

# Priority Weeds

## of WESTERN COLORADO

**For more information contact your  
county weed control department**

**Archuleta County**  
970-264-6773

**Montezuma County**  
970-565-0580

**Delta County**  
970-874-2102 or 970-333-3278

**Montrose County**  
970-249-5216

**Gunnison County**  
970-641-4393

**Ouray County**  
970-626-9775

**La Plata**  
970-382-6470

**San Juan County**  
970-626-9775

**Mesa County**  
970-255-7121

**San Miguel County**  
970-327-0399

### **Acknowledgements**

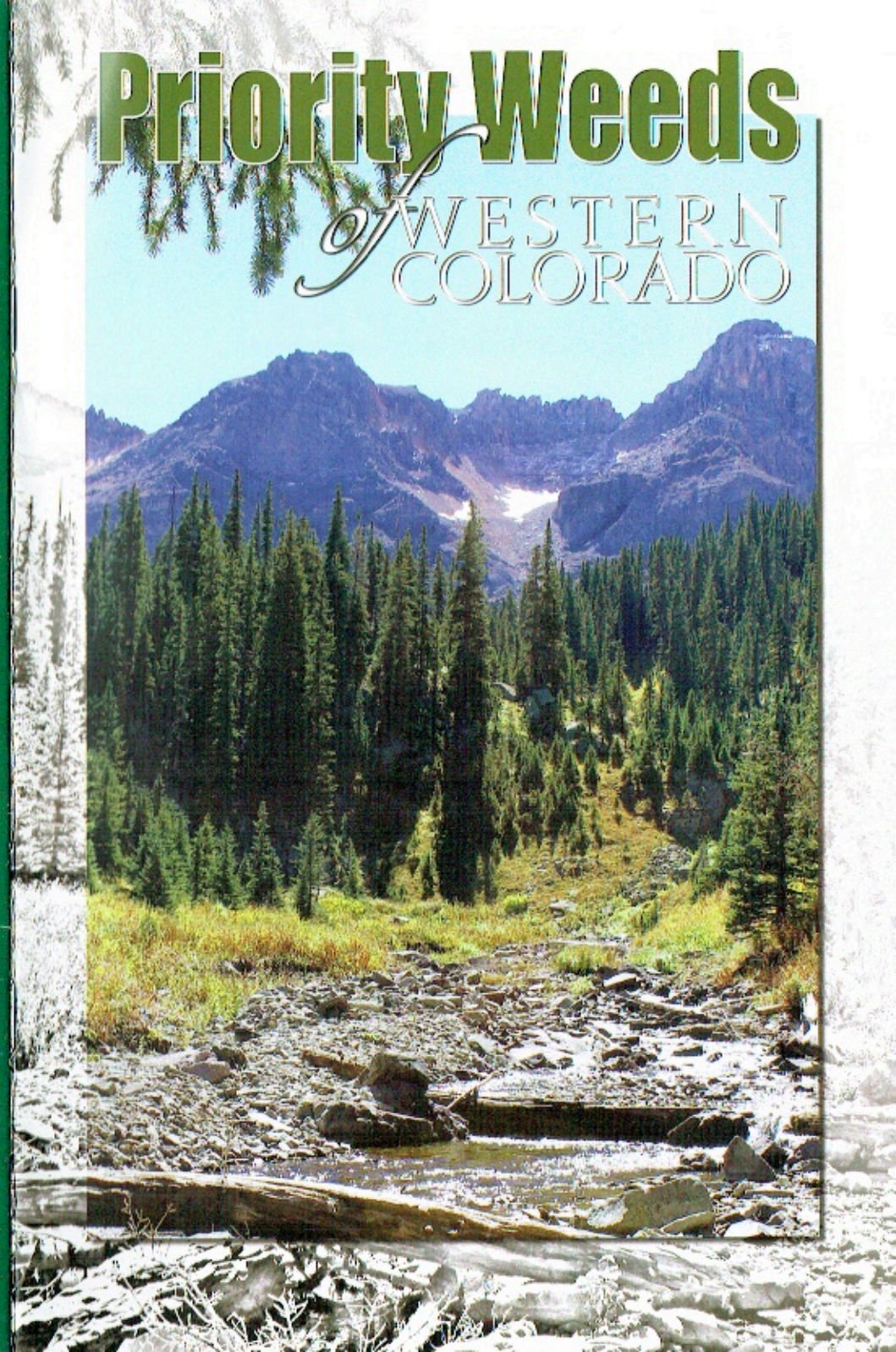
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Welcome to the second edition of **Priority Weeds of Western Colorado**. This book presents the noxious weeds of most concern to Western Colorado, the weeds that are posing the greatest threats to our native habitats and environments. But that is not to say that there are not other weeds of concern. Contact your county weed department to verify weed identification and for recommended control options. Chemical controls are not included in this book by design. For herbicide options contact the weed manager in your county or other qualified applicator for site specific prescriptions. Additional information and the complete Colorado noxious weed list are available from:

**Colorado Department of Agriculture  
Noxious Weed Program**

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

**Colorado Weed Management Association**

[www.cwma.org](http://www.cwma.org)



# Mission Statement

Our mission is to preserve and protect the agricultural, natural, and wildlife habitat areas of Western Colorado by providing leadership and education in the long term management and control of noxious weeds through an integrated, sustainable approach to weed control.





