

Noxious Weed Evaluation & Management Plan

For

Sanctuary Pointe

El Paso County, CO

Prepared for: **Classic Companies**
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October 2008
Revised May 2014
Revised February 2017 for Phase 2
Revised July 2019 for Phase 3

Noxious weeds are non-native plants that have been introduced into the local native plant communities. The problem that arises, due to the absence of any natural control, is an advantage over native species that allow these weeds to dominate the environment in which each grows.

This report was revised to include Phase 3 of the Sanctuary Pointe subdivision. The area of Phase 3 was inspected on Monday, July 29, 2019. The inspection was performed by walking the disturbed areas such as old roads, trails and newer areas of surface disturbance. These areas have the highest probability of containing noxious weeds.

Noxious weeds are characterized as being aggressive with the capacity to spread rapidly. They also tend to reproduce profusely and are very resistant to control measures. Noxious weeds rapidly establish themselves on disturbed sites which is a common occurrence in the Rocky Mountain West. Adding to the complexity of control measures is the tendency of native species to reclaim disturbed areas slowly due to the arid conditions that exist.

A review of the Forest Stewardship Plan (Root, 1993) indicates that the presence of noxious weeds was not included in the plan. In order to determine if noxious weeds are an issue in the Sanctuary Pointe subdivision, an inspection was conducted in the fall of 2008 and again in the early spring of 2014. A third revision is warranted to include any findings and specific recommendations for the development of Phase 2.

Based upon the noxious weed list developed by Colorado Department of Agriculture, there were four noxious weeds found within the subdivision.

Yellow Toadflax

The first and the one having the largest population is **Linaria vulgaris** or as it is more commonly known, Yellow Toadflax. This weed is listed as a List B species by the Colorado Agricultural Commissioner. List B species are designated as their current populations are established sufficiently to make eradication unfeasible. The goal is to stop the further spread of these weeds outside of their current locations of infestation.

Yellow toadflax is also known as “butter and eggs” and has a very attractive flower, closely resembling snapdragons in appearance. This plant is a native of Eurasia and was introduced in the mid-1800 as an ornamental. It is a perennial plant and reproduces from seed as well as from an extensive underground root system. Toadflax is adapted to a wide variety of growing conditions and in many types of soils. A biological review of Toadflax and management options can be found in Appendix 1.

Yellow toadflax was found predominantly in the forested areas that received stand improvement treatments (see Photo 1 & 2). These stand improvement treatments were conducted sometime between 1985 and 1990. Based on the tree removal techniques at that time, the litter layer was probably disturbed to allow the exposure of the mineral soil

layer. This may have provided favorable conditions for the toadflax to reproduce itself from seed.

A second factor is that toadflax may have been present, but its spread was suppressed by the thick litter layer and from the heavy shade provided by the tree canopy. A competitive advantage may have been gained by the toadflax when canopy was reduced and allowed more sunlight to reach the forest floor. This caused the stimulation of the root system and more vegetative reproduction resulted in denser stands of the toadflax.

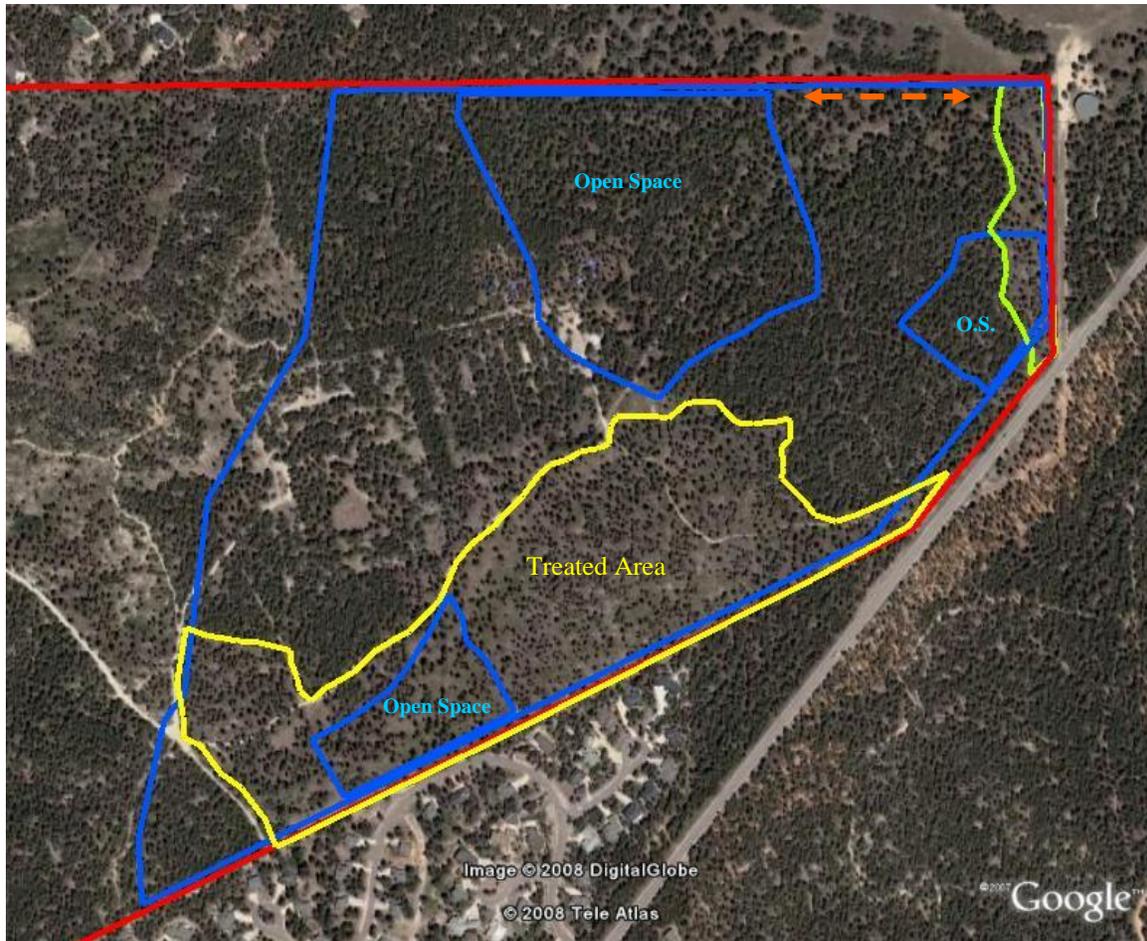
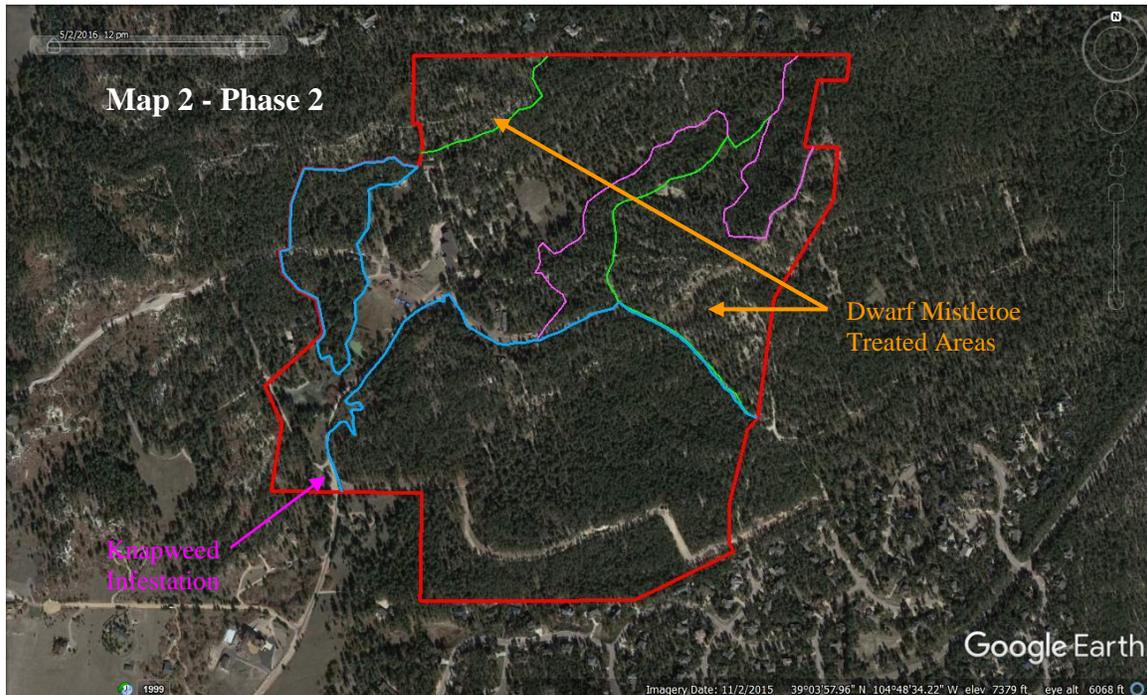


