Weed Management Plan

Knecht Minor Subdivision

Meridian Rd. & Latigo Blvd.

El Paso County, Colorado

December 2, 2024

Prepared for:

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1.0 INTRODUCTION

This Weed Management Plan was prepared at the request of Jon Knecht to fulfill the submittal requirements for El Paso County, Colorado. The project is a proposed minor subdivision from the two (2) parcels (Parcel No. 4218000023 & 4218000004) to the north of Upper Black Squirrel Creek into one (1) ±4.75 ac, two (2) ±5.00 ac, and one (1) ±5.06 ac residential lots. The existing parcel (Parcel No. 4218000002) to the south of Upper Black Squirrel Creek will also be platted as part of the minor subdivision as one (1) ±1.05 ac residential lot for a total of five (5) residential lots. The proposed project is located at 12375 and 12475 N. Meridian Rd. More specifically, the proposed project is located in the northwest quarter of Section 18, Township 12 South, Range 64 West of the 6th principal meridian. **(*Please Reference Figure 1 – Project Location Map*)**.

A pedestrian field survey of the project area, consisting of documenting noxious weeds, was conducted on May 7, 2024, by Aaron Vincent. The Colorado Department of Agriculture (CDA) noxious weed list and El Paso County Noxious Weeds and Control Methods were utilized for survey efforts (**Attachment A**). The results of the survey are presented in Section 3.0.

2.0 DESCRIPTION OF SURVEY AREA

The project area is dominated by disturbed fallow uplands. A mixture of xeric and hydric soil conditions was present on site. Dominant vegetation species include the following:

Disturbed Fallow Upland Areas
• Smooth Brome (*Bromus inermis*)
• Ponderosa Pine (*Pinus ponderosa*)
• Common Mullein (*Verbascum Thapsus*)
• Downy Brome / Cheatgrass (*Bromus Tectorum*)
• Dogwood (*Cornus spp.*)
• Coyote Willow (*Salix exigua*)
• Sedge (*Carex spp.*)
• Clover (*Trifolium spp.*)
• Cinquefoils (*Potentilla spp.*)
• Comfrey (*Symphytum spp.*)

Representative photos of the different plant community types are included in **Attachment B**

3.0 NOXIOUS WEED SURVEY RESULTS

Two (2) List C species were observed within the project area (**Figure 2 – Listed Weed Observation Map**; **Table 1**). No List A species were observed within the project area. The most common noxious weeds found within the project area were Downy Brome / Cheatgrass (*Bromus Tectorum*) and Common Mullein (*Verbascum Thapsus*), which were observed in moderate quantities across the entire project area.

Table 1 – Noxious Weeds Observed Within the Project Area

CDA/El Paso County Designation[1, 2]	Common Name	Scientific Name
List C	Downy Brome / Cheatgrass	*Bromus Tectorum*
List C	Common Mullein	*Verbascum Thapsus*

[1] Colorado Noxious Weed list: https://ag.colorado.gov/conservation/noxious-weeds/species-id

[2] El Paso County Noxious Weed list: https://epc-assets.elpasoco.com/wp-content/uploads/sites/10/Environmental-Division-Picture/Noxious-Weeds/Noxious-Weed-Control-Book.pdf

4.0 NOXIOUS WEED MANAGEMENT RECOMMENDATIONS

4.1 Management and Recommendations Overview

To meet the requirements of the Colorado Noxious Weed Act and El Paso County weed management goals, Kimley-Horn recommends implementing management techniques for noxious weeds included on any of the CDA State and El Paso County Weed Lists:

- List A – designated for statewide eradication
- List B – managed to prevent further spread and, for selected species, designated for eradication in large areas
- List C – of more localized concern, but for which the State will provide education, research, and biological control assistance to jurisdictions that choose to manage the species.

Additionally, Kimley-Horn recommends eliminating or minimizing those noxious weeds and invasive plants designated as "undesirable species" to meet reclamation objectives associated with the project. Undesirable species include CDA "watch list" species such as common reed (*Phragmites australis*), garlic mustard (*Alliaria petiolata*), and Siberian elm (*Ulmus pumila*). Other unlisted species such as Russian thistle (*Salsola tragus*), kochia (*Bassia scoparia*), and crested wheatgrass (*Agropyron cristatum*) are also species that should be targeted for control due to their non-native status and tendency for rapid colonization.

Control of invasive species is a difficult task and requires repeated and on-going control measures. Care must be taken to avoid negatively impacting desirable and native plant communities and inviting infestation by other pioneer invaders. Weed management is best achieved by employing aggressive control early on

and persistent control efforts over several growing seasons. This includes direct treatments, prevention through best management practices, monitoring of treatment efficacy, and subsequent detection efforts. Weed management is often limited to minimizing existing infestations and the prevention of further infestations, rather than eradication.

Weed management methods such as preventative, cultural, mechanical, biological, chemical, and water source protection methods are discussed below and recommended for the project area, where applicable.

4.2 Integrated Weed Management

4.2.1 Downy Brome / Cheatgrass

Downy Brome or Cheatgrass is an annual or winter annual that reproduces solely by seed. When mature cheatgrass dries, it becomes a major fire hazard. Habitats may include roadsides, waste areas, misused pastures, rangelands, cultivated fields, and eroded sites. This weed can potentially be controlled by means of mechanical or chemical control methods. Overall, the best method for effective control in to prevent seed production and/or spread.

Chemical Treatments: Non-selective herbicides are presently the primary chemical available for control of cheatgrass. The chemical fluazifop had been shown to prevent seed formation in cheatgrass, most successfully when applied early in the reproductive phase. Other commonly used herbicides for cheatgrass control include imazapic, and glyphosate. Herbicide application rates must not exceed the rates recommended on the manufacturer's label. Adherence to state and federal laws must also be a priority. In addition, only aquatic herbicides approved to be used in water shall be used where wetlands, waters of the US, and groundwater table are present.

Chemical Treatment Timing: The most effective time to utilize Imazpic in in the fall prior to a hard freeze and/or early spring growth. Glyphosate is best utilized in fall or early spring. Effectiveness of herbicide spraying is lower when plants are drought stressed or leaf damaged; therefore, herbicide application is not recommended when plant growing conditions are severe. Herbicides can be ineffective under dry soil conditions, and treatments should be avoided during droughts and during the hottest parts of the day. Consider rotating herbicides from year to year to prevent development of resistance.

Mechanical Treatment: Mechanical methods are best for residential areas and small infestations. Mowing and chopping are not recommended as these methods can leave roots behind, stimulate flower production, disperse seeds, and expand the size of the infested area. Collect, bag, and dispose of or destroy flowers, as seeds can mature and germinate if left behind.

Biological Treatment: Cattle and sheep will select green cheatgrass which also affects desired cool-season grasses. Properly managed grazing can improve vigor of desired species and directly reduce cheatgrass. Currently, there are no biological control agents for cheatgrass authorized for Colorado.

Cultural Treatment: Biological soil crust is a soil health indicator of arid and semi-arid sites. Crusts can inhibit cheatgrass seed germination. Aerial and drill seeding bluebunch wheatgrass and Sandberg bluegrass with vesicular-arbuscular mycorrhizae, these are drought tolerant natives that are highly competitive against cheatgrass but require mycorrhizae. It is also best practice to be mindful when purchasing seed, as cheatgrass is often a contaminate, especially in mixes.

Extent of Downy Brome / Cheatgrass: Cheatgrass was observed in isolated populations in disturbed areas throughout the site.

4.2.2 Common Mullein

Common Mullein is a biennial forb and is often found in roadsides, waste places, rights-of-way, pastures, hay fields, and abandoned lands. Typically, Common Mullein prefers gravelly soil types but can grow in other soil types. Ideally, effective control of mullein is preventing the production of seeds by means of mechanical, cultural, biological, and chemical treatments methods. These methods should be utilized together as an integrated weed management plan.

Chemical Treatment: Some chemicals typically utilized to treat mullein include Chlorsulfuron, 2,4-D + Picloram, Picloram, and Metsulfuron. Herbicide application rates must not exceed the rates recommended on the manufacturer's label. Adherence to state and federal laws must also be a priority. In addition, only aquatic herbicides approved to be used in water shall be used where wetlands, waters of the US, and groundwater table are present.

Chemical Treatment Timeline: Chemical treatment is effective when applied in spring at rosette stage before bolting or in fall to rosettes. Effectiveness of herbicide spraying is lower when plants are drought stressed or leaf damaged; therefore, herbicide application is not recommended when plant growing conditions are severe. Herbicides can be ineffective under dry soil conditions, and treatments should be avoided during droughts and during the hottest parts of the day. Consider rotating herbicides from year to year to prevent development of resistance.

Mechanical Treatment: Mullein is easy to hand pull (due to shallow taproot) or can be dug when soil is moist, prior to flowering and seed production. If flowers are present, bag specimens carefully so as to not scatter any potential seeds. The key to effective control is to prevent seed production and/or spread.

Biological Treatment: 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 in Colorado.

Cultural Treatment: In assistance with other treatment options, cultural control can be an effective control method. Once the parent plants have been removed, cultivating the area with desirable grasses and forbs may outcompete common mullein seedlings.

Extent of Common Mullein: Common Mullein was observed in isolated populations in disturbed areas throughout the site.

4.2.4 Other Undesirable Species

Undesirable weed species tend to be annual plants which are heavy seed producers and adapted to live in a variety of conditions. These species tend to congregate in newly or frequently disturbed areas such as roadsides, construction sites, and parking lots. These species are typically controlled by repeated chemical treatments and supplemented by mechanical and cultural treatments.

Chemical Treatment: Spot spray or broadcast spray with selective broadleaf herbicides such as aminopyralid, chlorsulfuron, 2,4-D, dicamba, or triclopyr. Non-selective herbicides, such as glyphosate, can also be used as a spot treatment. Great care must be taken to avoid non-target species when using glyphosate. Herbicide application rates must not exceed the rates recommended on the manufacturer's label. Adherence to state and federal laws must also be a priority. In addition, only aquatic herbicides approved to be used in water shall be used where wetlands, waters of the US, and groundwater table are present.

Chemical Treatment Timing: Treat weed-infested areas at least twice per year. The first treatment should coincide with initial weed germination in the spring. Plants are most susceptible during this stage, requiring a smaller dose of herbicide and reducing the amount of chemicals released into the environment. A second treatment mid-summer will target any early season germinators missed during the first treatment, as well as late season germinators.

Mechanical Treatment: Hand pulling, chopping, mowing, and seed head collection are all effective mechanical treatments. Though labor intensive, mechanical treatments limit the number of viable seeds entering the seed bank. These efforts can be paired with chemical treatments for a multi-faceted approach to noxious weed control.

Mechanical Treatment Timing: Annual weeds with shallow root systems can be successfully eradicated if hand pulled early in its life cycle. Other rhizomatous perennial species are best targeted with seed head collection prior to seed maturation in mid-summer.

Cultural Treatment: Planting and/or maintaining a robust native plant community is the most effective means of noxious weed and invasive plant control. A healthy native plant community will out-compete noxious weeds for water, nutrients, and sunlight. A self-sustaining native plant community; however, is typically the end stage in restoration timeline and requires several seasons of chemical and mechanical control prior to reaching this objective.

Cultural Treatment Timing: Each plant community should be visited at a minimum of once a year during the growing season to monitor for the presence of new populations of noxious weeds and other factors that may lead to the spread of noxious weeds such as flooding and erosional events.

4.3 Source Water Protection

The project area occurs within the Upper Black Squirrel Creek watershed. Pollutants from highway run-off, such as pesticides and herbicides, are a source of potential water contamination. The application of herbicides and pesticide must follow label directions, as well as Local, State, and Federal laws and regulations. Selective spot spraying is recommended to ensure targeted treatments of noxious weeds, the prevention of over-application of herbicide, and the protection of native vegetation, insect pollinators, and water resources.

5.0 REFERENCES

USDA. 2024. Natural Resources Conservation Service, Plants Database, U.S. Department of Agriculture
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El Paso County, Colorado. 2024. Community Services Department Environmental Division, Noxious Weeds and Control Methods.
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ATTACHMENT A

COLORADO DEPARTMENT OF AGRICULTURE NOXIOUS WEED LIST & FACT SHEETS

Colorado Noxious Weeds (including Watch List), effective May, 2023

List A Species (26)

Common	***Scientific***
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 aethiopis)*
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)*
Yellow flag iris	*(Iris pseudacorus)*

List B Species (38)

Common	***Scientific***
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	*(Lepidium draba)*
Houndstongue	*(Cynoglossum officinale)*
Jointed goatgrass	*(Aegilops cylindrica)*

List B Species Continued (38)

Common	***Scientific***
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)*
Scotch thistle	*(O. tauricum)*
Spotted knapweed	*(Centaurea stoebe 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)*

List C Species (18)

Common	***Scientific***
Bulbous bluegrass	*(Poa bulbosa)*
Chicory	*(Cichorium intybus)*
Common burdock	*(Arctium minus)*
Common mullein	*(Verbascum thapsus)*
Common St. Johnswort	*(Hypericum perforatum)*
Downy brome, cheatgrass	*(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)*
Siberian elm	*(Ulmus pumila)*
Tree of Heaven	*(Ailanthus altissima)*
Velvetleaf	*(Abutilon theophrasti)*
Wild proso millet	*(Panicum miliaceum)*

Watch List Species (19)

These species are not regulated by the Noxious Weed Act/Rule.

Common	***Scientific***
Baby's breath	*(Gypsophila paniculata)*
Caucasian bluestem	*(Bothriochloa bladhii)*
Common bugloss	*(Anchusa officinalis)*
Common reed	*(Phragmites australis)*
Garden loosestrife	*(Lysimachia vulgaris)*
Garlic mustard	*(Alliaria petiolata)*
Himalayan blackberry	*(Rubus armeniacus)*
Hoary alyssum	*(Berteroa incana L.)*
Meadow hawkweed	*(Hieracium caespitosum)*
Onionweed	*(Asphodelus fistulosus)*
Perennial Sweet Pea	*(Lathyrus latifolius)*
Scotch broom	*(Cytisus scoparius)*
Swainsonpea	*(Sphaerophysa salsula)*
Syrian beancaper	*(Zygophyllum fabago)*
Tall Oatgrass	*(Arrhenatherum elatius)*
Ventenata grass	*(Ventenata dubia)*
White bryony	*(Bryonia alba)*
Yellow bluestem	*(Bothriochloa ischaemum)*
Yellow mignonette	*(Reseda lutea)*

Cheatgrass Identification and Management

List C

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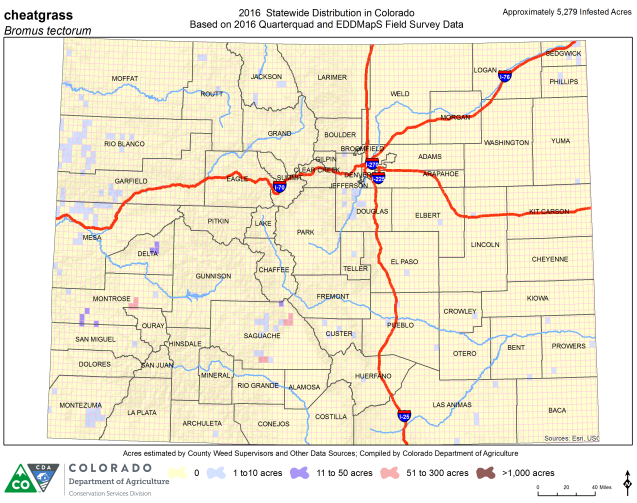
Cheatgrass (*Bromus tectorum* L.) is a winter annual grass in the Poaceae family, also known as downy brome.