# Absinth Wormwood

*Artemisia absinthium*

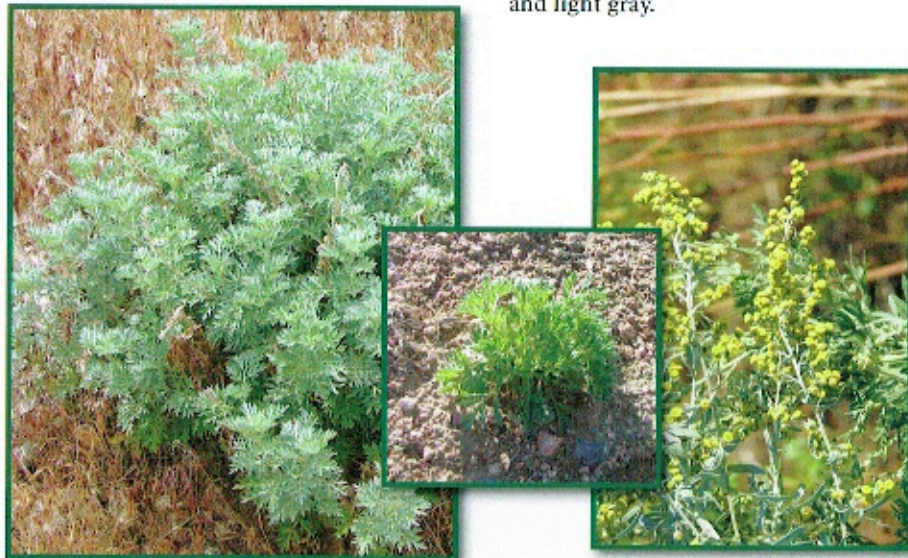
Absinth wormwood is native to Eurasia, the Middle East and North Africa. It was introduced to North America in the early 19th century to be cultivated for medicinal use. It was first reported outside cultivated gardens in 1841, along roadsides and waste grounds.

Habitats for Absinth wormwood include disturbed sites, moist soils, and is also shade tolerant. It can occur in 5,000 to 7,000 feet elevation and is considered a weed in pastureland, cropland, and rangeland. Absinth wormwood is listed as poor palatability in horses, but good for sheep.

## Keys to Control:

- Compared to most perennials, it is fairly easy to control with a combination of controls.

- **CULTURAL** — Cultural controls are possible in theory, but are very time consuming and expensive. Complete removal of any seedlings or newly established plants by continual hand pulling is also possible.
- **BIOLOGICAL** — There is no biological control available for Absinth wormwood.
- **MECHANICAL** — Hand pull or dig when soil is moist. Make certain to pull all the roots, including short horizontal roots. Bag specimens carefully so as to not scatter seeds if removed during or after flowering. Multiple mowings prior to seed generation can cause stress and may provide a control option.
- The seed viability is estimated to be 3 to 4 years and is easily scattered by wind, water, animals, and in hay. The seeds are less than 1/6 inch long, smooth, flattened and light gray.



