

Minnesota Noxious Weeds

<http://www.dot.state.mn.us/roadsides/vegetation/pdf/noxiousweeds.pdf>



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Dalmatian toadflax

Page	Common Name	Scientific Name	Family
15	Spotted knapweed	<i>Centaurea stoebe</i> L. ssp. <i>micranthos</i> (Gugler) Hayek	Asteraceae
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20	Purple loosestrife	<i>Lythrum salicaria</i> L. and <i>Lythrum virgatum</i> L.	Lythraceae
21	Wild parsnip	<i>Pastinaca sativa</i> L.	Apiaceae
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Japanese hops

Page	Common Name	Scientific Name	Family
23	Garlic mustard	<i>Alliaria petiolata</i> (M. Bieb.) Cavara & Grande	Brassicaceae
24	Glossy buckthorn	<i>Frangula alnus</i> Mill.	Rhamnaceae
25	Common buckthorn	<i>Rhamnus cathartica</i> L.	Rhamnaceae
26	Common reed	<i>Phragmites australis</i> (Cav.) Trin. Ex Steud.	Poaceae
27	Multiflora rose	<i>Rosa multiflora</i> Thunb.	Rosaceae



Garlic mustard

Page	Common Name	Scientific Name	Family
28	Knotweed, Japanese	<i>Polygonum cuspidatum</i> Siebold & Zucc.	Polygonaceae
29	Knotweed, giant	<i>Polygonum sachalinense</i> F. Schmidt ex Maxim.	Polygonaceae
	See note regarding listing of knotweeds.		
30	Poison ivy - western	<i>Toxicodendron rydbergii</i> (Small) Green	Anacardiaceae
	Poison ivy - common	<i>T. radicans</i> (L.) Kuntze ssp. <i>negundo</i> (Greene) Gillis	Anacardiaceae
	See note regarding listing of poison ivy.		

Plant names verified and sourced from: [USDA Plants Database](#)

[Citations](#) to images and reference materials. [Web links](#) provided for more information.

Graphical [control calendar](#).

[Definitions](#) of noxious weed categories and herbicide [disclaimer](#).



Biological Controls

Mowing or Other Mechanical Means

Herbicide

Prescribed Fire

Management tactics can take many forms and should be based on predefined vegetation management goals.

Following are plants, commonly misidentified as a species on the noxious weed list. It is important to identify and protect the native plants, while at the same time managing the State listed noxious weeds.

As for the non-natives listed here, while these plants may be aggressive on some sites, management is usually not a high priority.

Non Native Plants
Provided for comparison

Page	Common Name	Scientific Name	Family
31	Yellow rocket	<i>Barbarea vulgaris</i> W.T. Aiton	Brassicaceae
32	Musk or nodding thistle	<i>Carduus nutans</i> L.	Asteraceae
33	Alfalfa	<i>Medicago sativa</i> L.	Fabaceae
	Vetches	<i>Coronilla varia</i> L. and <i>Vicia villosa</i> Roth	Fabaceae
34	Balkan catchfly	<i>Silene csereii</i> Baumgarten	Caryophyllaceae

Minnesota Native Plants
Provided for comparison

Page	Common Name	Scientific Name	Family
35	American bittersweet	<i>Celastrus scandens</i> L.	Celastraceae
36	Fireweed	<i>Chamerion angustifolium</i> (L.) Holub ssp. <i>angustifolium</i>	Onagraceae
37	Swamp thistle	<i>Cirsium muticum</i> Michx.	Asteraceae
38	Cucumber, wild and bur	<i>Echinocystis lobata</i> Michx. and <i>Sicyos angulatus</i> L.	Cucurbitaceae
39	Cow-parsnip	<i>Heracleum lanatum</i> Michx.	Apiaceae
40	Common hops	<i>Humulus lupulus</i> L.	Cannabaceae
41	Virginia creeper	<i>Parthenocissus</i> spp.	Vitaceae
42	Native phragmites	<i>Phragmites australis</i> ssp. <i>americanus</i> Saltonstall	Poaceae
43	Cherries / wild plum	<i>Prunus</i> spp.	Rosaceae
44	Goldenrods	<i>Solidago</i> spp.	Asteraceae
45	Golden alexanders	<i>Zizia aurea</i> (L.) W.D.J. Koch	Apiaceae



Poison ivy (winter)



Stiff goldenrod

[Citations](#) to images and reference materials. [Web links](#) provided for more information.

[Definitions](#) of noxious weed categories and herbicide [disclaimer](#).

Prohibited: Eradicate

Oriental bittersweet : *Celastrus orbiculatus* Thunb.



Above: location of fruit is in leaf axils (where leaf attaches to stem).

Identification: Compare to native [American bittersweet](#) (*Celastrus scandens*). See page 35.
Plant: Woody, perennial vines up to 60 feet long, reaches tree tops and covers fences. Kills vegetation, especially trees and shrubs, either by shading, strangling or sheer weight of vines causing breakage. Stem diameters of 4 inches documented in Minnesota.
Leaves: Alternate, finely-toothed, elliptical, shiny leaves, nearly as wide as long at 2-5 inches.
Flower: Small, inconspicuous, greenish flowers clumped in the leaf axils along the stem. Compare the white pollen on male flowers to the yellowish pollen on American bittersweet flowers. Also, American bittersweet flowers are similar in size and color but are found terminal on vine branches (on the ends).



Bloom time is May to June.

Fruit and Seed: Not only terminal, but along the vine are yellowish, 3-parted capsules enclosing orange-colored, 3-parted, berry-like arils. Each aril contains 1-2 seeds. There are separate fruiting (female) and non-fruiting (male) plants (dioecious). American bittersweet's 3-parted fruit is more red, the 3-parted capsule is more orange and fruits are terminal on the vine branches (on the ends).

Life History: Vegetative reproduction occurs from below-ground rhizomes, above-ground stolons and suckering of roots. Birds will eat the fruits (arils) during the winter and disperse the seeds. Seeds germinate late spring.

Habitat: Readily invades disturbed, open, sunny sites, yet Oriental bittersweet is moderately tolerant of shade allowing it to grow in open woodlands.

Management:

Prescribed fire research has shown that basal sprouting is stimulated and stand density increases dramatically.

Cutting of stems can be used to kill above ground portions of plants especially if the infestation is covering large areas or is climbing high into forest canopy. Combine with herbicide applications for best results. If vines are fruiting, plants should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility.

Herbicides that act systemically such as formulations of triclopyr or glyphosate can be applied as foliar, basal bark or cut stem applications. Foliar applications are reserved for easy to reach foliage, re-sprouting or along fence lines. Once foliage is out of reach, application to cut stems or basal bark will yield the best results.



Left above: greenish, female flower.



Left below: greenish male flower, note the white pollen grains on the anthers of the upper flower.

