A FIELD GUIDE TO Northeast Oregon's Noxious Weeds



Tri-County CWMA Protecting Northeast Oregon's Natural Resources

Northeast Oregon's Noxious Weeds

A Field Identification Guide 2ND EDITION



Prepared By: Tri-County CWMA



Acknowledgements	Pg 1
Contacts	Pg 2
Preface	Pg 3-4
Management	Pg 5-6
Canada thistle - Cirsium arvense	Pg 19-20
Common Bugloss - Linaria genistifolia	Pg 7-8
Dalmatian toadflax - Linaria dalmatica ssp. dalmatica	Pg 45-46
Diffuse knapweed - Centaurea diffusa	Pg 31-32
Dyer's woad - Isatis tinctoria	Pg 47-48
Himalayan blackberry - Rubus discolor (armeniacus)	Pg 33-34
Houndstongue - Cynoglossum officinale	Pg 27-28
Japanese knotweed - Polygonum cuspidatum	Pg 35-36
Leafy spurge - Euphorbia esula	Pg 9-10
Meadow hawkweed - Hieracium caespitosum	Pg 49-50
Mediterranean sage - Salvia aethiopis	Pg 37-38
Medusahead rye - Taeniatherum caput-medusae	Pg 11-12
Musk thistle - Carduus nutans	Pg 21-22
Myrtle spurge - Euphorbia myrsinites	Pg 13-14
Perennial pepperweed - Lepidium latifolium	Pg 39-40
Poision hemlock - Conium maculatum	Pg 41-42

Contents

Puncturevine - Tribulus terrestris	Pg 51-52
Purple loosestrife - Lythrum salicaria	Pg 23-24
Rush skeletonweed - Chondrilla juncea	Pg 53-54
Russian knapweed - Acroptilon repens	Pg 15-16
Scotch thistle - Onopordum acanthium	Pg 17-18
Spotted knapweed - Centaurea maculosa	Pg 25-26
St. Johnswort - Hypericum perforatum	Pg 55-56
Sulfur cinquefoil - Potentilla recta	Pg 57-58
Summer pheasant eye - Adonis aestivalis	Pg 29-30
Whitetop - Lepidium draba	Pg 43-44
Yellow flag iris - Iris pseudacorus	Pg 59-60
Yellow starthistle - Centaurea solstitialis	Pg 61-62
Yellow toadflax - <i>Linaria vulgaris</i>	Pg 63-64
Glossary	Pg 65-66
Basic Leaf Shape & Margins	Pg 67-68
Basic Flower Structure	Pg 69-70
Herbicides	Pg 71-72
Weed Websites	Pg 73
References	Pg 74
Photo Credits	Pg 75-77

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> Sponsored By: Tri-County Cooperative Weed Management Area





Contacts for Weed Identification & Control in the Tri-County Region

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RI-COUNTY CWMA

■ There are many organizations and agencies throughout northeast Oregon who are dedicated to the cause of reducing the negative impacts of weeds on our private and public lands. Tri-County Cooperative Weed Management Area (CWMA) was created in 1994 to contribute to the "War on Weeds", throughout the Baker, Union, and Wallowa Counties. Tri-County's mission is to facilitate cooperation among all land managers and landowners, acting as responsible stewards of the land and resources in the state of Oregon by protecting and preserving all lands and resources in the Tri-County area from the degrading impact of exotic, invasive noxious weeds.

HAT ARE NOXIOUS WEEDS?

Oregon's noxious weeds are plant species that have been classified "noxious" by the Oregon State Weed Board that are particularly injurious to public health, agriculture, recreation, wildlife, or any public or private property. There are many definitions used to categorize noxious weeds. The Oregon Department of Agriculture defines noxious weeds as non-native plants that have been legally designated as serious pests because they cause economic loss and harm to the environment.

The Oregon State Weed Board establishes a noxious weed list with prioritized management goals for weeds on the "A" or "B" and/or "T" lists. Both the policy and system can be found on the Oregon Department of Agriculture (ODA) Noxious Weed Program website at: http://www.oregon.gov/ODA/PLANT/WEEDS/programoverview.shtml

MPACTS TO OUR NATURAL RESOURCES

Noxious weeds impose negative impacts upon crops, native plant communities, livestock, and the management of natural and/or agricultural systems. There are more than 118 weeds on Oregon's Noxious Weed List. The introduction and spread of noxious weeds have become a biological emergency, negatively impacting Oregon's natural resources.

THE PURPOSE OF THIS GUIDE & HOW TO USE IT

The purpose of this guide is to serve as a reference source of information about the noxious weeds of Eastern Oregon. This guide is designed for landowners, land managers, homeowners, recreationists and others. Being able to identify noxious weeds is the first step in control and/or eradication. Although the information in this handbook was current at the time of printing, users should be aware that new and updated information is constantly becoming available. Please consult your county weed supervisor to obtain the latest information.

The 29 weeds in this guide are arranged first by flower color and then alphabetically by weed common name. Flower color along with the weed's scientifc and common names are given on the edges of this guide. For weeds that have more than one common name, the guide uses the name in Oregon's official noxious weed list.

EED HERBICIDE RECOMMENDATIONS TO THIS GUIDE

Use Herbicides Safely! Wear protective clothing and safety devices as recommended by the label.

This handbook is not intended as a complete guide to herbicide use. Tri-County assumes no responsibility for recommendations. Always Read and Follow the Label!

If site-specific help is needed, land managers should contact a licensed consultant. The label will describe legal use of the herbicide for pasture, right-of-ways, rangeland, etc., and it will document restrictions on reentry intervals and subsequent having or grazing restrictions.

The Pacific Northwest Weed Management Handbook contains more detailed information on control and identification of most weed species encountered in Oregon. The handbook is available online at: http://pnwpest.org/pnw/weeds.

Further information can be obtained from The Oregon Department of Agriculture Plant Division, Noxious Weed Control: http://egov.oregon.gov/ODA/PLANT/WEEDS/.

This guide provides the chemical common names for herbicide recommendations as a starting point for chemical control options. To help individuals identify the common name, some trade names of commercial products are provided on pages 71-72.



DREVENTION, ERADICATION, CONTROL & RESTORATION

Prevention - Preventing new introductions of noxious weeds is the first line of defense. Weeds specialize in colonizing highly disturbed ground and tend to invade plant communities that have been degraded by poor land management. Consider preventive measures that can be used to reduce the likelihood of future weed infestations. Some common prevention tactics include: Always use hay, straw, or mulch that has been certified weed free.

- Avoid transporting weed seeds on clothing, gear, pets, vehicles and equipment. Clean contaminated equipment.
- Become aware of weed identification and report new infestations of known weeds. Educate neighbors, family, recreationists and others.
- Establish and maintain weed resistant, desirable plant communities.

Eradication - The elimination of all plant parts within the current growing season. By implementing early detection/rapid response, you can eliminate new invaders when the population is small and you not only save time and money, but also much effort in the long run.

Control - Some noxious weeds are found in such large numbers that it is no longer realistic to think we will be able to rid the entire state of their presence. Instead the management goal would be by stopping their spread and eradicating small outlier populations. Some weed control tactics are:

- Biological Organisms (insects or diseases) used to suppress the population of a noxious weed.
- Cultural Methods applied to reduce the suitability of the soil for weed growth, such as
 grazing strategies, crop rotation, planting date, applying fertilizer to encourage wanted
 vegetation, increasing the canopy cover, and revegetation of an infested area.
- Mechanical Methods that kill or suppress weeds through physical disruption, including pulling, digging, cutting, plowing, mowing and burning.
- Chemical A method that consists of the careful use of herbicides.

Restoration – Establish a healthy and competitive stand of desirable plants to protect a site from re-invasion.



ha tunia

The figure above illustrates the typical species invasion curve. During the introduction phase, fewer impacts are seen to natural resources, therefore invasive plant species have a high probability of eradication. As a population of the invasive plant enters the established phase, it begins to spread rapidly, impacting natural resources. At some point the introduced plant species will reach it's widely established phase where it occupies all the space available to the species, and has maximized impacts to natural and economic resources. Prevention and treatment of new invasive plant introductions is the most successful, cost effective, and least environmentally damaging means of control. After initial introduction of a new invasive plant, there is a short period of opportunity for eradication and containment. Once permanently established, a new invader becomes a long-term management problem.

common nehusa officinalis

Boraginaceae (borage family)

District Common Names: Common anchusa, Alkanet, Bee bread, Ox's tongue, Starflower, Common borage, Orchanet, Spanish bugloss, Enchusa, Lingua bovina & Blue bugloss.



dentification:

Perennial herbaceous plant that has a covering of bristly hairs & grows from 1 to 2 feet tall. Fleshy stalks can cause hay bales to mold.

Leaves: Lower leaves narrow & oblong. Mid-leaves progressively smaller up the stem. Upper leaves clasping. Fleshy leaves & stem.

Flowers: Numerous symmetrical 5-petaled flowers that are usually a deep sapphire blue color with white throats, found in coiled clusters at the end of stems. Flowers May to October.

Fruit: 4-chambered nutlet. Each nutlet contains 1 seed.







limited distribution in county not known to be present in county

ook Alikes:

Small bugloss, a winter annual, can be mistaken for Common bugloss, but can be distinguished by lance-shaped leaves, hairs arising from small bumps and a floral tube with a distinct curve.

bugloss





Chemical / Timing: • Chlorsulfuron / Rosette & prior to bolting stage

Metsulfuron / Rosette & prior to bolting stage.

*Always read & follow the label.





abitat:

Introduced from Europe & west Asia. Prefers dry, sandy to gravelly soils. Invades alfalfa fields, pastures, pine forests, roadsides, rangeland, riparian areas & waste areas.

Jeafy Suphorbia esula

Euphorbiaceae (spurge family)

ther Common Names: Wolf's milk, Faitour's grass, Hungarian spurge.

dentification:

Perennial, growing 2 to 3 ft tall. Milky sap from roots & stem is toxic & has resulted in temporary blindness in humans & livestock. Produces by seed & by root.

Leaves: Narrow, alternate (nearly opposite), 1 to 4" long. Stems are thickly clustered.

Flowers: Yellowish-green, small, arranged in small clusters & are surrounded by yellowish-green heart-shaped bracts during midsummer. Blooms during the months of June or July.

Fruit: Seeds are oblong, grayish to purple, contained in a 3-celled capsule (each containing 1 seed). Mature fruits rupture & expel seed up to 15 feet. Seeds viable for at least 8 years.