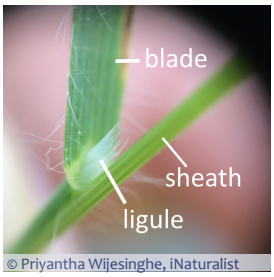
Mature plants reach up to 24 inches tall. The stems are smooth but the leaf blades and sheath are hairy (downy). The ligules are fringed, short and membranous. The culms range from five to 90 cm long, can be prostrate or vertical, and have fine short hairs. Its fibrous roots can be up to 60 inches long, but the majority of root biomass is within first 12 inches of the soil surface. Roots are efficient at absorbing soil moisture, allowing cheatgrass to grow quickly early in season, while other plants are still dormant. Green up can occur twice per season. Cheatgrass has an unique spectral signature during seed set and senescence when it turns reddish purple. During these shoulder growing season events, it is easily detectable from other vegetation with satellite imagery.



The flower is a simple one-sided panicle that characteristically flops over and hangs, branches and is open. Spikelets are usually terminal. Usually there are five to many florets; it has perfect flowers. The upper and lower glumes are usually unequal in length and shorter than florets; the lower glume ranges from 4 to 14 mm in length and is one veined. The upper glume is three-veined. The plant disarticulates above the glumes. The lemmas are usually downy, narrowly lanceolate with sharp tips and about 9 to 12 mm long. Usually there are five to many lemmas. Awns are usually present and range from 10 to 18 mm long. It is a prolific seed producer, capable of two seed crops per season. Seeds need to be buried in soil or litter and have fall moisture to germinate. The fall seed crop has greater reproductive success than spring. Seeds lack dispersal anatomy so fall close to parent plants but transport readily with animals, people and equipment. Seed longevity is about three years. Both inbreeding and cross breeding occur.

Cheatgrass is one of the most competitive non-natives in the Western US. It thrives in arid, semi arid, and cold environments. Colorado's high elevation range is not an issue for cheatgrass; plants were recently detected as high as 9,500 feet. It exhibits phenotypic plasticity and genetic diversity, making it highly adaptable to a variety of conditions, likely due to multiple introductions. Its presence has significant negative impacts throughout the West. Most notably, it alters fire regimes and thus engineers a positive fire feedback loop that favors its growth over other plants. This feedback loop is why cheatgrass forms monocultures throughout the West.

It is often confused with Japanese brome (*Bromus japonicus*), which has denser more compact spikelets, shorter awns, and changes from green to gold through the growing season.



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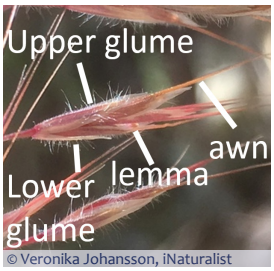

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Key ID Points

1. Downy leaf blades, sheaths, ligules
2. Glumes are unequal size, lemmas are downy
3. One-sided panicle that droops, red-purple during seed set & senescence
4. Fibrous roots

Cheatgrass

Bromus tectorum L.

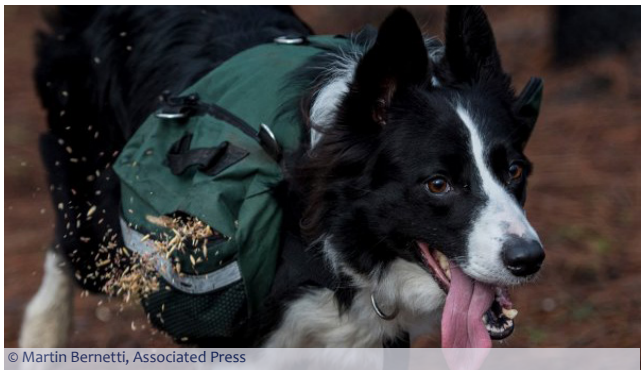
List C

Integrated Weed Management Recommendations

Cheatgrass

Bromus tectorum L.

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.



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CULTURAL

Biological soil crust is a soil health indicator of arid and semi arid sites; crusts inhibit cheatgrass seed germination. Aerial spread and cultivate soil crust where it is absent. Aerial and drill seeding bluebunch wheatgrass (*Pseudoroegneria spicata*) and Sandberg bluegrass (*Poa secunda*) with vesicular-arbuscular mycorrhizae; these are drought tolerant natives that are highly competitive against cheatgrass but require mycorrhizae. As these grasses establish and cheatgrass wanes slowly introduce additional species such as thickspike wheatgrass (*Elymus lanceolatus*), winterfat (*Krascheninnikovia lanata*), yarrow (*Achillea millefolium*) in the plant interspaces in subsequent years. Be cautious when purchasing seed as cheatgrass is often a contaminate, especially in mixes. Use seed pillows to disperse seeds.

MECHANICAL

Mechanical methods are best for residential areas and small infestations. Mowing and chopping are not recommeded; they leave roots behind, stimulate flower production, disperse seeds, and expand the size of the infested area. Collect, bag, and dispose of or destroy flowers; seeds can mature and germinate if left. Tilling must be deeper than 6 inches to work. Prescribed fire applied before seed maturity, (late spring or early summer), may kill seeds; the trick is to get green cheatgrass and litter to carry fire and at a hot enough temperature to destroy seeds and seedlings. Always combine prescribed fire with cultural methods, timed appropriately, and base it on site conditions and other plants present. Monitoring and adaptive management are critical if prescribed fire is used as a tool for control.

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BIOLOGICAL

Sheep and cattle will select green cheatgrass which also affects desired cool-season grasses. Properly managed grazing can improve vigor of desired species and directly reduce cheatgrass. Post-fire grazing management varies depending on site potential and objectives. Currently there are no biological control agents for cheatgrass authorized in Colorado. For more biocontrol information, visit the Colorado Department of Agriculture's Palisade Insectary website at: www.colorado.gov/ag/biocontrol

CHEMICAL

Pseudomonas fluorescens D7 inhibits cheatgrass and is currently approved by EPA and Colorado. NOTE: Herbicide recommendations to control cheatgrass 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 residential settings. Always read, understand, and follow the label directions. The herbicide label is the LAW!

Colorado Department of Agriculture - Conservation Services
305 Interlocken Parkway
Broomfield, CO 80021
(303) 869-9030
www.colorado.gov/ag/weeds

Rev.
2/19

Common mullein

Colorado Department of Agriculture

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(303) 869-9030
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Key ID Points

Updated on:
08/09

Identification and Management

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 fiberous 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 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.

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

Verbascum thapsus

Management Recommendations

Common mullein

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.

ATTACHMENT B

EL PASO COUNTY NOXIOUS WEED CONTROL

EL PASO COUNTY

COLORADO

Community Services Department
Environmental Division

Noxious Weeds and Control Methods

Purple loosestrife
(EPC Environmental Division)

Orange hawkweed
(EPC Environmental Division)

Canada thistle
(EPC Environmental Division)

For More Information Contact:

El Paso County Community Services Department
Environmental Division
3255 Akers Drive
Colorado Springs, CO 80922-1503

(719) 520-7839 or (719) 520-7846
www.elpasoco.com

Updated 2018

CONTENTS

What is a Noxious Weed?

In 1996 the Colorado Noxious Weed Act (Title 35, Article 5.5) was passed to control noxious weeds in the state. "Noxious weed" means an alien plant or parts of an alien plant that have been designated by rule as being noxious or has been declared a noxious weed by a local advisory board, and meets one or more of the following criteria:

(a) Aggressively invades or is detrimental to economic crops or native plant communities;
(b) Is poisonous to livestock;
(c) Is a carrier of detrimental insects, diseases, or parasites;
(d) The direct or indirect effect of the presence of this plant is detrimental to the environmentally sound management of natural or agricultural ecosystems.

Plants are prioritized as List A, B, or C species by the Colorado Department of Agriculture (CDA).

List A: Rare noxious weeds that must be eradicated statewide.

List B: Discretely distributed noxious weeds that must be eradicated, contained, or suppressed, depending on their location, to stop their continued spread.

List C: Widespread and well-established noxious weeds in Colorado; control is recommended by the state and may be required by local government.

Watch List: Intended to serve advisory and educational purposes only. Identification and reporting of these species to determine future potential status of species as noxious weeds.

For more information on noxious weeds: http://www.colorado.gov/ag/weeds

Why are Noxious Weeds a Threat?

Noxious weeds impose a wide variety of negative impacts on people, wildlife, and the environment. Livestock production and crop yields can be greatly reduced as well as adding the significant costs of weed management. Noxious weeds can also reduce the value of land when infestations are severe.

Wildlife habitat and forage are severely degraded by noxious weeds, often rendering the land totally unusable to native animals. Noxious weeds are capable of displacing native plant communities and forming monocultures in their stead, as well as threatening rare and endangered plants.

Many noxious weeds alter or damage environmental processes like hydrology, nutrient cycling, and fire cycles, or degrade the environment by increasing soil salinity or erosion. Many recreational activities such as hiking, biking, fishing, hunting, bird watching, and boating are also negatively impacted by noxious weeds.

A few noxious weed facts (http://www.invasive.org/library/):

- Estimated damage from invasive species worldwide totals more than $1.4 trillion.
- Russian thistle stands have been known to survive more than 100 years.
- The 2003 Guinness Book of World Species listed giant hogweed as the world's largest weed.
- Before the introduction of embalming, tansy ragwort was used to line coffins before burying the dead because of its ability to repel vermin.

How can Noxious Weeds be Managed?

The most effective way to control noxious weeds is through Integrated Pest Management (IPM). IPM incorporates weed biology, environmental Information, and available management techniques to create a management plan that prevents unacceptable damage from pests, such as weeds, and poses the least risk to people and the environment. IPM is a combination of treatment options that, when used together, provide optimum control for noxious weeds; however, IPM does not necessarily imply that multiple control techniques have to be used or that chemical control options should be avoided.

- **Prevention:** The most effective, economical, and ecologically sound management technique. The spread of noxious weeds can be prevented by cleaning equipment, vehicles, clothing, and shoes before moving to weed-free areas; using weed-free sand, soil, and gravel; and using certified weed-free seed and feed.

- **Cultural:** Establishing healthy native or other desirable vegetation. Methods include proper grazing management (prevention of overgrazing), re-vegetating or re-seeding, fertilizing, and irrigation.

- **Biological:** The use of an organism such as insects, diseases, and grazing animals to control noxious weeds; useful for large, heavily infested areas. Not an effective method when eradication is the objective, but can be used to reduce the impact and dominance of noxious weeds.

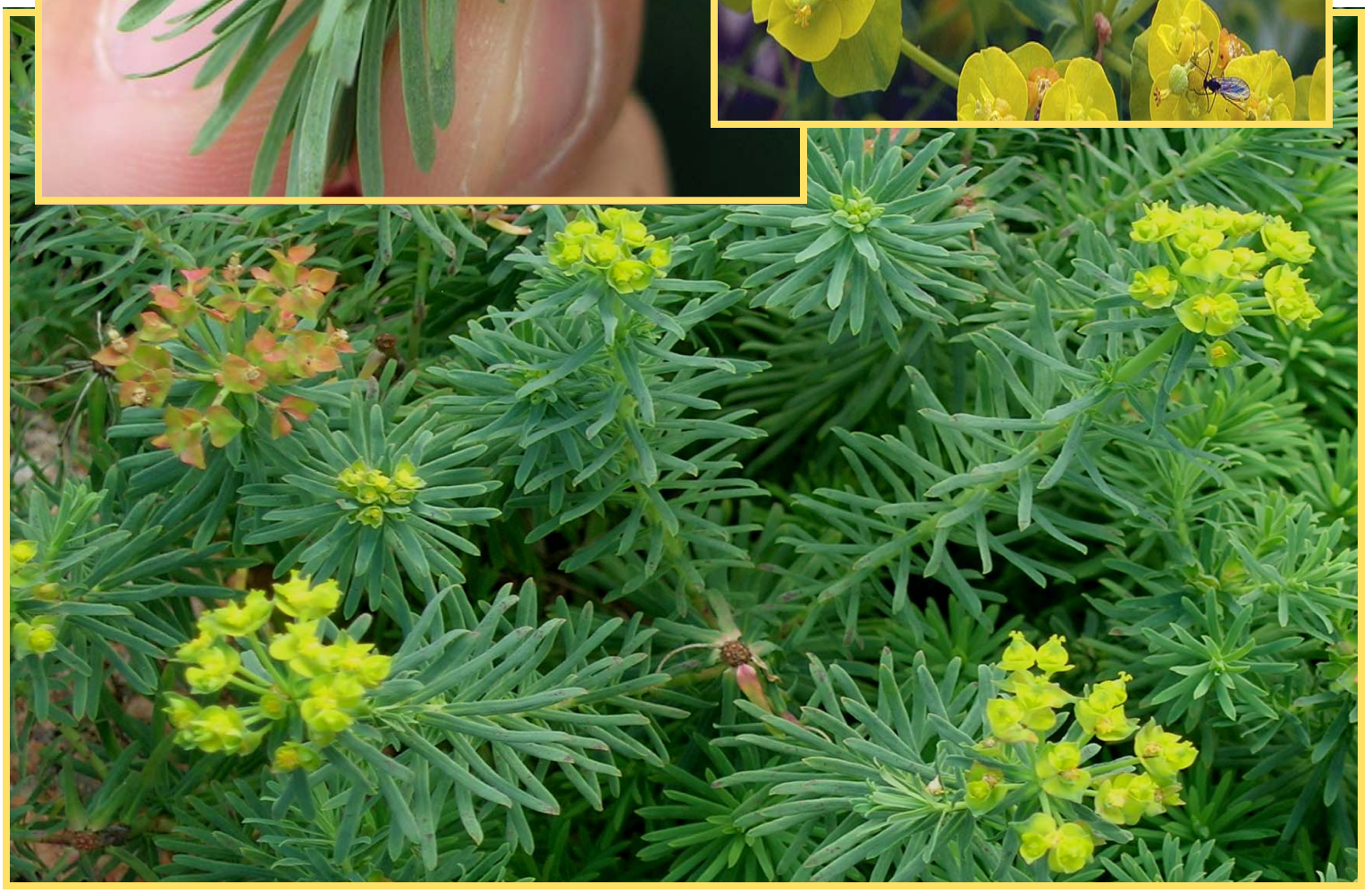
- **Mechanical:** Manual or mechanical means to remove, kill, injure, or alter growing conditions of unwanted plants. Methods include mowing, hand-pulling, tilling, mulching, cutting, and clipping seedheads.

- **Chemical:** The use of herbicides to suppress or kill noxious weeds by disrupting biochemical processes unique to plants.

Whether eradication or suppression is the objective of noxious weed management, priority should always be given to restoring desirable vegetation and a healthy ecosystem to prevent further noxious weed infestations.

This booklet lists chemical controls for noxious weeds as recommended by the Colorado Department of Agriculture (CDA). **Always read and follow the product label** to ensure proper use and application. For more information regarding agents listed for biological control, contact the CDA Palisade Insectary at 970-464-7916 or 1-866-324-2963.

Cypress spurge



LIST A

Cypress spurge - *Euphorbia cyparissias*

A low-growing perennial containing a milky latex that is toxic to horses and cattle, and can cause severe skin irritation to people. An escaped ornamental, popular in xeriscape and rock gardens. Has an extensive root system and can reproduce from root fragments.

Identification:

- Leaves: Linear and needle-like.
- Flowers: Yellow-green bracts, blooms early spring to late fall.
- Seeds: Projected up to 15' feet, and viable for up to 8 years.

Control methods:

Biological:

Not approved for Cypress spurge, which is a List A species, since eradication is the management objective.

Mechanical:

Hand-pull or dig while infestation is still small, removing all roots; tillage will encourage spreading. Wear rubber gloves and eye protection. Follow-up and perseverance is important.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Quinclorac: Apply during flowering stage.

2,4-D + Dicamba: Apply during flowering stage.

Dyer's woad

LIST A

Dyer's woad - *Isatis tinctoria*

A winter annual, biennial, or short-lived perennial. Thrives in light sandy and gravelly soils with minimum water. Ranges from 1 to 4 feet tall with a deep taproot. Causes loss of livestock forage by displacing native species. Dyer's woad is an abundant re-seeder and impacts native plant communities by outcompeting native plants.