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar	
	Burn										
		Burning is not recommended									
Herbicide	Basal Bark										
	Foliar										
	Cut stem										
	Mow										
	Don't mow										
	Flowering Period										
		Mowing is not recommended.									

Prohibited: Eradicate

Japanese hops : *Humulus japonicus* Siebold & Zucc.



Above: Male flower structure.
Below: Female flower structure.



Identification: Compare to native [cucumbers, wild and bur](#) (*Echinocystis lobata* and *Sicyos angulatus*). See page 38.

Compare to native [common hops](#) (*Humulus lupulus*). See page 40.

Compare to native [Virginia creeper/woodbine](#) (*Parthenocissus* spp.). See page 41.

Plant: Herbaceous, annual vine trailing on the ground or climbing vegetation and infrastructure. Stems are covered with downward pointing prickles.

Leaves: Opposite, 2-5 inches long and almost as wide, with 5-7 (maybe 9) palmate lobes. Leaves are rough and edges are toothed. Two bracts (stipules) are at leaf stalk bases and the leaf stalks (petioles) are as long or longer than the leaves. Compare to [common hops](#): typically 3-lobed occasionally 5.

Flower: Male flowers and female flowers are on separate plants (dioecious). Flowers are small and greenish to reddish, not showy. Male flowers are branched clusters (panicles) while the female flowers are drooping structures that are rather plump and composed of overlapping reddish bracts or scales (hops).

Bloom time is July into August.

Fruit and Seed: Single flattened seeds from each female flower. Each inflorescence produces several seeds that mature in September.

Life History: An annual plant germinating early spring and growing quickly as summer progresses. Vines quickly cover trees and shrubs weighing them down to the point of breakage and limiting their sunlight. Japanese hops flower in July-August, seeds mature in September. Soon after a killing frost, fragile vines fall apart dispersing their seed.

Habitat: Tolerant of disturbed roadside conditions if there is moist soil. Species prefers conditions found in riparian areas including full sunlight and exposed soils that are moist and rich.

Management: **Caution!** Stem prickles are known to irritate the skin. So, long clothing and gloves are recommended.

Manual methods including **cutting** and **pulling**, while labor intensive, can be successful on small infestations. Efforts should be focused on early season work when plants are small and limited entanglement with surrounding vegetation or structures has occurred.

If the area is accessible to **mowers** and vines have limited structure for climbing, such as trees and fences, then **mowing** is an effective method to control maturity and seed production.

Herbicides include pre-emergent and post-emergent applications. Both are useful since this is an annual plant with prolific seed production capabilities. Pre-emergent should be applied prior to the growing season beginning in late March or early April. Once germination has occurred a switch to foliar applications should be made in an effort to keep plants from maturing and producing seed.

Below: Stem prickles



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn									
	Post-emerge		█	█	█	█				
	Pre-emerge	█								█
	Mow		█	█	█					
	Don't mow					█	█			
Flowering Period						█	█			

Prohibited: Eradicate

Giant hogweed : *Heracleum mantegazzianum* Sommier & Levier



UGA1460060



UGA2121077



UGA5272016

Identification: Compare to native *cow-parsnip* (*Heracleum lanatum*). See page 39.

Plant: Herbaceous, biennial giant at 10-15 feet tall (potentially 20 feet). When flowering the second year, 2-4 inch diameter hollow stalks are a mottled reddish-purple with sturdy bristles.

Leaves: Alternate, up to 5 feet across, compound leaves with 3 deeply incised (cut) leaflets which may be further divided. The spotted leaf stalks, underside of leaves and stems are covered with coarse white hairs.

Flower: Large, flat umbels of small white florets create massive displays up to 2½ feet in diameter.

Bloom time is June to July.

Fruit and Seed: Seed is large, flattened, with visible brown resin canals.

Life History: A single flower head can produce upwards of 1500 seeds. First season basal rosette foliage can be 1-5 feet across with flower stalks typically appearing in the second season. When plants die a large bare patch of soil results which creates a good seed bed and potential erosion problems.

Habitat: Moist soils of woodlands and riparian zones with partial shade as found on woodland edges.

Management: **Caution!** Use protective clothing, goggles or face mask, contact with bristles (stiff hairs) or sap of plants (i.e., phyto) can cause severe blistering and swelling (i.e., dermatitis) when combined with exposure to sunlight (i.e., photo), photophytophotodermatitis.

Manual methods including cutting and removal by hand are effective on small infestations. The focus of this method is to prevent seed production. Plants should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility. Root systems can be weakened by repeated cutting but consider removal for best results. After cutting, monitor sites for follow-up treatment needs.

Herbicide applications of triclopyr or glyphosate are effective when applied early season to basal rosettes. If manual methods such as cutting are used early in the season, plan on returning to chemically treat re-sprouts.



UGA1460060

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn									
	Foliar	Before the plant flowers.						Treat rosettes		
	Cut stem									
	Mow						Cut and remove roots and or seeds by hand for disposal.			
	Don't mow									
Flowering Period										

Prohibited: Eradicate

Common teasel : *Dipsacus fullonum* L.



UGA1459703

Identification: Compare to [Cutleaf teasel](#) (next page) flower bracts and leaves.

Plant: Herbaceous, monocarpic perennial (plant dies after bearing fruit), first identifiable as a basal rosette. At maturity 2-7 feet tall with erect, ridged and prickly stems.

Leaves: On upright stems - opposite, stalkless (sessile), cup-forming, up to 12 inches long by 3 inches wide, hairless, yellowish to reddish-green, *lance-shaped with a wavy edged margin*. Central leaf vein forms a whitish line on top with stout prickles below.

Flower: Many white to lavender purple flowers, 4-parted and irregular. Dense, cylindrically clustered heads up to 4 inches tall and 1½ inches wide. *Stiff and spiny flower bracts may be taller than flower clusters.*



UGA2187029

Bloom time is June to October.

Fruit and seed: Each floret or small flower produces one capsule containing a grayish-brown, slightly hairy seed.

Life History: During the rosette stage, which may extend beyond one season, the plant creates a substantial tap root, up to 24 inches long by 1 inch wide at the crown.

Each flower head can produce upwards of 2000 seeds with germination success of 30-80%. Seed on immature heads may still ripen. Seed is viable for approximately two years with typical dispersal up to 50 feet. Seed may be transported longer distances via water.

Habitat: Disturbed, open sunny site with moist to dry soils. Common on roadsides and disturbed areas.

Management:

Cutting of roots below ground and removal of as much as possible will limit sprouting. Accomplish cutting and removal of either life stage with tools such as dandelion pullers or a sharp shovel.

Mowing of the rosette stage does not kill the plant, however mowing of the flowering stalks can disrupt seed production. After mowing or cutting of flowering plants monitor for new flower heads. Cut flower heads should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility.