Root: Brown with pink buds that can produce new shoots. The root system can exceed over 20 ft in length.





Alikes: Yellow toadflax at seedling stage.

nutlet = 4mm





seed = 3mm





abundant distribution in county limited distribution in county not known to be present in county

spurge



ontrol:

Biological: Flea beetle, moth, gall midge, beetle (stem borer). Contact ODA for a list of agents.

Cultural: Mechanical control & hand pulling is ineffective. Grazing throughout the summer & fall can set back production.

Chemical / Timing:

- Imazapic / After summer dry period when plants begin to grow.
- Picloram + 2,4-D / Bloom stage.
- Picloram / Bloom stage.
- Glyphosate / Spring to early summer.
- 2,4-D LV ester / Actively growing plant.

*Always read & follow the label.

abitat:

Introduced in the United

States through seed impurities from Eurasia around 1827. Leafy spurge is a flexible plant that tolerates extremely dry to extremely wet soil conditions. It can often be found along waterways & irrigations ditches, but also found in draws & sagebrush. It grows in a wide variety of soil types but is most abundant in sandy to gravelly soils in arid conditions.



medusahead

Jaeniatherum caput-medusa

Poaceae (grass family)

ther Common Names: Medusahead, Medusa's head.



seed with awn = 2-10cm

dentification:

Medusahead is winter annual grass. It will grow 6 to 24" tall. Stiff awns may cause injury to grazing animals by working into ears, eyes, nose, & tongue. Forage value is poor in early spring & becomes worthless with production of inflorescences; worthless for wildlife at all times. Because medusahead matures

several weeks later than most other annual grasses, its green color stands out against a backdrop of brown grasses.

Leaves: Leaf blades are somewhat rolled, & approximately $\frac{1}{8}$ wide.

Flowers: The inflorescence contains 2 to 3 spikelets per node. The longer of 2 awns in each spikelet contains upward pointing barbs that is nearly as wide as long. Awns are straight when green, but twist as they dry into a "snake-like" fashion reminiscent of the mythological medusa head. Flowering and seed formation occur in May and June.





abundant distribution in county limited distribution in county not known to be present in county



ook Alikes: Medusahead is sometimes confused with foxtail barley or squirreltail, but can be distinguished by a seed head that does not break apart as seeds mature.

rye





ontrol:

Medusahead rye is a rapidly spreading annual that requires multiple management stages for control. First, thatch layers need to be minimized so that herbicide can reach the actively growing plant. Secondly,

the plant communities must be reestablished to keep medusahead & other invasive plants from further establishment.

Chemical / Timing:

- Imazapic / Still undergoing testing.
- Glyphosate / Still undergoing testing.

*Always read & follow the label.





abitat: Introduced from Eurasia. Medusahead predominantly grows on semi-arid rangeland. Infested rangeland suffers 40 to 75% reduction in grazing capacity.

Suphorbia myrsinites



Euphorbiaceae (spurge family)

ther Common Names: Creeping spurge & Donkey tail.

dentification:

This plant is a biennial or perennial with trailing stems that grow close to the ground. It reaches a height of 8", although its leaning stems are up to 16" long. Myrtle spurge is poisonous if digested, causing nausea, vomiting & diarrhea. Additionally, the milky sap can cause swelling, redness & blistering of the skin & irritation to possible temporary blindness to the eyes.

Leaves: Leaves are succulent, gray green, ovate with sharp tips & arranged spirally along the succulent stem.

Flowers: Heart-shaped, showy, yellow-green bracts surround inconspicuous yellow flowers near the top of the stem. Flowering occurs in the spring.

Fruit: Seeds can burst explosively15 ft or more upon drying in late summer. These seeds remain viable in the soil at least 8 years.







Root: Tap root.



limited distribution in county not known to be present in county

ook Alikes:

Many species of Euphorbia resemble myrtle spurge. The majority of those that occur in the Northwest are exotic. These species can be differentiated by comparing the succulent leaves of myrtle spurge to other exotic and native Euphorbia, which often lack this trait.

spurge



ontrol:

When root segments are scattered by tillage, they can produce new plants. These segments can be transported through birds, animals or in soil.

Biological: One approved biological control agent, a leafy spurge flea beetle, has had a high survival rate on myrtle spurge in laboratory studies.

Cultural: Small infestations can successfully be dug or pulled. In order to gain control over a population it must be pulled over multiple years. Pull plants early in the season to prior to seed formation. Use caution when pulling to not get any sap on your skin. If sap contacts skin make sure to wash that area.

Chemical / Timing:

- 2,4-D ester / During spring or during fall regrowth.
 Dicamba + 2,4-D / During spring or during fall regrowth.
- Picloram + 2,4-D / At flowering growth stage during spring or to fall regrowth.
 Picloram / At flowering growth stage during spring or to fall regrowth.

*Always read & follow the label.

abitat: A native to Eurasia. It was introduced to North America as an ornamental and is often used in rock gardens. This plant has escaped cultivation in some areas, invading disturbed & well-drained areas.



russian Aeroptilon repens

Asteraceae (sunflower family)

D ther Common Names: Turestan thistle, Creeping knapweed, Mountain bluet, Russian cornflower, Hardheads.

dentification:

Russian knapweed is a perennial, growing up to 3 ft tall. Produces a chemical that inhibits the growth of the surrounding vegetation and is toxic to horses.

Leaves: Lower leaves are deeply lobed & the upper leaves are entire or serrate.

Stem: Erect & openly branched, 18-36" long.

Flowers: '4'' to '2'' in diameter, numerous in clusters on the ends of branches, pink to lavender in color forming from bracts that are rounded with papery margins. Flowers bloom from June to September.

Root: Differs from diffuse & spotted knapweed primarily in that it has a rhizomatous, or extensive, root system. Can grow up to 3 ft in depth & forms dense colonies due to this root system. Roots are also distinguishable by their black color, bark-like texture, & by buds that develop into shoots

Fruit: Seeds are small with whitish bristles attached. Seeds viable for up to 9 years.

ook Alikes:

Many native members of Asteraceae resemble knapweed in the rosette stage.



seed = 4mm





abundant distribution in county limited distribution in county not known to be present in county

k n a p w e e d





Biological: Stem/leaf gall nematode. Contact ODA for a list of agents.

Cultural: Soil disturbance has no effect on plants because root fragments have the ablility to resprout. Grazing sheep, goats, & cattle have aided in controlling seed production. Grazing needs to be done several times during the growing season to avoid flowering.

Chemical / Timing:

- Clopyralid +2,4-D /After rosettes form in spring; before bolting,
 Clopyralid / Up to bud stage.
 Aminopyralid / Bud to flowering stage;
- fall.
- Glyphosate / Bud stage.
 2,4-D / Early bolting.
- Chlorsulfurón / Fall.

*Always read & follow the label.





abitat:

Introduced from Eurasia around 1898. Plants are found in cultivated fields, rangeland, pastures, & along roadsides.

Scotch Inopordum acanthium Asteraceae

(sunflower family)

ther Common Names: Cotton thistle, Heraldic thistle, Woolly thistle.

> ook Alikes: Canada thistle, Musk thistle.



dentification:

Biennial or winter annual that grows up to 12 ft tall.

Leaves: Basal leaves, which are armed with sharp, yellow spines, are up to 2 ft long & 1 ft wide. Upper leaves are alternate & coarsely lobed. Upper & lower leaf surfaces are covered with a thick mat of cotton-like or woolly hairs, which give the foliage a gray-green appearance.

Stem: Stems have vertical rows of prominent, spiny, ribbon-like leaf material or "wings" that extend to the base of the flower heads.

Flowers: The globe-shaped flower heads are borne in groups of 2 or 3 on branch tips. Flower heads are up to 2" in diameter, with long stiff, needle-like bracts at the base. Flowers range from dark pink to lavender; sometimes white. Blooms May to June.



Fruit: Seeds are produced in a honeycomb shaped receptacle, deep brown to black, wrinkled, ³/₁₆" long, & plumed. Seed can be viable for over 30 years.





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thistle



ontrol:

Cultural: Avoid soil disturbance in established infestations, grubbing can be successful small areas. Burning plant material prevents regrowth from going to seed.

Chemical / Timing:

- Chlorsulfuron / Actively growing rosettes.
- Metsulfuron / Actively growing rosettes.
 Metsulfuron + Dicamba + 2,4-D / Spring prior to flowering.
- Aminopyralid / Rosette to bolting. Use high rate at bolting.

*Always read & follow the label.



abitat: Native to Europe and eastern Asia. Found in pastures, dry meadows, rangelands, waste areas, & along roadsides.



canada jirsium arvense

Asteraceae (sunflower family)

Californian thistle, Canadian thistle, Field thistle, Corn thistle, Field thistle, Corn thistle, Perennial thistle,



seed = 2mm

dentification:

Canada thistle is a perennial, growing 1 to 4 feet all. Roots are deep & horizontal.

Leaves: Alternate, lacking petioles, oblong, divided into spiny-tipped irregular lobes.

Flowers: Both male & female on separate plants. Flowers are purple, occasionally white, with ovoid heads 1/2" to 3/4" in diameter; occur solitary on branch tips. Flowers bloom July to August.

Fruit: Seeds are 1/8'' long & brownish, with a tuft of hairs at the top. Seeds viable up to 8 years. One plant is capable of producing over 3,000 seeds annually.





abundant distribution in county

ook Alikes:

Bull thistle, a biennial, is often confused with Canada thistle, but can be distinguished by the profuse hairs present on the upper leaf suface. Bull thistle will often appear as a single specimen, whereas Canada thistle will almost always be present with several daughter plants.

thistle



Control: Biological: Stem weevil & Gall fly. Distribution is limited to certain ecosystems. Contact ODA for a list of agents.

Cultural: Mechanical & physical removal is not effective. Grazing provides a varying degree of control.

Chemical / Timing:

- Clopyralid + Triclopyr or Clopyralid / up to bud stage.
- Aminopyralid / in spring to plants in the pre-bud growth stage, in fall to plant regrowth.
- Picloram / Before budding.
- Metsulfuron + Chlorsulfuron / Rosette through flowering stage but prior to seed development.
- Metsulfuron + Dicamba + 2,4,D / In spring to plants in the rosette to early bolt stage.