Photo 1. Yellow toadflax infestations are predominantly found in the forested areas treated from 1985 – 1990. The areas are delineated in yellow and the fuel break in green. The orange arrow indicates the approximate location of drainage infestations. The blue line approximates the subdivision boundary.

As a comparison, yellow toadflax was virtually absent in areas where the forest was not treated, and the litter layer was not disturbed. This finding has implications for the wildfire mitigation treatments that will be required in the future. As toadflax readily colonizes in conditions that have been sufficiently disturbed to where bare mineral soil has been exposed, low impact forest management treatments should be preferred. The use of tree mastication equipment to reduce fuels in wildfire mitigation should not be used near toadflax populations.

Regarding Phase 2, yellow toadflax is found in stands treated for dwarf mistletoe. Due to the extensive tree removal that occurred, bare mineral soil was exposed. This provided a seed bed for the weed and subsequent spread. Toadflax is also found in advanced areas of dwarf mistletoe infection. Infected trees have died and have fallen over, lifting a mineral soil root ball. This exposed soil pocket has provided a space for adequate germination and subsequent spread into the litter layer.

Also, Phase 2 encompasses several human-caused disturbed sites. These include the main conference areas, camp sites and other recreational and gathering locations. Seed dispersal of toad flax was accomplished either by vehicles, foot traffic and other means.



Another issue that has arisen since the development of this plan is migration of yellow toadflax from adjacent land ownerships. This is particularly noticeable along the northern boundary of Sanctuary Pointe. This appears to be occurring from toadflax seed being washed down small drainages from high water flow from extreme precipitation events. These precipitation events are strong enough to remove the thick litter layer that is preventing the toadflax from germinating and becoming established. Once the litter layer is removed, a very sandy soil is exposed that is susceptible to water caused erosion. This provides a very suitable seed bed for toadflax germination or root sprouting.

This was most noticeable during the most recent inspection of the property. Along the north boundary where this is occurring, infestations of toadflax appear to be reaching upwards of a quarter acre in size.