Prescribed fire can be used to increase competition from native warm season grasses, if they are present. Fire can also be used in combination with follow-up herbicide treatments. Keep in mind, high density infestations (large numbers of plants) will not burn well.

Herbicides such as metsulfuron methyl, clopyralid, triclopyr or 2,4-D amine are broadleaf specific herbicides that work on teasel at the rosette stage. Glyphosate is applicable but care must be exercised since it is not broadleaf specific.



UGA1459708



UGA1459713

Bracts may be longer than flower head

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn									
	Foliar									
	Cut stem	Not applicable.								
	Mow	Mowing is not recommended: mowing does not kill the plant and flowering may still occur. Seed dispersal can occur if mature plants are mowed. Mower scalping creates a good seed bed.								
	Don't mow									
Flowering Period										

Prohibited: Eradicate

Cutleaf teasel : *Dipsacus laciniatus* L.

Identification: Compare to [common teasel](#) (previous page) flower bracts and leaf shape.

Plant: Herbaceous, monocarpic perennial (plant dies after bearing fruit), first identifiable as a basal rosette. Matures to 2-7 feet tall with erect, ridged and prickly stems.

Leaves: On upright stems - opposite, stalkless (sessile), cup-forming, up to 12 inches long by 3 inches wide, hairless, *lance-shaped, lobed with sinuses cut almost to the midrib*. Prominent leaf vein with stout prickles below.

Flower: Many white to lavender purple flowers, 4-parted and irregular. Dense, cylindrically clustered heads up to 4 inches tall and 1½ inches wide. Spiny, stiff *flower bracts are not taller than the flower cluster*.

Bloom time is July to September.

Fruit and seed: Each floret or small flower produces one capsule containing a grayish-brown, slightly hairy seed.

Life History: During the rosette stage, which may extend beyond one season, the plant creates a substantial tap root, up to 24 inches long by 1 inch wide at the crown.

Each flower head can produce upwards of 2000 seeds with germination success of 30-80%. Seed on immature heads may reach viability. Seed is viable for approximately 2 years with typical dispersal up to 50 feet. Seed may be transported longer distances via water.

Habitat: Disturbed, open sunny site with moist to dry soils. Common on roadsides and disturbed areas.

Management:

Cutting of roots below ground and removal of as much as possible will limit sprouting. Accomplish cutting and removal of either life stage with tools such as dandelion pullers or a sharp shovel.

Mowing of the rosette stage does not kill the plant, however mowing of the flowering stalks can disrupt seed production. After mowing or cutting of flowering plants monitor for new flower heads. Cut flower heads should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility.

Prescribed fire can be used to increase competition from native warm season grasses, if they are present. Fire can also be used in combination with follow-up herbicide treatments. Keep in mind, high density infestations (large numbers of plants) will not burn well.

Herbicides such as metsulfuron methyl, clopyralid, triclopyr or 2,4-D amine are broadleaf specific herbicides that work on teasel at the rosette stage. Glyphosate is applicable but care must be exercised since it is not broadleaf specific.



Lobed or cut leaves

Clustered flower and short bracts



Left: teasel flowering on short stems after being mowed.

Right: Prickles underside of leaf.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar	
Herbicide	Burn		▲					▲	▲	▲	
	Foliar		■				■				
	Cut stem	Not applicable.									
	Mow	Mowing is not recommended: mowing does not kill the plant and flowering may still occur. Seed dispersal can occur if mature plants are mowed. Mower scalping creates a good seed bed.									
	Don't mow										
Flowering Period					■						

Prohibited: Eradicate

Dalmatian toadflax : *Linaria dalmatica* (L.) Mill.



Identification: Compare to introduced [Balkan catchfly](#) (*Silene csereii*). See page 34.

Plant: A short-lived herbaceous perennial up to 4 feet tall. Base may be woody and plant is often branched. Waxy stems and leaves have a bluish-gray color.

Leaves: Alternate leaves 1-3 inch in length clasp stems, are wider and more heart-shaped than similarly flowered butter-and-eggs (*L. vulgaris*).

Flower: Erect, spike-like racemes of yellow flowers with orangey center markings. Flowers are 1-1½ inches long with slender spurs extending downward from the back.

Bloom time is May to September.

Fruit and Seed: On average 140-250 winged seeds are contained in ½ inch long pods.

Life History: Reproduction is primarily by seed that is viable in the seedbank up to 10 years, but the plant also forms colonies via vegetative reproduction from roots.

Habitat: Rapidly colonizes disturbed sites such as roadsides, rail right-of-way, and other locations including cultivated ground. Prefers a drier site in coarse, well-drained soils.

Management: Advice - identify and treat early.



Eradication is the goal in Minnesota; therefore, biological control is not a compatible option at this time.

Prescribed fire can set plants back and drain some energy while **mowing** can prevent or delay seed production. However, both stimulate vegetative reproduction, thus potentially increasing stem counts. Monitor the infestation and consider follow-up treatments of periodic mowing and / or herbicide treatments.

Manual methods including, **cutting, hand pulling or tillage** if done repeatedly and in conjunction with other treatments may control infestations. **Grazers** eat the flowers, but may also carry the seeds.

Herbicide formulations of chlorsulfuron, dicamba, imazapic or picloram have had reported success. Also, combinations of picloram and chlorsulfuron or imazapic and chlorsulfuron or diflufenzopyr and picloram and chlorsulfuron are being used in some areas. Re-treatment is likely necessary.

Below center: early season regrowth.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar	
Herbicide	Burn	Fire does not kill rhizomes. Result is likely an increased stem count.									
	Foliar										
	Cut stem										
	Mow	Mowing can prevent seed production, but forces vegetative reproduction.									
	Don't mow	Therefore, after mowing, monitoring and repeating the process is likely necessary.									
Flowering Period											

Prohibited: Eradicate

Grecian foxglove : *Digitalis lanata* Ehrh.



Identification:

Plant: Herbaceous, perennial beginning its first year as a basal rosette with a single flowering stalk from 2-5 feet tall in subsequent years.

Leaves: Alternate, smooth, stalk-less upper leaves with toothless edges are narrow (lance-shaped). Basal leaves are more oval with rounded tips and are densely woolly.

Flower: Many tubular flowers attached to a central stalk (raceme) with bloom progression from the bottom to the top of the stalk. Flowers have a brown or purple veined upper hood and a creamy-white, elongated lower lip.

Bloom time is June to July.

Fruit and seed: Seed capsules are 2-parted and split to release tiny reddish-brown seed with 3-4 year viability. The hook-covered seed pods are easily caught on clothing or fur and transported to new locations.