*Always read & follow the label.

abitat:

Introduced from southeastern Eurasia as a contaminant in crop seed. Plants grow in colonies & produce thousands of seeds. Habitat includes croplands, pastures, meadows, roadsides, waterways, clear-cuts, rangelands & waste areas.









(sunflower family)

ther Common Names: Nodding thistle.

dentification: Musk thistle is a biennial & sometimes winter annual, growing up to 6 ft tall.

Leaves: Green with a light green to white midrib, hairless, deeply lobed with spiny margins.

Flowers: Solitary head, terminal, 11/2 to 3 " in diameter, color: deep rose, violet, purple or white, flower usually has bent over appearance. Many spine tipped bracts. Musk thistle produces many heads. The terminal, or tallest shoots

flower first, then lateral shoots develop in leaf axils. A robust plant may produce 100 or more flowering heads. Flowers bloom June through August.

Fruit: Seeds are $\frac{3}{16}''$ long, shiny, yellowish-brown with a plume of white hair-like fibers. It begins to



musk







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ook Alikes:

The invasive, non-native plumeless thistle can be confused with musk thistle. The flowers of plumelss thistle are smaller & musk thistle has solitary drooping flower heads.

thistle





ontrol:

U The key to successful musk thistle control is to prevent seed production. *Biological:* Thistle rosette weevil. Contact ODA for a list of agents.

Cultural: Mechanical tillage provides limited control. High seed production henders mechanical control involving soil disturbance. First year rosettes can be hand pulled with little effort. Pull or chop mature plants before they go to seed.

Chemical / Timing:

- Chlorsulfuron / After rosettes forming spring; before bolting.
- Metsulfuron 7 Actively growing rosettes.
- Metsulfuron + Dicamba + 2,4-D.
- Metsulfuron + chlorsulfuron / Prior to flowering.
- Clopyralid / Rosette to early bolting stages.
- Aminopyralid / Rosettes, bolting plants-early flowering growth stages.
- Picloram / Rosettes in fall.

*Always read & follow the label.





abitat: Introduced to North America in the early part of this century from southern Europe and western Asia. It is found in pastures, range, forestlands, waste areas, ditch banks, & along roadsides.



Lythrum salicaria

Lythraceae (loosestrife family)

ther Common Names: Spiked loosestrife.

> ook Alikes: Blazing star, Fireweed.

dentification:

Perennial & upright reaching up to 7 ft tall. Extensive root system & the prolific seed production results in rapid spread. In addition, stems of the plant that are broken off or disturbed often grow shoots.

Leaves: Clasping leaves have smooth margins, are lance shaped, & are heart-shaped or rounded at the base. Leaves are covered by downy fine hairs & whorled or alternate on the stem.

Stem: Numerous square stems that are green to purple and woody in appearance. Mature plants can have from 30 to 50 stems arising from a single rootstock.

Flowers: Showy display of magenta-colored flower spikes blooming throughout much of the summer. Flowers have 5-7 petals.

Root: Rhizomatous.

Fruit: A small capsule containing numerous minute seeds . Seeds burst at maturity around late July or early August, with each stem producing up to



three million tiny seeds per year. Germination can occur the following season, but seeds may lay dormant for several years before sprouting.







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loosestrife





abitat:

Introduced from Europe as ornamental. Prefers aquatic sites, stream banks, shorelines, shallow ponds, marsh area and ditches.

ontrol:

Biological: Loosestrife leaf feeding beetle, flower weevil, root mining weevil. Contact ODA for a list of agents.

Cultural: Hand pulling is effective in small areas - entire plant must be removed. Dispose of plant particles to prevent resprout.

Chemical / Timing:

- Glyphosate / Before bloom or full to late flowering.
- Metsulfuron / Actively growing plants.
 Triclopyr / Bloom stage or seedlings.

*Always read & follow the label.





spotted entaurea stoebe

Asteraceae (sunflower family)

ther Common Names: None.

> ook Alikes: Other Knapweeds, Cornflower, Bachelor's buttons, Canada thistle.

dentification:

Spotted knapweed is a biennial or short lived perennial with a stout taproot. It can grow 1 to 3 ft tall. Produces a chemical that inhibits growth of surrounding plants.

Leaves: Leaves are oblong & wider at the tip. Deeply lobed & in early stages covered with a layer of fine hairs. Upper leaves are finely divided at maturity. Stem leaves are alternate, sessile, & have few lobes, or they are linear & entire, & are smaller toward the uppermost part of the stem.

Stem: Stems can have more than one stem & are branched on the upper half.

Flowers: Flower heads are born solitary or in clusters of 2 or 3 & are found at the branch ends. Flower heads are ovate to oblong and are pink to pinkish-purple in color. Flowers are surrounded by oval bracts with black tips, thus the name spotted knapweed. One plant can produce up to 300 flower heads. Flowers bloom from June to October.

Root: This plant has a strong taproot as well as lateral roots.

Fruit: Seeds are dark brown to tan & plumed. Each plant can produce up to 25,000 seeds that are dispersed by wind, animals, water & people.











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k n a p w e e d



ontrol: Biological: Seed head moth, rootboring moth, seedhead weevil, broadnosed knapweed



seedhead weevil, seadhead peacock fly, root weevil.Contact ODA for a list of agents.

Cultural: High seed production limits benefits of soil disturbance such as tillage. Sheep & goats provide some control of seed production if grazed several times during the growing season.

Chemical / Timing:

- Triclolyr + clopyralid / rosette to early bolting stages.
- Picloram / Spring before bolting.
 Clopyralid + 2,4-D / After rosettes form in spring, before bolting.
- Clopyralid / Up to bud stage.
- Aminopyralid / Up to bud stage.
- 2,4-D / Early bolting.
- Glyphosate / Bud stage.

*Always read & follow the label.

abitat: Introduced from Europe. Spotted knapweed grows along roadsides, disturbed areas, waste areas, & dry to moist rangelands.







houndstongue

Boraginaceae (borage family)

ther Common Names: Gypsy flower, Rats & Mice, Dog bur, Beggers lice.

dentification:

Biennial growing 1 to 4 ft tall. Forms a rosette 1st year & sends up a flowering stock the 2nd year. Contains large quantities of pyrrolizidine alkaloids, which are toxic to cattle & horses.

Leaves: The rosette leaves are broad, oblong & petioled. Leaves are alternate, up to 1 ft in length & up to 3" wide. Very pubescent leaves with smooth margins that are soft & velvety to touch; resembling a dog's tongue.

Flowers: Reddish-purple, terminal, born in a coil-like panicle at end of stem. Typically blooms from June to August.

Fruit: Produces barbed seeds, or burrs, which allow the plant to adhere to hair, wool and fur; Velcro-like burrs. Reproduces from seed only & each plant can produce up to 2,000 seeds.



abundant distribution in county limited distribution in county not known to be present in county

sed = 5mm



ook Alikes:

Exotics: Rosettes may resemble burdock. Natives: If not flowering, could be mistaken for members of the Hackelia or Lappula genus (stickseeds).





ontrol:

Cultural: Hand pulling can be used in small infestations. Chopping & hand pulling must occur before plant goes to seed.

Chemical / Timing:

- Chlorsulfuron / Rosette to flowering stage.
- Metsulfuron / Rosette to flowering stage.
- *Always read & follow the label.







abitat: Prefers well drained, relatively sandy & gravelly soils, & can be found in disturbed sites, rangelands & meadows.

, summer do*nis aestivalis*

Ranunculaceae (buttercup family)



ther Common Names: Pheasant's eye, Blood drop.

dentification:

Summer Pheasant eye is an upright annual that can grow up to 3 ft tall. It is fatally toxic to horses & cattle.

Leaves: The leaves are alternately arranged along the stem, 3 to 5"long & bright green. They are deeply divided with individual linear segments up to $2 \frac{1}{2}$ " long.

Stem: The slender stems have many branches & they are covered in soft hairs near the base of the plant.

Flowers: Red to orange or yellow in color, solitary, terminal on stocks that lengthen as the flower matures, 5-10 petals, oblong in shape, petal base is blue to purplish. Sepals a dark-purplish brown & slightly hairy at the base. Flowers from midsummer to early fall.

Fruit: The plant produces seeds in a small fruit that can attach to clothing & animals. The seeds can also be spread through contaminated hay or grains.

ook Alikes:

Summer Pheasant's Eye closely resembles field poppy. Leaves of the poppy are not as finely divided, & its petals are larger & more numerous.









pheasant eye

Control: Cultural: Digging & tilling can effectively control small infestations. Mowed or grazed plants can still flower and produce seeds.

Chemical / Timing:

- Metsulfuron / Rosette to bolting stage.
- Chlorsulfuron / Actively growing plants.

*Always read & follow the label.







abitat: Native to Eurasia, thrives in well-drained soils, riparian areas, meadows, & rangelands.

diffuse Centaurea diffusa

Asteraceae (sunflower family)

ther Common Names: White knapweed, Spreading knapweed, Tumble knapweed.

dentification:

Diffuse knapweed is an annual or short lived perennial, growing 1 to 2 feet tall.

Leaves: The rosette consists of greatly divided & featherery looking leaves that are covered with small hairs. On the stem, leaves become alternate, smaller & less divided. They are lance-shaped & grayish-green in color, growing up to 6" long. Stems have rough texture.

Flowers: Numerous & narrow, & tend to be white but, flowers can also be pink to purple. Flower head forms comb-like bracts that are tipped with a definite slender spine. Blooms from July to September.

Fruit: Seeds are 4mm in size, brown to grayish & are tipped with plumes that fall off at maturity. Each plant can produce up to 18,000 seeds annually.

ook Alikes:

Squarrose knapweed can be confused with Diffuse knapweed. Squarrose knapweed's central spine on the bract below the flower is curved downward while Diffuse knapweed's central spine is not bent.









abundant distribution in county limited distribution in county not known to be present in county

k n a p w e e d



ontrol:

Biological: Moth, weevil, fly, beetle, nematode. Contact ODA for a list of agents.

Cultural: Control would be sheep & goats to help reduce seed production. Physical removal is successful in small areas.

Chemical / Timing:

- Tricloyr + Clopyralid / Rosette to early bolting stages.
- Picloram / Spring-rosette to early bolting stage.
- Clopyralid + 2,4,D / After rosettes form up to bolting.
 Clopyralid / Up to bud stage.
 Aminopyralid / Rosette to bolting stage or in fall.

- Glyphosate / Bud stage.