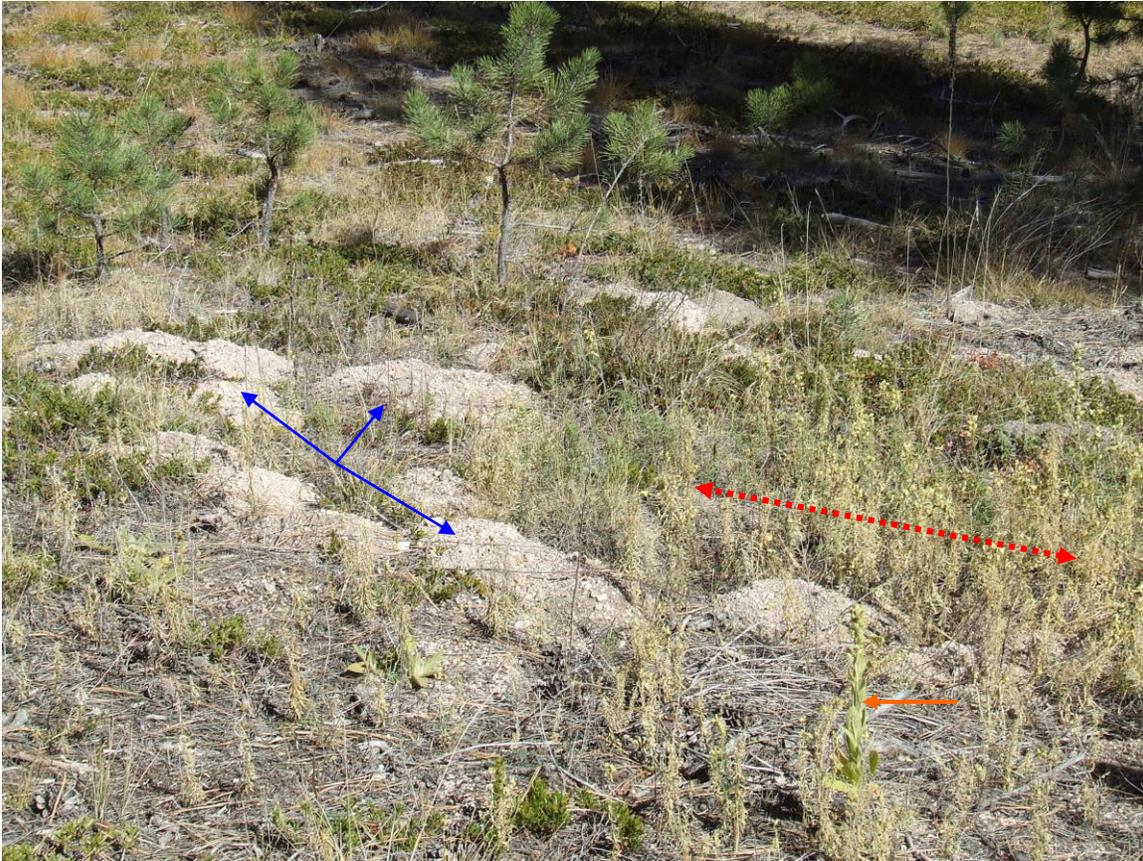


Photo2. This picture shows a population of yellow toadflax (dotted red arrow). The presence of common mullein (orange arrow) makes locating these infestations easier. The light-colored mounds are from pocket gopher activity (blue arrow). This infestation is in the fuel break on the east property boundary.

At the present time it is estimated that yellow toadflax occupies 20 – 30% of the surface cover within the treated areas. The population densities of toadflax are higher on the lower one-third of the slopes, in the drainages and in locations where pocket gophers have been or are currently active. The upper one-third of the slopes seem to have lower population densities as they tend to be drier and the toadflax may have difficulty in competing with native species.

The recent field reconnaissance of weed infestations on the property has reinforced the relationship between pocket gopher activity and the presence of yellow toadflax. Where the pocket gopher is actively burrowing, there are substantial populations of toadflax. Some of these populations have reached a tenth of an acre in size or larger. This is very evident along the southern boundary with the Ridge at Fox Run subdivision. Since the original review of the property, there has been a dramatic increase and spread of toadflax. A portion of this spread can also be attributed to the effects of water erosion along the property boundary area. Repeated heavy rainfall continues to expose more sandy soil and transports seed, particularly on the steeper locations in this area.

There is not the level of pocket gopher effect in Phase 2 as was found in the original reconnaissance of the property. Snow cover during the Phase 2 inspection in January may have shielded this activity from view.

In proposed Phase 3, yellow toadflax is found throughout the area. Populations are not large, usually less than a tenth of an acre. These populations can be found in disturbed and relatively undisturbed locations.



Photo 3. A view of a population of yellow toadflax along Sanctuary Rim Drive within Phase 3. The plant has the blue-green color in the center of the photo (see black line).

Due to the widespread nature of yellow toadflax, chemical control is not recommended. Usually there are other plants such as kinnikinnick, also known as bearberry, within these toadflax populations. It would be difficult to spray herbicide on the toadflax without killing the bearberry as well. Only select extensive populations for chemical treatment.

It would be preferable to seed native grass to compete with the toadflax. In locations where the sandy soils are naturally eroding as seen in the upper left corner of Photo 3, the toadflax could be mowed with a grass trimmer when flowering. This would reduce the spread of the weed through seed dispersal.