Identification:

- Leaves: White mid-rib on upper surface.
- Flowers: Numerous, yellow, and very small.
- Seeds: Pods turn dark purple to black.

Control methods:

Early detection and control when infestations are small, as well as long -term management and monitoring, are essential to ensure eradication.

Biological:

Not approved for Dyer's woad, which is a List A species, since eradication is the management objective.

Mechanical:

Hand-pulling or digging when soil is moist are effective control methods. Bag plants carefully to contain seeds if the plant is flowering.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Metsulfuron: Apply during rosette to bloom stages.

Chlorsulfuron: Apply at the rosette to early bolt growth stage.

Knotweeds


Bohemian knotweed
co.thurston.wa.us


Giant knotweed
dnr.wi.gov


Japanese knotweed
cumberlandcd.com

LIST A

Giant knotweed - *Polygonum sachalinense*
Japanese knotweed - *Polygonum cuspidatum*
Bohemian knotweed - *Polygonum* x *bohemicum*

Bright green, bamboo-like perennial plants that grow 5 to 16 feet tall and spread through roots and root fragments. Introduced from Asia as an ornamental, for erosion control and landscape screening. They can tolerate many environmental conditions, including high temperatures and drought. Infestations can clog small waterways, displace native vegetation and degrade wildlife habitat. Bohemian knotweed is a hybrid of giant and Japanese knotweed.

Identification:

- Leaves: Heart-shaped and bright green.
- Flowers: Small, showy, greenish-white, in clusters.
- Stems: Hollow between nodes and swollen at nodes.

Control methods:

Biological:

Not approved for giant knotweed, which is a List A species, since eradication is the management objective.

Mechanical: Not recommended due to extensive root system.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Glyphosate (Aquatic): Apply evenly over leaf surface to wet, not dripping. Treat when plants are actively growing.

Glyphosate (Aquatic): Use calibrated injection gun to inject just below the third node from July to September.

Myrtle spurge

LIST A

Myrtle spurge - *Euphorbia myrsinites*

A tap-rooted low-growing perennial with trailing fleshy stems. Also known as donkey-tail spurge. Leaves and stems have a toxic, milky sap that can cause severe skin irritations. All plant parts considered poisonous. Escaped ornamental, popular in xeriscape and rock gardens.

Identification:

- Leaves: Fleshy, blue-green.
- Flowers: Yellow-green bracts, blooms in early spring.
- Seeds: Projected up to 15 feet, viable for up to 8 years.

Control methods:

Biological:

Not approved for Myrtle spurge, which is a List A species, since eradication is the management objective.

Mechanical:

Hand-pull prior to seed set, wear rubber gloves and eye protection. Follow-up is important.

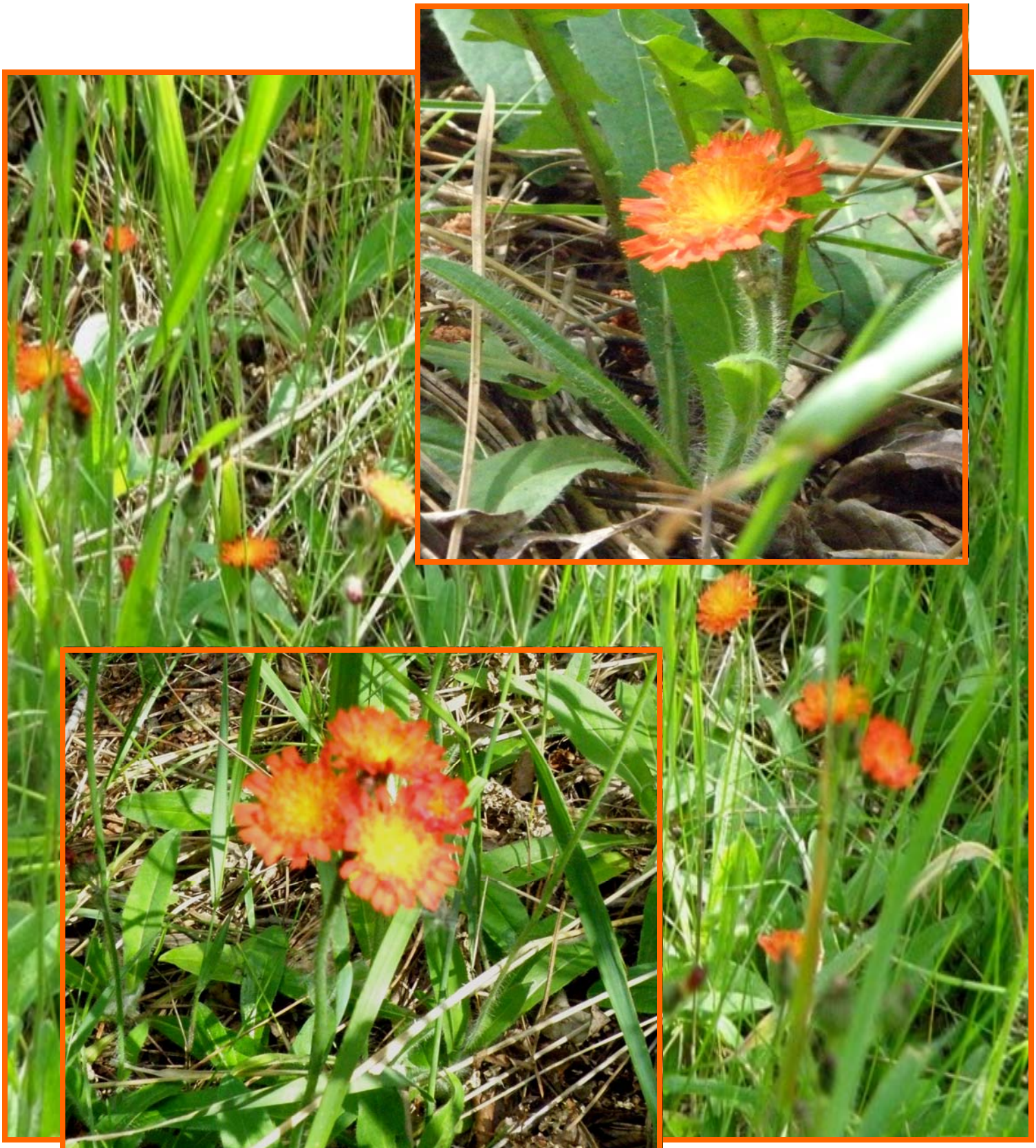
Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

2,4-D ester:	Apply in spring or during fall re-growth.
Dicamba + 2,4-D:	Apply in spring or during fall re-growth.
Picloram + 2,4-D:	Apply when flowering or during fall re-growth.

Orange hawkweed



LIST A

Orange hawkweed - *Hieracium aurantiacum*

A perennial plant that has 5 to 30 bright red-orange, dandelion-like flower heads per stem. The stems and leaves are hairy and bristly and contain a milky juice. Plant reproduces from seeds and underground rhizomes.

Identification:

- Leaves: Basal with 1 or 2 small leaves and rosette leaves.
- Flowers: Red-orange flowers, petals have notched tips.
- Stems: Hairy, contain a milky sap.

Control methods:

Biological:

Not approved for orange hawkweed, which is a List A species, since eradication is the management objective.

Mechanical:

Not recommended because of ability to reproduce by stolons, rhizomes, and root fragments.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminopyralid:	Apply when plants are in rosette to bolting stage.
Clopyralid:	Apply when plants are in the rosette growth stage.
Clopyralid + 2,4-D:	Apply when plants are in the rosette growth stage.

Purple loosestrife

LIST A

Purple loosestrife - *Lythrum salicaria*

Escaped ornamental that often grows on riverbanks and in wet areas. Pieces of roots and stems can produce new plants, and a mature plant can produce up to 3 million seeds per year that can remain viable in the soil for 5 to 20 years.

Identification:

- Leaves: Whorled, smooth edges, 2 to 5 inches long, lance-shaped.
- Flowers: Purple, crushed look, 5 to 7 petals, long flower stalk.
- Stems: Four-sided (square).

Control methods:

Early detection and control when infestations are small, as well as long-term management and monitoring, are essential to ensure eradication.

Biological:

Not approved for purple loosestrife, which is a List A species, eradication is the management objective.

Mechanical:

Remove by hand prior to seed set. If flowering, clip all flowers and buds, bag them, then apply herbicide to plant.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Check for aquatic-approved herbicides if growing on or near the water.

Triclopyr: Apply in the summer. If plants are flowering, clip, bag, and dispose of flower heads before spraying.

Glyphosate (aquatic): Apply in summer during flowering stage. Clip, bag, and dispose of flower heads before applying.

2,4-D Amine (aquatic): Apply in early spring. Will prevent seed formation only. Re-treatment will be necessary. DO NOT apply when outside temperatures exceed 85 degrees.

Absinth wormwood

LIST B

Absinth wormwood - *Artemisia absinthium*

A long-lived perennial with a strong odor of sage. Plant can grow 2 to 4 feet in height, with a lateral root system extending 6 feet in all directions. Grows well in disturbed sites, moist soil, and is shade tolerant. Introduced for medicinal purposes.

Identification:

- Leaves: Blue-olive green, alternate and highly divided.
- Flowers: Small, yellowish, arranged in large, spike-like panicles.
- Stems: Numerous, and covered with fine gray hairs.

Control methods:

Biological:

No biological control available.

Mechanical:

Hand-pull or dig when soil is moist. Make certain to pull all roots. Multiple mowings prior to seed production may provide a control option.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminopyralid: Apply late spring into summer flowering growth.

Aminopyralid + Metsulfuron: Apply late spring into summer flowering growth.

Aminopyralid + 2,4-D: Apply late spring into summer flowering growth.

Clopyralid: Apply late spring into summer flowering growth.

Picloram + 2,4-D: Apply late spring into summer flowering growth. Do not use near trees, shrubs or water.

Bouncingbet

LIST B

Bouncingbet - *Saponaria officinalis*

An escaped ornamental forb that reproduces by seed and rhizomes. This perennial plant can be poisonous to livestock and humans. Prefers moist, well-drained soils in full sun. Is often found in municipal areas and surrounding natural areas.

Identification:

- Leaves: Opposite, smooth, narrow, 2 to 4 inches long, 3 distinct veins from the leaf base.
- Flowers: White to light pink, 5 petals, clustered at branch ends, slightly notched apex.
- Stems: Three feet tall, erect, sparingly branched, smooth and forming.

Control methods:

Biological:

No biological control available.

Mechanical:

Not recommended due to extensive root system. Hand-pull or dig individual plants, removing all roots when the soil is moist. Prevent seed production by clipping and disposing of flower heads.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Chlorsulfuron: Apply at bolting to bud stage, in late spring to mid-summer.

Sulfometuron-methyl: Apply at bolting to bud stage, late spring to mid-summer.

Bull thistle

LIST B

Bull thistle - *Cirsium vulgare (Savi) Tenore*

A biennial forb introduced as a seed contaminant. Mature plants produce up to 4,000 seeds. Presence of bull thistle in hay decreases forage and lowers market value. Will grow on gravel and clay-textured soils. Can be distinguished from musk thistle by the presence of winged spines extending to the flower heads.

Identification:

- Leaves: Prickly-hairy on top and cottony underneath.
- Flowers: Gum-drop shaped, pinkish to dark purple.
- Seeds: Capped with circle of plume-like white hairs.

Control methods:

Biological:

No biological control available in Colorado.

Mechanical:

Sever the root below the soil surface prior to before plant flowers.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminopyralid: Apply to rosettes through plants bolting stage in spring or to fall rosettes.

Chlorsulfuron: Apply in spring from bolting to bud stages.

Clopyralid: Apply to rosettes through flower bud stage in spring or to fall rosettes.

Aminocyclopyrachlor + chlorsulfuron: Apply from seedling to bolting stage.

Canada thistle

LIST B

Canada thistle - *Cirsium arvense*

A deep-rooted perennial that spreads mainly through an aggressive rhizomatous root system, but also through seed production. Often grows in wet areas, but can grow in a variety of habitats. Small pieces of root (½ inch) can form new plants. Tilling and hand-pulling stimulate the growth of plants and are not an effective means of control.

Identification:

- Leaves: Spine-tipped, dark green, oblong, and crinkled.
- Flowers: Small purple (sometimes white) clusters on ends of branches.
- Stems: Hollow and spineless.

Control methods:

Biological: Grazing by cattle, goats, and sheep when plants are young. Insects available; have not shown effective control.
Rust fungus (*Puccinia punctiformis*) collection and distribution methods are being refined.

Mechanical: Neither hand-pulling or tilling is an option. Mowing can be effective if done every 10 to 21 days during the growing season. Especially effective combined with fall herbicide treatment.

Chemical:
Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminopyralid: Apply in spring until flowering and/or to fall re-growth. Especially effective in fall after the first light frost.

Clopyralid + *triclopyr* : Apply in spring until flowering or fall regrowth.

Aminoclopyrachlor + *chlorsulfuron*: Effective from rosette to bud stage, also to fall regrowth.

Chinese clematis

LIST B

Chinese clematis - *Clematis orientalis*

A perennial, herbaceous-to-woody climbing vine that is capable of completely covering trees and bushes, causing death to young trees and shrubs. An escaped ornamental that prefers well-drained soils and sunny locations, and is often found along roadsides, riparian areas, and rocky slopes.

Identification:

- Flowers: Solitary, four yellow sepals (petal-like), often nodding.
- Fruits: Feathery, long-tailed, conspicuous all winter.
- Roots: Five to ten feet long.

Control methods:

Biological: No biological control agents available.

Mechanical: Pull or dig up the plant prior to flowering when soil is moist; remove all roots.

Chemical:

Recommendations only! Always read, understand and follow the label.

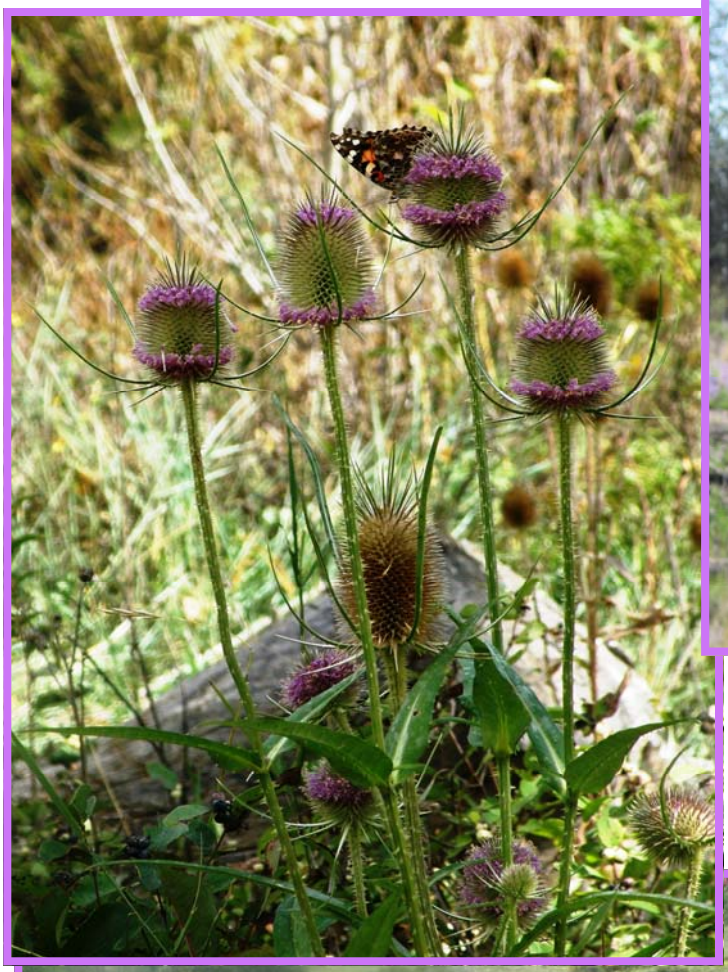
The label is the law!