# Canada Thistle

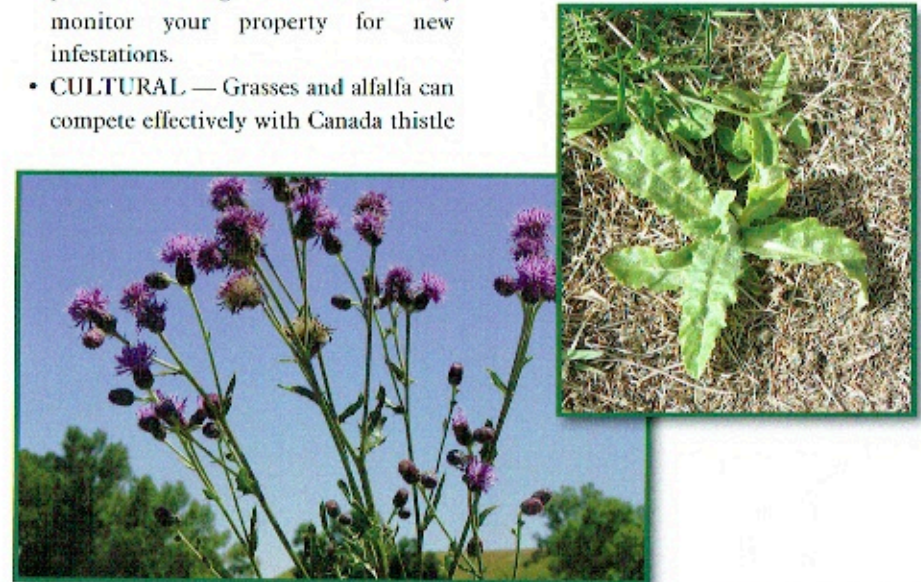
*Cirsium arvense*

Canada thistle is a non-native deep-rooted perennial that spreads by seeds and aggressive, creeping, horizontal roots (rhizomes). 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.

## Keys to Control:

- 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 needs to be continually stressed, forcing it to exhaust root nutrient stores and eventually die. Maintain healthy pastures and rangeland and continually monitor your property for new infestations.
- **CULTURAL** — Grasses and alfalfa can compete effectively with Canada thistle

- if their growth is favored by good management. Maintain fertility and, if possible, moisture at optimum levels to favor grass or alfalfa growth. Soil analysis can easily determine fertility needs. Be cautious with nitrogen fertilizers, because excess available soil nitrogen may favor weed growth.
- **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.
- **MECHANICAL** — Due to an 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.





# Chinese Clematis

*Clematis orientalis*

Chinese clematis is a non-native herbaceous to woody vined perennial. A deciduous climber, this species can cause death to young trees and brush; out competing native shrubby and herbaceous species. Chinese clematis is an escaped ornamental species native to Eurasia. Plants will completely cover rock walls, trees, bushes and fences. The juice of freshly crushed leaves and stems have blister causing agents.

## Keys to Control:

- The key to controlling Chinese Clematis is to eliminate seed and plant populations by controlling plant before seed spreading with long-term management plan.
- **CULTURAL** — No known method.
- **BIOLOGICAL** — No known method.
- **MECHANICAL** — Hand pull or dig when soil is moist. Make certain to pull all the roots. Bag specimens carefully so as to not scatter seeds if flowering.



# Dames Rocket

*Hesperis matronalis*

Dames rocket is a native of Eurasia and is a biennial or short lived perennial forb belonging to the mustard family. Many people think that it is a native wildflower and is planted as a garden ornamental, however; the plant quickly escapes cultivation due to its prolific seed production. It is often sold in “native wildflower” mixes, so please be sure to check the contents of “native wildflower” seed mixes and do not plant those that carry Dame’s rocket.

## Keys to Control:

- The key to effective control of Dame’s rocket is prevention and education. Dame’s rocket has been included in many different seed mixes, thus consumers should carefully read the label prior to planting so called “native wildflower” mixes. If in your garden, locate and remove plants immediately

before plants set seed to prevent the spread of Dame’s rocket. Since the plant reproduces solely by seed, integrated management efforts must include the elimination of seed production and depletion of seed bank.

- **CULTURAL** — Prevent the establishment of new infestations by minimizing disturbance and seed dispersal, eliminating seed production and maintaining healthy desirable species.
- **BIOLOGICAL** — There is no biological control available for Dame’s rocket. Since biological control agents take years to research, develop and release, no releases are expected in the foreseeable future.
- **MECHANICAL** — Hand pull or dig when soil is moist, making sure to get the roots to prevent resprouting. Removing flowers before the plant sets seed will also be effective. Be sure to bag specimens carefully so the spread of seeds does not occur.





# Diffuse Knapweed

*Centaurea diffusa*

Diffuse knapweed is a non-native biennial forb that reproduces solely by seed. 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.

### Keys to Control:

- The key to effective control of Diffuse knapweed is to prevent the plant from flowering and going to seed. An integrated weed management approach is highly recommended.
- **CULTURAL** — Prevent the establishment of new infestations by minimizing disturbance and seed dispersal, eliminating seed production and maintaining healthy native communities.
- **BIOLOGICAL** — The seedhead weevil (*Larinus minutus*) and the root weevil

(*Cyphocleonus achates*) provide fair to good control when used in combination with each other. Expect to wait at least 3 to 5 years for the insects to establish and achieve optimum results. This is an option for large infestations.

