CONTROL METHODS

Methods, such as tilling, hoeing and digging, are best for infestations smaller than 0.5 acres; weigh this against other plants present, ecology and site condition. Sever roots below the soil surface during the first year before the plant stores energy, and in the second year before flower production. Mowing, chopping and deadheading stimulates more flower production; these methods require consecutive years of season-long treatments. All flowerbuds and heads must be collected, bagged, and disposed of or destroyed; seeds will mature and germinate if left on the ground. Prescribed fire that results in high soil burn severity damage roots and above ground biomass, but is not recommended due to impacts on desired plants. Fire generally favors musk thistle germination.

CHEMICAL

NOTE: The following are recommendations for herbicides that can be applied to pastures and rangeland. Rates are approximate and based on equipment with an output of 30 gal/acre. Follow the label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the LAW!

HERBICIDE	RATE	APPLICATION TIMING
Aminopyralid* (Milestone)	6 oz./acre + 0.25% v/v non-ionic surfactant	Apply in spring rosette to early bolting growth stages or in fall to rosettes. *Product not permitted for use in the San Luis Valley.
Chlorsulfuron** (Telar)	1-2.6 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply in spring from rosette through very early flower growth stages. (Can prevent viable seed formation if applied no later than the first viable flowers begin to open.) **This herbicide has residual soil activity that will affect all broadleaf seedlings germinating after application has occurred.
Clopyralid (Transline)	0.67-1.33 pints product/acre + 0.25% v/v non-ionic surfactant	Apply to rosettes through flower bud stage in spring, or to fall rosettes.



Colorado Department of Agriculture - Conservation Services

305 Interlocken Parkway

Broomfield, CO 80021

(303) 869-9030

www.colorado.gov/ag/weeds



Saltcedar

List B species

Rangeland, pasture, and riparian site recommendations

1

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us



Key ID Points

1. Saltcedar is a tall shrub or small tree that has white to pink flowers in clusters called racemes.
2. Leaves are small and scaly.

Saltcedar Identification and Management



Identification and Impacts

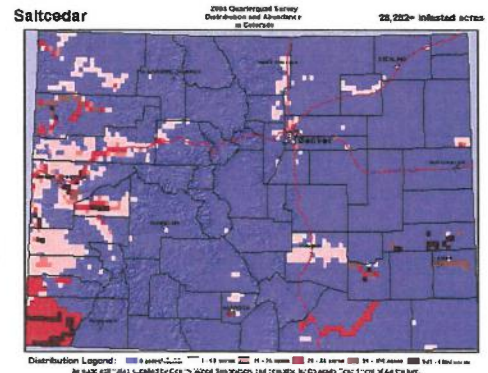
Saltcedar, or tamarisk (*Tamarix spp.*), is a non-native deciduous evergreen shrub or small tree that grows from 5 to 20 feet tall. The bark on saplings and stems is reddish-brown. The leaves are small, scale-like and bluish-green in color. Tiny pink to white flowers have five petals and grow on slender racemes. Saltcedar reproduces by seeds as well as vegetatively. A mature plant can produce up to 600,000 seeds per year. Seeds are viable for up to 45 days under ideal conditions. Saltcedar buds break dormancy in February or March. Flowering occurs anytime between April and August. Ideal conditions for saltcedar seedling survival are saturated soil during the first few weeks of life, a high water table, and open sunny ground with little competition from other plants.

Saltcedar was introduced from Central Asia, northern Africa, and southern Europe for ornamental purposes and for stream bank stabilization. It is now widespread in the United States. Saltcedar crowds out native stands of riparian and wetland vegetation. Saltcedar increases salinity of surface soil, rendering the soil inhospitable to native plant species. Saltcedar can be

found along floodplains, riverbanks, streambanks, marshes, and irrigation ditches. It's heavy use of water has contributed to the intensity of the drought.