2,4-D amine: Apply whenever plant is actively growing. (will damage neighboring brush species if present).

Imazapic: Apply at flowering growth stage.

Aminopyralid: Apply at flowering growth stage.

Common teasel



LIST B

Common teasel - *Dipsacus fullonum*

A biennial or sometimes monocarpic perennial forb that can grow up to 6 feet tall. Generally found along irrigation ditches, rivers, abandoned fields, pastures, waste areas, and forests. Can produce more than 2,000 seeds per plant, and seeds can stay viable for up to 14 years. Plants die after seed production.

Identification:

- Flowers: Purple or white and egg-shaped with spiny bracts.
- Leaves: Clasp the stem and appear wrinkled.
- Fruits: Four-angled achene, each containing a single seed.

Control methods:

Biological: No biological control agents available.

Mechanical: Digging while at the rosette stage and cutting plants near flowering stage can be effective. Re-visit the site frequently to ensure re-growth does not occur.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Metsulfuron: Apply when in rosette or bolting growth stage.

Aminopyralid: Apply when in rosette or bolting stage.
Best choice of herbicide in riparian areas.

Imazapic: Apply when in rosette or bolting stage.

Dalmatian toadflax

LIST B

Dalmatian toadflax - *Linaria dalmatica*

A perennial forb introduced from the Mediterranean as a folk remedy, fabric dye, and ornamental. Grows up to 3 feet high in disturbed open sites, fields, pastures, rangelands, and wildlife habitats. Reproduces by seed (up to 500,000 per plant) and extensive, creeping rhizomes.

Identification:

- Flowers: Showy yellow snapdragon-like with an orange throat.
- Leaves: Thick, waxy, bluish, heart-shaped, and wraps the stem.
- Roots: Can regenerate from vegetative buds.

Control methods:
Controlling toadflax is expensive and difficult. Control when infestations are small, but prevention is the best option.

Biological:

Calophasia lunula - a predatory noctuid moth, feeds on flowers and leaves.

Eteobalea intermediella - root boring moth.

Mecinus janthinus - a stem boring weevil

Mechanical:

Pulling by hand can be effective for small infestations. Pull every year (5 to 6 years) to deplete root system reserves.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminocyclopyrachlor + *chlorsulfuron*: Apply when flowering, in spring or to fall regrowth.

Diffuse knapweed

LIST B

Diffuse knapweed - *Centaurea diffusa*

A tap-rooted plant that is a biennial forb. It reproduces by seeds only, and is capable of producing 18,000 seeds per plant. Following seed production, the plant dries out and takes the form of a tumbleweed, spreading seeds great distances.

Identification:

- Flowers: Usually white, sometimes lavender; spiny bracts with a distinct central spine and fringed comb-like edges.
- Leaves: Finely divided, become reduced as plant matures.

Control methods: Prevent seed production.

Biological:

Insects listed below provide good control when used together, but may take 3 to 5 years to establish and achieve optimum results.

Seedhead weevil - *Larinus minutus*
Root weevil - *Cyphocleonus achates*

Mechanical:

Sever the taproot below ground prior to flowering. Mowing is effective at full-bloom; plant parts must be disposed of properly as seed can still develop on cut plants.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminocyclopyrachlor + chlorsulfuron: Use as a pre-emergent or apply from seedling to mid-rosette stage.

Aminopyralid: Rosette to early bolt stage (spring) and/or in the fall to the rosettes.

Clopyralid: Apply in spring or fall to rosettes.

Hoary cress

LIST B

Hoary cress - *Cardaria draba*

A.K.A. whitetop, this perennial member of the mustard family (*Brassicaceae*) reproduces by seeds and creeping rhizomes. One of the first noxious weeds to emerge in the spring, it flowers in early spring and sets seed by mid-summer. Single plants are capable of producing as many as 4,800 seeds that can remain viable in the soil for about 3 years. Hoary cress prefers moderate precipitation, alkaline soils, lots of sun, and disturbed sites, and can grow in a variety of habitats.

Identification:

- Flowers: White with four petals, flat-topped flower clusters.
- Leaves: Blue-green, lance-shaped, serrated edges, blunt ends.
- Seeds: Heart-shaped capsules hold two flat reddish-brown seeds.

Control methods:

Biological:

No biological control available.

Mechanical:

Mow frequently in early spring before the bolting stage to stress the plant. Mow several times during the summer, and apply herbicide during the fall for optimum control.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Chlorsulfuron: Apply while flowering.

Metsulfuron: Apply while flowering (Early spring to early summer).

Houndstongue

LIST B

Houndstongue - *Cynoglossum officinale*

A short-lived perennial or biennial forb. Produces rosettes in the first year, and bolts a stout, erect stem that is 1 to 4 feet tall by mid-summer of the second year. Seeds have barbs like Velcro and will cling to animals, clothing, and machinery. Houndstongue is poisonous and can be lethal to wildlife and livestock.

Identification:

- Flowers: Reddish-purple with 5 petals and 5 soft, hairy sepals. Slightly drooping from densely clustered panicles.
- Leaves: Lance shaped, with a smooth edge and no teeth or lobes. Leaf tip is sharply pointed, like a hound's tongue.
- Seeds: Prickly teardrop-shaped nutlets in a pyramid-shaped receptacle.

Control methods:

Biological:

No biological control available.

Mechanical:

Cut or pull plants, remove entire root crown when plants are in rosette stage.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Metsulfuron + 2,4-D: Rosette to early flower growth stages.

Chlorsulfuron + 2,4-D: Rosette to early flower growth stages.

Metsulfuron + chlorsulfuron: Rosette to early flower growth stages.

Leafy spurge

Norman E Reese, USDA ARS, Bugwood.org

LIST B

Leafy spurge - *Euphorbia esula*

A long-lived perennial that emerges early in spring with an extensive creeping root system. Roots can extend to a depth of 30 feet. Plants contain a milky latex that can damage sensitive skin and eyes. A single plant can produce up to 130,000 seeds that can be projected up to 15 feet from the plant, these seeds are capable of remaining viable in the soil for at least 8 years. The plant also reproduces from the large numbers of vegetative buds on its roots.

Identification:

- Flowers: Small, enclosed by yellowish-green heart-shaped bracts.
- Leaves: Alternate, narrow, and linear.
- Stems: Erect, 1 to 3 feet tall, unbranched except at flower clusters.

Control methods:

Biological:

Both sheep and goats can be effective grazers of leafy spurge.

Three flea beetles (below) are available for control.

Flea beetle - *Ahpthona nigriscutis*

Flea beetle - *Aphthona czwalinae / lacertosa*

Flea beetle - *Ahpthona cyparissiae*

Mechanical:

Hand-pulling is not an option due to the vast root system. Frequent mowing can reduce seed production but will not provide long-term control.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminocyclopyrachlor + chlorsulfuron mixed with *Diflufenzopyr + dicamba:* While flowering (spring) or fall application.

Quinclorac mixed with *Diflufenzopyr + dicamba:* While flowering (spring) or fall application.

Aminocyclopyrachlor + chlorsulfuron: Post-emergence (spring) until flowering, or to rosettes (fall).

Musk thistle

LIST B

Musk thistle - *Carduus nutans*

A biennial thistle with very showy flowers producing up to 20,000 seeds per plant. Flower heads often bend over or nod, giving rise to the common name “nodding thistle.” Flowers emerge mid to late summer, seeds develop shortly after. Reproduces only by seeds. Often found in disturbed / overgrazed areas, but can invade various habitats.

Identification:

- Flowers: Purple, rarely white,1.5 to 3 inches wide, nodding, solitary on stems; large triangular-shaped, spine-tipped bracts.
- Leaves: Spiny, dark green, white margins, prominent white midrib.
- Stems: Leaves usually absent or very reduced below flower. Stem smooth below flower head. Stem has winged spines throughout remainder of plant with spiny margined leaves.

Control methods:

Biological:

The crown weevil, *Trichosirocalus horridus,* is available for control.

Mechanical:

Sever the root below the soil surface prior to plant flowering. Mowing is effective at full bloom, but flowering plant parts must be disposed of properly because seeds may still develop on cut plants.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminopyralid: Apply in spring during rosette to early bolting stages, or to rosettes in fall.

Chlorsulfuron: Apply in spring from rosette through very early flowering stages.

Clopyralid: Apply to rosette through flower bud stage or to fall rosettes.

Perennial pepperweed

LIST B

Perennial pepperweed - *Lepidium latifolium*

A very invasive perennial forb. Plants act as a “salt pump” by absorbing salt from deep in the soil and then excreting salt and depositing it on the soil surface. Many plants cannot tolerate high concentrations of saline. Reproduces by seed, root fragments.

Identification:

- Flowers: Tiny, white in clusters on branch tips.
- Roots: Up to 10 feet deep into soil
- Leaves: Alternate, lance shaped, serrated edges.

Control methods:

Biological:

No biological control available.

Mechanical:

Most mechanical methods are not recommended and can increase the density of pepperweed.
Spring mowing, combined with chemical treatments can be effective.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Chlorsulfuron: Apply from early flower to flowering growth stage.
Metsulfuron: Apply from early flower to flowering growth stage.
Imazapic: Apply from early flower to flowering growth stage.

Russian knapweed

LIST B

Russian knapweed - *Acroptilon repens*

A deep-rooted, creeping perennial that reproduces primarily from adventitious buds on the roots, but it also reproduces from seed. The plant is allelopathic, meaning it exudes a toxic substance that inhibits the growth of surrounding plants. It is also toxic to horses, and prolonged consumption results in "chewing disease."

Identification:

- Flowers: Pink to purple, urn-shaped, and solitary at the ends of upper branches, pointed papery tips on rounded bracts.
- Stems: Upright, branched, covered in short stiff hairs.
- Roots: Horizontal, vigorous, and black with a scaly appearance.

Control methods:

Biological:

The gall midge, *Jaapiella ivannikovi*, is currently being established by the Colorado Department of Agriculture, but is not yet available to the public.

Mechanical:

Mow several times before plants bolt. Most effective when mowing is combined with fall herbicide treatment.

Chemical:

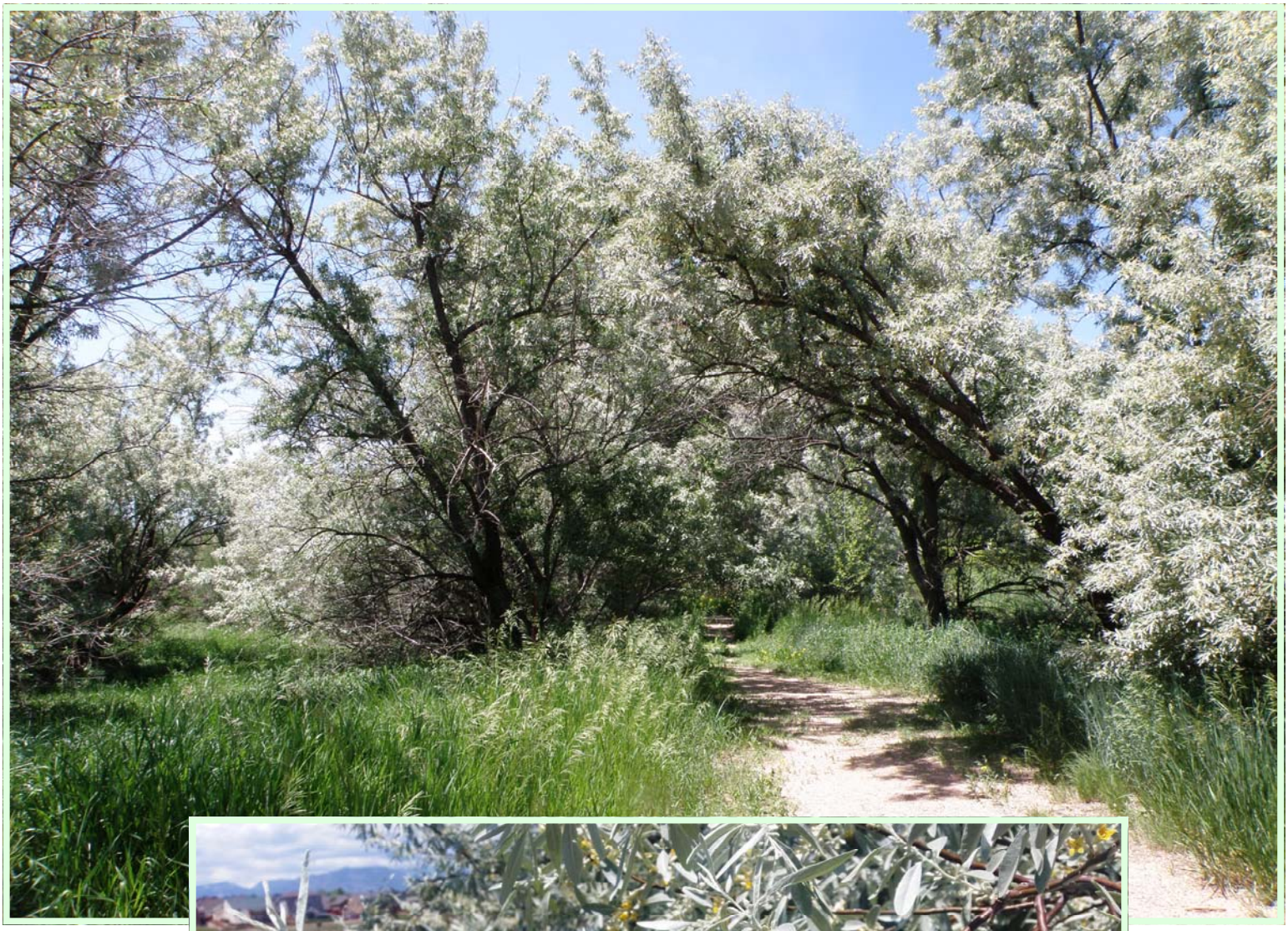
Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminopyralid: Apply in fall when stems die back or spring in the bud to flowering stage.

Aminocyclopyrachlor + clorsulfuron: Apply in fall when stems die back

Russian olive



LIST B

Russian olive - *Elaeagnus angustifolia*

A fast-growing perennial shrub or small tree (up to 30 feet) that reproduces through adventitious roots and seed production. It possesses an extensive root system, and can grow on bare, mineral substrates within the soil. It tolerates many soil, light, and moisture conditions, but prefers open, moist riparian areas and often out-competes native riparian vegetation. Prior to being listed as a noxious weed by the CDA, it was commonly used for erosion control and can be found in home landscaping.

Identification:

- Leaves: Narrow, linear, upper surface is light green, lower surface is silvery white.
- Branches: Young twigs, reddish and flexible with 1” to 2“ thorns.
- Fruit: Olive-shaped, become yellow-red when mature.

Control methods:

Biological:

Tubercularia canker is an unapproved bio-control; however, it can girdle entire stems and kill stressed plants over time.

Mechanical:

Cut trees, then immediately treat stumps with a herbicide to prevent re-sprouting.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Triclopyr: Apply to the cambial layer of the tree immediately after the stump is cut or to the roots above soil surface.

Glyphosate: Apply to the cambial layer of the tree immediately

Scentless chamomile

LIST B

Scentless chamomile - *Matricaria perforata*

An annual, biennial, or short-lived perennial forb that is native to Europe. Produces a dense mat that out-competes other plants. A single plant can produce 300,000 seeds. Seeds and flowers are continuously formed, producing many generations during the growing season.

Identification:

- Flowers: Yellow-centered disk surrounded by white petals, daisy-like.
- Leaves: Alternate, finely divided, fern-like.
- Stems: 6 inches to 3 feet tall with numerous branches.

Control methods:

Prevent seed production and crowd out infestations through crop competition.

Biological:

There is no biological control available at this time.

Mechanical:

Frequent shallow tilling can help exhaust seed bank. Hand pulling effective if repeated as new plants appear, prior to blooming.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Metsulfuron: Apply when plant is in rosette to bolting stage.