Life History: A perennial plant that blooms following its first year as a basal rosette. Each flower produces numerous seeds that are viable for up to 4 years. Small wingless seeds are easily transported by birds, animals, human activity as well as wind and water.

Habitat: Minnesota sites are in full sun to partial shade along roads, woodland edges and in open fields.

Management: **Caution!** Grecian foxglove contains toxins (cardiac glycosides) that can be absorbed through the skin. These compounds are harmful to livestock and humans. Do not pull or handle this plant without protective clothing, in particular, rubber gloves and long sleeves are required.

Repeated mowing or cutting to prevent flowering throughout the year and over several years can drain plants of energy and help control an infestation. Since flowering can occur on mowed, short stems follow-up treatments with herbicide may be necessary.

Prescribed fire, there is no research information available at this time.

Herbicide applications in May and again in July are beneficial to knock down plants before flowering can occur. A fall application is also recommended to kill basal rosettes that were missed earlier or that developed during the season. Metsulfuron-methyl formulations are recommended for good control.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn									
	Foliar									
	Cut stem									
	Mow									
	Don't mow									
Flowering Period										

Prohibited: Eradicate

Black swallow-wort : *Cynanchum louiseae* Kartesz & Gandhi



Identification:

Plant: A perennial, herbaceous vine with a twining habit reaching heights of 3-8 feet. Member of the milkweed family, the only family member in Minnesota that vines.

Leaves: Opposite, shiny and dark green foliage has a smooth (toothless) edge terminated by a pointed tip. Leaves are somewhat oval at 3-4 inches long by 2-3 inches wide.

Flower: Clustered, small (1/4 inch) dark purple flowers with five downy petals.

Bloom time is June to July.

Fruit and seed: Slender pods, taper to a point at about 1½-3 inches. Pods are described as milkweed-like and at maturity split open to release flattened seed carried on the wind by downy, filamentous fibers.

Life History: Herbaceous vine that dies back to the ground every winter. Below ground rhizomes sprout to create a group of stems. With more stems, plants in full sun will produce more flowers and set more seed (up to 2,000/meter square). Long distance wind dispersal of seeds can begin in late July. Seeds contain one to four embryos which helps to ensure germination. Seed viability is potentially 5 years.

Habitat: Prefers full sun in upland soils. Disturbances, natural or human caused, provide an opening in which black swallow-wort can gain a foothold. Old fields, grasslands, road or rail corridors, quarries and other disturbed areas provide excellent habitat.

Management:

Goals: control seed production and stimulate competitive plant cover. **Manual** removal and destruction of plants and root crowns will meet these goals.

Repeated mowing or **cutting** can impact plants, but will not eradicate a population. After early season mowing or cutting, plans must be in place to monitor and repeat the process as necessary. Black swallow-wort if cut early in the season can still produce seed that year and the goal of cutting is to eliminate seed production. If seeds are present, clean equipment before moving offsite.

Prescribed fire can be used in conjunction with other management efforts to encourage stands of native grasses that will compete with black swallow-wort for resources. Monitoring will be necessary to control resprouting and seedlings that germinate after burns are completed.

Herbicide applications should target plants at or beyond flowering stage. As plants reach maturity, foliar applications of glyphosate or triclopyr ester cover enough surface area to potentially deliver a lethal dose to the root system. Timing the application prior to pod formation may limit the production of viable seed that season. Applying herbicide to early emerging plants with limited foliar area will likely result in roots remaining viable and plants resprouting.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn									
	Foliar									
	Cut stem									
	Mow									
	Don't mow									
Flowering Period										

Treat actively growing plants - once flowering has begun. Treat plants with enough foliage to carry a lethal dose to the root system.

Follow-up mowing to control seed production.

Prohibited: Eradicate

Yellow starthistle : *Centaurea solstitialis* L.



A member of the knapweeds, genus *Centaurea*.

Identification:

Plant: Herbaceous, annual with heights of 6 to 36 inches. Plants start as a biennial or winter annual with a basal rosette the first season. Mature plants are described as bushy with a grayish or bluish cast to otherwise green color.

Leaves: Basal leaves are lobed, dandelion-like at about 8 inches. Basal leaves may not persist as plants bolt to flower. Stem leaves are alternate, narrow to oblong and an extended leaf attachment provides a winged appearance to stems.

Flower: Approximately 1 inch long flowers with substantial 3/4 inch yellowish spines emanating from bracts beneath flowers. Flowers are terminal and solitary on stems.

Bloom time is June to August.

Fruit and Seed: Each terminal flower produces between 35 to 80 plumeless or plumed seeds.

Life History: Yellow starthistle is a strong invader. Due to a lack of tufting on some seeds, reliance is on animals and humans for movement any distance from parent plants.

Habitat: Periods of summer drought favor infestations on disturbed sites such as roadsides. Also an invader of prairies, fields, woodlands and pastures where spines can cause injury to grazing animals.

Management: Limit movement of seed on grazing animals, mowing equipment and vehicles.

Eradication is the goal in Minnesota; therefore, biological control is not a compatible option at this time.

Mowing, monitor infestations and time mowing at early flowering stages, soon after spine development.

Herbicide formulations of aminopyralid, clopyralid or picloram applied as foliar applications early in the growing season appear to be most effective.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn									
	Foliar	Dark Blue	Dark Blue	Dark Blue						
	Cut stem		Dark Purple	Dark Purple						
	Mow		Green	Green						
	Don't mow					Red	Red	Red	Red	
Flowering Period				Light Red	Light Red	Light Red				

Prohibited: Eradicate

Meadow knapweed : *Centaurea x moncktonii* C. E. Britton



Synonyms: *C. pratensis* Thuill., *C. debeauxii* Godron & Grenier. subsp thuilleri Dostál, *C. jacea* x *nigra*

Identification: Compare to [brown knapweed](#) and [spotted knapweed](#). Pages 14 and 15.

These 3 plants fall in what is often referred to as the knapweed complex. Suggestion is to concentrate on what is spotted knapweed - otherwise leave identification to a botanist. Compare to non-natives [alfalfa](#) and [vetches](#). See page 33.

Plant: Herbaceous perennial with multiple stems attaining 20 to 40 inches in height from a woody root crown.

Leaves: Simple, alternate, dark green color, basal leaves / lower stem leaves are un-lobed (maybe shallow lobes, or toothed) and up to 6 inches long by 1 inch wide. Farther up the stem, leaves are small and linear.

Key difference: *Spotted knapweed's* basal foliage is grayish-green with deep sinuses, creating a strongly, pinnately lobed leaf up to 6 inches long.

Flower: Pink to purple, ¾ inch wide flowers are solitary and terminal to stems. Bracts beneath flower heads are light brown, fringed (appearing insect-like) becoming coppery and shiny at maturity.