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



# Hoary Cress

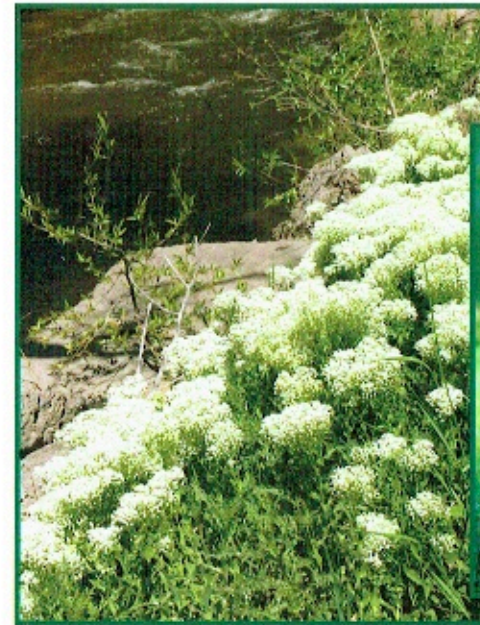
*Cardaria draba*

Hoary cress, commonly known as whitetop, is a creeping perennial that is a member of the mustard family and native to Europe. Hoary cress plants can spread rapidly. One plant can produce from 1,200 to 4,800 seeds. A single plant can eventually form a large colony, producing a dense monoculture that can crowd out native species. In the absence of a competitor, a single plant can spread over an area 12 feet in diameter in one year.

### Keys to Control:

- The key to effective control of Hoary cress is prevention. Preventing invasions by limiting seed dispersal, monitoring and using weed free hay. Beyond prevention, the key is early detection when infestations are small.

- **CULTURAL** — Prevent the establishment of new infestations by minimizing disturbance and seed dispersal, eliminating seed production and maintaining healthy native communities. Planting competitive legumes, such as alfalfa, can reduce Hoary cress in crop rotations.
- **BIOLOGICAL** — There is no biological control available for Hoary cress.
- **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 an herbicide in the fall.





# Houndstongue

*Cynoglossum officianale*

Houndstongue is a short lived perennial or biennial forb. Reproduction is solely by seeds. Houndstongue is poisonous. Livestock and wildlife may live up to six months after ingesting a lethal dose. Houndstongue's toxicity effects horses and cattle more severely, sheep seem more resistant.

## Keys to Control:

- The key to effective control of Houndstongue is preventing establishment and to prevent seed production. Planting competitive and desirable grasses and forbs can be effective. An integrated weed management approach can also be successful.
- CULTURAL — Prevent the establishment of new infestations by minimizing disturbance and seed



dispersal, eliminating seed production and maintaining healthy native communities.

- BIOLOGICAL — A root weevil, *Mogulones cruciger*, has been successful in Canada and introduced in Montana, but has not yet been approved for use in Colorado.
- MECHANICAL — Cut or pull plants, and remove entire root crown when plants are in the rosette stage. Remove dense litter layer (up to 4 inches) to stimulate germination of desired plants. To reduce seed production, mow or cut flowering stems before seed outlets develop, this can significantly reduce seed production.

# Jointed Goatgrass

*Aegilops cylindrica* Host

Jointed goatgrass is a winter annual grass, vegetatively similar to wheat in the seed stage. Jointed goatgrass was introduced from Europe into the United States in the early 1900's, and reported in the Pacific Northwest in 1917. Jointed goatgrass is a noxious weed in Idaho, Oregon, Utah, and California, as well as Washington. Jointed goatgrass reproduces by seed. Hybridization may occur with wheat.

## Keys to Control:

- The key to effective control of Jointed goatgrass 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 seed and hay.
- CULTURAL — A good weed management program includes regular scouting and planting of competitive crops. Do not allow Jointed goatgrass to spread to uncontaminated fields. Be aware of neighboring infestations of

Jointed goatgrass and potential paths and methods for introduction.

- BIOLOGICAL — No known control.
- MECHANICAL — Jointed goatgrass may be managed early in its life cycle with frequent mowing. However, if the plant has begun to tiller, mowing initiates the formation of new tillers, and the result may be a more competitive plant. For tillage to be effective, the soil must be dry and air temperatures warm when the soil is tilled. It is difficult to control moderate to dense infestations of Jointed goatgrass with tillage alone. Tillage kills only the germinated Jointed goatgrass, and soil disturbance usually prompts additional seed to germinate. Sweep tillage immediately after harvest improves seed-to-soil contact for optimum Jointed goatgrass germination and better control. Preventing Jointed goatgrass from producing seed during the fallow period is critical. Sweep or rodweed during the summer, using additional tillage as needed to control weeds and prepare a seedbed.





# Leafy Spurge

*Euphorbia esula*

Leafy spurge is a non-native deep-rooted perennial that spreads by seed and extensive, creeping roots. One large Leafy spurge plant can produce up to 130,000 seeds. Three-sided seed capsules explode when ripe and project the seeds up to 15 feet away from the parent plant.