Chlorsulfuron: Apply when plant is in rosette to bolting stage.

Scotch thistle

LIST B

Scotch thistle - *Onopordum acanthium*
Scotch thistle - *Onopordum tauricum*

A non-native biennial forb that reproduces solely by seed. Can produce up to 14,000 seeds per plant. Due to spiny nature, Scotch thistle can act as a living barbed wire fence to livestock and can grow up to 12 feet tall. Invades overgrazed pastureland, roadsides, and irrigation ditches.

Identification:

- Flowers: 2 to 5 clusters, purple to dark red in color.
- Leaves: Alternate, stalk-less, and spiny edged.
- Stems: Numerous, branched, with broad, spiny wings.

Control methods:

Biological:

No known biological control agents effective against Scotch thistle.

Mechanical:

Any physical method that severs the root below the soil surface prior to seed production will kill the plant. Properly dispose of flowering cut plants, as seeds can mature and become viable.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminopyralid: Apply in spring or fall during the rosette stage.

Chlorsulfuron: From bolting to flower bud stages.

Metsulfuron + Chlorsulfuron: Appy rosette to flower bud stages.

Clopyralid: Apply to rosettes in spring or fall.

Aminocyclopyrachlor + chlorsulfuron: Apply from seedling to bolting stage.

Spotted knapweed

LIST B

Spotted knapweed - *Centaurea stoebe*

A short-lived perennial that reproduces mostly by seed. Each plant is capable of producing an average of 900 seeds annually. Plants tend to invade disturbed / overgrazed areas and can tolerate both dry conditions and high moisture areas.

Identification:

- Flower: Urn-shaped, pink to purple, solitary at the end of branches with black-tipped ("spotted") spiny bracts.
- Leaves: Small, oblong, pinnately divided.
- Root: Stout taproot.

Control methods:

Biological:

The insects listed below are available for control:

Root weevil - *Cyphocleonus achates*

Seedhead weevil - *Larinus minutus*

This is a great option for large infestations, optimum results take 3-5 years.

Mechanical:

Dig when the soil is moist, removing all roots. Mow when plant has flower buds or early flowers to stress the plant; all parts must be disposed of properly, as seed may still develop on cut plants.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminocyclopyrachlor + chlorsulfuron: Apply as a pre-emergent, or from seedling to rosette stage.

Aminopyralid: Apply in spring at the rosette to early bolt stage and / or in fall to the rosettes.

Clopyralid: Apply to spring or fall rosettes. When plants bolt, mix with 2,4-D to treat.

Tamarisk

LIST B

Tamarisk (Salt cedar) - *Tamarix spp.*

A small shrub or tree that reproduces vegetatively and by seed. Mature plants can produce up to 600,000 seeds that are viable for up to 45 days. It increases the salinity of the soil surface, which favors its growth while hindering native plant growth. It is often found in floodplains, along river banks, stream banks, irrigation ditches, and marshes.

Identification:

- Flowers: Tiny, pink to white, 5 petals, slender flower stalks.
- Leaves: Small, scale-like (like juniper), bluish-green in color.
- Stems: Reddish-brown color.

Control Methods:

Biological:

Diorhabda elongata-Leaf beetle, is available for limited distribution.

Mechanical:

Bulldozing can be used to open up large stands of salt cedar; follow up with herbicide treatment of re-growth when 1 to 2 meters tall.

The cut-stump method can be applied with a chainsaw, or loppers for smaller plants.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Cut-stump method refers to mechanically cutting down the tree, then immediately applying herbicide to the stump.

Triclopyr: Cut-stump & basal bark - Summer to fall.

Glyphosate (Aquatic)*:* Cut-stump - Summer to fall. Treat the cambium immediately after cutting and to roots above the ground.

Triclopyr + *Aminopyralid:* Broadcast foliar treatment: Apply when plants are growing rapidly—May to September.

Yellow toadflax

LIST B

Yellow toadflax - *Linaria vulgaris*

A perennial with an extensive creeping root system that reproduces vegetatively, and also through prolific seed production. It is well-adapted to moist or dry sites and is found in all soil types. Very competitive due to early spring emergence from vegetative buds on root stock. Herbicide control results can be highly variable. Known to be mildly poisonous to cattle, but little effect to sheep or goats.

Identification:

- Flowers: Snapdragon-like, bright yellow with orange centers, long spur.
- Leaves: Narrow, linear, 1 to 2 inches long.
- Stems: Woody at the base and smooth toward top, 1 to 3 feet tall.

Control Methods:

Controlling toadflax is expensive and difficult. Control when infestations are small. Prevention is the best option.

Biological:

The following insects are available for control:
Noctuid moth - *Calophasia lunula*
Root boring moth - *Eteobalea intermediella*
Stem-boring weevil - *Mecinus janthinus*

Mechanical:

Hand-pulling and tillage are not recommend due to its extensive creeping root system. A single new plant might be an exception.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Aminocyclopyrachlor + Chlorsulfuron: Apply at flowering through fall post-flower into senescence.

Picloram + Chlorsulfuron: Fall application, late August through September has best results.

Common mullein

LIST C

Common mullein - *Verbascum thapsus*

Common mullein, often mistaken as a native plant, is a biennial plant that originated in Eurasia. It can be found in disturbed areas, preferring dry, stony soil. It reproduces by seed, up to 250,000 per plant, which can remain viable in the soil for over 80 years.

Identification:

- Flowers: Yellow, saucer-shaped, attached to stem.
- Leaves: Oblong, wooly, with a rounded tip.
- Stems: Erect, rigid up to 6 feet tall covered with wooly hairs.

Control Methods:

Biological:

No insect biological control available.

Mechanical:

Easy to pull before flowering due to shallow taproot. If flowers are present, bag and dispose of plants to prevent spread of seeds.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Chlorsulfuron: Apply in spring at rosette stage before bolting or in fall to rosettes.

2,4-D + Picloram: Apply in spring at rosette stage before bolting or in fall to rosettes.

Picloram: Apply in spring at rosette stage to early growth or in fall to rosettes.

Metsulfuron: Apply in spring or fall to rosettes.

Downy brome / Cheatgrass

List C

Downy brome / Cheatgrass - *Bromus tectorum*

This annual or winter annual, native to the Mediterranean region, ranges in height from 2" to 36". Each plant contains multiple erect stems with multi-branched inflorescences at their tips, which are slender, dense and usually drooping; at maturity they appear greenish-purple. Cheatgrass reproduces solely by seed, which is viable for 2 to 5 years. The root system is fibrous and fleshy. When mature Cheatgrass dries it becomes a major fire hazard, which has increased rangeland fire frequency from once every 60-110 years to once every 3-5 years. Habitats include roadsides, waste areas, misused pastures, rangelands, cultivated fields, and eroded sites. Grazing animals will forage on the green plants, but the sharp seeds on the dried plants can injure grazing animals, getting caught in the mouth, nose and eyes.

Identification:

- Inflorescences: Slender, dense, 3/8" to 3/4" long, usually drooping. Greenish-purple at maturity.
- Leaves: Flat blades, densely covered with soft hairs.
- Stems: Multiple erect stems, 2" to 36" tall.

Control Methods:

Biological: No biological control currently available.

Mechanical: Tillage, mowing and grazing help reduce established plant populations. The key to effective control is to prevent seed production and/or spread.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Imazapic: Apply in fall prior to a hard freeze and/or early spring growth.

Glyphosate: Apply in fall or early spring.

Field bindweed

Steve Dewey, USU, Bugwood.org

LIST C

Field bindweed - *Convolvulus arvensis*

A deeply rooted perennial that reproduces through seeds and rhizomes. Taproots can extend up to 20 feet deep into the soil and seeds can remain viable for up to 40 years. Commonly found throughout Colorado in, pastures, roadsides, waste areas, lawns, and gardens from 4,000 to 8,000 feet in elevation.

Identification:

- Flowers: White to light pink, trumpet or bell-shaped.
- Leaves: Arrowhead shape.
- Stems: Prostrate, twining, up to 6 feet long.

Control Methods:

Biological:

The Bindweed Gall Mite, *Aceria mahlerbae,* is available for control and has been successful.

Mechanical:

Cutting, mowing, and pulling have negligible effects unless plants are cut below the soil surface in the early seedling stage.

Chemical:

Recommendations only! Always read, understand and follow the label.

The label is the law!

Dicamba + 2,4-D:	Apply just after full bloom and/or in fall.
Picloram:	Apply just after full bloom and/or in fall.
Glyphosate:	Apply when plants are in full bloom and/or in fall.

Poison hemlock

LIST C

Poison hemlock - *Conium maculatum*

This plant is native to Europe. Habits include wetland areas and roadside ditches. ALL parts of this plant are poisonous! Consumption can be fatal.

Identification:

- Flowers: white, umbrella-like clusters.
- Leaves: Fern-like, lacy.
- Stems: Hollow, purple spots

Control Methods:

Biological:
Agonopterix alstroemericana, the hemlock moth larvae feed on plant and cause sever defoliation and death of the plant.

Mechanical:
Hand pull or dig. ALWAYS wear gloves! Bag plants to contain seeds if flowering.

Chemical:
Recommendations only! Always read, understand and follow the label.

The label is the law!

2,4-D: Apply during rosette to early bolting stage.
Chlorsulfuron: Apply during rosette to early bolting stage.
Metsulfuron: Apply during rosette to early bolting stage.
Picloram + 2;4-d: Apply during rosette to early bolting stage.

Glossary

Adventitious: Tissue that is not growing at the typical location on the plant.

Annual: A plant completing its lifecycle within a single growing season.

Apex: The tip of a leaf, root, or stem.

Biennial: Herbaceous plant that completes its life cycle in two years: in the first year, plants germinate and typically exist as basal rosettes; in the second year, plants bolt, flower, and die.

Bolting: Producing erect, elongated flowering stems from a basal rosette of leaves. Usually associated with winter annuals or biennials.

Bracts: A very reduced leaf-like structure usually associated with the base of a flower or inflorescence.

Inflorescence: The flowering part of a plant.

Midrib: Central vein of a leaf.

Perennial: A plant that lives through several growing seasons (more than two years).

Restricted-Use Pesticide: Use of pesticide requires a certified applicator's license from the Colorado Department of Agriculture.

Rhizome: An underground, horizontal stem capable of producing shoots above ground and roots below ground. A plant with rhizomes is often referred to as **rhizomatous** or a **creeping perennial**.

Rosette: A circular cluster of leaves arising from a very short stem at the surface of the soil. Lacks an erect stem.

Sepal: A flower part that usually encloses and protects the flower bud.

Spur: A tubular projection from a flower.

Taproot: A prominent root with few branches, sometimes swollen to store nutrients.

Viable: Capable of germination.

Whorl: More than two leaves or flowers attached at a node.

Listings are informational only, not an endorsement by El Paso County.
Application of restricted chemicals requires a certified professional.

Herbicide Vendors

Big R
165 Fontaine Blvd.
Colorado Springs, CO 80911
(719) 390-9134

5845 Constitution Ave
Colorado Springs, CO 80915
(719) 591-1830

14155 E. Highway 24
Peyton, CO 80831
(719) 749-9136

840 Spanish Bit Drive
Monument, CO 80921
(719) 488-0000

Herbicide Applicators

Ark Ecological Services, LLC
(303) 985-4849

Colorado Noxious Weed Management, LLC
(719) 352-1981

Colorado Vegetation Management, Inc.
(719) 545-6163

Horizon Vegetation Management
(303) 419-5332

T-P Enterprises, Inc.
(719) 243-0558

Biological Control

Colorado Department of Agriculture Insectary
750 37.8 Road
Palisade, CO 81526
(866) 324-2963
www.colorado.gov/agmain

Contacts

El Paso County
Community Services Department
Environmental Division
3255 Akers Drive
Colorado Springs, CO 80922-1503
Phone: (719) 520-7839, (719) 520-7846
http://adm.elpasoco.com/environmental%20division/pages/default.aspx

Colorado Department of Agriculture
Conservation Services Division
Noxious Weed Program
305 Interlocken Parkway
Broomfield, CO 80021
https://www.colorado.gov/pacific/agmain

Colorado State Forest Service
Woodland Park District
113 South Boundary Street
Woodland Park, CO 80863
Phone: (719) 687-2951, (719) 687-2921
Email: CSFS_WoodlandPark@mail.colostate.edu
http://csfs.colostate.edu/districts/woodland-park-dist/

Colorado State University Extension Office
17 N. Spruce Street
Colorado Springs, CO 80905
Phone: (719) 520-7690, Master Gardeners (719) 520-7684
http://elpasoco.colostate.edu/

Colorado Weed Management Association
PO Box 419
Hotchkiss, CO 81419
(970) 361-8262
www.cwma.org

Natural Resources Conservation Service
Colorado Springs Service Center
5610 Industrial Place, Suite 100
Colorado Springs, CO 80916
(719) 632-9598
www.nrcs.usda.gov

Simla Service Center
PO Box 188
504 Washington Street
Simla, CO 80835
(719) 541-2358

ATTACHMENT C

USDA PLANT GUIDE

USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Plant Guide

CHEATGRASS

Bromus tectorum L.

Plant Symbol = BRTE

Contributed By: USDA, NRCS, National Plant Data Center; Idaho NRCS State Office; and University of California, Department of Botany; partial funding from the USGS and the US National Biological Information Infrastructure

Hitchcock (1950)

Caution: This plant is highly invasive.

Alternate Names
Downy brome, downy bromegrass, downy chess, early chess, slender chess, drooping chess, junegrass, and bronco-grass

Uses
Erosion Control: due to being a winter annual species with a shallow root system, cheatgrass is considered a poor erosion control plant particularly during periods of extended drought.

Invasive to Noxious Traits: Cheatgrass or downy brome is native to the Mediterranean region. In Europe, its original habitat was the decaying straw of thatched roofs. *'Tectum'* is Latin for roof, hence the name *Bromus tectorum*, 'brome of the roofs'.

Introduced into the United States in packing materials, ship ballast and likely as a contaminant of crop seed, cheatgrass was first found in the United States near Denver, Colorado, in the late 1800s (Whitson et al. 1991). In the late 1800's and early 1900's, it spread explosively in the ready-made seed-beds prepared by the trampling livestock hooves of overstocked rangelands. Disturbance associated with homesteading and cultivation of winter wheat also accelerated its spread and establishment. By the 1930's, cheatgrass was becoming the dominant grass over vast areas of the Pacific Northwest and the Intermountain West regions and the "worst" western range weed.

Cheatgrass has developed into a severe weed in several agricultural systems throughout North America, particularly western pastureland, rangeland, and winter wheat fields. It is now estimated to infest more than 41 million hectares (101 million acres) in western states (Mack 1981).

Winter wheat growers in the western United States proclaim it as their worst weed problem. In the Palouse winter wheat country of the Pacific Northwest, at high density, it reduces wheat yields by an average of 27% (FICMNEW, 1997). It can reduce seed yield of winter rye as much as 33%. In winter wheat and alfalfa fields, it is especially troublesome, because of its ability to reproduce prior to crop and hay harvesting (Peepers 1984). It is an aggressive invader of sagebrush, pinyon-juniper, mountain brush and other shrub communities, where it often completely out-competes native grasses and forbs. Approximately five million hectares of overgrazed rangeland in Idaho and Utah are covered by almost pure stands of cheatgrass (FICMNEW 1997). Serious problems with downy brome have been reported in the New England nursery trade and in orchards (Morrow & Stahlman 1984).

Stands of cheatgrass on western rangeland are highly flammable in late spring through early fall after maturation, which usually occurs long before native species mature and enter summer and autumn dormancy. Consequently, its presence, in altering the timing and occurrence of range and forest fires, negatively impacts other species.