*Always read & follow the label.





abitat:

Introduced from the Mediterranean region. Prefers disturbed areas along sandy river shores, gravel banks, roadsides, rangeland, pastures & waste areas.
Himalayan



Rosaceae (rose family)

dentification:

Himalayan blackberry is a perennial shrub that can grow up to 15 ft tall with canes up to 40 ft long, forming impenetrable thickets.

Leaves: Leaves are large, round to oblong & toothed, & typically come in sets of 3 (side shoots) or 5 (main stems).

Stem: The most characteristic feature is probably the robust stems supporting large, stiff prickles.

Flowers: Small, white to pinkish flowers with 5 petals. Blooms June to August.

Fruit: The fruit are aggregate, shiny, large, black drupelets. Fruit ripen beginning in mid-summer until fall. Seeds remain viable in soil for many years.

Root: Main plants have large, deep, woody root balls that sprout at nodes. The canes root at tips, creating daughter plants.



ook Alikes:

Among the many native blackberriees & raspberries, one can differentiate Himalayan blackberry by the 5 leaflets & curved spines with wide bases. This blackberry species also has furrowed, angled stems while others are typically round.

D ther Common Names: Armenian blackberry.





blackberry





ontrol:

Cultural: Removal of top growth by mowing, cutting or grazing with goats will eventually kill blackberry if done regularly & over several years. Cutting followed by digging up root crowns is much more effective than cutting alone.

Chemical / Timing:

- Glyphosate / Fall, actively growing & after berries are formed.
- Metsulfuron / Apply to fully leafed-out vegetation before fall leaf coloration.
- Picloram / Apply in late spring after leaves are fully developed.
- Imazapyr / Late fall Early spring.

*Always read & follow the label.

abitat:

A native of Western Europe & was first introduced to North America in 1885 as a cultivated crop. This species then became established on the west coast by 1945. It thrives in wastelands, pastures, forest plantations, roadsides, creek gullies, river flats, riparian areas, fence lines & right-of-way corridors preferring moist soil.





Polygonaceae (buckwheat family)

Her Common Names: Mexican bamboo, Fleeceflower, Huzhang, Sakhalin knotweed, Japanese bamboo.

dentification:

Perennial, reproducing from long creeping rhizomes up to 18 ft long.

Stems: Stout, reddish-brown, 4 to 9 ft tall, woody & hollow. Nodes are slightly swollen & surrounded by thin papery sheaths. The stems are smooth & resemble bamboo.

Leaves: Short petioles, broadly ovate, 2 to 6" long, narrowed at point, alternate & born on zigzag stem.

Flowers: From August to September, the small pale green to white flowers form attractive dropping panicles about 4" long.

Fruit: Glossy; brown to dark brown.



limited distribution in county not known to be present in county







ook Alikes: Giant knotweed & Himalayan knotweed. Also invasive, nonnative plant species.

knotweed



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ontrol: Chemical / Timing:

- Triclopyr / Actively growing plants. Imazapyr / Mid-summer after seed
- head forms.
- Glyphosate / Actively growing plants.

*Always read & follow the label.





abitat:

Introduced from Japan & China as an ornamental. Tolerates a variety of conditions. Prefers full sunlight, but can tolerate full shade as well. Thrives in warm weather in riparian areas, but will tolerate dry soil and salt. Often found near water sources, such as streams & rivers, floodplains, low-lying areas & wetlands.

mediterranean

alvia aethiopis

Lamiaceae (mint family)

ther Common Names: African sage, Ethiopian sage.



dentification:

Mediterranean sage is an aromatic biennial. It grows 2 or 3 ft tall. The first season Mediterranean sage forms rosettes with large grayish woolly leaves. In the second year, the plant produces its flower & goes to seed.

Leaves: White to blue-green, woolly, felt-like leaves, ovate to triangular, lobed or deeply toothed, up to 12" long on stalks. Stem leaves are opposite, smaller, & aromatic when crushed.

Flowers: Yellowish-white, borne in clusters on branched stems, bilabiate (2 lipped), in whorls of 5-10. Flowering occurs June through August.

Fruit: Each flower produces 4 nutlets & holds thousands of seeds. At maturity, the plant will break off, tumble with the wind & disperse its seed.

ook Alikes:

The opposite leaves and square stems differentiate this plant from non-Lamiaceae look alikes. Within the family, there are many native and exotic species of Salvia that it resembles. Most do not have white flowers; those that do are not strongly 2-lipped. Most Salvia look-alikes also do not have flowers in such long, tight clusters as Mediterranean sage and have very different leaves. The rosettes of common mullein can be confused with those of Mediterranean sage, but can be distinguished by their yellow-tinted and stalkless leaves and absence of pungent sage-like smell when the leaves are crushed.





abundant distribution in county limited distribution in county not known to be present in county

sage



ontrol:

Biological: Crown/root weevil species. Contact ODA for a list of agents.

Cultural: Mechanical removal has been effective for controlling this plant by uprooting rosettes any time of the year, & removing the mature plant before it flowers. This plant can be removed with soil disturbance, but timing is important to prevent further seed dispersal.

Chemical / Timing:

- Metsulfuron + 2,4-D / Rosette to bolting stage.
- Picloram / Rosette to bolting stage.
- Glyphosate / Rosette to bolting stages.

*Always read & follow the label.

abitat:

Introduced to North America from the Mediterranean and northern Africa. It is spreading rapidly in many parts of the West. It invades pastures, meadows, rangeland, roadsides, and disturbed open areas.





perennial

ridium latifoliu

Brassićaceae (mustard family)

ther Common Names:

Tall whitetop, Giant whiteweed, Perennial peppergrass, Slender perennial peppercress, Broadleaf or broadleaved pepperweed, & Ironweed.

dentification:

Perennial plant that can grow from 1 to 6 ft tall.

Leaves: Basal leaves are bright green to gray-green; lance shaped, has long petioles, up to 12" long, & covered with a waxy layer. Stem leaves are smaller & have shorter petioles, but don't clasp the stem. Leaves have a prominent, whitish mid-vein.

Flowers: White, 4-petalled, less than $\frac{1}{8}''$ wide, formed in dense, rounded clusters at the branch tips. Flowering occurs in early summer until fall.

Root: Deep-seated root systems with creeping rhizomatous roots structures make this noxious plant hard to control. Rooting depth extends more than 9 ft.

Fruit: Seeds are small & flattened pods about one tenth of an inch long & containing 2 seeds. These seeds remain on the plant throughout the winter & drop at irregular intervals.





ook Alikes: Whitetop, leaves have clasping bases; perennial pepperweed can also be distinguished by its waxy appearance.



abundant distribution in county limited distribution in county not known to be present in county





ontrol:

Cultural: Mechanical control reduces seed if cut several times. Cultivation spreads root fragments increasing plant abundance with soil disturbance. Persistent grazing with goats, sheep, & cattle reduces seed production.

Chemical / Timing:

- Chlorsulfuron or metsulfuron / Flower to bud stage.
- Metsulfuron + cholorsulfuron / Activley growing plants less than 4" tall.
- Glyphosate / Flower bud stage.
- 2,4-D amine / Flower bud stage.
- 2,4-D ester / Resprouting stems in late summer.
 Surfactant use is recommended to penetrate leaf surface.

*Always read & follow the label.



abitat:

Native of southern Europe & western Asia. Perennial pepperweed prefers wet sunny conditions, but can grow in dry areas as well. Because of this flexibility with moisture it can be found in seasonally wet areas, riparian areas, along streams, rivers, marshes, roadsides, railways, ditches, hay meadows, pastures, cropland, waste places, hillsides, & sub-irrigated pasture.

poison onium maculatum

Apiaceae (carrot family)

ther Common Names:

Spotted parsley, Spotted cowbane, Poison parsley, Spotted hemlock, Spotted conium, & Poison snakeweed.

dentification:

Poison Hemlock is a biennial & can grow from 3 to 8 ft tall. All of the parts of this plant are toxic to animals & humans.

Leaves: Shiny green, highly dissected resembling those of a fern. The leaves are alternately arranged on the stem, dividing 3 to 4 times & pinnately compound. Poison hemlock can also be characterized by its rank, pungent odor when one is near the plant or has crushed the leaves or stem. Lower leaves on long stalks clasp at the stem; upper leaves on short petioles.

Stem: The weed is extensively branched, with an erect stem with distinct ridges. Its stems are hollow, except at the nodes. The stems are purplish in color with the lower portions of the stems containing purple spots.

Flowers: White, forming an umbrella-shaped cluster, each supported by a stalk. Foliage has strong musty odor, flowers lacking sepals. This plant can flower from spring to fall.

Fruit: Poison hemlock reproduces solely by seeds. Seeds are paired, ¹/₈" inch long, light brown, barrel-shaped capsules with conspicuous longitudinal ribs.

ook Alikes:

One distinguishing characteristic between poison hemlock and wild carrot is the lack of hairs on the leaves & stems of poison hemlock. Cow parsnip differs from poison hemlock by its palmately compound leaves unlike the pinnately compound leaves of hemlock.



seed = 3-4mm





abundant distribution in county

h e m l o c k





ontrol:

Gultural: Removing this plant with machinery may reduce seed production. It is not recommended to graze with livestock. Humans should not touch any part of the plant with bare hands.

Chemical / Timing:

- Metsulfuron / Rosette in spring.
- 2,4-D / Rosette in spring.
- MCPA / Rosette in spring.
- Glyphosate / Rosette in spring.
- Metsulfuron + Dicamba + 2,4-D / Bud to bloom stage.
- Metsulfuron + chlorsulfuron / Bud to bloom stage.
- Chlorsulfuron / Rosette in spring.

*Always read & follow the label.







abitat:

Native to Europe. It can tolerate poorly drained soils. It grows in pastures, streams, irrigation ditches, & cropland.



whitetop Lepidium draba

Brassicaceae (mustard family)

ther Common Names: Hoary cress, Heart-podded hoary cress & Perennial peppergrass.

dentification: Whitetop is a hardy perennial that grows up to 2 ft tall.

Leaves: Consists of both basal & stem leaves. Basal leaves taper to a short stalk that attaches to the crown near the ground. Stem leaves are grayish- to bluish-green, lance-shaped, with smooth & occasionally finely toothed edges. All leaves have a covering of short, soft white hairs. The base of each leaf clasps around the stem at the point of attachment.

Flowers: The plant consists of a distinctive inflorescence of several small white 4-petaled flowers that give the plant a white, flat topped appearance. Blooms by May into mid-summer. After blooming, it continues to grow until frost.