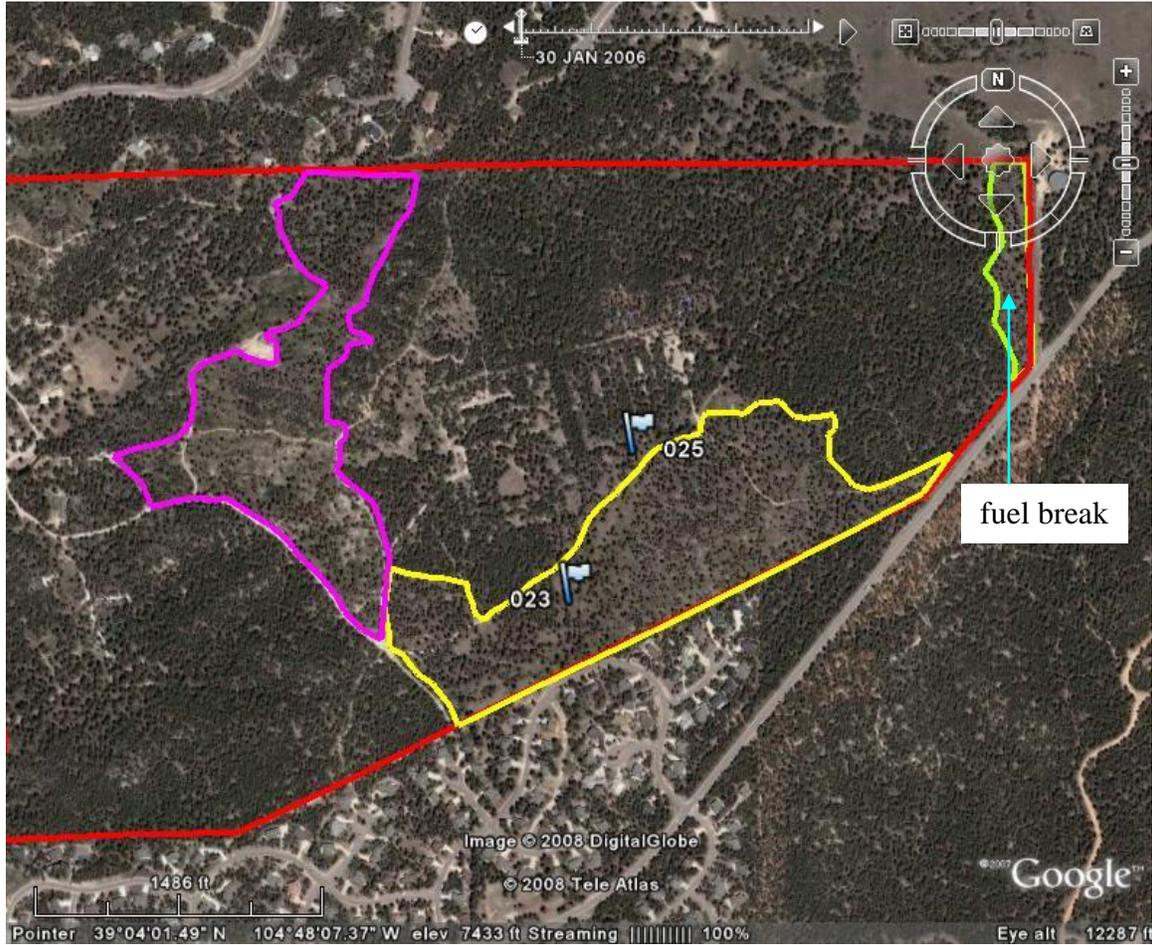
Canada Thistle

The second noxious weed that was found was Canada thistle (**Cirsium arvense**). This weed is also designated as List B specie. This plant was introduced from Europe and entered through Canada in the late 18th century. It is a perennial plant reproducing from seeds and fleshy rhizomes. The flowers are not showy, ranging from rose purple to pink in color. It is one of the most widespread and damaging noxious weeds in Colorado. A detailed description of this plant can be found in Appendix 1.

Fortunately, while there could be more, only two small infestations were found. These two infestations were composed of less than a dozen plants. It is assumed here that the Canada thistle is a random occurrence from chance seed dispersal. Even though this weed is difficult to control and eradicate, these two populations should be successfully controlled with repeated chemical applications.

Phase 3 contains a significant emerging population of Canada thistle along with knapweed. This population may provide an example of noxious weeds being introduced to a site by heavy equipment. The population is found along a water pipeline right of way that provides service from the Triview Metropolitan District storage tank.

Due to the relative absence of Canada thistle across the property, it is reasonable to assume that seed was brought onto the site from machinery that was used at a location where Canada thistle was present. The population is restricted to the roadway and along its edge. It is also entwined in the straw wattles used for sediment control. But it has established itself slightly outside of the pipeline.



The two Canada thistle locations are at icon numbers 23 & 25. The GPS coordinates for these two locations are:

#23: Lat 39° 3' 55.06" N
Long 104°48' 7.74" W
(This is in the middle of a slash pile.)

#25: Lat 39° 4' 2.31" N
Long 104°48' 3.79" W

There were no visual infestations of Canada thistle found in Phase 2.

Common Mullein

The third noxious weed that was found was Common Mullein (Verbascum thapsus). This weed is designated as List C specie. Control of this plant is recommended by the state but is not required as it is found throughout Colorado. This plant was introduced from Europe and is common throughout temperate areas of the United States. It is a biennial plant and needs two growing seasons to produce seed. The first year it grows as a large, thick rosette of hairy blue green to grayish green leaves. The second season the plant produces a single stalk on which yellow flowers are arranged. This plant is very common on the property, particularly in disturbed areas in conjunction with yellow toadflax. A detailed description of this plant can be found in Appendix 1.

The same is true of Common Mullein in Phase 2 and to a lesser extent in Phase 3. This weed is found routinely throughout the area, particularly in and around disturbed soil locations.

Knapweed

The last noxious weed was found during the inspection for Phase 2. It is located at the old main entrance to the property from Kingswood Drive. It is a small population found immediately north of the fork that formerly divided the entrance and exit roads for the property.

There are three species of knapweed, Diffuse Knapweed (*Centaurea diffusa*), Russian Knapweed (*Centaurea repens*) and Spotted Knapweed (*Centaurea maculosa*). A description of Diffuse Knapweed can be found in Appendix 1. All three weeds are listed as List B species by the Colorado Agricultural Commissioner. List B species are designated as their current populations are established sufficiently to make eradication unfeasible. The goal is to stop the further spread of these weeds outside of their current locations of infestation.

These knapweed species are native to Europe. All three are perennial in nature may spread via seed or through the root system. Flower color ranges from lavender to white, depending on the specie.

As this infestation is relatively small, it would be desirable to eradicate it and avoid further spread.

Knapweed has also been found in Phase 3. Besides the water pipeline infestation, there is a single plant that was found at Waypoint 11. A search of the area around this single plant yielded no further observations of this weed.

Since the original and subsequent inspection for noxious weeds, two more noxious weeds have been located and identified.

Hoary Cress

Hoary cress or Whitetop (***Cardaria draba***) is a creeping perennial which reproduces by seeds and roots. This weed is a List B specie and is subject to control to stop spread. This infestation was limited to the meadow area in the northwest corner of Phase 3.

Herbicides can be very effective in control of this weed. As hoary cress is one of earliest perennial weeds to start growing, there is reduced risk of damaging preferred forbs within a treatment area if treated early in the growing season.

Downey Brome

Downey brome or more commonly known as Cheatgrass is a List C specie. This means there is no active requirement to control this weed unless designated by local jurisdictions. El Paso County does not appear to have any requirement for control.

The concern is this weed is highly flammable upon maturity. Therefore, Downey brome presents itself as a readily available fuel by mid-summer for wildfire spread.

Within Phase 3, Downey brome occurs in small populations in and around meadow areas and does not appear to be a significant threat. Control can be limited to reducing further spread of this weed by mowing or the use of a hand-held trimmer. This should be accomplished prior to seed development.

Control & Management

Yellow Toadflax

The infestation of yellow toadflax is much too extensive to warrant a goal of complete eradication. The two exceptions are in the fuel break that borders the park on the east side of the property and along the north border. The north border has become important due to the long-term potential for an infestation to become established within the forest that is not infested.

Within the fuel break, chemical treatment for control is recommended. After one year of treatment, locations of infestation should be seeded with a native grass mix suitable for the site.

If pocket gopher activity is present, it will be necessary to trap the gophers out of those locations. Otherwise the native seed will be buried too deep to germinate and the size of the infestation will grow larger as the burrowing expands as the gopher search out food sources.

The same strategy should be used along the north boundary as well. However, water bars should be installed to reduce seed spread through water erosion. As these locations will be treated for fuel reduction, there should be suitable trees to be removed that will be available to serve this purpose.

The second goal will be to prevent the migration of the toadflax out of the infected forested area into the untreated areas scheduled for wildfire mitigation treatments. In order to accomplish this goal, the mitigation treatments should have as little surface disturbance as is practically possible. If the litter layer can be left as undisturbed, there will little exposed soil available to serve as a seed bed. In addition, the litter layer will suppress any seed from germinating and sprouting from existing plants.

Yellow toadflax populations identified within 100 feet of the untreated forest should be sprayed so as to reduce the potential of seed migrating into the area. These chemical treatments can be discontinued once the wildfire mitigation treatment is completed. These treated areas may require control of pocket gophers and subsequent seeding of native grass species.