Livestock: Although cheatgrass provides good quality forage early in the season, the plants mature quickly; initially turning reddish before completely curing to a tan- buff color. Forage yields fluctuate widely with changes in annual precipitation. The best forage quality is in late winter to mid spring and it must be grazed early in the growing season. Moreover, under drought situations the presence of cheatgrass causes rapid depletion of early season soil moisture, thus serving to out-compete, retard or prevent the establishment of perennial grasses (Welsh 1981).

Mature plants are unpalatable, the characteristic drooping seed heads becoming brittle as the plant dries, shattering upon disturbance and disseminating the sharp-tipped seeds with their barbed awns. These sharp-tipped seeds work their way into the eyes, nostrils, mouths, and intestines of grazing animals. Put succinctly by Aldo Leopold (1949), he writes "to appreciate the predicament of a cow trying to eat mature cheat, try walking through it in low shoes. All field workers in cheat country wear high boots." Leopold was perhaps one of the first authors to bring to the general public an awareness of the impact of cheatgrass in the west. In his essay "Cheat Takes Over," he addresses the ecological implications of its establishment with clarity and humor. His list of negative impacts and noxious characteristics are:

- replacement of rich and useful native bunchgrasses and wheatgrasses with the inferior cheat;
- prickly awns that, when mature, cause cheat-sores in the mouths of cows and sheep;
- extreme flammability of cheat-covered lands that results in burn-back of winter forage such as sagebrush, bitterbrush, and perennial grasses, and destruction of winter cover for wildlife;
- degradation of hay following invasion of alfalfa fields; and
- blockading of newly-hatched ducklings from making the vital trek from upland nest to lowland water.

Vectors: Overgrazing and misuse of western rangelands has resulted in trampling of native bunchgrasses and destruction of the soil surface and sometimes cryptogam layer, resulting in an increase in evaporation of soil moisture and reduction of bunchgrass population. Such disturbance favors the invasion of cheatgrass, whose seedlings become established during fall through late winter before the principal germination and growth period of native taxa. Homesteading and cultivation of winter wheat, beginning with the railroad boom of the 1880s, disturbed the land even further, and accelerated the introduction and establishment of cheatgrass.

Cultivation of land for winter wheat prepares a seedbed. The lack of the use of selective herbicides for the control of cheatgrass has aided its increase and spread.

The barbed awns of the florets penetrate or adhere readily to fur or clothing. When vehicles are driven across cheatgrass- infested land, seeds become lodged in clothing, tire treads, in cracks and crevices, and in mud of tires and bumpers, to be dislodged perhaps hundreds of miles distant. Since its introduction, cheatgrass has been spread far and wide by livestock, by trains and other vehicles, and by wildlife and livestock. Seeds, maturing before harvest of alfalfa and winter wheat, contaminate hay and grain.

Wildlife: Deer and elk make some use of cheatgrass in late winter to early spring while it is green and prior to other grasses and forbs beginning growth. It seems to be very important food, cover and nesting habitat for Hungarian partridge and chukar. Canada geese graze cheatgrass heavily in fall, winter and early spring.

Status

Consult the PLANTS Web site and your State Department of Natural Resources for this plant's current status, such as, state noxious status.

Description

General: Grass Family (Poaceae). Cheatgrass is an annual or winter annual, softly downy to short-hairy throughout, and generally 10- 60cm (4- 24 in) tall.

Stems are solitary or in a few-stemmed tuft. Ligules are short (usually 1- 2 mm long), membranous, and fringed at the top; auricles are lacking. Leaf blades are up to 20 cm (8 in) long, flat, relatively narrow, usually 2- 5 mm wide (1/8- 3/16 in), and generally long-ciliate near the base.

The roots are fibrous and usually quite shallow; the plants do not root at the nodes. The inflorescence is a soft and drooping, much-branched, open panicle, usually becoming a dull red- purple color as it matures to a tan- buff color when fully cured. Spikelets are about 1.5- 2.0 cm (0.6- 0.8 in) long with 3- 6 florets. Florets are 12- 19 mm (1/2- 3/4 in) long, tapering to sharp points. The glumes are shorter than the florets, the first 1-veined and the second 3-veined. Lemmas are sharply tipped, glabrous to densely hairy, more-or-less rounded on the back, and with a

nearly straight awn that is 7- 18 mm (3/8- 5/8 in) long. Flowering occurs from April to mid June depending on climate and location.

Reproduction is by seed. Germination occurs in fall through winter to early spring, depending on the climate and rainfall (Hickman 1993; Gleason & Cronquist 1991; Cronquist et al. 1977; Muenscher 1955; Uva et al. 1997).

Hitchcock (1950)

Adaptation
Cheatgrass grows in rainfall areas receiving 6- 22 inches or more. It does particularly well under conditions where rainfall occurs in fall, winter and early spring. During periods of multiple year drought, it may almost disappear from the plant community only to return in very lush stands as moisture conditions improve.

Cheatgrass prefers well drained soils of any soil texture. It is not well adapted to saline or sodic soil conditions or soils that are too wet.

Cheatgrass can be found at almost any elevation, but it does particularly well at elevations ranging from 500- 6,000 feet.

Distribution
Cheatgrass is one of the most widespread introduced annual grasses in the North America, occurring in all 50 states as well as in most of the Canadian provinces and also in parts of Mexico. It is most common where annual rainfall ranges from 15-55 cm (6- 22 in) and autumn rainfall ranges from 5-12 cm (2- 6 in) (Peepers 1984). It is a weed of roadsides, cropland, hayland, pastureland, rangeland and waste places, usually occurring on dry, sometimes weakly alkaline, clayey to loamy to sandy or gravelly soils. Cheatgrass is especially common in the western states including the Columbia Basin, Snake River Basin and the Great Basin (Morrow & Stahlman 1984). Uncommon or sporadic in the southeastern part of the United States, it is abundant over large areas of sagebrush plant communities, where whole landscapes are lush green, turning red- purplish by the developing inflorescences, then a tan- straw- buff color as the plants mature and cure.

For current distribution, consult the Plant Profile page for this species on the PLANTS Web site.

Establishment
This species is not recommended for seeding.

Control
Contact your local extension specialist or county weed specialist for assistance on recommendations for cheatgrass control in your area. Tillage and chemicals are the most common control methods. When using chemicals, it is important to always read and follow label and safety instructions. Trade names and control measures that appear in this document are only to provide specific information. USDA, NRCS does not guarantee or warranty the products and control methods named, and other products may be equally effective.

Environmental and Mechanical: Environmental practices, which minimize the further spread of cheatgrass, are suggested by knowledge of the circumstances, which have accompanied its spread. Vehicles, clothing, camp gear, and pets should be cleaned of adhering seed after driving, camping, and walking in cheatgrass-infested areas. Excessive roadside and rangeland disturbance should be avoided. In cultivated fields, mowing cheatgrass before seeds are formed and clean cultivation assist in control. Infested meadows and pastures can be harrowed while seedlings are small (Muenscher 1955). In cropland and hayland, the best control is often achieved by fallowing or planting continuous spring crops for two or more years (Kennedy et al. 1989).

Biological: Soil bacteria which cause crown rot may be a potential biological control for cheatgrass in the arid environment of western North America (Grey et al. 1995). The crown rot causing soil bacteria has been found to produce a toxin that is specific for cheatgrass and related species. Studies have shown that these bacteria can be used to suppress the growth of cheatgrass, thus resulting in substantial increases in winter wheat yields (Kennedy et al. 1989).

Applications of a strain (D7) of *Rhizobacterium* have been shown to selectively suppress cheatgrass in winter wheat test plots by means of a phytotoxin produced by the bacteria (Tranel et al. 1993), apparently by inhibition of root elongation.

Chemical: Non-selective herbicides are presently the primary chemical available for control of cheatgrass. Since non-selective herbicides can kill all vegetation they contact, not just the problem weed, care must be taken that they do not contact desirable plants.

The chemical fluazifop has been shown to prevent seed formation in cheatgrass, most successfully when applied early in the reproductive phase (Richardson et al. 1987. Metribuzin or Metribuzin plus terbutryn, fall-applied, have succeeded in reducing cheatgrass infestations and increasing wheat yields. The combination results in better control. Sulfonylurea herbicides have been shown to increase winter wheat yields when used for cheatgrass control.

Other herbicides that have been recommended for cheatgrass management include glyphosate, bromacil, imidazolinone and tebuthiuron.

Formulations containing glyphosate are marketed as JURY, RATTLER, ROUNDUP, and RODEO. Those containing bromacil are sold as HYVAR X and HYVAR X-L. Those containing imidazolinone are sold as Plateau. Tebuthiuron is sold as SPIKE 80W.

Glyphosate controls cheatgrass by inhibition of biosynthesis of amino acids. It is applied to above ground parts, since the active ingredient is adsorbed and made inactive by soil particles. Following absorption, glyphosate is translocated to underground structures and should thus be applied during active growth. Growth is inhibited soon after application, and foliar chlorosis and necrosis are seen within 10-20 days. Contact with formulations of glyphosate should be avoided. **Ingestion requires emergency medical attention**.

Bromacil inhibits photosynthesis. It is readily absorbed through the root system and is then translocated to foliage. It is applied as a spray just before or during the period of active growth, preferably when rain can be expected for soil activation. Application near desirable plants or grazing of cattle in treated areas should be avoided. After the herbicide has been carried into the root zone by rain, leaf chlorosis and defoliation occur within a week. Contact with bromacil may irritate eyes, nose, throat, and skin. In case of contact, flush eyes copiously with water and wash skin with soap and water. **Get medical attention if irritation persists**.

Tebuthiuron is a pre- and post-emergence herbicide used for total control of vegetation. A small amount of the herbicide in contact with roots of desirable plants may kill them. It produces browning of vegetation within one week, which suggests that it acts through photosynthesis inhibition. It is absorbed principally through the roots, and is readily translocated. For best results it should be applied before spring growth begins. At least one inch of rainfall is needed to activate the herbicide and place it in the seed germination zone, so it should be applied before the predominant portion of annual rainfall occurs. It may not be fully effective on clay soils or those high in organic matter. Tebuthiuron should not contact skin, clothing, or eyes (causes eye irritation). If it gets on skin or in eyes, wash with plenty of water; if swallowed, or if breathing difficulty develops from inhalation, get emergency medical attention.

Imidazolinone, sold as Plateau is a pre- and post-emergence herbicide used for partial to total control of vegetation. Plateau herbicide may be used for control of brome grass species and tall fescue. It can be used for the release of most other wheatgrasses, native grasses, wildflowers and certain legumes. It is readily absorbed through leaves, stems, and roots and is translocated rapidly throughout the plant, with accumulation in the meristematic regions. Treated plants stop growing soon after spray application. Adequate soil moisture is important for optimum herbicide activity. When adequate soil moisture is present, it will provide residual control of susceptible germinating weeds. Activity on established weeds will depend on the weed species and rooting depth. Post emergence application is the method of choice in most situations, particularly for perennial species. It may be applied in the dormant or growing season for weed control. Tolerance of desirable grass species to Plateau herbicide may be reduced when grasses are stressed due to insect damage, disease, environmental conditions, shade, poorly drained soils or other causes. It should not be applied to newly seeded or sprigged grass stands, unless stated in label.

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ATTACHMENT D

COLORADO DEPARTMENT OF NATURAL RESOURCES NATIVE PLANT REVEGETATION

APPENDIX III: WEED LISTS

COLORADO PROHIBITED NOXIOUS WEED SEEDS

Table A6: Colorado Prohibited Weed Seeds

(none allowed for certified seed)

	COMMON NAME	SCIENTIFIC NAME
*	ANODA, SPURRED	*Anoda cristata*
	BINDWEED, FIELD	*Convolvulus arvensis*
*	BOUNCINGBET	*Saponaria officinalis*
*	CAMELTHORN	*Alhagi pseudalhagi*
*	CHAMOMILE, SCENTLESS	*Anthemis arvensis*
*	CINQUEFOIL, SULFER	*Potentilla recta*
*	CLAMATIS, CHINESE	*Clematis orientalis*
*	DAISY, OXYEYE	*Chrysanthemum leucanthum*
	GOATGRASS, JOINTED	*Aegilops cylindrica*
	HALOGETON	*Halogeton glomeratus*
	HORSENETTLE, CAROLINA	*Solanum carolinense*
	HORSENETTLE, WHITE	*Solanum elaeagnifolium*
*	HOUNDSTONGUE	*Cynoglossum officinale*
	JOHNSONGRASS	*Sorghum halepense*
*	KNAPWEED, BLACK	*Centaurea nigra*
	KNAPWEED, DIFFUSE	*Centaurea diffusa*
	KNAPWEED, RUSSIAN	*Acroptilon (Centaurea) repens*
	KNAPWEED, SPOTTED	*Centaurea maculosa*
*	KNAPWEED, SQUAROSE	*Centaurea virgata*
	LOOSESTRIFE, PURPLE	*Lythrum salicaria* and *Lythrum virgatum*
*	MALLOW, VENICE	*Hibiscus trionum*
*	MEDUSAHEAD	*Taeniatherum caput-medusae*
*	MILLET, WILD PROSO	*Panicum miliaceum* ssp. *ruderale*
*	NUTSEDGE, YELLOW	*Cyperus esculentus*
	PEPPERWEED, PERENNIAL	see Whitetop, tall
	POVERTYWEED, SILVERLEAF	*Ambrosia tomentosa (Franseria discolor)*
	POVERTYWEED, WOOLLYLEAF	*Ambrosia grayi (Franseria tomentosa)*
+	ROCKET, DAME'S	*Hesperis matronalis*
*	RUE, AFRICAN	*Peganum harmala*
*	SAGE, MEDITERRANEAN	*Salvia aethiopis*
*	SALTCEDAR	*Tamarix parviflora* and *Tamarix ramosissima*
*	SKELETONWEED, RUSH	*Chondrilla juncea*
	SORGHUM, ALMUM	*Sorghum almum*
	SOWTHISTLE, PERENNIAL	*Sonchus arvensis*
*	SPURGE, CYPRESS	*Euphorbia cyparissias*
	SPURGE, LEAFY	*Euphorbia esula*
*	SPURGE, MYRTLE	*Euphorbia myrsinites*
	ST. JOHNS WORT, COMMON	*Hypericum perforatum*

Table A6: Colorado Prohibited Weed Seeds

(none allowed for certified seed)

	COMMON NAME	SCIENTIFIC NAME
	STARTHISTLE, YELLOW	*Centaurea solstitialis*
*	TARWEED, COAST	*Madia sativa*
	THISTLE, CANADA	*Cirsium arvense*
	THISTLE, MUSK	*Carduus nutans*
	THISTLE, PLUMELESS	*Carduus acanthoides*
	THISTLE, SCOTCH	*Onopordum acanthium* and *Onopordum tauricum*
	TOADFLAX, DALMATIAN	*Linaria dalmatica*
	TOADFLAX, YELLOW	*Linaria vulgaris*
	WHITETOP	*Cardaria draba*
	WHITETOP, HAIRY	*Cardaria pubescens*
	WHITETOP, TALL	*Lepidium latifolium*
	WOAD, DYER'S	*Isatis tinctoria*

* These weeds are added to the prohibited noxious weed list effective January 1, 1999.
\+ Dame's rocket shall not be considered a prohibited noxious weed until January 1, 2001.

COLORADO RESTRICTED NOXIOUS WEED SEEDS

Table A7: Colorado Restricted Noxious Weed Seeds

(Up to 6 per lb allowed for Certified Seed)

	COMMON NAME	SCIENTIFIC NAME
	BLUEWEED	*Helianthus ciliaris*
*	BURDOCK, COMMON	*Arcticum minus*
	BUTTERPRINT OR VELVET LEAF	*Abutilon theophrasti*
	DOCK, CURLY	*Rumex crispus*
	DODDER	*Cuscuta* spp.
	FOXTAIL, GIANT	*Setaria faberi*
	GROUNDCHERRY, PURPLE	*Quincula lobata (Physalis lobata)*
*	HEMLOCK, POISON	*Conium maculatum*
*	HENBANE, BLACK	*Hyoscyamus niger*
	LETTUCE, BLUE	*Lactuca tatarica* ssp. *pulchella (Lactuca pulchella)*
	MUSTARD, BLACK	*Brassica nigra*
	MUSTARD, INDIA	*Brassica juncea*
	MUSTARD, WILD	*Sinapsis arvensis*
	OAT, WILD	*Avena fatua*
	PLANTAIN, BUCKHORN	*Plantago lanceolata*
	POVERTYWEED, MOUSE-EAR	*Iva axillaris*
	PUNCTUREVINE	*Tribulus terrestris*
	QUACKGRASS	*Elytrigia repens (Agropyron repens)*
*	SANDBUR, LONGSPINE	*Cenchrus longispinus*
*	THISTLE, BULL	*Cirsium vulgare*

* These weeds are added to the prohibited noxious weed list effective January 1, 1999.