## Keys to Control:

- The key to effective control for Leafy spurge is to prevent its establishment through proper land management. Maintain healthy pastures and rangeland and continually monitor your property for new infestations. New infestations are much more easily controlled than established infestations.
- **CULTURAL** — Establishment of selected grasses can be an effective cultural control of Leafy spurge. Maintain healthy pastures and prevent

bare spots caused by overgrazing. Bare ground is prime habitat for weed invasions.

- **BIOLOGICAL** — Both sheep and goats can be effective grazers of Leafy spurge. The flea beetles *Apthona nigriscutis*, *A. lacertosa*, and *A. cyparissiae*, are effective especially when combined with grazing and/or herbicides.
- **MECHANICAL** — Due to the extensive root system, hand-pulling this plant is not a viable option. Mowing will reduce seed production if repeated every 2 to 4 weeks during the growing season, but will provide little long-term control.



# Meadow Knapweed

*Centaurea nigrescens*

Meadow knapweed is native to Europe where originally it was introduced (a cross between black and brown knapweed) as a potential forage species. However, Meadow knapweed began to outcompete native plants and other pasture species, reducing the diversity of available forage for wildlife and livestock. It was found to have low palatability to grazing animals and lacks nutritional value sufficient for livestock. Meadow knapweed disrupts wetland habitat by quickly displacing native plant species.

Meadow knapweed is a perennial that grows from a woody crown. Its primary reproduction is by seed, but root and crown fragments resprout when disturbed by heavy equipment or cultivation. Meadow knapweed seeds can be carried in rivers, streams, or irrigation water, in hay or by vehicles along roadsides. The seed viability for Meadow knapweed is unknown. The site must be monitored for at least 10 years.

## Keys to Control:

- Prevent the establishment of plant communities by maintaining healthy native plant populations. If Meadow knapweed is present, using a combination of control methods is best.
- **CULTURAL** — Preventing the establishment of the Meadow knapweed is crucial, so maintaining healthy native plant communities is a priority. Bare ground is prime habitat for weed invasion, so prevent bare spots caused by overgrazing.
- **BIOLOGICAL** — Biocontrol agents are not included in the prescribed management plans by the State for List A Species. Eradication is the management objective of all List A's.
- **MECHANICAL** — Hand pulling or digging is an effective control method when populations are small. Hand pulling should occur when soil is moist and be certain to pull all the roots. It is important to bag specimens carefully so as to not scatter seeds if the plant is flowering.





# Musk Thistle

*Carduus nutans*

Musk thistle is a non-native biennial forb that reproduces solely by seed. A biennial is a plant that completes its lifecycle within two years. A native of Western Europe, Musk thistle was introduced into the eastern United States in the early 1800s and has a long history as a rangeland pest in the U.S.

Habitats for Musk thistle include open natural areas such as meadows, prairies, and grassy balds. The plant may also occur on rangeland, roadsides, ditches, riparian areas, and trails. It spreads rapidly in areas subjected to frequent disturbance events such as overgrazing, flooding or human traffic but does not grow well in excessively wet, dry or shady conditions.

### Keys to Control:

- A prolific seed producer, Musk thistle can produce up to 20,000 seeds per plant, only one-third being viable. Because Musk thistle reproduces solely from seed, the key for successful management is to prevent the plant from going into seed production.
- CULTURAL — Establishment of selected grasses can be an effective cultural control of Musk thistle. Maintain

healthy pastures and prevent bare spots caused by overgrazing.

- BIOLOGICAL — Two weevils have been introduced from Europe and released in the United States as a biological control for Musk thistle, the thistlehead-feeding weevil (*Rhinoecyllus conicus*) and the rosette weevil (*Trichosiocalus horridus*).
- MECHANICAL — Any mechanical or physical method that severs the root below the soil surface will kill Musk thistle. Hand pulling, mowing or chopping is most effective on small populations and can be done throughout the year, but is most effective when plants are at full-bloom just prior to the development of seeds. Be sure flowers and seed heads are bagged and disposed of in a landfill to prevent seed dispersal since seeds can mature and become viable after the plant has been cut down. Minimizing disturbance to the soil during removal activities will help reduce the chance of germination of seeds stored in the soil.



# Myrtle Spurge

*Euphorbia myrsinites*

Myrtle spurge is an invasive ornamental that is native to Eurasia. It is popular in xeriscapes and rock gardens, preferring sunny to partly sunny areas and well drained soils. Myrtle spurge rapidly escapes gardens and invades sensitive ecosystems, outcompeting native vegetation and reducing wildlife forage.