Mechanical equipment used to construct roads and structures or to install landscaping should be cleaned and washed prior to entering the subdivision. Road construction equipment should be cleaned if leaving the infected area and prior to entering locations where yellow toadflax has not been detected. There is a high probability that transportation of toadflax seed will occur from the movement and use of this equipment.

Once the subdivision road construction is completed, the risk from this mode of seed transport should be reduced.

As the subdivision is built out, responsibility for yellow toadflax control should be transferred to each residential lot owner. This activity can be coordinated by the homeowner's association to increase effectiveness of control treatments.

Canada Thistle

As there are only two very small populations of Canada thistle, chemical control should be utilized with a goal of eradication. The chemical to be used can be selected from the list in Appendix 1.

Application should be accomplished with a handheld sprayer under low pressure to prevent drift. Both locations should be inspected every thirty days after the initial application and new basal leaves should be treated immediately.

Inspection and treatment, if necessary, should continue until no evidence of sprouting is found for one full year.

Soil disturbance should be avoided, if possible, at these locations to prevent any seed that may be present from germinating.

In Phase 3, the water pipeline population should be eradicated. As the thistle is currently flowering, the flowers should be cut off to prevent spread by seed. If delayed, seed heads should be collected prior to dispersal.

The older leaves are not readily susceptible to herbicide control. The thistle should be cut back to ground level to encourage new shoot sprouting. These can then be sprayed with higher control results. The area should be inspected in late spring for continued root sprouting and subsequent chemical control.

Common Mullein

As this plant requires two years to produce seed, it can be easily controlled by hand removal of the rosette stage of the plant. As it very shallow rooted, it is easily pulled from the ground.

As it prefers disturbed sites, the best management practice is to seed locations of infestation with native grass species and slowly suppress or even eliminate further spread. As the seed of common mullein is viable for up to 80 years, it is important to disturb the soil in these locations as little as possible. Again, pocket gophers help sustain this weed by constant mounding of soil as they tunnel in these locations. This provides an excellent seed bed for mullein germination and spread.

Knapweed

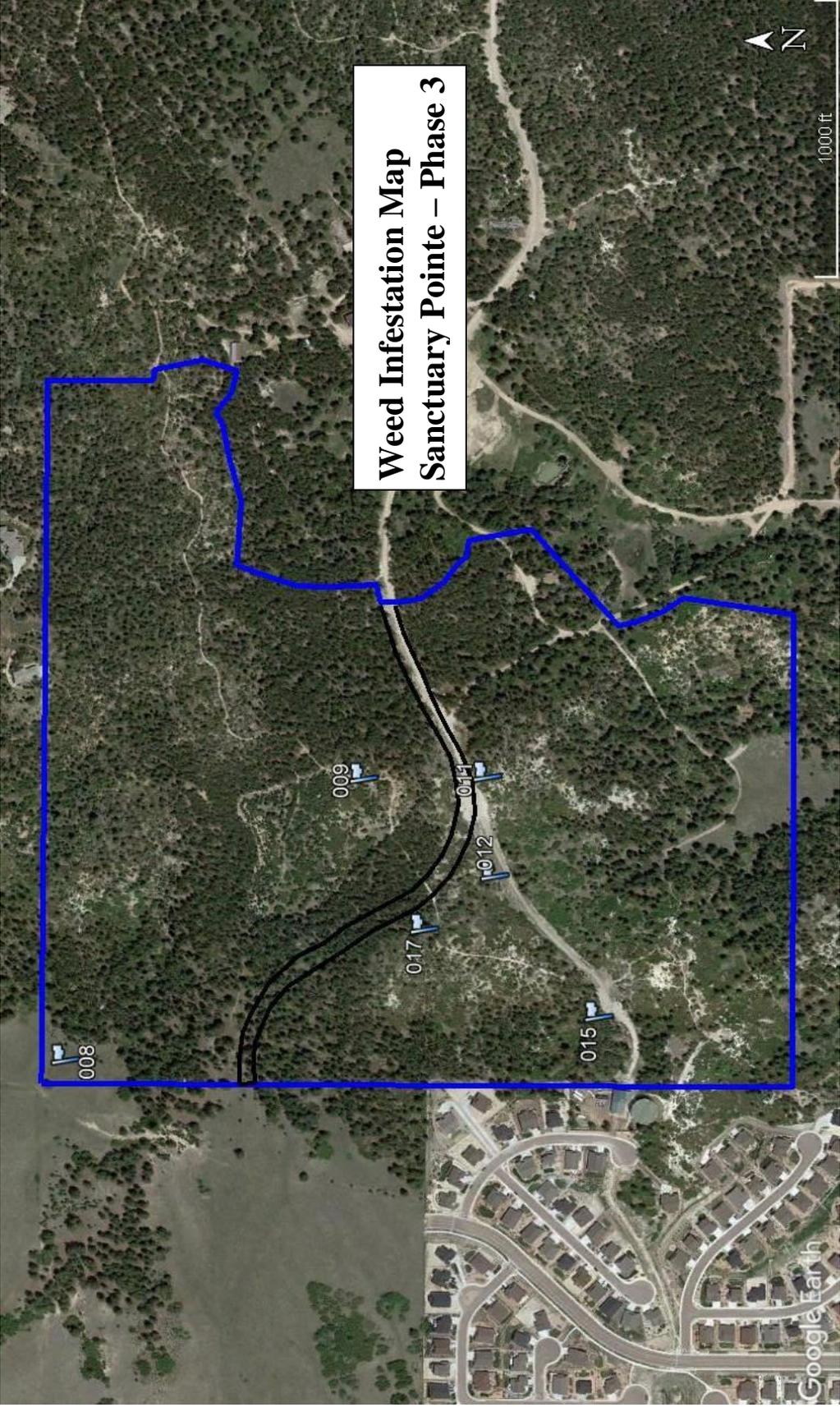
As there appears to be only a small population of knapweed, chemical control should be utilized with a goal of eradication. Specific identification of the specie is not critical to control. The chemical to be used can be selected from the list in Appendix 1.

Application should be accomplished with a handheld sprayer under low pressure to prevent drift. This location should be inspected every thirty days after the initial application and any new basal leaves that have been formed should be treated immediately.

Inspection and treatment, if necessary, should continue until no evidence of sprouting is found for one full year.