Compare knapweed bract tips;

meadow knapweed - long fringe; spotted knapweed - dark tip, short fringe; brown knapweed - brown, tan papery edge.

Bloom time is June to September.

Fruit and seed: Small (½ inch) light brown seeds are topped by a small line of short hairs.

Life History: Seed is transported by water, vehicles, animals and in hay. Cuttings from roots can sprout.

Habitat: Prefers moist soil types found along water, wet grasslands or meadows, irrigation ditches, roadsides and openings in woodlands.

Management:

Hand pulling or digging while time consuming can be an effective step when coupled with chemical treatments. Plants should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility. **Repeated mowing or cutting** can reduce seed production, but sites must be monitored and applications likely repeated and followed up with herbicide treatments.

Prescribed fire can be used to encourage stands of native grasses that will compete with knapweeds. However, monitoring is needed to check for knapweed germination in bare soil soon after burns are completed.

Herbicide foliar applications with formulations including aminopyralid, clopyralid, or picloram have proven effective in controlling knapweeds.

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar	
Herbicide	Burn										
	Foliar		Foliar treatments target rosettes.								
	Cut stem										
	Mow										
	Don't mow										
Flowering Period											

Prohibited: Eradicate

Brown knapweed : *Centaurea jacea* L.



5474971



5436659



5436651

Identification: Compare to [meadow knapweed](#) and [spotted knapweed](#). Pages 13 and 15. These 3 plants fall in what is often referred to as the knapweed complex. Suggestion is to concentrate on what is [spotted knapweed](#) - otherwise leave identification to a botanist. Compare to non-natives [alfalfa](#) and [vetches](#). See page 33.

Plant: Herbaceous perennial reaching heights of 8 to 32 inches. Typically, multi branched with solitary, terminal disk flowers.

Leaves: Simple, alternate, [green](#) foliage typically has a wavy, [entire margin](#) (no lobes on leaf edge). Basal leaves or lower 1/3 of the plant may have lobes or teeth near the base of the lance-shaped leaf and are larger than the lance-shaped leaves above.

Key difference: *Spotted knapweed's* basal foliage is grayish-green with deep sinuses, creating a strongly, pinnately lobed leaf up to 6 inches long.

Flower: Solitary, terminal to branches, purplish disk flowers that are surrounded by 5-petaled florets. Bracts that cover the bulb-like bases of flowers are 2-parted with the bottom of bracts green striped while upper portions are brown with a transparent, papery edge that may be toothed.

Compare knapweed bract tips;

[meadow knapweed](#) - long fringe; [spotted knapweed](#) - dark tip, short fringe; [brown knapweed](#) - brown, tan papery edge.

Bloom time is June to September.

Fruit and seed: A small (less than 1/8 inch) dry, slightly hairy seed. A typical achene (seed) of the Asteraceae family but there is no fuzz or plume to carry it on the wind.

Life History: Most reproduction is advanced by seed which is moved by water, animals, and birds. But, humans are probably the most significant transporters of seed on farm and construction equipment, recreational vehicles, as well as on personal automobiles, clothes and other recreational gear.

Habitat: In contrast to meadow knapweed's preference towards moist sites, brown knapweed prefers drier sites such as old fields, road and rail right-of ways, or similar disturbed areas.

Management:

Hand pulling or **digging** can be an effective step when coupled with chemical treatments. Plants should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility. **Repeated mowing** or **cutting** can reduce seed production, but sites must be monitored and applications likely repeated or followed up with herbicide treatments.

Prescribed fire can be used to encourage stands of native grasses that will compete with knapweeds. However, monitoring is needed to check for knapweed germination in bare soil soon after burns are completed.

Herbicide foliar applications with formulations including aminopyralid, clopyralid, or picloram have proven effective in controlling knapweeds.



Synonyms:

C. nigra, and *C. nigrescens* plus a nothospecies, *C. xmoncktonii*



5436650

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn									
	Foliar		Foliar treatments target rosettes.							
	Cut stem									
	Mow									
	Don't mow									
Flowering Period										

Prohibited: Control

Spotted knapweed : *Centaurea stoebe* L. ssp. *micranthos* (Gugler) Hayek



Above: basal rosette,

Right: basal foliage,

Below: Mature foliage.



Identification: Compare to [meadow knapweed](#) and [brown knapweed](#). See pages 13 and 14.

These 3 plants fall in what is often referred to as the knapweed complex.

Suggestion is to concentrate on what is spotted knapweed - otherwise leave identification to a botanist.

Compare to non-natives [alfalfa](#) and [vetches](#). See page 33.

Plant: Herbaceous, short-lived perennial living 1-4 years. Initial stage is a rosette before the plant produces 1-6 stems ranging from 1-4 feet tall.

Leaves: Simple, alternate, grayish-green basal rosette leaves up to 6 inches long have deep sinuses. Alternate leaves on mature stems vary from smaller, 1-3 inch, versions of the basal leaves to very small linear leaves near the top.

Key difference: *meadow / brown knapweed* - green leaves, lacking lobes.

Flower: Strongly resemble the flowers of thistles in their pink to purple color (rarely white) and multi-parted texture. Below the petals, flowers are held together by bracts that are stiff and tipped with darkened hairs.

Compare knapweed bract tips;

meadow knapweed - long fringe; *spotted knapweed* - dark tip, short fringe; *brown knapweed* - brown, tan papery edge.

Bloom time is July to September.

Fruits and Seed: Small (1/8 inch long), brownish, tufted, seeds.

Life History: Allelopathic properties (chemicals exuded by the plant) can suppress the germination of seeds of other plants nearby. Plant removal can lead to bare patches of soil subject to erosion.

Seeds are the primary means of reproduction and a mature plant produces thousands of seeds that may remain viable for up to 5 years. Wind disperses seeds short distances while animal and human activity disperse it far and wide.

Habitat: Prefers disturbed sites with gravelly or sandy dry soils. Roadsides, abandoned lots, old fields and gravel pits are all likely habitat that can support large infestations.

Management: **Caution!** Gloves and long sleeves are recommended. Spotted knapweed is a known skin irritant.

Biological controls approved for use in Minnesota are seedhead weevils (*Larinus minutus* and *L. obtusus*) and a root-boring weevil (*Cyphocleonus achates*). Weevils are collected July through September and released on infestation sites larger than 1/3 acre. When a combination of seedhead and root boring weevils work together, infestations can be reduced over a number of years.

While **cutting, mowing** and **prescribed fire** can encourage competition from native grasses and help reduce the extent of an infestation they will likely not eradicate it. Early spring prescribed fire is compatible with biological control.

Herbicide formulations including aminopyralid, clopyralid, glyphosate, imazapyr, aminocyclopyrachlor or picloram have demonstrated control with foliar applications.



Compare flower similarities to [Canada thistle](#), page 18.