The most effective method of control for saltcedar is to prevent its establishment through proper land management. Monitor susceptible areas for new infestations. An integrated weed management approach has proven to be an effective control when dealing with saltcedar. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Saltcedar is designated as a "List B" species on the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local infestations. For more information, please visit www.colorado.gov/ag/csd and click on the Noxious Weed Program link. Or call the State Weed Coordinator of the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.



Plant and flower photos © Kelly Uhing. Leaf photo © USDA Aphis PPQ. Infestation photo above, © Steve Dewey, Invasive.org. Tamarisk branch © Stevens County, WA Noxious Weed Control Board

Tamarix spp.

**CULTURAL**

After a saltcedar infestation is managed, revegetation is necessary in order to protect the soil resource and reduce the threat of reinvasion. Seeded grasses, willow stakes, and cottonwood cuttings can reduce the chances of saltcedar reinvading managed sites.

**BIOLOGICAL**

The saltcedar leaf beetle (*Diorhabda elongata*) larvae and adults feed on foliage. This causes stem dieback and potential death of the plant if defoliation is consistent. The leaf beetle should be available for limited distribution. For more information, contact the Palisade Insectary of the Colorado Department of Agriculture, 970-464-7916.

**MECHANICAL**

A bulldozer or prescribed fire can be used to open up large stands of saltcedar. These methods must be followed up with a herbicide treatment of the resprouts when they are 1 to 2 meters tall. Chainsaws, or loppers for smaller plants, are effective for cut-stump treatments to smaller infestations or in environmentally-sensitive management areas.

Integrated Weed Management:

Select the appropriate control method based on the size of the area and other environmental or cultural considerations. Re-seed controlled areas with desirable species to protect the soil resource and to prevent or slow saltcedar reinvasion. Follow up control efforts the same growing season and for several years afterwards.

Saltcedar

HERBICIDES: The following are recommendations for herbicides that can be applied to range and pasturelands. Rates are approximate and based on hand-held equipment with an output of 30 gallons per acre. Always read, understand, and follow the label directions. **The herbicide label is the LAW!**

Herbicide	Rate	Application Timing
Triclopyr (Garlon 4, Remedy)	20-30% solution in basal bark oil. The herbicide Pathfinder comes pre-mixed in oil and does not require dilution.	Cut-Stump Treatment: Apply to the cambial layer of the tree immediately after the cut-stump treatment and to roots above soil surface. (Summer to fall) Basal Bark Treatment: Spray till wet but not dripping; the roots above soil surface, root collar, and lower trunk to a height of 12-15 inches above ground (Summer to fall)
Glyphosate* (Rodeo - approved aquatic label)	Undiluted (100% solution) or 50% solution in basil bark oil	Cut-Stump Treatment: Apply to the cambial layer of the tree immediately after the cut-stump treatment and to roots above soil surface. Diluted solutions requires regular agitation. (Summer to fall)
Triclopyr (Garlon 4, Remedy) + Aminopyralid (Milestone)	3 qts. Garlon 4/acre + 7 oz. Milestone/acre + 0.25% v/v non-ionic surfactant	Broadcast foliar treatment: Apply when plants are growing rapidly. (May to September)

Note: *These products are non-selective and will kill any vegetation contacted.

Additional herbicide recommendations for other species can be found at:

goo.gl/TvWnv9

All photos © Kelly Uhing.

Common mullein

List C Species

Rangeland, pasture, and riparian site recommendations

1

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us

Identification and Management



Common mullein, due to the hairy leaves of the plants. The plants were originally introduced as a medicinal plant. The Europeans used the flowers for tea, and the leaves for many remedies like burns and rashes. Both the Europeans and the Indians smoked the dried leaves to treat bronchitis.

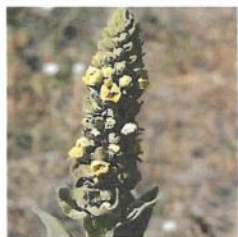
The key to effective control of Common mullein is preventing the production of seeds. This plant is difficult to control due to the large amount of seed produced and seed bank left in the soil. Mechanical, cultural, biological and chemical treatments can be successful if utilized together in an integrated weed management plan. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Common mullein is designated as a "List C" species on the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local jurisdictions managing this species. For more information, visit www.colorado.gov/ag/weeds or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.