Phase 3 populations should be eradicated. Control of knapweed in the water pipeline area can be conducted in conjunction with Canada thistle.

The single plant population should be removed and inspections for basal leaf sprouting should occur regularly. Chemical control for sprouting is suggested. This treatment is a high priority as the knapweed plant is in a high soil erosion location. If allowed to escape, it may become very difficult to control in the future.



**Weed Infestation Map
Sanctuary Pointe - Phase 3**



1000 ft

008

009

011

012

015

017

Google Earth

Legend to Weed Infestation Map

Waypoint 008 – Meadow area containing Hoary cress infestation

Waypoint 009 – Toadflax infestation at bottom of slope – large enough to warrant
chemical control

Waypoint 011 – Single Knapweed plant location

Coordinates: Latitude = 39-3' 59.86" N

Longitude = 104-49' 5.03"W

Waypoint 012 to 015 – Canada thistle & knapweed along pipeline

Waypoint 017 – Canada thistle infestation in middle of trail (< 10 plants)

Appendix 1

Yellow toadflax Identification and Management (2008)
Canada thistle Identification and Management (2008)
Common mullein Identification and Management (2009)
Diffuse Knapweed Identification and Management (2015)
Hoary cress Identification and Management (2015)
**Downey brome - Cheatgrass Identification and Management
(2015)**

**Colorado Department of Agriculture
Conservation Services Division**

Yellow toadflax

Colorado Dept. of
Agriculture
Conservation Services
Division
700 Kipling Street
Suite 4000
Lakewood, CO 80215
303-239-4100



Key ID Points

1. Yellow flowers that are like snapdragons with deep orange centers.
2. Stems that are woody at the base and smooth to the top.

Updated on:
02/08

Yellow toadflax Identification and Management



Identification and Impacts

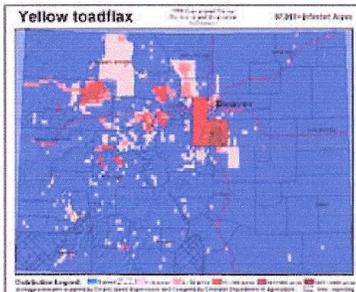
Yellow toadflax (*Linaria vulgaris*) is a perennial escaped ornamental plant that is native to the Mediterranean region. The leaves are narrow, linear, and 1 to 2 inches long. The stems are woody at the base and smooth toward the top. Sparingly branched and 1 to 3 feet tall. The showy snapdragon-like flowers are bright yellow with a deep orange center and have a spur as long as the entire flower. It develops an extensive root system, making control options varied. Yellow toadflax displaces desirable plant communities reducing ecological diversity and rangeland value. Decreases forage for domestic livestock, some big game species and decreases habitat for associated animal communities. The plant is known to be mildly poisonous to cattle. Goats and sheep have been known to graze the plants with little effect.

Habitats for Yellow toadflax include roadsides, vacant lots, gravel pits, fields, waste areas, other disturbed sites and rangeland. It has adapted to a variety of site conditions, from moist to dry and does well in all types of soil. The plant can even establish in areas of excellent

condition in natural disturbances or small openings.

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

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



Infestation photo, above, © John M. Randall, The Nature Conservancy. Infestation map, Crystal Andrews, Colo. Dept. of Agriculture. Flower photo, top, © Missouri Extension. Flower bract photo, left, © Paul Slichter, University of Wisconsin, Stevens Point. Leaves photo © Gary Fewless, University of Wisconsin, Stevens Point.

Linaria vulgaris

**CULTURAL**

Establish select grasses and forbs as an effective cultural control of Yellow toadflax. Contact your local Natural Resources Conservation Service for seed mix recommendations. Bareground is prime habitat for weed invasions, so maintain healthy pastures and prevent bare spots caused by overgrazing.

**BIOLOGICAL**

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

**MECHANICAL**

Handpulling or digging is not recommended for eradication of Yellow toadflax because it's unlikely that the entire root will be excavated and a new plant is likely to occur. A single new plant might be an exception. Tillage is not recommended due to the creeping root system.

Integrated Weed Management:

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

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

HERBICIDES

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

Herbicide	Rate	Application Timing
Chlorsulfuron (Telar - general use)	Apply 1-3 oz/A product plus 0.50% v/v MSO Silicone Blend surfactant (multiple brands available)	Apply at mid-flowering through fall. Telar has grazing restrictions above 1 1/3 oz/A rate. Please refer to the label for more detail.
Picloram + Chlorsulfuron (Tordon 22K - *restricted use* + Telar - general use)	Apply at 1 qt/Acre Picloram + 1.25 oz/A Telar plus 0.25% v/v non-ionic surfactant.	Apply at flowering through fall. Typically late August through September application timing has shown best results. Re-treatment may be necessary. Refer to label for grazing restrictions on Telar.
Picloram (Tordon 22K - *restricted use*)	Apply at 1.5 qt/A plus 0.25% v/v non-ionic surfactant or 1 qt/A crop oil concentrate	Apply in fall (late August through September). Re-treatment may be necessary.

Middle photo © Eric Coombs, Oregon Department of Agriculture, Bugwood.org. All other photos © Kelly Uhing.

Yellow toadflax



Canada thistle

Colorado Dept. of
Agriculture
Conservation
Services Division
700 Kipling Street,
Suite 4000
Lakewood, CO
80215
303-239-4100



Key ID Points

1. Purple flowers form in clusters of 1-5 per branch.
2. Floral bracts are spineless.
3. Small heads, vanilla scent.

Updated on:
08/08

Canada thistle Identification and Management



Canada thistle during the flowering stage. This stage typically occurs in the early summer. Seed production will follow and effective management options will then become limited.

Identification and Impacts

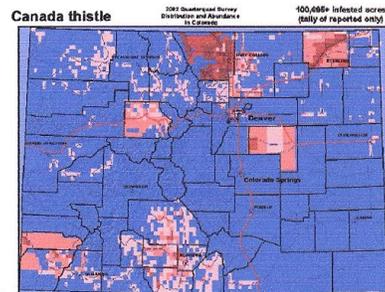
Canada thistle (*Cirsium arvense*) is a non-native deep-rooted perennial that spreads by seeds and aggressive, creeping, horizontal roots (rhizomes). Canada thistle can grow 2 to 4 feet in height. The leaves are oblong, spiny, bright green in color, and are only slightly hairy on the undersurface. Flowers occur in small clusters that form on the ends of branches. They are about 1 cm in diameter, tubular shaped, and vary from white to purple in color with a strong vanilla scent (female flowers).