Fruit: Seed capsules are broad, flat & heart shaped. Each capsule contains two reddish-brown seeds.

Root: Reproduces from seed and root segments. Vertical roots can reach depths up to 6 feet. The root system consists of a vertical taproot with a mesh of lateral roots. Vertical & lateral roots produce adventitious buds which develop into rhizomes & shoots.





ook Alikes:

Whitetop can be confused with the native plant yarrow, but yarrow can be most easily distinguished by having parsley-like leaves. Whitetop can also be confused with other mustards, such as lenspodded & hairy whitetop but can be most easily distinguished by having heart-shaped seedpods whereas lens-podded has round seedpods & hairy whitetop has globeshaped seedpods. Annual pepperweed can also resemble whitetop.

abitat: Common on alkaline and disturbed soils. Whitetop prefers open. unshaded areas and can be found on a wide variety of soil types. Whitetop generally grows better in moist sites or areas of moderate rainfall. Its attraction to moisture results in it being found in sub-irrigate pastures, ditch banks, irrigated cropland and at the edge of riparian areas. Whitetop prefers disturbed sites, including excessively



grazed areas, waste areas, roadsides, & open grasslands.









ontrol:

The deep root system & the weeds' ability to reproduce vegetatively make it difficult to control. Due to its extensive system of roots, this weed can form a monoculture that squeezes out all other plants & vegetation.

Cultural: Soil disturbance invigorates establishment. Repetitive grazing reduces seed production if continued through the growing season.

Chemical / Timing:

- Chlorsulfuron + 2,4-D / Bud to bloom stages or rosette in fall.
- Metsulfuron or chlorsulfuron / Bud to bloom stage.
- Chlorsulfuron / Bud to bloom stages or rosette in fall.
- Metsulfuron / Bud to bloom stages or rosette in fall.
- Imazpic / Rosette in fall. Surfactant is recommended for successful results.

*Always read & follow the label.

Brassicaceae *epidium draba* whitetop

dalmation

Scrophulariaceae (figwort family)

ther Common Names: Broadleaf toadflax. Wild snapdragon.

dentification:

Dalmation Toadflax is a perennial that can grow up to 4 feet tall. Reproduces by seed & root.

Leaves: Dense blue-green and waxy-like, heart shaped & clasping the stem. Less than 2" long, alternate & entire. Upper leaves are conspicuously broad-based.

Flowers: 2-lipped resembling snapdragons, yellow with orange centers. Blooms from mid-summer to fall.

Fruit: Seeds are produced in a 1/2'' pod with many irregular shaped angles. These seeds can remain viable for up to 10 years & each plant can produce up to 500,000 seeds annually.

Root: Deep rooted, creeping root system.



not known to be present in county









seed = 1-2mm



ook Alikes:

Dalmation toadflax can be confused with Yellow toadflax by having nearly identical flowers. It is distinguished from Yellow toadflax by having linear leaves while Dalmation toadflax has ovate to lanceshaped leaves.

toadflax



ontrol:

Biological: Defloliating moth, Stem boring weevil. Contact ODA for a list of agents.

Cultural: Dalmation toadflax is a perennial; it is very difficult to control via mechanical means. Livestock do not consume this noxious plant.

Chemical / Timing:

- Chlorsulfuron / Bud to bloom stage. Fall is most effective.
- Metsulfuron / Apply to actively growing plants.
 Picloram + Chlorsulfuron / Bud to bloom stage.
- Picloram / Late summer to fall or late
- winter. Dicamba / Early spring. A waxy exterior leaf layer mandates the use of a non-ionic surfactant to penetrate the leaves.

*Always read & follow the label.





abitat:

Introduced from southeastern Europe as an ornamental, this non-palatable plant prefers dry areas and will invade roadsides, rangelands and disturbed areas. Will hybridize with Yellow toadflax.



dyer's Psatis tinctoria

Brassicaceae (mustard family)

ther Common Names: Asp of Jerusalem.

dentification:

Dyer's woad is a winter annual, biennial or short-lived perennial. It can grow from 1 to 4 feet tall.

Leaves: Blue-green with a prominent cream colored mid-vein that is especially noticeable on the rosettes. Alternate, sessile with a base clasping the stern & covered with fine hairs.

Flowers: Numerous, yellow & found in clusters at the end of the branch tips, 4-petalled.

Fruit: Seed pods are purplish-brown & 1-celled, tear drop shaped, containing a single seed. When flowers go to seed, the large purplish-brown seed pods are very distinguishable. Blooms from April to July.

Root: A tap root that can reach 5 feet in depth that hinders control strategies.







ook Alikes: Common Mustard.



fruit = 8-18mm seed = 3-4mm

ıoad



ontrol:

Biological: Rust control available. Contact ODA for this agent.

Cultural: Hand pulling or removing foliage below the crown has successful results.

Chemical / Timing:

- Metsulfuron / Actively growing plants.
- Chlorsulfuron / Before or just after emergence.
- Metsulfuron + Dicamba + 2,4-D /
- Actively growing plants. Metsulfuron + Chlosulfuron / Actively growing plants.
- 2,4-D LV ester / Rosette or bud stage.

*Always read & follow the label.





abitat: Dyer's woad was introduced from Europe during colonial times. Inhabits roadsides, waste areas, rangeland, pastures, grain field & alfalfa fields.

meadow Hieraeium pratense

Asteraceae (sunflower family)

ther Common Names: Yellow hawkweed

dentification:

Perennial weed with shallow, fibrous roots. Root runners and seed production make this weed extremely invasive and hard to manage.

Leaves: Rosettes contain narrow, hairy, spatula shaped leaves that are up to 6" long, almost exclusively basal, & dark green on the top of the leaf & lighter green underneath.

Stems: Usually leafless with short bristly hairs, up to 3 ft in height & contain a milkly sap.

Flowers: Yellow, born in cluster, up to 30 flower heads near top of plant, $\frac{1}{2}$ " to 1"

in diameter. Ray petals with square tips, that resemble dandelions. Flowers in bud are distinctively rounded and black-hairy in tight clusters at the tops of the stems. Flowers from May to July.

Fruit: Seeds look very similar to dandeliion seeds & are spread by wind.

Root: Shallow & made up of runners that can create mats of vegetation.







limited distribution in county not known to be present in county



ook Alikes: Dandelion



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hawkweed





 Aminopyralid / Rosette to bolting stage.

- Picloram / Apply after basal leaves
- form; before flower-bud stage.
 Clopyralid / Apply after basal leaves form; before flower-bud stage.

*Always read & follow the label.

abitat: Introduced from Europe. Inhabits moist grasslands, meadows, rangelands, pastures, & borders of forests.









Zygophyllaceae (calrop family)

ther Common Names: Mexican sandbur, Texas sandbur, Bullhead, Caltrop, Goathead.

dentification:

Puncturevine is a prostrate, summer annual, broadleaf plant that forms dense mats.

Leaves: Opposite, hairy, and divided into 4 to 8 pairs of leaflets up to $\frac{1}{2}$ long.

Stem: Highly branched, green to reddish-brown, prostrate and spreading radially from the crown on open ground up to 4 ft across.

Flowers: Yellow with 5 petals, ½" wide, and borne singly in leaf axils from July until October.

Fruit: After each flower blooms, it is followed by a fruit that easily falls apart into 4 or 5 single-seeded nutlets. The seeds are hard and bear 2 to 3 sharp spines. Seed can remain dormant in soils for 4 to 5 years. The spiny seeds attach to livestock, humans, & equipment. These hard, spiny burs damage wool, are undesirable in hay, and may be injurious to livestock.

Root: Slender, branched, often somewhat woody deep taproot with a network of fibrous roots.



seed = 1-1.5cm



ook Alikes: Puncturevine is unlikely to be confused with other plants.



abundant distribution in county limited distribution in county not known to be present in county **Biological:** Seed & stem boring weevils provide fair to good control of puncturevine in warmer southern climates. Contact ODA for a list of agents.

Cultural: Physical removal reduces seed production. Continuous monitoring will be needed to eliminate plant establishment from dormant seeds for up to 5 years.

Chemical / Timing:

- Chlorsulfuron / early summer, late fall or winter.
- Bromacil + diuron / fall or spring.
- 2,4-D / seedlings; will require retreatment when new seedlings emerge.

*Always read & follow the label.











abitat:

Puncturevine was introduced from southern Europe & is widely scattered throughout much of North America. It can grow in pastures, ditches, cultivated fields, waste areas, along roadways, & in disturbed areas. It is often found on sandy, dry & gravel sites.







Asteraceae (sunflower family)

Skeletonweed, Hogbite, Gum succory, Naked

dentification:

This plant is a perennial. It can grow 1 to 4 ft tall & portrays a skeletal look due to the lack of leaves on the upper part of the plant.

Leaves: Sharply-lobed leaves, similar to those of dandelion, form a rosette that withers as the flower stem develops. Other leaves up the stem are inconspicuous, narrow, & entire. Leaves produce a milky latex sap.

Stem: Downwardly bent coarse reddish hairs that cover the base of the stem are a diagonstic characteristic of rush skeletonweed. The stem also produces a milky latex sap.

 $\it Flowers:$ Yellow, %'' in diameter, contain 7-15 star-shaped flowers. Flowers bloom from July to September.

Root: A slender, simple taproot that can reach 10 ft deep. Lateral roots branch off the main taproot and form satellite plants.

 $\it Fruit:$ Seeds are pale brown to black, several ribbed, about 1/s'' long & have numerous soft white plumes.

ook Alikes: Rush skeletonplant (*Lygodesmia juncea*) has pink (occasionally white) flowers. It can also resemble dandelion or chicory at rosette stage.









not known to be present in county

skeletonweed







ontrol:

Biological: Rust, gall midge, gall mite - Not successful in cooler climates. Contact ODA for a list of agents.

Cultural: Tillage can drag root fragments to noninfested areas where they can take root and form new colonies.

Chemical / Timing:

- Aminopyralid / After rosettes form in spring.
- Clopyralid / Rosettes in spring or fall.
 Picloram / Rosettes in fall or spring.

*Always read & follow the label.



abitat:

Introduced from Eurasia, generally grows in well drained & light textured soils. This plant is found in pastures, rangeland, grain fields, & along roadsides.





(st. johnswort family)

ther Common Names: Klamath weed, Common goatweed, Tipton.