Identification and Impacts

Common mullein (*Verbascum thapsus*) is a biennial forb native to Europe and Asia. The first year of the plant it produces a basal rosette. Basal rosettes can grow to 30 inches in diameter. The leaves are light-green in color and are covered in fine soft hairs. The woolly leaves are alternate and overlapping each other and can grow over a foot long. In spring of the second year the plant bolts an erect stem, that grows 2 to 6 feet tall. The flowers of the plant are borne in terminal spikes. These terminal spikes may reach up to 20 inches in length. The flowers are sulfur-yellow in color and have five petals. The flowers range from 3/4 of an inch to 1 1/2 inches in diameter. Numerous two chambered fruits produce 100,000 to 250,000 seeds per plant. Flowering and seed production typical occur from June to August. The plant has a deep taproot along with a fibrous root system.

Habitats for Common mullein are roadsides, waste places, right-of-ways, pastures, hay fields, and abandoned lands. It prefers gravelly soil types, but can grow in other soil types. Livestock will avoid eating



Key ID Points



Photos © All Photos from Kelly Uhing, Department of Agriculture; Except Bottom left Mary Ellen (Mel) Harte, United States

Verbascum thapsus

**CULTURAL**

Cultural control can be effective in assistance with other treatment options. Once the parent plants have been removed, cultivating the area with desirable grasses and forbs may outcompete Common mullein seedlings. For specific seed recommendations contact your local Natural Resources Conservation Services for seed mixes.

**BIOLOGICAL**

Gymnetron tetrum, a seed eating weevil, biological control has been found in eastern Washington State and is currently working on populations there. The weevil has not yet been approved for use in Colorado. Contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916 for more information.

**MECHANICAL**

Hand pull or dig when soil is moist, prior to flowering and seed production can be effective. If flowers are present, bag specimens carefully so as not to scatter any potential seeds. The key to effective control is to prevent seed production and/or spread.

Integrated Weed Management:

Preventing the establishment and the seed production of Common mullein is key to controlling populations. If the population is established, using a combination of cultural, chemical, biological and mechanical treatments can aid in suppressing population size. Since plants produce thousands of seed treatments need to occur over an extended period of time.

HERBICIDES

NOTE: The following are recommendations for herbicides that can be applied to range and pasturelands. Rates are approximate and based on equipment with an output of 30 gal/acre. Please read label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the LAW!

HERBICIDE	RATE	APPLICATION TIMING
Chlorsulfuron (Telar XP)	1-3 oz/acre	Apply to rosette stages in spring or fall prior to bolting. Add non-ionic surfactant @ 0.32 oz/gal water or 1 pt/100 gal water.
2,4-D Picloram (Grazon P+D *this is a Restricted Use Pesticide*)	4 pts/acre	Apply to rosette stages in spring or fall prior to bolting. Add non-ionic surfactant @ 0.32 oz/gal water or 1 pt/100 gal water. DO NOT apply near trees/shrubs/high water table.
Picloram (Tordon 22K *this is a Restricted Use Pesticide*)	1-2 qts/acre	Apply to rosette stages to early growth stages in spring or fall. Add non-ionic surfactant @ 0.32 oz/gal water or 1 pt/100 gal water. DO NOT Apply near trees/shrubs/high water table.
Metsulfuron (Cimmaron)	1.0 oz/acre	Apply to rosette stages in spring or fall. Add non-ionic surfactant @ 0.32 oz/gal water or 1 pt/100 gal water.

Photos © Top to Bottom; Kelly Uhing, Colorado Department of Agriculture; Whitney Cranshaw, Colorado State University, Bugwood.org; Kelly Uhing, Colorado Department of Agriculture

Common mullein



Field bindweed

List C Species

Rangeland, pasture, and riparian site recommendations

1

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us



Key ID Points

1. Leaves are shaped like arrowheads.
2. Flowers are funnel-shaped, white to pink, and have two small bracts one inch below the flower base.