Canada thistle emerges from its root system from late April through May. It begins to flower in late spring to early summer with increase in day length. Canada thistle only produces about 1,000 to 1,500 seeds per plant. Typically, it reproduces vegetatively through a creeping root system, and can quickly form dense stands. Every piece of root, from 1/2 to 1 inch in length, is capable of forming new plants. The key to controlling Canada thistle is to eliminate seed production and also to reduce the plant's nutrient reserves in its root system through persistent, long-term management.

Canada thistle is one of the most feared noxious weeds in the U.S. as it can infest many land types, from roadsides, ditch banks, riparian zones, pastures, irrigated cropland, to the most productive dryland cropland. Forage production is severely reduced because cattle will not graze near infestations.

The key to effective control of Canada thistle is combining control methods. These weeds need to be continually stressed, forcing it to exhaust root nutrient stores and eventually die. Of all control methods, prevention is most important. Maintain healthy pastures and rangeland and continually monitor your property for new infestations. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

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



Distribution Legend: 200 Uninfested County, 100,000+ Infested acres, Total of reported county

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

Cirsium arvense



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



BIOLOGICAL
Cattle, goats, and sheep will graze on Canada thistle when plants are young and succulent in the spring. Follow up grazing with a fall herbicide application. Insects are available but have not been effective. Insects can be obtained at no charge from the Colorado Department of Agriculture. Please call 970-464-7916 or visit www.colorado.gov/ag/csd for more information.



MECHANICAL
Due to extensive root system, hand-pulling this plant is not a viable option. Mowing can be effective if done every 10 to 21 days throughout the growing season. Combining mowing with herbicides will further enhance control of Canada thistle.

Integrated Weed Management:

Combining control methods for Canada thistle is imperative. This weed needs to be continually stressed, forcing it to exhaust root nutrient stores and eventually die.

Of all control methods, prevention is most important. Maintain healthy pastures and rangeland and continually monitor your property for new infestations.

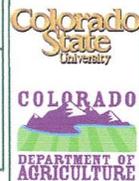
HERBICIDES

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HERBICIDE	RATE	APPLICATION TIMING
Aminopyralid (Milestone)	5-7 ounces/acre or 1 teaspoon/gal water	Apply in spring at the pre-bud growth stage and/or to fall regrowth. Add non-ionic surfactant 0.32oz/gal water or 1 qt/100 gal water.
Chlorsulfuron (Telar DF)	1-3 ounces/acre or 0.50 grams/1 gal water	Apply in spring during bud to bloom stage and/or to fall regrowth. Add non-ionic surfactant 0.32oz/gal water or 1 qt/100 gal water.
Clopyralid + 2,4-D (Redeem R&P)	3 pints/acre or 1.25 oz/gal water	Apply from rosette to bud stage when all plants have emerged. Add non-ionic surfactant @ 0.32oz/gal water or 1 qt/100 gal water. (Spring or Fall)
Picloram (Tordon 22K *This is a Restricted Use Pesticide*)	1 qt/acre or 1.0 oz/gal water	Spring - early bud stage and/or fall regrowth. DO NOT apply near or under trees or where soils have rapid permeability or where water level is high. Add a non-ionic surfactant @ 0.32oz/gal water or 1 qt/100 gal water.

Photos © Kelly Uhing, Colorado Department of Agriculture

Canada thistle

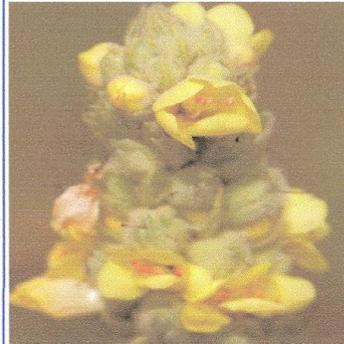


Common mullein

Colorado Dept. of
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Conservation
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700 Kipling Street
Suite 4000
Lakewood, CO 80215
303-239-4100



Key ID Points



Identification and Impacts

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

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

Identification and Management

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

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

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



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

Verbascum thapsus

**CULTURAL**

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

**BIOLOGICAL**

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

**MECHANICAL**

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

Integrated Weed Management:

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

HERBICIDES

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

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

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

Common mullein



Diffuse knapweed

Colorado Department of
Agriculture

305 Interlocken Pkwy
Broomfield, CO 80021

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



Key ID Points

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

Updated on:
07/2015

Diffuse knapweed Identification and Management



Identification and Impacts

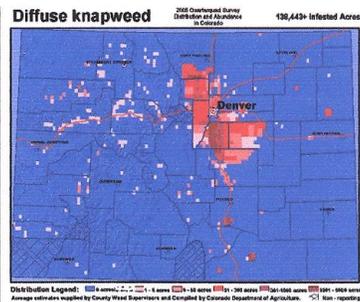
Diffuse knapweed (*Centaurea diffusa*) is a non-native biennial forb that reproduces solely by seed. A biennial is a plant that completes its lifecycle within two years. During the first year of growth, diffuse knapweed appears as a rosette in spring or fall. During the second year in mid to late spring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

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

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

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

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



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

Centaurea diffusa



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



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



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

Integrated Weed Management:

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

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

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

Weevil photo © I. Johnson, Univ. Idaho, bugwood.org. All other photos © Kelly Uhing.

Diffuse knapweed



Hoary cress

Colorado Department of
Agriculture

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Broomfield, CO 80021

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



Key ID Points

1. White flowers.
2. Grows erect 10-24" in height.
3. Leaf is 3/4-4" long with blunt end and fine white hairs.

Updated on:
07/2015

Hoary cress Identification and Management

well on alkaline soils.



Identification and Impacts

Hoary cress (*Lepidium draba*) is commonly known as whitetop, is a creeping perennial that is a member of the mustard family and native to Europe. The stems, in the rosette stage, may grow up to 2 inches in height and produce grayish-green leaves that are lance shaped. The leaves are alternate and 3/4 to 4 inches long. The upper leaves have 2 lobes that clasp the stem. The plant has numerous small, white flowers with 4 petals on stalks radiating from a stem. Seed capsules are heart-shaped with two small, flat, reddish brown seeds. One plant can produce from 1,200 to 4,800 seeds. The plants emerge in early spring with stems emerging from the center of each rosette in late April. Hoary cress flowers from May to June and plants set seed by mid-summer.