> ook Alikes: Tansy ragwort.



seed = 1mm

dentification:

St. Johnswort is a perennial, growing 1 to 3 ft tall. Contains toxic substance that affects white haired animals.

Leaves: Opposite, sessile, entire, elliptic to oblong in shape & usually not exceeding 1" in length. Leaves contain tiny transparent dots visible when held up to the light.

Stem: Erect, having numerous branches, somewhat 2-ridged, rust colored, and woody at their base.

Flowers: Bright yellow & 5-petalled. Tiny black dots can be found along the edges of the petals. Flowers are found in clusters at the ends of the stems & are 1"or less in diameter.

Root: A long taproot & shallow rhizomes which extend from the root crown.

Fruit: Seeds are born in a 3-celled capsule & rust-brown. Each pod has many seeds. Reproduces from seeds and short





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abundant distribution in county

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Biological: St. Johnswort root borer, St. Johnswort moth, Klamath beetle, Klamath weed beetle, gall midge. Contact ODA for a list of agents.

Cultural: Mechanical control is ineffective. Livestock avoid grazing St. Johnswort. Removal prevents plants from going to seed.

Chemical / Timing:

- Round-up, 2,4-D / Spring.
- Picloram / fall.

*Always read & follow the label.







abitat: Introduced from Europe. Prefers sand or gravel soils. Found along roadsides, disturbed areas & waste areas.

Potentilla recta

Rosaceae (rose family)

ther Common Names: Five-finger cinquefoil, Rough-fruited cinquefoil, Tall five-finger, Tormentil, Upright cinquefoil, & Yellow cinquefoil.

dentification: Sulfur cinquefoil is a perennial herb that grows 1-2 ft tall.

Leaves: Basal leaves are greenish, coarse-hairy on both sides, few, long-stalked, & palmately compound with 5 or 7 toothed leaflets. Stem leaves are similar to basal leaves but are shorter-stalked, several & alternate. Leaves are approximately 2 to 4" long and up to 1" wide and resemble marijuana leaves. Leaves of sulfur cinquefoil have green coloring rather than silver on the underside of the leaf.

Stem: 1 or a few stems grow from a well-developed rootstock. Stems are tufted, erect, simple or branched, & very leafy with both coarse and fine hairs & no branches below the flowers.

Flowers: The flowers have 5 light sulfur-yellow petals surrounding a dark yellow center. Each flower is ½" to 1" in diameter. Flowering occurs May to July.

Fruit: Seeds single-seeded achenes that are numerous, clustered, brownish, & strongly net-veined.

ook Alikes:

Sulfur cinquefoil may be confused with buttercups (Ranunculus spp) or with several of our native cinquefoils (Potentilla spp). However, the flowers of buttercups & all of the native cinquefoils are bright yellow, not the distinctive sulfur-yellow of sulfur cinquefoil. Sulfur cinquefoil can also be distinguished from native cinquefoils by the presence of long hairs that are oriented perpendicular to the stem or leaf stalk, many more stem leaves than basal leaves, & net-like patterns on the seed coats.



fruit = 5mm seed = 1mm





abundant distribution in county limited distribution in county not known to be present in county

cinquefoil





ontrol:

Cultural: Digging & tilling can effectively control small infestations. Mowed or grazed plants can still flower and produce seeds.

Chemical / Timing:

- Picloram / Fall.
- Aminopyralid / Fall.

*Always read & follow the label.



abitat: Sulfur cinquefoil prefers full sunlight & has adapted to a wide range of soil conditions. It can commonly be found in grasslands, shrubby/forested areas, logged areas, roadsides and waste areas.

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lridaceae (iris family)

ther Common Names: Yellow iris, Water flag, Pale yellow iris, European yellow iris.

dentification: Yellow flag iris is an escaped ornamental. It is a robust, clumping perennial that grows 2-5 ft tall along shores in shallow water. It can cause gastroenteritis in cattle, pigs & humans, & can also cause skin irritation in humans.

Leaves: Erect, flattened, sword-like, $\frac{3}{2}$ wide, raised midrib, with parallel veins. The leaves are mostly basal & folded clasping the stem at the base in a fan-like fashion.

Flowers: Deep yellow, 2 or 3 on one stalk, flower stalk round, shorter than outer leaves, three outer drooping sepals, with brownish mottled markings, surrounding the true flower. Flowering occurs in summer months.

Fruit: Seedpods are large, glossy green, egg-shaped capsules. Each capsule contains numerous smooth, flattened seeds. These seeds fall into the water, remain buoyant & can spread over long distances by waterways.

Root: Rhizomatous, 4-12" long & form dense mats. This plant also spreads vegetatively through its extensive root system.



fruit = 4-7cm seed = 7-10mm





ook Alikes:

When it is not flowering it may be confused with cattails. Look for the fruits in the summer, or the fan-shaped plant-base at other times of year.



ontrol:

Cultural: Small infestations can be dug by hand; rhizomes must be expelled to ensure eradication.

Chemical / Timing:

- Imazapyr / Late fall Early spring.
- *Always read & follow the label.



abitat: Introduced from Europe as ornamental in early 1900's. Prefers wet meadows and wetland margins & can often occupy habitats that have low oxygen.

Centaurea solstitialis Asteraceae (sunflower family)

ther Common Names:

Geeldissel, Golden star thistle, St. Barnaby's thistle, Yellow centaury & Yellow cockspur.

dentification:

Annual plant, growing 1-3 ft tall. Toxic to horses, causes "chewing disease".

Leaves: Leaves are a grayish-green color & covered with a cottony wool. Lower leaves are up to 3" long & deeply lobed, while upper leaves are short & narrow with fewer lobes.

Stem: Erect, grayish-green, rigid, winged, & branched with a hairy cotton-like pubescence.

Flowers: Solitary flowers are a bright yellow & sharp spines up to 3/4" in length surround the base of the flower. Flowers occur from May to October.

Fruit: Outer seeds are dark brown without bristles & inner seeds are mottled light brown with a tuft of white bristles. Starthistle primarily spreads by seed, & each plant can produce up to 150,000 seeds. Seed is viable for up 12 years.



yellow







seed = 2mm



not known to be present in county

ook Alikes:

Most closely resembles maltese starthistle, another invasive weed in North America. Maltese starthistle also has yellow flower heads with very long and spiny bracts. It is also a winter annual and can be found in similar habitat but differs in its less gray-green appearance of foliage and less narrower leaves. Other thistles such as Purple and Iberian Starthistle, have similar growth characteristics (thistle-like), but are different in color with light purple to deep purple flower heads.

starthistle



ontrol:

Disturbances including cultivation & overgrazing favor this rapid colonizer. It forms dense infestations & rapidly depletes soil moisture, thus preventing the establishment of other species. Control of yellow starthistle cannot be accomplished with a single treatment. Effective management requires control of the current population combined with competitive vegetation.

Biological: Starthistle bud weevil, hairy weevil, flower weevil, gallfly & Peacock fly. Contact ODA for a list of agents.

Cultural: Soil disturbance should be limited in established infestations. Grubbing can be successful in small infestations. Grazing is effective in reducing seed production. Sheep, goats, or cattle eat yellow starthistle before spines form on the plant.

Chemical / Timing:

- Aminopyralid / Rosette to bolting stage.
- Clopyralid / Rosette to early bolting stage.
- Picloram / Rosette to bolting stages.
- Chlorosulfuron / Rosette stage.
- Clopyralid + 2,4-D / Rosette to bolting stages.

*Always read & follow the label.





abitat: Introduced from Europe; found in rangeland, pastures, waste areas, & along roadsides. Ability to grow in various soil types.

Centaurea solstitialis Asteraceae (sunflower family)

ther Common Names:

Geeldissel, Golden star thistle, St. Barnaby's thistle, Yellow centaury & Yellow cockspur.

dentification:

Annual plant, growing 1-3 ft tall. Toxic to horses, causes "chewing disease".

Leaves: Leaves are a grayish-green color & covered with a cottony wool. Lower leaves are up to 3" long & deeply lobed, while upper leaves are short & narrow with fewer lobes.

Stem: Erect, grayish-green, rigid, winged, & branched with a hairy cotton-like pubescence.

Flowers: Solitary flowers are a bright yellow & sharp spines up to 3/4" in length surround the base of the flower. Flowers occur from May to October.

Fruit: Outer seeds are dark brown without bristles & inner seeds are mottled light brown with a tuft of white bristles. Starthistle primarily spreads by seed, & each plant can produce up to 150,000 seeds. Seed is viable for up 12 years.



yellow







seed = 2mm



not known to be present in county

ook Alikes:

Most closely resembles maltese starthistle, another invasive weed in North America. Maltese starthistle also has yellow flower heads with very long and spiny bracts. It is also a winter annual and can be found in similar habitat but differs in its less gray-green appearance of foliage and less narrower leaves. Other thistles such as Purple and Iberian Starthistle, have similar growth characteristics (thistle-like), but are different in color with light purple to deep purple flower heads.

starthistle



ontrol:

Disturbances including cultivation & overgrazing favor this rapid colonizer. It forms dense infestations & rapidly depletes soil moisture, thus preventing the establishment of other species. Control of yellow starthistle cannot be accomplished with a single treatment. Effective management requires control of the current population combined with competitive vegetation.

Biological: Starthistle bud weevil, hairy weevil, flower weevil, gallfly & Peacock fly. Contact ODA for a list of agents.

Cultural: Soil disturbance should be limited in established infestations. Grubbing can be successful in small infestations. Grazing is effective in reducing seed production. Sheep, goats, or cattle eat yellow starthistle before spines form on the plant.

Chemical / Timing:

- Aminopyralid / Rosette to bolting stage.
- Clopyralid / Rosette to early bolting stage.
- Picloram / Rosette to bolting stages.
- Chlorosulfuron / Rosette stage.
- Clopyralid + 2,4-D / Rosette to bolting stages.

*Always read & follow the label.





abitat: Introduced from Europe; found in rangeland, pastures, waste areas, & along roadsides. Ability to grow in various soil types.





Scrophulariaceae (figwort family)

ther Common Names:

Butter & eggs, Wild snapdragon, Common toadflax, Ramsted, Flaxweed & Jacob's ladder.

dentification:

This plant is a perennial. It will grow 1 to 3 ft tall. This weed contains several compounds, including glucosides and the cyanogenic glucoside prunasin that may be harmful to livestock.