Field bindweed Identification and Management



Identification and Impacts

Field bindweed (*Convolvulus arvensis*) is a non-native deep-rooted perennial that reproduces from seed and creeping, horizontal roots (rhizomes). Field bindweed stems are prostrate (grows low to the ground) and twining, and grow up to 6 feet long. Leaves are distinguishable by their arrowhead shape. The flowers are bell or trumpet-shaped, white to pink in color, and are about 1 inch long. Field bindweed seeds can remain viable in the soil for up to 40 years.

Field bindweed emerges from its root system in the spring. Flowering occurs from June to September and until the first fall frost. The number of seeds produced per plant ranges from 25 to 300 and seed production is variable depending on environmental conditions. Field bindweed is an extremely difficult noxious weed to control because, in part, of its taproot that may go 20 feet deep into the soil, and which repeatedly gives rise to numerous long rhizomes.

Field bindweed is a problem throughout Colorado. It is one of the most competitive perennial weeds. It is widespread in cultivated areas, pastures, lawns, gardens, roadsides, and waste areas from 4,000 to 8,000

feet in elevation.

To successfully manage field bindweed, containment and persistence in controlling existing stands are necessary in order to exhaust the root system and deplete the soil seed bank. This weed needs to be continually stressed, forcing it to exhaust root nutrient stores and eventually die. Of all control methods, prevention is most important. Maintain healthy pastures and rangeland and continually monitor your property for new infestations. A healthy cover of desirable perennial plants will assist in discouraging field bindweed establishment.

Field bindweed is designated as a "List C" species on the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local jurisdictions managing this species.

On the back of this sheet are field bindweed management recommendations. For more information, visit www.ag.state.co.us/csd/csdhome.html. Or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.



White flower © Mary Ellen Harte, Invasive.org.
All other photos © Kelly Uhing.

Convolvulus arvensis

**CULTURAL**

Establishment of selected grasses can be an effective cultural control of field bindweed. Contact your local Natural Resources Conservation Service for seed mix recommendations. Maintain healthy pastures and prevent bare spots caused by overgrazing. Bareground is prime habitat for weed invasions.

Integrated Weed Management:

Field bindweed requires active management once it is established because of its potential to regenerate rapidly. Even small infestations should be viewed as a serious threat and managed aggressively.

Contain and persistently control infestations in order to exhaust the root system and deplete the soil seed bank.

Maintain a healthy cover of perennial plants to discourage field bindweed establishment.



Bindweed mite damage

BIOLOGICAL

The bindweed gall mite, *Aceria mahlerbae*, has proven to be effective in reducing field bindweed infestations. This is an option for large infestations. To obtain a mite release, contact the Colorado Department of Agriculture, 970-464-7916.

MECHANICAL

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.



HERBICIDES: The following are recommendations for herbicides that can be applied to range and pasturelands. *Rates are approximate and based on equipment with an output of 30 gallons per acre. Please read label for exact rates.* Always read, understand, and follow the label directions. **The herbicide label is the LAW!**

HERBICIDE	RATE	APPLICATION TIMING
Clarity + 2,4-D Amine	1 qt./acre or 1 oz/gal water	Just after full-bloom and/or fall. DO NOT apply near or under trees/shrubs or where soils have rapid permeability. DO NOT apply when outside temperatures will exceed 85 degrees. Add non-ionic surfactant @ 0.32oz/gal water or 1 qt/100 gal water.
Tordon 22K *this is a Restricted Use Pesticide*	1 qt./acre or 1 oz/gal water	Just after full-bloom and/or fall. DO NOT apply near or under trees/shrubs or where soils have rapid permeability. Add non-ionic surfactant @ 0.32oz/gal water or 1qt/100 gal water.
Roundup Ultra *non-selective herbicide, will kill all vegetation*	4 - 5 qts./acre or 4 - 5 oz/gal water	Apply at full-bloom and/or fall. Add non-ionic surfactant @ 0.32oz/gal water or 1qt/100 gal water. Use caution when applying near grasses or other desirable vegetation.