Habitats for Hoary Cress include: fields, waste places, meadows, pastures, croplands and along roadsides. It is typically found on unshaded, generally open areas of disturbed ground. It generally does better with moderate amounts of precipitation and grows

The key to effective control of Hoary cress is prevention. Preventing the encroachment of these weeds is the most cost-effective management. Preventing invasions by limiting seed dispersal, monitoring and using weed free hay, and quarantine animals that may have grazed in infested areas. Beyond prevention, the key is early detection when infestations are small, and aggressive management. Integrated Weed Management is required for proper control. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

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



Photos © Kelly Uhing, Colorado Department of Agriculture; Mark Schwarzlander, University of Idaho. Above map: Crystal Andrews, Colorado Department of Agriculture.

Lepidium draba

**CULTURAL**

Prevent the establishment of new infestations by minimizing disturbance and seed dispersal, eliminating seed production and maintaining healthy native communities. Contact your local Natural Resources Conservation Service for seed mix recommendations. Planting competitive legumes, such as alfalfa, can reduce Hoary cress in crop rotations.

**BIOLOGICAL**

There is no biological control available for Hoary cress. Since biological control agents take years to research, develop and release, no releases are expected in the foreseeable future. For more information, contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916.

**MECHANICAL**

Mowing several times before the plants bolt stresses Hoary cress and forces the plant to use nutrient reserves stored in the root system. Combining mowing with herbicides will further enhance control of this weed. Mow repeatedly during the summer, then apply a herbicide in the fall.

Integrated Weed Management:

No single treatment provides effective, long term control. The best and first defense is always prevention. Once established, integrate a variety of combinations of competitive planting, crop rotations, and herbicides. This can reduce Hoary cress to manageable levels.

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)	1 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply at flowering. (Early spring to early summer)
Metsulfuron (Escort XP)	1 oz. product/acre + 0.25% v/v non-ionic surfactant	Apply at flowering. (Early spring to early summer)
Imazapic (Plateau, Panoramic)	12 oz./acre + 2 pints/acre methylated seed oil or crop oil concentrate	Apply at late flower to post-flower growth stage. (Late spring to mid-summer)

Note: *This herbicide has residual soil activity that will affect all broadleaf seedlings germinating after application has occurred.

Additional herbicide recommendations for other species can be found at:

goo.gl/TvWnv9

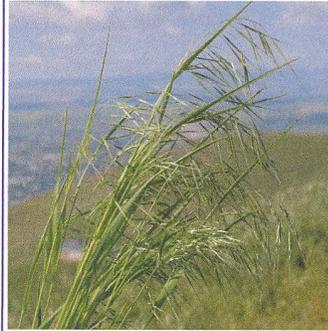
Downybrome-Cheatgrass

Colorado Department of
Agriculture
305 Interlocken Pkwy
Broomfield, CO 80021
(303) 869-9030
weeds@state.co.us



Key ID Points

Identification and Management



Identification and Impacts

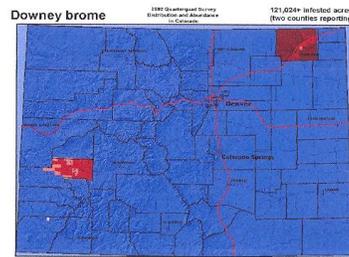
Downybrome or Cheatgrass (*Bromus tectorum*) is an annual or winter annual, native to the Mediterranean region. Cheatgrass ranges in height from 2 to 36 inches. Each plant contains multiple stems that are erect in nature. The inflorescences are born at the end of the stems, and are multi-branched. They appear in a slender, dense, and usually drooping manner. At maturity, they appear greenish-purple in color. The spikelets are slender, 3/8 to 3/4 of an inch long and are nodding. The awns on the end of the spikelets are usually 3/8 to 5/8 of an inch long. The sheaths of the leaves are flat blades and densely covered in with soft hairs. Cheatgrass reproduces solely by seed. The root system is fibrous and fleshy.

Habitats for Cheatgrass include; roadsides, waste areas, misused pastures, rangelands, cultivated fields, and eroded sites. When plants are green animals will graze as forage. When the plant dries, the sharp seed can injure grazing animals getting caught in the mouth, nose, and eyes of the animal. It is a competitive grass with native grasses and forbs, because it germinates in the fall and

will over winter as a seedling. In the spring it will bolt and produce seed, using valuable moisture and shading desirable plants. Once Cheatgrass reaches maturity and dries, it becomes a major fire hazard. Large infestations can increase fire frequency in rangelands. Seed viability ranges 2 to 5 years for cheatgrass, increasing the chances of taking over a disturbed site.

The key to effective control of Cheatgrass preventing the establishment of the plant through proper grazing and management techniques. If the plant has become established, using an integrated management approach can prove to be an effective control method. Details on the back of this sheet can help to create a management plan compatible with your site ecology.

Cheatgrass 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 © From Bottom left; (Next 2) Steven Dewey, Utah State University; Richard Old XIV Services Inc.; Chris Evans, River to River CWMA; All Bugwood.org; Map Crystal Andrews, Colorado Department of Agriculture

Bromus tectorum

**CULTURAL**

Preventing the establishment of Cheatgrass by planting desirable grasses and forbs can prove to be an effective control method. Properly maintaining grazing lands will also reduce the risk of infestations. For specific seed recommendations contact your local Natural Resources Conservation Services for seed mixes.

**BIOLOGICAL**

Research is currently being conducted on certain molds to be used as a biocontrol. But currently there is not any approved biological control agents approved for the use on Cheatgrass. For more information please contact the Palisade Insectary of the Colorado Department of Agriculture at 970-464-7916.

**MECHANICAL**

Fire, tillage, mowing and grazing have been proven to help reduce plant populations once established. The key to effective control is to prevent seed production and/or spread.

Integrated Weed Management:

Preventing the establishment of Cheatgrass through proper grazing management techniques proves to be the most effective control method. If infestations are already established using a combination of mechanical and chemical control methods proves to be effective control options, following these treatments with cultural control methods will reduce the size of infestations.

HERBICIDES

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

HERBICIDE	RATE	APPLICATION TIMING
Imazapic	4-10 oz/Acre	Fall application prior to a hard freeze is optimum or during early spring growth. Add non-ionic surfactant 0.32oz/gal water or 1qt./100 gal water.
Glyphosate *Non-selectiveherbicide*	4-5 qts/Acre or 4-5 oz/gal water	Apply in fall or early spring. Add non-ionic surfactant 0.32oz/gal water or 1 qt./100 gal water.