Myrtle spurge contains a toxic, milky sap that causes severe skin irritations, including blistering. This plant is poisonous if ingested; causing nausea, vomiting and diarrhea. Wearing gloves, long sleeves, shoes, and eye protection is highly recommended when in contact with Myrtle Spurge, as all plant parts are considered poisonous. The seed reserve of Myrtle spurge is estimated to be eight years. The site must be monitored for at least nine years after the last flowering adult plants have been eliminated and treatments repeated when necessary.

### Keys to Control:

- The key to effective control of Myrtle Spurge is to remove plants prior to seed set and to detect and remove new populations in natural areas early on. Small areas can be easily removed by mechanical means but should be done early to prevent triggering seed launching.
- CULTURAL — Keeping desirable vegetation healthy and thick will help keep invaders out. Prevent the establishment of new infestations by minimizing disturbance and seed dispersal.
- BIOLOGICAL — Biocontrol is not an approved method of control for State List A species. Eradication is the management objective for all List A species.
- MECHANICAL — Hand pull or dig when soil is moist. Make certain to pull all the roots and wear rubber gloves and eye protection to protect yourself from the toxic milky sap. Treatment follow up is important to check root fragment resprouts that will occur when the tap root is severed too shallow.





# Oxeye Daisy

*Leucanthemum vulgare*

Oxeye daisy is an herbaceous perennial in the aster family (Asteraceae) that was introduced from Europe as a seed contaminant and as an ornamental. Oxeye daisy is an aggressive rangeland competitor forming dense populations reducing plant diversity and pasture forage. Heavy infestations may reduce nutrient cycling due to a shallow root system and also create areas of bare soil, increasing soil erosion. In addition, Oxeye daisy reduces the carrying capacity of heavily infested pastures when cattle are the primary grazers. A typical plant produces over 500 seeds that spread by wind or animals. The root system is comprised of shallow, unbranched roots and rhizomes. Plants reproduce by roots and seeds.

## Keys to Control:

- The key to effective control of Oxeye daisy is education and prevention. Oxeye daisy has been included in many

different seed mixes, thus consumers should carefully read the label prior to planting so-called "native wildflower" mixes.

- **CULTURAL** — Keeping desirable vegetation healthy and thick will help keep invaders out. Prevent the establishment of new infestations by minimizing disturbance and seed dispersal.
- **BIOLOGICAL** — Goats or sheep can be effective in the control of Oxeye daisy.
- **MECHANICAL** — Hand pull or dig when soil is moist and infestations are small before seed heads are produced. Oxeye daisy is fairly shallow rooted. Make sure to pull up all of the roots. Bag specimens carefully so as to not scatter seeds if removed during or after flowering.



# Purple Loosestrife

*Lythrum salicaria*

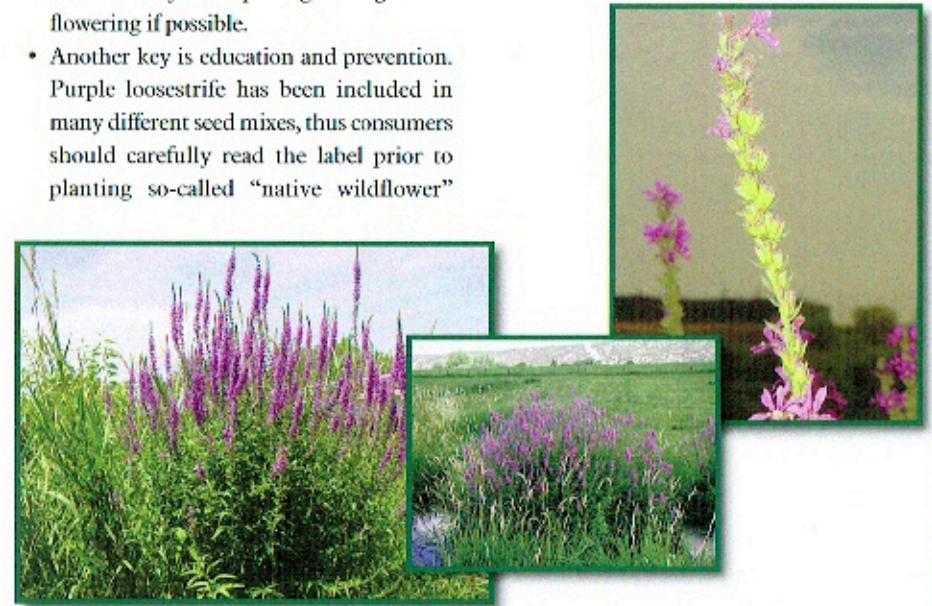
Purple loosestrife is a non-native, tap-rooted, perennial forb. It is native to Europe and was introduced to North America as an ornamental plant for gardens. It has escaped into natural areas such as stream banks and shallow ponds. Purple loosestrife reproduces primarily by seed. A single, mature plant can produce up to three million seeds per year. The seeds can remain viable in the soil for 5 to 20 years.