Field bindweed



Poison hemlock

List C Species

Rangeland, pasture, and riparian site recommendations

1

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us

Poison hemlock Identification and Management



weight is lethal. Poisoning of humans has occurred, the plant can easily be confused with members of the carrot family. Consumption in large quantities can be fatal.

The key to effective control of Poison hemlock is prevention and containment. Identified early enough, pulling the taproot when soil is moist can be an effective control method. When plants are already present, containment using herbicides is crucial. Other herbicide control methods include spraying plants in the rosette stage in early spring or late fall. Mechanical treatments are also effective, depleting root reserves and reducing seed production, with repeat mowings. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Poison hemlock is designated as a "List C" species on the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local jurisdictions managing this species. For more information, visit www.colorado.gov/ag/weeds or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.

Identification and Impacts

Poison hemlock (*Conium maculatum*) is an erect biennial weed that is native to Europe. The plant typically grows 4 to 8 feet tall and has smooth, hollow stems that are rigid and have distinct purple spots. The plant has shiny green leaves that are pinnately compound, multi-stemmed and have a fern like appearance. The leaves are lacy, resembling parsley and have a musty odor when crushed. The first year the plant usually forms a larger rosette. The second year the plant bolts a large stem, flowers and then dies. The flowers have 5 petals, clawed, notched (1 to 1.5 mm long) and are white, umbrella-like clusters at the end of the branch. They appear from June to July. The fruit matures in August-September and is flat, small and grayish-green in color.

Habitats for Poison hemlock include streams, rivers, irrigation and roadside ditches, crop and pasture lands, as well as disturbed sites. All parts of the plant are poisonous, they contain alkaloids. Animals do not eat the plant, unless food is scarce. Ingestion of 0.25-0.30% of an animal's body



Key ID Points

1. Fern-like shiny green leaves.
2. Smooth, hollow stems that are rigid and have purple spots.

Conium maculatum



Photos © Clockwise from lower left: Ohio State Weed Lab Archive, Ohio State University, Bugwood.org; Unknown; Unknown; Richard Old, XID Services, Inc., Bugwood.org; and Steve Dewey, Utah State University, Bugwood.org.

**CULTURAL**

Broadcast seeding or "no-till" drill seeding can be effective by helping out compete hemlock. For specific seed recommendations contact your local Natural Resources Conservation Services for seed mixes.

**BIOLOGICAL**

The hemlock moth (*Agonopterix alstroemeriana*) larvae feed on leaves, young stem tissue, flowers, and seeds causing severe defoliation and death of the plant. Contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916 for more information.

**MECHANICAL**

Hand pull or dig when soil is moist, but make sure to wear gloves. Bag specimens carefully so as not to scatter seeds. The key to effective control is to prevent seed production and/or spread.

Integrated Weed Management:

Integrated management approaches have not been an approved method of control concerning Poison hemlock. Even though it has not been a proven method, does not mean that it is ineffective. Using a combination of biological and herbicide treatments may be successful in combating Poison hemlock. Adding the promotion of desirable plants to help out compete the infestation of Poison hemlock may assist with control as well.

HERBICIDES

NOTE: The following are recommendations for herbicides that can be applied to range and pasturelands. Rates are approximate and based on equipment with an output of 30 gal/acre. Please read label for exact rates. Always read, understand, and follow the label directions. The herbicide label is the LAW!

HERBICIDE	RATE	APPLICATION TIMING
2,4-D (4 lb ai/gallon)	2 qt/ac. + 0.25% v/v non-ionic surfactant	Apply when plant is in rosette to early bolting growth stages. (36 inches tall or less)
Grazon P+D	2 qt/ac. + 0.25% v/v non-ionic surfactant	Apply when plant is in rosette to early bolting growth stages. (36 inches tall or less)
Escort	1 oz product/ac. + 0.25% v/v non-ionic surfactant	Apply when plant is in rosette to early bolting growth stages.
Telar	1 oz product/ac. + 0.25% v/v non-ionic surfactant	Apply when plant is in rosette to early bolting growth stages.