PLANTS TO AVOID

Plants to Avoid (modified from Plant Species Not To Use in Gardening, Reclamation, and Restoration by the Colorado Native Plant Society, Boulder Chapter. November, 1995.) This is not a complete list. New species are continually identified that have escaped cultivation to become weed problems.

FORBS

Bellflower, **Creeping** (*Campanula rapunculoides*) - Stoloniferous plant that displaces native vegetation. Found in the foothills and plains in shady places.

Bindweed, **Field** (*Convovulus arvensis*) - Perennial with extensive root system and stems that climb or form dense tangled mats. Difficult to control. Common on disturbed sites.

Bouncing Bet or **Soapwort** (*Saponaria officinalis*) - Escapes from gardens and displaces native vegetation. Occurs on roadsides, trails, and homestead sites on mesas and in the foothills.

Burdock (*Arctium minus*) - Biennial that competes with native vegetation. Often disperses by sticking to the hair of livestock and wildlife. Found on roadsides, trails, ditches, and streambanks.

Butter-and-Eggs (*Linaria vulgaris*) - Escaped ornamental with yellow, snapdragon like flowers. Highly invasive in natural areas and very difficult to control.

Carrot, **Wild** or **Queen Anne's Lace** (*Daucus carota*) - Escapes from gardens, spreading by seeds. Found along roadsides in the plains and foothills.

Chamomile, **Scentless** (*Matricaria perforata = Anthemis arvensis*) - Adventive plant that competes with native vegetation. Found along roadsides, pastures, and townsites in the mountains.

Chicory (*Cichorium intybus*) - Adventive weed that competes with native vegetation. Occurs on roadsides, trails, and open areas.

Cinquefoil, **Sulfur** (*Potentilla recta*) - Adventive perennial. Found in disturbed areas, along roadsides and in pastures.

Clematis, **Oriental** (*Clematis orientalis*) - Adventive plant that competes with native vegetation. Found in the foothills and montane areas especially along Clear Creek.

Crambe (*Crambe cordifolia*) - Escapes from gardens. Produces abundant seeds. Found on disturbed sites.

Daisy, **Ox-eye** (*Leucanthemum vulgare = Chrysanthemum leucanthum*) - Escapes from gardens and spreads easily by seeds. Displaces native plants. In wildflower seed mixes and used in roadside reclamation. Establishes in natural areas. Found from the plains to the alpine.

Dame's Rocket or **Sweet Rocket** (*Hesperis matronalis*) - Escaped from gardens displacing native vegetation. Occurs in riparian areas and wet meadows.

Dyer's Woad (*Isatis tinctoria*) - Escapes from cultivation. Occurs on disturbed sites. Invades natural areas.

Field bindweed (*Convolvulus arvensis*) - Competitive perennial weed. Widespread in cultivated areas, pastures, lawns, gardens, roadsides, and waste areas.

Hoary Cress (see Whitetop)

Hemlock, **Poison** (*Conium maculatum*) - All plant parts are poisonous, including the large, white taproot. Biennial that tolerates poorly drained soils. Frequently found on streambanks.

Horehound (*Marrubium vulgare*) - Escapes from cultivation. Found on disturbed sites.

Hound's Tongue (*Cynoglossum officinale*) - Escapes from cultivation. The prickly seeds travel on fur and clothing. Found on disturbed areas, trails, and logging sites.

Knotweed, **Japanese** or **Buckwheat** (*Reynoutria japonica*) - Escapes cultivation. Spreads by long rhizomes. Found in populated areas at the base of the foothills.

Knapweed, **Diffuse*** (*Centaurea diffusa*) - Highly competitive annual that is found along roadsides, waste areas, and dry rangelands.

Knapweed, **Russian*** (*Centaurea repens*) - Perennial that spreads by black, deep growing roots along roadsides, pastures, orchards, and cultivated fields.

Knapweed, **Spotted*** (*Centaurea maculosa*) - Short-lived perennial. Found along roadsides, waste areas, and rangelands.

Kochia (*Kochia scoparia*) - Annual introduced weed that reproduces by seeds. Grows in cultivated fields and waste places.

Loosestrife, **Purple** (*Lythrum salicaria*) - Attractive, perennial garden plant that is extremely invasive and threatens cattail marshes and other wetlands. Spreads by seeds in mud and water and by pieces of stems.

Mustard, **Jim Hill** or **Tumble** (*Sisymbrium altissimum*) - Adventive plant that breaks at the soil level and tumbles with the wind spreading its seed over a wide area. Common in fields, rangeland, waste areas and along roads.

Pepperweed, **Perennial*** (*Lepidium latifolium*) - Perennial with deep rootstocks that make the plant difficult to control. Found in wetland and riparian areas.

St. John's Wort (*Hypericum perforatum*) - Competes with and displaces native vegetation. Poisonous to animals. Found in open areas on mesas in the foothills.

Sage, **Mediterranean** (*Salvia aethiopis*) - Escapes from cultivation forming pure stands that out compete natives. Winter tumbleweed. Found in grasslands, pastures, meadows and rangelands.

Spurge, **Leafy*** (*Euphorbia esula*) -Perennial that reproduces by vigorous rootstocks and seed. Milky sap is irritating to the skin and detrimental to cattle. Grows in disturbed sites and along riparian corridors.

Spurge, **Myrtle** or **Mercer's** (*Euphorbia myrsinites*) - Escapes from gardens and displaces native vegetation. Xeriscape plant with poisonous sap. Found on trails and meadows in the plains and foothills. Also occurs in logged or disturbed forest areas of the mountains.

Starthistle, **Yellow** (*Centaurea solstitialis*) - Not common in Colorado yet, but is considered a serious threat in our northern and western neighboring states.

Sweetclover, **White** (*Melilotus albus*) - Reclamation escapee. Found along roadsides, trails, and disturbed sites.

Sweetclover, **Yellow** (*Melilotus officinalis*) - Reclamation escapee. Found along roadsides, trails, and disturbed sites.

Sweetpea, **Perennial** (*Lathyrus latifolius*) - Escapes from cultivation. Spreads by explosive seed pods. Commonly found on urban fringes.

Tansy, **Common** (*Tanacetum vulgare*) - Used as a medicinal herb, escapes and spreads by seeds and rootstocks. Found on roadsides, streambanks, and pastures.

Teasel (*Dipsacus fullonum*) - Biennial with a taproot. Occurs on moist soils.

Thistle, **Bull** (*Cirsium vulgare*) - Has a short, fleshy taproot. Occurs on disturbed sites.

Thistle, **Canada*** (*Cirsium arvense*) - Aggressive weed, extremely difficult to control because breaking up the roots just increases the number of plants. Commonly found in moist to wet disturbed areas.

Thistle, **Musk*** (*Carduus nutans*) - Biennial that spreads rapidly forming dense stands and crowds out desirable forage plants. Grows in pastures, roadsides, and waste areas.

Thistle, **Russian** (*Salsola iberica* and *S. collina*) - Annual with stiff, spiny leaves. At maturity, plant breaks off at the base, and tumbles with the wind, scattering the seed. Grows on dry plains, in cultivated fields and waste places.

Thistle, **Scotch** (*Onopordum acanthium* and *O. tauricum*) - Biennial with very large coarsely lobed, hairy leaves with a velvety-gray appearance. It is increasing in densities throughout Colorado.

Toadflax, **Dalmatian** (*Linaria genistifolia* ssp. *dalmatica*) - Perennial with extensive and deep root system. Difficult to control. Found on disturbed, open areas, roadsides, and trails in the plains, foothills and montane areas.

Toadflax, **Yellow** (see Butter-and-Eggs)

Whitetop (*Cardaria draba, C. Chalepensis, C. latifolia*) - Perennial that reproduces from root segments and seeds. Common on disturbed, alkaline soils.

GRASSES

Some of the grasses listed here, including **crested wheatgrass** (*Agropyron cristatum*), **smooth brome** (*Bromus inermis*), **orchardgrass** (*Dactylis glomerata*), and **timothy** (*Phleum pratense*), are planted for hay or pasture grass, or are used for erosion control or reclamation projects where the use of native species is not a priority. These species are listed in the weed section because they can be detrimental to the establishment of native species.

Barnyard Grass (*Echinochloa crusgalli*) - An annual grass that spreads by seeds. Found in croplands and disturbed areas.

Brome, **Smooth** (*Bromus inermis*) - Competes with native vegetation via extensive underground roots. Found in planted grasslands and roadsides, especially on moister sites. It has escaped from planted areas and invaded disturbed native ecosystems.

Cheatgrass* (*Bromus tectorum*) - An aggressive winter annual that out competes native plants and is a fire hazard. Widespread along roadsides, in waste areas, and in disturbed pastures and rangelands.

Johnsongrass (*Sorghum halepense*) - Vigorous perennial that reproduces from seed or creeping, robust rhizomes. Grows in cultivated fields and neglected areas.

Orchardgrass (*Dactylis glomerata*) - Widely used in pastures. It has escaped and invaded roadsides and disturbed habitats.

Reedgrass, **Canary** (*Phalaris arundinacea*) - Stout perennial which regenerates from large rootstocks. Found along streams, ditches, and in marshes. It has escaped from intentional plantings to establish on disturbed riparian and wetland habitats.

Rye, **cereal** (*Secale cereale*) - Annual. Escapes cultivation and can become established on roadsides, waste places, and even open rangeland.

Timothy (*Phleum pratense*) - Escapes from pasturelands and competes with native vegetation. A habitat generalist, it is found in dry to wet soils.

Wheatgrass, **Crested** (*Agropyron cristatum*) - Persistent reclamation grass that out competes native grasses, and can cause soil erosion between individual plants. Found along roadsides, trails, and disturbed areas.

SHRUBS

Buckthorn (*Frangula alnus*) - Escapes from gardens and competes with native vegetation. Found in riparian areas in the plains, especially in urban areas.

Tamarisk or **Salt Cedar*** (*Tamarix ramosissima* and *T. parviflora*) - Very aggressive shrub or small tree. Has displaced the native willows along riparian corridors especially on the Western Slope and lower Arkansas River valley.

TREES

Elm, **Siberian** (*Ulmus pumila*) - Widely planted, hardy tree that escapes cultivation. Found along roadsides and floodplains.

Russian Olive* (*Elaeagnus angustifolia*) - Extremely invasive tree that displaces native willows and cottonwoods throughout the plains and Western Slope. Seed commonly dispersed by birds. Found along riparian corridors.

Willow, **Crack** (*Salix fragilis*) - Originally cultivated along streams. Displaces native cottonwoods and willows. Found in riparian corridors along the plains and lower foothills.

Willow, **White** (*Salix alba* var. *vitellina*) - Displaces native willows and cottonwoods. Found in riparian corridors.

* Discussed in more detail in **Appendix IV: Managing The Most Common And Aggressive Weeds Of Colorado**.

APPENDIX IV: MANAGING THE MOST COMMON AND AGGRESSIVE WEEDS OF COLORADO

FORBS

Diffuse knapweed (*Centaurea diffusa*)

Description: This usually biennial weed has finely divided leaves and numerous solitary flower heads. It is distinguished from other knapweeds by the comb-like, spiny bracts under the flower heads. This introduced weed invades disturbed and undisturbed ground with dry, light soils. It spreads rapidly as it breaks off at the ground level and blows into new areas. The dry seed heads can also easily attach to animals' fur, tire tread and hiking boots. It typically has white flowers.

Management Methods: The key to controlling this weed is to prevent seed production.

Cultural Control: The most effective way to prevent invasion of this noxious weed is to revegetate disturbed areas as soon as possible.

Chemical Control: Transline (clopyralid) is an effective chemical control for diffuse knapweed when applied at the rosette to early bolting growth stage. This herbicide is only effective on four plant families. Other herbicides such as Banvel (dicamba), Tordon (picloram), or tank mixes of Banvel plus 2,4-D, Banvel plus Tordon, and others are also effective against diffuse knapweed.

Biological Control: The root-boring beetle (*Sphenoptera jugoslavica*) has the best potential for success against diffuse knapweed, although further research needs to be done. Two seedhead flies (*Urophora* spp.), and several species of seedhead weevil have been released against diffuse knapweed with marginal control success. Grazing with sheep, goats and cattle will also reduce knapweed seed set and release grasses from competition. Spring grazing can be effective for reducing seed formation especially when a large number of animals have been grazed in a small area for a short time.

Russian knapweed (*Acroptilon repens = Centaurea repens*)

Description: This purple-flowered perennial spreads by seeds and creeping roots. The extensive roots can grow to 23 feet (7 meters) deep within two years of establishment. Russian knapweed differs from other knapweeds by having broad, round bracts with papery margins under the flower head. In Colorado, an estimated 50,000 acres (20,235 hectares) has been infested by this noxious weed. Abandoned farmlands are the most frequently invaded habitats.

Control Measures: The most effective weed control plan combines cultural control methods with mechanical and/or chemical control methods. Mowing or applying herbicide alone is usually not sufficient.

Cultural Control: Planting an area with grasses helps prevent the establishment and spread of Russian knapweed.

Mechanical Control: Mowing the area two to three times per season for two or more seasons helps prevent seed production and stresses the plant. Mow after the plant has bolted, but before the seeds have matured (usually six to eight week intervals). More than one season of mowing is recommended because mowing for only a year may actually increase Russian knapweed density.

Chemical Control: Herbicides alone will rarely manage this weed effectively. Curtail, Tordon 22K or Transline can be sprayed at the bud to flower growth stage. Then a month to six weeks before seeding, disk the area. Plant grass seed, especially cool season grasses.

Spotted knapweed (*Centaurea maculosa*)

Description: Very similar to diffuse knapweed, this short-lived perennial reproduces from seed. It typically has purple flowers. The distinguishing physical character of spotted knapweed is a small, dark spot at the end of the bracts underneath the flower head. This noxious weed invades disturbed ground with light, well drained, often calcareous soils. It survives in slightly more moist soils than diffuse knapweed.

Management Measures: Spotted knapweed can be managed in the same manner as diffuse knapweed.

Leafy spurge (*Euphorbia esula*)

Description: This Eurasian native forms dense patches in riparian corridors. It can invade dry as well as moist sites. This plant has leafy stems supporting bright yellow-green flowers. This perennial grows from seeds and root stock. The extensive root system may grow 15 feet (4.5 meters) deep or more. It is extremely difficult to control, much less eradicate this weed, once it has become established. Leafy spurge grows rapidly, taking moisture and nutrients from native plants before they have had a chance to grow. It also produces a white milky sap that is irritating to skin and detrimental to grazing wildlife, horses and cattle.

Management Measures: Attempts to kill this plant with herbicides will be more effective if the plants are stressed before herbicides are applied.

Prevention: The most effective management technique is to prevent this weed's establishment. All other methods are difficult and require great persistence.

Cultural Control: Having a good cover of grasses, especially early in the growing season, helps prevent an infestation of leafy spurge from spreading.

Mechanical Control: It is difficult to control leafy spurge with mowing alone. However, mowings at 14 to 21 day intervals throughout the summer can be combined with herbicide control to decrease the amount of herbicide needed. Caution: leafy spurge's milky sap may gum up the mower.