Leaves: Leaves are numerous, pale green to gray-green in color, narrow & pointed at both ends and have smooth margins, 2 ¹/₂" or more in length. They are alternately arranged on the stem. Leaves of the plant are mainly alternate but may appear to be opposite due to crowding.

Stem: Somewhat woody at the base & smooth towards the top of the plant. Sparingly branched & usually 1 to 3 ft tall.

Flowers: The flowers grow at the base of the upper leaves in a dense cluster of 15 to 20 & resemble a snapdragon. The upper lip is yellow, the corolla is 2-lobed, & the lower lip is 3-lobed with an orange spot. A long spur is located at the base of the flower & can be up to 1" long.

Fruit: Round ¼" in diameter, brown, 2-celled, many seeds. Seeds are dark brown to black, ½" in diameter, flattened with a papery circular wing. Seeds of yellow toadflax can remain viable in the soil for a period of 10 years or more.

Root: An extensive, deep rooted system allowing it to outcompete native vegetation and hinder control objectives.

ook Alikes:

Seedlings of yellow toadflax resemble leafy spurge at young stages, but do not produce a milky sap when broken. Unlike Dalmatian toadflax, yellow toadflax only grows to a height of 1 to 2 ft & leaves are linear, rather than lance shaped. Yellow toadflax also resembles the typical snapdragon.







abundant distribution in county limited distribution in county not known to be present in county

toadflax







ontrol:

Biological: Defoliating moth, seed head weevil, stem-boring weevil & a flower feeding beetle provide fair to good control. Contact ODA for a list of agents.

Cultural: This perennial noxious weed cannot be controlled by mechanical means. Livestock generally don't consume this plant.

Chemical / Timing:

- Chlorsulfuron / Bud to bloom.
- Picloram + chlorsufuron / Bud to bloom.
- Picloram + metsulfuron / Bud to bloom.
- Picloram / Late summer to fall or late winter.
- Dicamba / Early spring.

Non-ionic surfactant use is recommended in combination with these chemicals.

*Always read & follow the label.



abitat: This plant was introduced in the mid 1800's from Eurasia as an ornamental. This creeping perennial is an aggressive invader of rangelands, roadsides, waste areas & cultivated fields.



adventitious roots	Roots appearing in an unusual or unexpected place on a plant
alternate	Leaf arrangement where one leaf arises from the stem at a time
annual	A plant that flowers and dies within a period of one year from germination
apex	Тір
awn	Bristle-like appendage on grass seeds that extends beyond the seed, as throughout the seed heads of wheat
axil	Where a leaf attaches to the stem
basal	At the base of a plant or plant part
biennial	A plant that flowers and dies between its first and second years and often does not flower in its first year
bolting	To develop a flowering stem from a rosette
bract	A small, leaf-like structure below the flower
capsule	Dry fruit with more than one seed
clasping	Partly surrounding the stem
divided	A leaf whose margin is not entire but rather extends inward to the midvein, creating numerous small leaflets
entire	Leaf edges are not toothed or serrated
exotic	Not native
fibrous roots	Root system with many, fine, diffuse roots
floret	One of the small, closely clustered flowers forming the head of a composite flower in the sunflower family
flower head	Cluster of numerous florets, which is common in the sunflower family; resembles one individual flower
glabrous	Smooth; without hairs
globular	Spherical
inflorescence	The flowering part of a plant
leaflet	One small blade of a compound leaf
ligule	Thin, papery outgrowth at the junction of leaves and leaf stems in grass species

lobed	A leaf with shallow or rounded, deeply indented margins, as in a thistle rosette leaf
midrib	The central axis or vein of the leaf blade or leaflet
monoculture	Area where only one type of plant grows
node	Joint on a stem where stems and leaves originate
nutlet	Hard, small, one-seeded fruit, usually referring to fruits of the Boraginaceae members
oblong	Longer than wide
opposite	Leaf arrangement where two leaves arise from the stem at the same height but on opposite sides of the stem
palmate	Leaflets, lobes, or veins which arise from the same point at the tip of the stalk
perennial	A plant that lives more than two years
pinnate	Leaflets or lobes developing from several different points on the main leaf axis
pistil	Female reproductive part of flower
plume	A hair-like or featherlike structure, often on a seed
rhizomatous	Having a rootlike subterranean stem, commonly horizontal in position, that produces roots below and sends up shoots progressively to the upper surface
rosette	A compact, circular, and normally basal cluster of leaves
seed head	Synonym for flower head
sepal	One of the outermost flower structures, usually enclosing the other flower parts in the bud
silicle	Dry fruit usually twice as long as wide with two sections that release seeds when ripe
spur	Any long, narrow (sometimes tubular) extension of a petal
stamen	Male reproductive part of flower
stolon	A horizontal stem growing above the ground, which can develop roots or sprouts at the joints
succulent	Thick and fleshy
taproot	The primary descending root along the vertical axis of the plant which is larger than the branching roots
terminal	Borne at or belonging to the extremity or summit
umbel	Cluster of flowers where all flower stalks are of similar length and originate from the same point
variegated	Of different colors, not monochrome
whorled	Cluster of three or more leaves rising out of the stem at the same height in a ring around the stem












These herbicide recommendations are to be used as a starting point. Due to the large number of trade (brand) names of commerical products that exist, common names (active ingredients) and a *few* of these trade names are provided. Mention of a specific product should not be interpreted as an endorsement. Other trade names are available.

This handbook is not intended as a complete guide to herbicide use. *Tri-County* assumes no responsibility for these recommendations.

Active Ingredients(s):	Product(s):
2,4-D	several products
aminopyralid	Milestone
bromoxynil	Burctil
chlorsulfuron	Telar
clopyralid	Stinger
	Transline
clopyralid + 2,4-D	Curtail
clopyralid + triclopyr	Redeem
dicamba	Banvel
	Clarity
	Vanquish
dicamba + 2,4-D	Pasturemaster
	Weedmaster
diquat	Reward
endothall	Aquathol
	Hydrothol
fenoxaprop	Acclaim
	Horizon

Remember.....

Always Use Herbicides Safely! Wear protective clothing and safety devices as recommended by the label and....

ALWAYS READ AND FOLLOW THE LABEL!

Active Ingredients(s):	Product(s):
fluazifop	Fusilade
fluridone	Avast!
	Sonar
glyphosate	Rodeo
	Roundup
	Touchdown
glyphosate + 2,4-D	Landmaster
imazapic	Plateau
imazapic + glyphosate	Journey
imazapyr	Arsenal
	Habitat
MCPA	several products
metsulfuron	Ally
	Cimarron
	Escort
metsulfuron + dicamba + 2,4-D	Cimarron Max
picloram	Tordon
sethoxydim	Poast
sulfometuron	Oust
tribenuron	Express
	Garlon
triclopyr	Remedy
	Renovate
triclopyr + 2,4-D	Crossbow



- Baker County Weed Control: http://www.bakercounty.org/weed/ Weeds.html
- BLM Noxious Weed Management: http://www.blm.gov/or/resources/ weeds/index.php
- Center for Invasive Plant Management: http://www.weedcenter.org/
- Federal Weed List: http://plants.usda.gov/java/noxiousDriver
- iMapInvasives: http://www.imapinvasives.org/
- National Network of Invasive Plant Centers: http://www.invasiveplantcenters.org/
- North American Weed Management Association: http://www.nawma. org/
- Oregon Biological Control Program: http://oregon.gov/ODA/PLANT/ WEEDS/biocontrolprogram.shtml
- Oregon CWMA List: http://oregon.gov/ODA/PLANT/WEEDS/weed_cwmacontactlist.shtml
- Oregon Invasive Species Council: http://oregon.gov/OISC/
- Oregon Noxious Weed List: http://www.oregon.gov/ODA/PLANT/ WEEDS/statelist2.shtml
- Oregon State Weed Board: http://www.oregon.gov/ODA/PLANT/ WEEDS/oswb_index.shtml
- Oregon Weed Free Forage Program: http://oregon.gov/ODA/PLANT/ WEEDS/weedfreeforageprogram.shtml
- Union County Weed Control: http://unioncountyweedcontrol.org/ index.html
- Weed Mapper: http://www.weedmapper.org/
- Western Society of Weed Science: http://www.wsweedscience.org/
- XID Services; Weed Identification: http://xidservices.com/



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Photo credits

- <u>Canada thistle</u>: Plant, Richard Old XID Services; Stem, Emily Folkestad; Seed, Jim O'Brien ANR Communication Services - cecentralsierra.ucanr.org; Rosette, Oregon State University - mint.ippc.orst.edu; Plant Stand and Flowers, Matt Lavin – Montana State University - flickr.com
- <u>Common bugloss</u>: Seed, Steve Hurst USDA NRCS PLANTS Database Bugwood.org; Infestation and Leaf, Dan Sharratt; Inflorescence, UBC Botanical Garden and Centre for Plant Research; Plant Stand and Nutlet, Robert L. Carr - Flora of Eastern Washington and Adjacent Idaho; Rosette, Kootenai County Noxious Weed Control Department
- <u>Dalmatian toadflax</u>: Foliage and Fruit, Linda Wilson University of Idaho ipmimages.org; Seed, Steve Hurst - USDA NRCS PLANTS Database - Bugwood.org; Plants, Utah State University – ipmimages.org; Flowers, William W Dunmire - luirig.altervista.org
- <u>Diffuse knapweed</u>: Biocontrol, Marissa Ermovick BLM; Plant, Richard Old XID Services; Rosette and Infestation, Dan Sharratt; Flower, Tara Bohnsack – Tri-County CWMA; Plant, Emily Folkestad – unioncountyweedcontrol.com; Stem, Joseph M. DiTomaso – University of California – invasive.org
- <u>Dyer's woad</u>: Infestation, Dan Sharratt; Pods and Rosette, Steve Dewey Utah State University ipmimages.org; Plant and Flowers, Kurt Stüber - wikipedia.org; Plant, Bonnie Rasmussen - Oregon Dept. of Agriculture; Stem/Leaves, Robert H. Callihan – University of Idaho
- Himalayan blackberry: Stem, Stan Shebs wikimedia.org; Seed, Julia Scher USDA APHIS PPQ forestryimages.org; Stem2, Joseph M. DiTomaso - University of California – forestryimages.org; Infestation, Dan Sharratt; Berries, Daniel Mosquin - botanicalgarden.ubc.ca; Leaves, Richard Old – XID Services – invasive.org; Green Fruits, Keir Morse - calphotos.berkeley.edu
- <u>Houndstongue</u>: Flowers, Jeffery S. Pippen Utah wildflowers duke.edu; Seed heads, David Fenick APHOTOFLORA; Leaves, Rodney G. Lym - ag.ndsu.edu; Plant and Rosette, Dan Sharratt; Inflorescence, Tara Bohnsack – Tri-County CWIMA; Seed, USDA Agricultural Research Service (ARS)
- Japanese knotweed: Flowers, Richard Old XID Services; Stem/Leaves, Jack Ranney University of Tennessee; Seeds and Fruit, Ken Chamberlain Ohio State University forestryimages.org; Inflorescence, Columbia.edu; Hollow Stem, Gary Fewless University of Wisconsin; Infestation, Tri-County CWMA
- Leafy Spurge: Roots, John Jefferies John Jefferies Spray Service; Seedling and both Infestations, Tara Bohnsack – Tri-County CWIMA; Stem, Norman Rees – USDA Agricultural Research Service, ipmimages. org; Fruit and Seed, Julia Scher - USDA APHIS PPQ – ipmimages.org; Plant, Kristian Peters - wikimedia.org; Inflorescence, pawpaw67 - flickr.com; Flower, Anne Elliott – flickr.com
- <u>Meadow Hawkweed</u>: Infestation, Mike Baybado Green Balance LLC; Infestation, Tri-County CWMA; Plant, Tara Bohnsack – Tri-County CWMA; Stems, Tom Heutte – USDA Forest Service; Flower buds and Leaf, King county Washington Noxious weeds; Seed head with seed, Chris Neeser – Rogues Gallery; Seedlings, Richard Old – XID Services