## Keys to Control:

- The key to effective control of Purple loosestrife is early detection. When infestations are small, it is fairly easy to control loosestrife plants and keep the seed bank in the soil low. Persistent management and monitoring of site is a long-term program to ensure eradication. Small loosestrife infestations should be eradicated by hand-pulling/cutting before flowering if possible.
- Another key is education and prevention. Purple loosestrife has been included in many different seed mixes, thus consumers should carefully read the label prior to planting so-called "native wildflower"

mixes. There are many planting alternatives that are better suited to Colorado and beneficial to wildlife.

- **CULTURAL** — Prevent the establishment of new infestations by minimizing disturbance and seed dispersal.
- **BIOLOGICAL** — Biocontrol agents are not included in the prescribed management plans by the State for List A Species. Eradication is the management objective of all List A's.
- **MECHANICAL** — Hand removal of isolated individuals can be effective on small infestations. Hand removal should be performed prior to seed set. During the flowering stage, flower heads must be cut and disposed of properly before an herbicide is applied. This will prevent or reduce seed production.





# Russian Knapweed

## *Acrotilon repens*

Russian knapweed is a non-native deep-rooted perennial that spreads by aggressive, creeping, horizontal roots (rhizomes) and seeds. Russian knapweed is allelopathic, containing a toxic substance that inhibits the growth of competing plants. This weed is also toxic to horses resulting in serious injury or possibly death of the animal. Russian knapweed displaces native vegetation and reduces forage values on range and pasturelands.

### Keys to Control:

- The most effective method of control for Russian knapweed is to prevent its establishment through proper land management. Maintain healthy pastures and rangeland and continually monitor your property for new infestations. If Russian knapweed is already established, using an integrated weed management approach proves to be effective.
- **CULTURAL** — Establishment of selected grasses can



be an effective cultural control of Russian knapweed. Maintain healthy pastures and prevent bare spots caused by overgrazing. Disturbed or bare ground is prime habitat for weed invasions.

- **BIOLOGICAL** — A gall forming nematode, *Subanguina picridis*, is currently being monitored for effectiveness but is not yet available to the public.
- **MECHANICAL** — Mowing several times before the plants bolt stresses Russian knapweed and forces them 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 and then apply an herbicide in the fall.

Salt cedar native to Europe, Asia and Africa. It was introduced to North America as an ornamental and for stream bank stabilization. Habitats for salt cedar include riparian areas along stream/river/lake banks and in landscape plantings. It can spread downstream 12 miles per year and consumes large quantities of water daily, and increases salt content of soil, making salt cedar very detrimental to native riparian habitats.

Salt cedar leaves are similar in appearance to cedar/juniper leaves. They are small, scale-like, overlapping and often encrusted in salt secretions in an alternate leaf pattern.

Reproduction of salt cedar occurs by seed and vegetatively. Flowers bloom April-September and are small, pink to white in color and plants can grow from 3 to 20 feet tall and can either resemble a bush or a tree in structure. Branches are slender, bark is dark to reddish brown and root system is a single taproot that branches out when it reaches the water table.

### Keys to Control:

- The most effective method of control for salt cedar is through prevention of spread and establishment. Once



established, it can be very difficult and expensive to control since stress on plants increases flowering and seed production and the entire root system must be killed to prevent sprouting.

- **CULTURAL** — Encouraging establishment of native trees such as cottonwoods by mimicking historic flood regimes is one way to discourage salt cedar establishment. Salt cedar do not grow well in shade, therefore can be out competed by cottonwoods due to their canopy cover.
- **BIOLOGICAL** — The tamarisk leaf beetle is a known biological control of salt cedar. They feed on the leaves and flowers, preventing the trees from producing seed. Unfortunately, trees thought to have been killed by beetles have shown resprouts a few years after the beetles move on.
- **MECHANICAL** — Salt cedar cannot be killed using mechanical methods alone due to their root system, but combining mechanical methods (e.g. cutting, mowing, mulching and bulldozing) with chemical treatments proves to be very effective.





# Spotted Knapweed

*Centaurea stoebe*

Spotted knapweed is a non-native biennial or short-lived perennial member of the sunflower family (Asteraceae) that reproduces primarily by seed production. Native to Eurasia it was introduced in 1890's as a contaminant in alfalfa or hay seed. A prolific seed producer, Spotted knapweed can produce up to 40,000 seeds per plant. Once established, Spotted knapweed reduces livestock and wildlife forage by outcompeting native species.