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar	
Herbicide	Burn										
	Foliar		Foliar treatments target rosettes.								
	Cut stem										
	Mow										
	Don't mow										
Flowering Period											

Prohibited: Control

Narrowleaf bittercress : *Cardamine impatiens* L.



Identification:

Plant: Herbaceous, annual or biennial starting its first season as a basal rosette and in the second season sending up a smooth flower stem to approximately two feet in height.

Leaves: Basal rosette leaves are pinnately compound with 3-11 round lobed leaflets. Alternate leaves on flowering stems, while still pinnately compound, likely will not have rounded lobes but 6-20 lance or arrowhead shaped leaflets. Edges of flowering stem leaves may be smooth or sharply toothed.

An important differentiation from other plants can be found at the point where leaves attach to stems, look for narrow pointed ears or auricles that grasp and may extend beyond stems.

Flower: Small (0.1 inch), white 4-parted flowers. White petals may not be present.

Bloom time is May to August.

Fruit and Seed: Similar to other mustard family members, seed pods are long (0.6 - 0.8 inch) and slender. Seed ripens from May to September and is dispersed short distances from plants.

Life History: Reproduction is by seed. Seed pods average 10-24 seeds and individual plants can produce thousands of seeds. Movement of seeds is aided by water, animals and human activities.

Habitat: Moist woodlands, forested areas and on margins of thickets. River bottom sites, streambanks and other moist areas are very good habitat and provide avenues for dispersal. This species can tolerate a variety of conditions and has been reported in areas such as roadsides, vacant lots, as well as yards and gardens.

Management: Recommendations at this time focus on hand pulling infestations. Good advice from the Minnesota Department of Agriculture in reference to controlling narrowleaf bittercress;

“Following guidelines for controlling other biennial mustards such as garlic mustard, *Alliaria petiolata*, may be helpful.”

Hand pulling timed to prevent flower and/or seed production is recommended. Subsequent re-treatments will be required due to germination and recruitment from the seedbank. If flowers or seed pods are present on plants should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility. If infestations are large or dense, consider the need for ground cover to prevent erosion and to provide competing vegetation.

Prescribed fire in spring to top-kill basal rosettes and seedlings. Follow-up treatment with **herbicide** is imperative after seedling germination to further slow growth of infestations.

Herbicide applications to foliage with formulations of triclopyr, metsulfuron-methyl, or imazapic. Use glyphosate or 2,4-D after native plants have entered dormancy and narrowleaf bittercress is still active.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow							
	Foliar	Dark Blue						Dark Blue	Dark Blue	Dark Blue
	Cut stem									Dark Blue
	Mow	Green	Green							
	Don't mow			Red	Red	Red	Red	Red	Red	Red
Flowering Period			Light Red	Light Red	Light Red	Light Red	Light Red			



Identification: Compare to Minnesota native [swamp thistle](#) (*Cirsium muticum*). See page 37.
 Compare to non-native [musk thistle](#) (*Carduus nutans*). See page 32.
 Compare to non-natives [alfalfa](#) and [vetches](#). See page 33.

Plant: Herbaceous, biennial reaching heights of 1-4 feet. Unlike native thistles, the stems of plumeless thistle are winged and spiny.

Leaves: Edges of rosette leaves are wavy with yellowish spines. Stem leaves are alternate, attached directly to stems and typically have hairs on bottoms along mid-veins.

Flower: Numerous stem branches support terminal, single, composite flowers that are ½ to 1½ inches wide. Linear or narrow bracts with short spines are found immediately below pink to purple flowers.

Bloom time is July to October.

Fruit and Seed: Small seeds approximately 1/16 inch long described as straw colored and tufted with fibers on the terminal end. The fibers aid in wind dispersal.

Life History: Reproduction is by seed and seeding is prolific building a large seed bank in a short period of time. Thus, control measures should focus on eliminating seed production and exhaustion of seed banks. Movement is greatly increased by animal and/or human activities such as mowing or haying.

It is reported that musk thistle (*Carduus nutans*) and plumeless thistle hybridize.

Habitat: Found on dry to moist soils in pastures, woodlands, waste areas, along roadsides, ditches and stream banks.

Management:

Cutting taproots 1-2 inches below ground is effective but time consuming for large numbers of plants. **Mowing** should be timed at flower bud stage to prevent seed production and should be repeated 2-3 times per season to be effective. Avoid spreading seed with hay or straw and with mowing and vehicle movement through infestations.

Prescribed fire can be used to encourage stands of native grasses that will outcompete thistle. However, monitoring is needed to check for thistle that germinates in bare soil soon after burns are completed.

Herbicide applications timed at the early bolting phase are foliar applications of 2,4-D ester or dicamba formulations. For foliar applications at the budding to flower stage or fall applications to basal rosettes turn to formulations of aminopyralid, clopyralid, metsulfuron-methyl or triclopyr.

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow	Yellow			Yellow	Yellow	Yellow	
	Foliar	Dark Blue	Dark Blue	Dark Blue				Dark Blue	Dark Blue	
	Cut stem									
	Mow		Green	Green						
	Don't mow				Red	Red	Red	Red	Red	
Flowering Period					Red	Red	Red	Red		



Identification: Compare to Minnesota native [swamp thistle](#) (*Cirsium muticum*). See page 37.
 Compare to non-native [musk thistle](#) (*Carduus nutans*). See page 32.
 Compare to non-natives [alfalfa](#) and [vetches](#). See page 33.
 Compare flower similarities to [spotted knapweed](#), page 15.



Plant: Herbaceous, perennial with grooved, non-spiny, hairy and typically upright stems to a height of 2-6+ feet tall.

Leaves: Alternate, simple, pinnately lobed leaves that are generally lance-shaped. The leaves are irregularly lobed, with toothed, spiny edges. The leaves are stalkless (sessile) and at maturity are downy or hairy on the underside.

Flower: Male and female (dioecious) 3/4 inch flowers occur singly on the end of branches. The disk or composite inflorescence is comprised of numerous purple to pinkish small florets. Bracts below the inflorescence do not have spines on the tips.

Bloom time is June to October.

Fruit and Seed: Tufted light brown seeds are easily dispersed by wind. Do not mow after seed has developed as this strongly aids seed dispersal.

Life History: Reproduction can occur from seed, root cuttings and from rhizomes. Clonal stands are common and spread can be significant from roots that can grow horizontally 10-12 feet per year.

Habitat: A successful inhabitant of disturbed areas such as roadsides and old fields but will also move into open woodlands and prairies. This species is also found where water levels fluctuate such as in wet meadows, along stream banks and ditches.

Management:

A **biological control** is under investigation, stem-mining weevil (*Ceutorhynchus litura*). This insect is available from commercial vendors and is acceptable for distribution in Minnesota.