- <u>Mediterranean Sage</u>: Flower, Vladimir Sviridenko plantarium.ru; Plant, Dan Sharratt; Plant, Tara Bohnsack
 Tri-County CWMA; Rosette, Eric Coombs Oregon Department of Agriculture, ipmimages.org; Seed,
 Steve Hurst USDA NRCS PLANTS Database Bugwood.org
- <u>Medusahead rye</u>: Seed, Steve Hurst USDA-NRCS PLANTS Database; Seed head, Green Flower head and bottom Infestation, Matt Lavin – Montana State University - flickr.com; Seed head, Zoya Akulova calphotos.berkeley.edu; top Infestation, John Randall – The Nature Conservancy – ipmimages.org; Plant Stand, Craig Thornsen- California Dept. of Food & Agriculture- Botany Laboratory
- <u>Musk thistle</u>: Seedlings, JJ Dellow NSW Department of Primary Industries; Seed head, Les Merhoff
 discoverlife.org; Stem, Sheryl Pollock discoverlife.org; Flowers, opsu.edu; Rosette, University of
 Minnesota Extension; Seed, University of British Columbia Botanical Garden and Centre for Plant Research;
 Infestation, Nigel Jones flickr.com
- <u>Myrtle spurge</u>: Seed, Steve Hurst USDA NRCS PLANTS Database Bugwood.org; Flower close-ups, Frank Vincentz - wikimedia.org; Infestation, Bryant Olsen – flickr.com; Plant, Steve Dewey – Utah State University – invasive.org; Stand, Arnie Grammon – Baker County Weed Control
- <u>Perennial pepperweed</u>: Young fruit, Gary Fewless University of Wisconsin; Root and Infestation, Les Mehrhoff – discoverlife.org; Foliage, Pedro Tenorio-Lezama – invasive.org; Rosette, Dan Sharratt ; Plant, Leigh Dawson – US Forest Service; Seed, Steve Hurst - USDA-NRCS PLANTS Database; Seed head, bdei2. cs.umb.edu
- <u>Poison hemlock</u>: Stem, Steve Baskauf discoverlife.org; Infestation, Richard Old XID Services, Leaflet, Robert Vidéki – forestryimages.org; Seed head, Jan Samanek – State Phytosanitary Administration - forestryimages.org; Seed, Steve Hurst – USDA-NRCS PLANTS Database - forestryimages.org; Seedling; Ohio State Weed Lab Archive – forestryimages.org; Flower, Jim Maloney – flickr.com
- <u>Puncturevine</u>: Seeds, Steve Hurst USDA-NRCS PLANTS Database forestryimages.org; Fruit and Ground cover; Forest & Kim Starr–invasive.org; Stem, Steve Dewey Utah State University forestryimages.org; Seed in tire, Arnie Grammon Baker County Weed Control; Sidewalk Infestation, Ray Hosler; Seedling, plantwise.org; Seed in shoe, Tanya Trevor Saunders wildernessdiary.com
- <u>Purple loosestrife</u>: Stem, Andrew Williams critterzone.com; Fruit and flower, Jouko Lehmuskallio naturegate.com; Seed and Fruit, Gary Piper – Washington State University; Seedling, Ohio State Weed Lab Archive – forestryimages.org; Infestation, Angie Gibbons – Tri-County CWIMA
- <u>Rush Skeletonweed</u>: Masked flower and Stem, Richard Old XID Services; Plant and Rosette Tara Bohnsack – Tri-County CWIMA; Seed, Steve Hurst – USDA-NRCS PLANTS Database - invasive.org; Root, John Jefferies – John Jefferies Spray Service; Flower, Peter Stevens – flickr.com

- Russian Knapweed: Masked flower and top view of Flower, Ron Wolfe discoverylife.org; Seed, Steve Hurst – USDA-NRCS PLANTS Database - invasive.org; Seed head and Infestation, John M. Randall – invasive. org; Three Flowers, Steve Dewey – Utah State University; Root, Washington State Noxious Weed Control Board; Rosette, LL Berry – invasive.org
- <u>Scotch thistle</u>: Leaves, Bonnie Million invasive.org; White flower, Dan Sharratt; Rosette, Arnie Grammon – Baker County Weed Control; Stand and Stem, Tara Bohnsack – Tri-County CWMA; Seeds Steve Hurst – USDA Plants Database; Seed heads, Brad Sharp – SharpFotos.com
- <u>Spotted knapweed</u>: Seed head, Richard Old XID Services; Biocontrol and Plant, Tara Bohnsack Tri-County CWIMA; Leaf, John Cardina – invasive.org; Seeds, Steve Hurst - USDA NRCS PLANTS Database - Bugwood.org; Rosette and Infestation, Leslie J. Mehrhoff – forestryimages.org; Bracts, Jason Hollinger – flickr.com
- <u>St. Johnswort</u>: Leaves and Seed heads, Matt Lavin Montana State University flickr.com; Flower, Bildagentur-Online Science Photo Library; Red Plant, Norman E. Rees - USDA Agricultural Research Service – Retired; Seed, Steve Hurst USDA NRCS PLANTS Database - Bugwood.org; Seedling, Joseph M. DiTomaso - University of California – invasive.org; Plant, Richard Old - XID Services – invasive.org; Infestation, Western Society of Weed Science
- <u>Sulfur cinquefoil</u>: Leaf, missouriplants.com; Stem, Steve Dewey Utah State University invasive.org; Stem and Seedling, Joseph M. DiTomaso - University of California – invasive.org; Seed, Steve Hurst USDA NRCS PLANTS Database - Bugwood.org; Plant, Jouko Lehmuskallio – naturegate.org; Infestation, Mike Baybado – Green Balance LLC
- Summer pheasant eye: Yellow flower, nuriatomas.blogspot.com; Fruit with Flower, Saint Mary's College of California; Seed, Plant and Seedling, weed-atlas.eu; Orange flower, Steve Dewey Utah State University invasive.org; Stand, Wallowa Resources; Infestation, Todd Pfeiffer Klamath County Weed Control invasive.org
- <u>Whitetop</u>: Plant, Angie Gibbons Tri-County CWMA; Single Fruit and Seed, Julia Scher USDA APHIS PPQ; Fruit on Plant and Flower, JR Crellin - floralimages.co.uk; Infestation and Rosette, Dan Sharratt; Small Plants, Arnie Grammon – Baker County Weed Control
- <u>YellowFlag Iris</u>: Infestation, Tri-County CWIMA; Leaves and Seed Cover, Tara Bohnsack Tri-County CWIMA; Plant, kgnaturephotography.com; all others, wikipedia.org
- <u>Yellow starthistle</u>: Seed heads, Rosette, Plant and Infestation, Tara Bohnsack Tri-County CWMA; Stem, Paul Slichter - science.halleyhosting.com; Flower with Seed head, Steve Dewey – Utah State University – invasive.org; Leaf, Mary Ellen (Mel) Harte
- Yellow Toadflax: Fruit, USDA Agricultural Research Service (ARS); Seed, USDA Agricultural Research Service (ARS); Infestation, Michael Shephard – USDA Forest Service – invasive.org; Green fruit, Jouko Lehmuskallio – naturegate.org; Leaves, John Cardina – Ohio State University – invasive.org



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- St. Johnswort: Leaves and Seed heads, Matt Lavin Montana State University flickr.com; Flower, Bildagentur-Online Science Photo Library; Red Plant, Norman E. Rees - USDA Agricultural Research Service – Retired; Seed, Steve Hurst USDA NRCS PLANTS Database - Bugwood.org; Seedling, Joseph M. DiTomaso - University of California – invasive.org; Plant, Richard Old - XID Services – invasive.org; Infestation, Western Society of Weed Science
- <u>Sulfur cinquefoil</u>: Leaf, missouriplants.com; Stem, Steve Dewey Utah State University invasive.org; Stem and Seedling, Joseph M. DiTomaso - University of California – invasive.org; Seed, Steve Hurst USDA NRCS PLANTS Database - Bugwood.org; Plant, Jouko Lehmuskallio – naturegate.org; Infestation, Mike Baybado – Green Balance LLC
- Summer pheasant eye: Yellow flower, nuriatomas.blogspot.com; Fruit with Flower, Saint Mary's College of California; Seed, Plant and Seedling, weed-atlas.eu; Orange flower, Steve Dewey Utah State University invasive.org; Stand, Wallowa Resources; Infestation, Todd Pfeiffer Klamath County Weed Control invasive.org
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- <u>Yellow starthistle</u>: Seed heads, Plant and Infestation, Tara Bohnsack Tri-County CWMA; Stem, Paul Slichter - science.halleyhosting.com; Flower with Seed head, Steve Dewey – Utah State University – invasive.org; Leaf, Mary Ellen (Mel) Harte; Rosette, Joseph M. DiTomaso - University of California
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