## Keys to Control:

- The most effective method of control for Spotted knapweed is to prevent seed production and its establishment through proper land management.
- **CULTURAL** — Preventing the establishment of Spotted knapweed is crucial, so maintaining healthy pastures/rangeland and native plant

communities is a priority. Continually monitor your property for new infestations. Bare ground is prime habitat for weed invasion. Establish select grasses as an effective cultural control of Spotted knapweed.

- **BIOLOGICAL** — Root and Seed head weevils (*Cyphocleonus achates* and *Larinus minutus*) attack the roots and reduce seed production in Spotted and Diffuse knapweeds. This is an option for large infestations, though optimum results take 3-5 years.
- **MECHANICAL** — Dig when the soil is moist, and remove all the taproot as well as all lateral roots. Mowing Spotted knapweed at full-bloom will stress the plant, but not kill it. Be sure to bag the flowering cut plants, since the seeds remain viable even after cutting.



# Sulfur Cinquefoil

*Potentilla recta*

Sulfur cinquefoil is a perennial forb that is native to Eurasia. Sulfur cinquefoil is unpalatable to grazing animals and is avoided for the most part. The low preference is believed to be a result of a high concentration of phenolic tannins (acidity) in the leaves and stems. The plant has a long life span and twenty year old plants are not uncommon.

## Keys to Control:

- The key to effective control of Sulfur cinquefoil is an integrated weed management approach. Properly identifying sulfur cinquefoil is imperative, since it resembles the native cinquefoils.
- **CULTURAL** — Increasing the competitiveness of native species can assist in preventing establishment of Sulfur cinquefoil. Bare ground is prime habitat for weed invasions.

- **BIOLOGICAL** — Biocontrol species have been used in trials, since Sulfur cinquefoil is similar to strawberries though; the insects used are considered pests.
- **MECHANICAL** — Hand pulling or digging when infestations are small and the soil is moist, is effective. Be sure to dig up as much of the root system as possible, especially since root fragments can produce new plants. Be sure to carefully bag all specimens to prevent the spread of seeds. Mowing is not effective, as new shoots will replace the cut stems.





# Yellow Starthistle

*Centaurea solstitialis*

Yellow starthistle originated from Northern Spain. Yellow starthistle spreads by seed with a single large plant producing up to 100,000 seeds. Plumed and plumeless seeds disperse at different times. Yellow starthistle is fatally poisonous to horses (causing chewing disease) and is considered poor forage for all livestock and wildlife. It also destroys native plant communities. The seed bank of Yellow starthistle is not completely understood. The site must be monitored for at least 15 years after the last flowering adult plants have been eliminated and treatments repeated when necessary.

## Keys to Control:

- The key to effective control of yellow starthistle is to prevent seed set from occurring in existing populations, monitoring your land for new infestations frequently, treating newly detected invasions rapidly, and preventing new introductions from occurring.



- **CULTURAL** — Following initial control, establishment of selected grasses can be an effective cultural control of yellow starthistle. Maintain healthy pastures and prevent bare spots caused by overgrazing. Bare ground is prime habitat for weed invasions.
- **BIOLOGICAL** — Insect biocontrol agents exist but are not included in the state prescribed management plan. Eradication is the management objective for all List A species.
- **MECHANICAL** — Hand pull when soil is moist and make certain to pull all the roots. Bag specimens carefully so as to not scatter seeds if flowering. Include dried skeletons as they may still contain seed. Mowing is not advisable and may extend life of the plant and stimulate additional flowering while spreading any existing seeds.

# Yellow Toadflax

*Linaria vulgaris*

Yellow toadflax is a perennial escaped ornamental plant that is native to the Mediterranean region and south-central Eurasia where it was used for fabric dyes and for medicinal purposes. It was imported into North America in the late 1600's as an ornamental and for folk remedies. It was widely distributed in North America by the mid-20th century. Unfortunately, in states where Yellow toadflax is not noxious, it still is sold by some nurseries as "butter and eggs" or as "wild snapdragons" and can be found in some wild flower mixes.

Yellow toadflax displaces desirable plant communities reducing ecological diversity and rangeland value. Disturbance promotes toadflax invasion and may be necessary for establishment to occur.

## Keys to Control:

- 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.



- **CULTURAL** — Maintain healthy pastures and prevent bare spots caused by overgrazing. Establish select grasses and forbs as an effective cultural control of Yellow toadflax. Bare ground is prime habitat for weed invasions.
- **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.
- **MECHANICAL** — Hand pulling 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.