Cutting or mowing should target plants that are approximately 3 inches tall and the process must be repeated throughout the season to maintain the plants at 3 inches or less in height. Continuing this approach for several years can drain the plants of reserves.

Repeated **prescribed fire** can be used to encourage stands of native grasses that will outcompete thistle. However, monitoring is needed to check for thistle that germinates in bare soil soon after burns are completed.

Herbicide foliar sprays with formulations of clopyralid, aminopyralid, or metsulfuron-methyl. These foliar applications are made as the plants bolt, prior to flower set, or in late summer/early autumn to rosettes.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow	Yellow						
	Foliar	Dark Blue	Dark Blue				Dark Blue	Dark Blue		
	Cut stem		Dark Purple	Dark Purple						
	Mow		Dark Green	Dark Green						
	Don't mow				Red	Red	Red	Red	Red	
Flowering Period				Light Red	Light Red	Light Red	Light Red	Light Red		

Prohibited: Control

Leafy spurge : *Euphorbia esula* L.



Above: Flower and bracts.
Right: Cut stem exuding white latex.



Identification: Similar to *invasive cypress spurge* (*E. cyparissias*). Due to bloom period overlap confused with *introduced yellow rocket* (*Barbarea vulgaris*). Compare to *yellow rocket*, page 31.

Plant: Herbaceous, perennial to 3 feet tall. *Cypress spurge* is 8-14 inches tall. Broken stems of many *Euphorbia* spp. produce a milky sap (latex) that is a good identification characteristic.

Leaves: Alternate, linear to lance-like, bluish-green and 1-4 inches in length. *Cypress spurge* leaves are approximately 1 inch in length, alternate or whorled and narrower than leafy spurge leaves.

Flower: There are no petals or sepals on the small yellowish-green flowers. Upper stem leaves or bracts develop just below flowers and are yellow-green in color providing the appearance of yellowish petaled flowers. The bracts develop before the true flowers.

Bloom time is May to August.

Fruit and Seed: Three-celled capsules that expel seeds up to 20 feet. Each cell contains a seed.

Life History: Leafy and cypress spurge reproduction can be vegetative from buds on roots, rhizomes and root cuttings. The ability to reproduce vegetatively makes these plants difficult to control. Deep roots to 21 feet and extensive horizontal roots allow plants to store vast reserves providing the ability to recover after removal attempts. Seed production is significant with plants producing on average 140 seeds per stem. Seeds can remain viable in the soil up to 8 years.

Habitat: Leafy and cypress spurge readily invade dry sites in full sun, but tolerance of a range of conditions allows them to invade moist, rich soils as well.

Management: **Caution!** Some people are sensitive to the sap of spurges and develop skin rashes after pulling or handling plants, so gloves and long clothing are recommended. The milky sap is toxic to cattle and horses.

Biological controls are available for controlling leafy spurge. Flea beetles (*Aphthona lacertosa*) are widely used in Minnesota. Flea beetles are collected late May to early June and released on infested sites larger than 1/3 acre. Additionally in Minnesota, stem and root boring beetles (*Oberea erythrocephala*) provide some control. Early spring prescribed fire is compatible with biological control on this plant species.

Cutting or mowing if timed before flower development can reduce or limit seed production. Grazing goats and sheep can effectively limit the spread of infestations.

Prescribed fire is another tool that helps drain plants of reserve energy. Control of spurges typically requires a multi-tactic approach - eliminate or reduce seeding, exhaust seed banks, and drain reserves of existing plants while attempting to encourage native plants for competitive cover. So, consider spring mowing or fire with a fall application of imazapic.

Herbicide controls are applied as foliar applications and usually involve formulations of aminocyclopyrachlor, picloram, 2,4-D, glyphosate, dicamba, or imazapic. Repeated applications are likely necessary.

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow	Yellow				Yellow	Yellow	
	Foliar	Dark Blue	Dark Blue				Dark Blue	Dark Blue		
	Cut stem									
	Mow	Green	Green							
	Don't mow			Red	Red	Red	Red	Red	Red	
Flowering Period			Light Red	Light Red	Light Red	Light Red				



Left: Leafy spurge
Right: Cypress spurge.



Listing includes species, European wand loosestrife (*Lythrum virgatum* L.).

Identification:

Compare to native [fireweed](#) (*Chamerion angustifolium*). See page 36.

Plant: Herbaceous, wetland perennial, 4-7 feet tall with a 4 to 6 sided wood-like stem.

Leaves: Opposite, sometimes whorled, lance-shaped, and downy with a slightly wavy yet smooth edge. Leaf pairs are positioned at right angles to the leaf pairs above and below.

Flower: Each plant can have from one to many spikes of pinkish-purple flowers. Center of the flower is yellowish and surrounded by 5-7 petals that have a wrinkled appearance.

Bloom time is July to September.

Fruit and seed: Tiny seeds are released from 2-parted capsules.

Life History: Reproduction by seeds and rhizomes produce large monoculture infestations.

Habitat: Purple loosestrife can be found on upland sites but is best known as an invader of wetlands or aquatic habitats such as ditches, wet meadows, ponds, marshes, river and stream banks as well as lake shores. Purple loosestrife disrupts aquatic habitats as it displaces wetland emergent species.

Management:

Biological controls in the form of two leaf feeding beetles of the same genus (*Galerucella calmariensis* and *G. pusilla*) have been very effective in Minnesota.

Mowing is seldom an option due to wet environments. **Cutting** of flower spikes can be an effective control of seed production, spikes should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility. **Hand pulling** or **digging** of plants can also be effective but care should be taken to remove entire root systems if possible. Resprouting can occur from roots and root segments left in the ground or on the site so contain (e.g., bag) and remove to an approved facility.

Herbicide formulations labeled for use on rights-of-way and near water; 2,4-D, glyphosate, imazamox, metsulfuron-methyl+aminopyralid, triclopyr, imazapyr and aminocyclopyrachlor.

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn									
	Foliar		Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue		
	Cut stem			Dark Purple	Dark Purple					
	Mow		Dark Green	Dark Green	Dark Green					
	Don't mow					Red	Red	Red	Red	
Flowering Period					Light Red	Light Red	Light Red			



Identification: Compare to [golden alexanders](#) (*Zizia aurea*) and [heart-leaved golden alexanders](#) (*Z. aptera*), both native. See page 45.

Plant: Herbaceous, classed as a monocarpic perennial (plant dies after bearing fruit). Early life form is a basal rosette with mature stems developing a hollow, grooved flowering stalk potentially reaching 5 feet.

Leaves: Basal rosette leaves can be 6 inches in height and are pinnately compound with 5-15 leaflets. Flowering stalk leaves are alternate, 2-5 leaflets that become smaller near the top of the stem. Leaflets are coarsely toothed, sinuses cut to varying depths creating lobes of various sizes. The base of the leaf stalks wrap or clasp the grooved stem.