Chemical Control: Timing herbicide application is critical, and all treatments may need to be repeated for several years. Roundup (Glyphosate) needs to be applied at one month intervals (1 quart per acre) beginning in June, and works best when combined with fall grass seedings. Other herbicides such as Banvel (dicamba) and Tordon 22K (picloram) require fewer applications. Neither Tordon or Banvel should be used under woody vegetation or where ground water is more than six feet (1.8 meters) below.

Biological Control: Sheep and goats can graze on leafy spurge to help stress control (but not eradicate) the plant. Other livestock avoid the plant. The Colorado Department of Agriculture has four varieties of flea beetle available to feed on and help control leafy spurge. The appropriate type of beetle depends on the soil type, moisture regime, and cover of the area.

Canada thistle (*Cirsium arvense*)

Description: This aggressive weed forms large dense patches of prickly plants along the bottoms of intermittent drainages and other areas with moist soil. This thistle, however, does not do as well in continually saturated or inundated soils (although, it does grow in seasonally saturated or inundated sites). It is extremely difficult to eradicate because it has an extensive root system and new plants can grow from even a small piece of root. One plant can colonize an area up to six feet (1.8 meters) in diameter in one or two years. Canada thistle grows to three to five feet (1-1.5 meters) tall, has spine-tipped leaves, smooth stems, and small lavender flowering heads.

Management Measures: In addition to prevention, the critical management measure is to stress the plant by forcing it to use stored root nutrients. The most effective way to prevent this species is to revegetate moist bare soil.

Cultural Control: After establishment, competition with other plants is helpful, but not completely effective in controlling this weed. Reseeding is often necessary after the thistle has been removed from an area.

Mechanical Control: Mowing can be effective when combined with herbicide treatments, especially in areas with competition from established grasses. Mow throughout the growing season and then treat with herbicides in the fall. Mowing alone, without herbicides, can be effective if done at one-month intervals over several years. Late spring burning will also stress the plant if sufficient dead plant material is available to carry a fire hot enough to kill spring rosettes. Burning will have to be repeated annually for several years or at three year intervals.

Chemical Control: Herbicides can be effective, especially when combined with mowing, tilling, and competition from other plants. Mow two or three times in the summer at monthly intervals (beginning at bolt to early bud-growth stage) and follow with a fall application.

Biological Control: The larvae of the weevil *Ceutorhyncus litura* bores into Canada thistle, weakening the plant. This weevil alone will not effectively control thistle but it can be combined with other methods. *Urophora cardui* is another insect that helps to control this weed. Grazing can be used in the spring and early summer to help control Canada thistle in riparian areas as well.

Musk thistle (*Carduus nutans*)

Description: This biennial weed is a prolific seed producer and reproduces rapidly. It establishes in moist, bare ground. Reaching up to 6 feet (1.8 meters) tall, musk thistle has spiny marginated leaves and rose pink clusters of flowers growing at the top of the stem.

Management Measures: In addition to prevention, the key to controlling this weed is to prevent seed production.

Cultural Control: Because seeds need open moist ground to germinate, the most effective control method is to keep an area vegetated. Do not allow a grassland to degrade into open areas of bare soil.

Mechanical Control: Tilling can effectively remove musk thistle. Cut the weed below the soil line before the bud stage. Mowing when the terminal flower head is in the late-flowering stage can be effective. However, musk thistle (like many biennials) will often continue to live until it is afforded the opportunity to flower and produce seed. Mowed debris should be gathered and burned to destroy any seeds.

➲ Be aware that tilling may promote the germination of other weeds in the seed bank.

Chemical Control: Several different herbicides (e.g. Banvel, Tordon, Curtail, Transline, 2,4-D) can be applied to the musk thistle rosettes in the spring or fall before the flowering stems are produced (bolting). Apply Escort in early spring when the thistle is in the bolting to early-flower growth stages.

Biological Control: The most successful and widespread biological control insect for weed management has been the musk thistle seed head weevil, *Rhinocyllus conicus*. It infests developing terminal flowers on most areas of the state. However, this seed head weevil has been found to attack native thistles as well. Another musk thistle weevil is *Trichosirocalus horridus*. Instead of reducing seed production, this insect feeds on the developing thistle rosette.

Perennial Pepperweed (*Lepidium latifolium*)

Description: Creeping perennial mustard that reproduces from seed and roots. It is highly competitive in wetland and riparian areas often forming pure stands.

Management Measures: Prevention is the best method. Soon after disturbance, sow perennial grasses that grow early in the season.

Cultural Control: When battling an existing infestation, combine grass seeding with the other methods described below.

Mechanical Control: Mowing may reduce seed set but will not control established stands.

Chemical Control: Telar or Escort are very effective and should be applied in late spring, bud to flower growth stage. Landmaster/Campaign can also be applied at the flower growth stage. Desirable seed can be sown into the residues of these herbicides in the fall following late spring application. When restoring an infested site, disk lightly. Landmaster/Campaign may need to be sprayed for two consecutive seasons; the area should be seeded in the fall following the second application.

GRASSES

Cheatgrass or Downy Brome (*Bromus tectorum*)

Description: This winter annual grass grows from seed to a height of 4 to 30 inches (10 to 76 centimeters). Growing in early spring and summer, this weed effectively competes with more desirable native grasses for moisture and nutrients. As the plant dries in summer, it becomes a fire hazard.

Cultural Control: Several native grasses, including bottlebrush squirreltail and western wheatgrass have been shown to compete well with cheatgrass.

Mechanical Control: Grazing, mowing and controlled burning may be used to control cheatgrass. If the weed has been in the area for many years, the soil probably has a large bank of cheatgrass seeds. The plant will continue to sprout and control will require several years of effort. The most effective intensity and timing of efforts for grazing, mowing and burning have not been well established and may vary with geographic setting and habitat type. The guiding principle is to limit the cheatgrass infestation without damaging native warm season grasses. The most commonly used prescribed burn approach is to burn in early spring when the cheatgrass is 1-1.5" tall. Burning later in the summer after cheatgrass seedset but before seedset of warm season grasses has also been effective in some areas (T. Nauman, personal communication).

Chemical Control: Several different herbicides can kill cheatgrass. However, they may also kill the desired native plants. Pronamide applied in late fall will control cheatgrass selectively in stands of slender wheatgrass, western wheatgrass, and other grasses (although, this does not mean it is harmless to all grasses). The label for Pronamide prohibits grazing of treated grass. Pronamide also will control seedlings shortly after they germinate. Glyphosate is another herbicide that when applied in the early spring or late winter (mid-to late February along the Front Range) does not reduce the cover of western wheatgrass, blue grama and needlegrasses. This treatment can be pushed a little later in the season (early March along the Front Range) and still not harm the desirable grasses especially warm season grasses. Glyphosate affects only the living plant and does not affect the seeds that may be in the ground.

TREES/SHRUBS

Russian-olive (*Elaeagnus angustifolia*)

Description: This fast-growing tree has silvery green leaves and long thorns. The fruit is olive-shaped. A European native, Russian-olive has been widely sold in Colorado as an ornamental shade tree. Along some streams, Russian olive has completely replaced native woody vegetation such as cottonwoods, thus reducing the amount and quality of wildlife habitat.

Management Methods: Russian olive trees can be controlled by either cutting the trees down and treating the stumps with herbicide, or pulling the tree out of the ground when it is young. The cutting method should be used on trees larger than two inches (5 centimeters) in diameter. Cut the Russian olive trees within four inches (10 centimeters) of the ground. Within five minutes of cutting, treat the stumps with an herbicide. Appropriate herbicides to use would include Garlon, the premixed product Pathfinder and Rodeo. Garlon decomposes rapidly after application, in a day or less in sunlit water and approximately two weeks to two months in soil. Rodeo (glyphosate) is specified for use in riparian or wetland habitats. Monitor and implement follow-up treatment as needed. Follow-up treatments are best completed the following June before any possible resprouts have time to grow. Retreated areas should be monitored every 6 months until complete mortality is ensured. Care should be taken not to introduce any herbicide into adjoining waters.

Trees less than about two inches (5 centimeters) in diameter can be wrenched out of the soil by means of a weed winch. Removal of small Russian olive trees will be easier when the soil is moist so that the majority of roots can be extracted.

Tamarisk or Salt Cedar (*Tamarix ramosissima* and *T. parviflora*)

Description: This shrub grows from 5 to 20 feet (1.5 to 6 meters) tall. Tiny scale-like leaves grow on slender reddish-brown stems. Originally introduced for erosion control purposes, tamarisk has become naturalized along many of the streams and canals of the West. It forms dense stands that replace native vegetation and degrade wildlife habitat.

Management Methods: The recommended management method is the same as described for Russian Olive.

APPENDIX V: REGIONAL VENDORS OF PLANT MATERIALS

Table A8: Colorado Plant Material Vendors		
Anderson Seed	2410 10th St., Greeley, CO 80631	(970) 353-0188
Applewood Seed Co.	5380 Vivian St., Arvada, CO 80002	(303) 431-6283
Applewood Seed Co.	P.O. Box 270, Rocky Ford, CO 81067	(719) 254-7460
Aquatic and Wetland Nurseries	1655 Walnut St., Suite 205, Boulder, CO 80302	(303) 442-5770
Arbor Valley Nursery	P.O. Box 932, Brighton, CO 80601	(303) 654-1682
Arkansas Valley Seeds, Inc.	4333 Hwy. 66, Longmont, CO 80504	(303) 535-4481
Bookcliff Gardens	755 26 Rd., Grand Junction, CO 81506	(970) 242-7766
Camelot Gardens	16612 S. Hwy 550, Montrose, CO 81401	(970) 249-6109
Carhart Feed and Seed	Dove Creek, CO 81324	(970) 677-2233
Colo-Hydro Inc.	5555 Ute Highway, Longmont, CO 80501	
Colorado State Forest Service	CSU-Foothills Campus, Ft. Collins, CO 80523	(970) 491-8429
Colorado Alpines, Inc.	P.O. Box 2708, Avon, CO 81620	(970) 949-6464
Country Lane Wholesale Nursery	2979 North Hwy 83, Franktown, CO 80116	(303) 688-2442
Earth, Wind, and Rock	5899 Co. Rd. 24, Ridgeway, CO 80143	
Farmers Marketing Assoc.	4545 Madison St., Denver, CO 80216	
Farmers Pride Seed Co.	916 19 1/2 Rd., Fruita, CO 81521	
Ft. Collins Nursery	2224 N. Shields, Ft. Collins, CO 80524	(970) 484-1289
Green Acres Nursery	4990 McIntyre St., Golden, CO 80403	(303) 279-8204
Hydro-Garden, Inc.	P.O. Box 9707, Colorado Springs, CO 80932	
Iliff Gardens	4750 East Iliff, Denver, CO 80222	(970) 858-9134
Kroh Nursery	Loveland, CO 80537	
Little Valley Nursery	13022 E. 136 Ave., Brighton, CO 80524	(800) 221-3241 or (303) 659-6708
Longmont Seed Co.	P.O. Box 2298, Longmont, CO	(970) 776-1560
Mile High Seed Co.	Box 1988, Grand Junction, CO 81501	(970) 242-3122
Neco, Inc.	Box 1178, Cahone, CO 81320	
Northrup-King and Company	1621 West Twelfth Ave., Denver, CO 80204	
Northrup-King and Company	Box 998, Longmont, CO 80501	
Pawnee Buttes Seed Inc. (formerly Southwest Seed)	P.O. Box 1604 605 25TH Street Greeley, CO 80632	(970) 356-7002 (800) 782-5947
Rocky Mountain Native Plants, Co.	2730 Snowmass Creek Road, Snowmass, CO 81654 bigsky@aspeninfo.com native@aspeninfo.com	(970) 927-0925

Table A8: Colorado Plant Material Vendors		
Rocky Mountain Rare Plants	P.O. Box 200483, Denver, CO 80220	
San Juan Native Nursery	Box 302, Pagosa Springs, CO 89117	
Sharp Brothers Seed	101 East 4th St., Greeley, CO 80631	(970) 356-4710
Steamboat Landscaping, Inc.	Box 1521, Steamboat Springs, CO 80477	
Sunchaser Natives	14290 W. 54th Ave., Arvada, CO 80002	
Dean Swift	Box 24, Jarosa, CO 81138	
Timberline Tree Seed	Rye Star Route, Box 145, Pueblo, CO 81104	
Treehouse Nursery	7450 Velmont Road, Boulder, CO 8030	
Upper CO Environ. Plant Center	P.O. Box 448, 5538 Rio Blanco County Rd. 4, Meeker, CO 81641	(970) 878-5003
Western Evergreen, Inc.	14201 West Forty-fourth Ave., Golden, CO 80401	
Western Native Seed	P.O. Box 1463, Salida, CO 81201	
Yellow Pine Nurseries	Box 192, Kiowa, CO 80117	(719) 539-1071

Table A9: Idaho Plant Material Vendors		
All Seasons Landscape Nursery	3376 E. Overland Rd., Meridian, ID 83642	(208) 888-6268
Allied Seed, Inc.	1917 E. Fargo Ave., Nampa, ID 83651	(208) 466-9218
Aloha Landscape and Nursery	4291 S. Cloverdale Rd., Boise, ID 83704	(208) 362-2062
Asgrow Seed Co.	1811 E. Florida Ave., Nampa, ID 83651	(208) 466-3351
Bakker Bros. of Idaho	Eastland Dr. South, Twin Falls, ID 83301	(208) 459-1900
W.R. Baxter Wholesale Nursery	2615 Pioneer Ave., Emmett, ID 83617	(208) 365-6011
Baxter Wholesale Nursery	P.O. Box 621Meridian, ID 83642	
Boise Valley Seed, Inc.	R.R.10, Darrow Land, Caldwell, ID 83651	(208) 459-7211
Brown King Nursery	1407 Arthur Street, Caldwell, ID 83605	
Clayton Wholesale Nursery Co.	6622 Joplin Road, Nampa, ID 83651	(208) 286-7801
Clifty View Nursery	Route 1, Box 509, Bonners Ferry, ID 83805	
Cloverdale Nursery	2528 N. Cloverdale Rd., Boise, ID 83704	
Coeur d'Alene Landscaping	Box 1556, Coeur d'Alene, ID 83814	
Crookham Company	301 Warehouse Avenue, Caldwell, ID 83651	
D&G Turf Farm and Nursery	1267 N. Cloverdale Rd., Boise, ID 83704	
Dahlin's Landscape Nursery	Route 1, Box 304, Priest River, ID 83856	
Donnelly Nursery	11911 Franklin Rd., Boise, ID 83709	(208) 375-2000

ATTACHMENT E

REPRESENTATIVE PHOTO LOG

Site Conditions

Photo 1 – Project Site Northeast Corner, Facing North

Photo 2 – Project Site Northeast Corner, Facing West

Representative Site Photos – May 7th, 2024			
Knecht Minor Subdivision Project El Paso County, Colorado			Kimley»Horn
Appendix B	*May 2024*	*Scale: NTS*	

Site Conditions

Photo 3 – Project Site Southeast Point, Facing East

Photo 4 – Project Site Southeast Point, Facing South

Representative Site Photos – May 7th, 2024		
Knecht Minor Subdivision Project El Paso County, Colorado		
Appendix B	*May 2024*	*Scale: NTS*

Kimley»Horn

Site Conditions

Photo 5 – Project Site Below Home, Facing North

Photo 6 – Project Site Below Home, Facing South

Representative Site Photos – May 7th, 2024		
Knecht Minor Subdivision Project **El Paso County, Colorado**		
Appendix B	*May 2024*	*Scale: NTS*

Kimley»Horn

Site Conditions

Photo 7 – Project Site At Meridian Road, Facing North

Photo 8 – Project Site At Meridian Road, Facing East

Representative Site Photos – May 7th, 2024		
Knecht Minor Subdivision Project **El Paso County, Colorado**		
Appendix B	*May 2024*	*Scale: NTS*

Kimley»Horn