Photos © (Top to bottom): Steve Dewey, Utah State University, Bugwood.org and bottom two by: Jan Samanek, State Phytosanitary Administration, Bugwood.org.

Poison hemlock



Redstem filaree

List C Species

Rangeland, pasture, and riparian site recommendations

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

(303) 869-9030
weeds@state.co.us

Redstem filaree Identification and Management



grazed by many different animals especially sheep.

The key to effective control of Redstem filaree is preventing establishment of the plant and seed production. There are many options for control of Redstem filaree depending on site ecology. Both chemical and mechanical control options are effective. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Redstem filaree is designated as a "List C" species in the Colorado Noxious Weed Act. It is required to be either eradicated, contained, or suppressed depending on the local infestations. For more information visit www.colorado.gov/ag/weeds or call the State Weed Coordinator at the Colorado Department of Agriculture, Conservation Services Division, 303-239-4100.

Identification and Impacts

Redstem filaree (*Erodium cicutarium*) is a winter annual or biennial forb that has a spreading or erect profile and is native to the Mediterranean or Asia. Part of the Geranium family, Redstem filaree grows generally from a rosette stage, and can grow from the 3 inches to 2 feet tall. The stems are hairy and red in color. The leaves are opposite and finely divided with toothed or lobed margins. They are pubescent, grow on short stems and have a reddish tint. The root system is a shallow taproot with fibrous secondary roots. The five petaled flowers are a purplish-pink in color and are in clusters of 2 or more. Each flower will produce five long lobed fruits. Each fruit will have an awn like tail which will dry and split with maturity. Redstem filaree primarily reproduces by seed and generally germinates in early spring.

Habitats for Redstem filaree include: dry pasturelands, landscapes, turfgrass and it prefers sandy soils. It can easily outcompete desirable vegetation once established. Redstem filaree is drought tolerant and can withstand a heavy stocking rate. The plant is



Key ID Points

1. The hairy red colored stems.
2. The opposite leaf pattern in the rosette stage.
3. The long-beak like fruit and seed.



Photos © (Clockwise from lower left): Theodore Webster, USDA, Bugwood.org; (Unknown) Oregon State University; Howard F. Schwartz, Colorado State University, Bugwood.org; Richard Old, XID Services Inc., Bugwood.org; (Unknown) Oregon State University

Updated on:
08/09

Erodium cicutarium



CULTURAL

Prevent the establishment of Redstem filaree, in rangeland or pastureland by planting native grasses and forbs. Contact your local Natural Resources Conservation Service for seed mix recommendations that may help. Bareground is prime habitat for weed invasions.



BIOLOGICAL

Currently there is not any biocontrol available for Redstem filaree. Biocontrol takes many years of research and development. For more information, contact the Colorado Department of Agriculture's Insectary in Palisade, Colorado at 970-464-7916.



MECHANICAL

Hand pulling or digging when soil is moist, making sure to get the roots to prevent resprouting is effective. Removing flowers before the plant sets seed will also be effective. Be sure to bag specimens carefully so as not to spread seeds. Any kind of tillage to the area can also be effective.

Integrated Weed Management:

Locate and remove plants immediately before plants set seed to prevent the spread of Redstem filaree. Since the plant reproduces solely by seed, an integrated management effort must include the elimination of seed production and depletion of seed bank. Combing control methods of herbicide and mechanical can be effective.

HERBICIDES

NOTE: The following are recommendations for herbicides that can be applied to range and pasturelands. *Rates are approximate and based on equipment with an output of 30 gallons per acre. Always read, understand, and follow the label directions. The herbicide label is the LAW!*

HERBICIDE	RATE	APPLICATION TIMING
Metsulfuron (Escort XP)	.33 oz of product /acre +.025% v/v non-ionic surfactant	Apply rosette stage through early flower stage.
2,4-D + dicamba (Rangestar)	2 pt. + 1 pt. product / acre	Apply rosette stage of growth.

Redstem filaree

Colorado State



Appendix C

Town of Castle Rock Public Properties & Facilities