Flower: Many 5-petaled, small yellow flowers on wide, flat umbels of 2 to 6 inches.

Bloom time is June to July.

Fruit and Seed: Flattened, yet ridged, oval seeds.

Life History: Typical life span is two years, first year a basal rosette. At this stage, it is one of the first plants to green up in the spring and one of the last to brown down in autumn providing good opportunities for scouting and treating. Mid to late summer, mature second-year plants will bolt, flower and set dozens of seed per plant. Seeds are moved off infested sites by animal and human activity or wind and water movement. Seed is reported to be viable in soil for up to 4 years.

Habitat: Disturbed sites such as roadsides and abandoned fields or lots. Can occur in wet meadows but dry to mesic soils are more typical. Full to partial sun is a must for this species.

Management: **Caution!** Use protective clothing, goggles or face mask, contact with the bristles or sap of the plant (i.e., phyto) can cause severe blistering and swelling (i.e., dermatitis) when combined with exposure to sunlight (i.e., photo), phytophotodermatitis.

If **cutting** or **mowing** after seed set, clean equipment to leave seeds on the infested site. A second option if cut after seed-set is to contain (e.g., bag) and remove plant material to an approved facility. If a site is mowed early in the season it must be monitored as plants will likely re-sprout, bolt and flower.

Prescribed fire can be used to encourage stands of native grasses for competition. However, follow-up treatments (herbicide or cutting) are still required to prevent seed production.

Herbicide controls include foliar applications of 2,4-D or metsulfuron-methyl to the rosette stage during May and June and again in September or October. If glyphosate is to be applied to rosettes, it is recommended to hold off until late fall to prevent damage to native plants that should then be dormant.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn									
	Foliar		■	■			■	■		
	Cut stem									
	Mow		■	■						
	Don't mow				■	■	■	■	■	
Flowering Period				■	■					



Identification: Compare to native [goldenrods](#) (*Solidago* spp.). See page 44.

Plant: Herbaceous, perennial reaching 2-5 feet in height. Stems appear woody, are slightly hairy to smooth and at the base are purplish-red.

Leaves: Alternate, pinnately divided, toothed on edges and 2-12 inches long, typically smaller near the top of plants. Leaves are strongly aromatic when crushed.

Flower: Single stems support multi-branched, flat clusters of bright yellow button-like flowers. Each ¼-½ inch wide button is comprised of many small florets and the flower heads, like the leaves, are strongly aromatic.

Key difference - Note the lack of ray petals surrounding the flower heads.
Compare to [goldenrods](#) which have ray petals.

Bloom time is July to October.

Fruit and seed: Small, yellowish-brown, dry, 5-toothed crowned seeds.

Life History: Reproduction is both vegetative from rhizomes and root fragments or by seed. Seeds are dispersed by wind, water and human activities such as vehicle traffic and mowing.

Habitat: Found most often in open, disturbed areas typical of stream and river banks, trail edges, roadsides, gravel pits and old farmsteads or pastures. Can be found in riparian areas, but most often in dry, well drained soils in full sun.

Management: **Caution!** The alkaloids contained in common tansy are toxic to livestock and humans if consumed in quantity. Toxins can also be absorbed through skin so gloves are recommended when handling or pulling this plant.

Mechanical methods like **tilling** can spread common tansy by spreading small root segments. **Pulling** also may leave root segments in the ground which may resprout.

Cutting or **mowing** to prevent seed production can be effective and should be timed just prior to flowering.

Prescribed fire can eliminate competition and create favorable conditions for common tansy by opening the canopy and preparing bare soil. Thus, fire can make an infestation worse; however, fire can be used to remove dead material to improve follow-up herbicide application providing better contact and potentially better control.

Herbicide control with formulations of metsulfuron-methyl, imazapyr, glyphosate or 2,4-D provide good control when applied as foliar applications in spring.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar	
Herbicide	Burn										
	Foliar		Foliar treatments target rosettes.								
	Cut stem										
	Mow										
	Don't mow										
Flowering Period											



Identification:

Plant: Herbaceous, biennial with first year plants being basal rosettes. Second year flowering plants can attain heights of 4 feet and can produce more than one flowering stem.

Leaves: Basal rosettes with coarsely toothed, kidney-shaped foliage remains green through winter. Foliage on flowering stems is alternate, triangular, coarsely toothed and stalked. Foliage has the odor of garlic when crushed.

Flower: Clustered, 4-parted, white flowers are approximately 1/8 inch across.

Bloom time is April to June.

Fruit and Seed: The 1-2 1/2 inch long slender seed pods are very recognizable and contain numerous black, shiny seeds.

Life History: Reproduction is by seed that matures June into July and can be dispersed about 6 inches when pods burst at maturity. Seed remains viable in soil for up to 5 years.

Habitat: An invader of shady, moist forests or woodland settings but also invades oak savannas and disturbed areas in full sun. It is reported that garlic mustard will inhibit the growth of beneficial fungi associated with native plants thus causing a decline in herbaceous cover.

Management: **Biological controls** are under investigation, but none are approved for release at this time. One insect being studied is *Ceutorhynchus scrobicollis*, a crown and stem-mining weevil.

Manual methods include pulling plants in early spring prior to flowering (seed set is almost coincidental with flowering) and cutting plants back to the ground as they bolt for flowering, prior to flower opening. Monitor the site as cutting may need to be repeated. If mature flowers (or seed pods) are present, plants should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility.

Prescribed fire in spring to top-kill basal rosettes and seedlings. Follow-up treatment with **herbicide** is imperative after seedling germination to further slow growth of infestations.

Herbicide applications to foliage with formulations of triclopyr, metsulfuron-methyl, or imazapic. Use glyphosate or 2,4-D after native plants have entered dormancy and garlic mustard is still active.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow							
	Foliar	Dark Blue						Dark Blue	Dark Blue	Dark Blue
	Cut stem									Dark Blue
	Mow	Green	Green							
	Don't mow			Red	Red	Red	Red	Red	Red	Red
Flowering Period		Light Blue	Light Blue	Light Blue						

Restricted

Glossy buckthorn : *Frangula alnus* Mill.



Identification: Compare to the native [cherries and wild plum](#) (*Prunus* spp.). See page 43.

Plant: Shrub or small tree at 20 feet in height, often multi-stemmed with prominent light-colored lenticels on dull grayish to dark brown bark. Heartwood may be orange to pinkish and sapwood may be yellowish, both can facilitate identification.

Leaves: Alternate, glossy, 2-3 inch length with prominent parallel veins terminating near a smooth edge. Undersides are slightly hairy and dull. Leaves will likely persist longer in autumn than native deciduous shrubs, but they will turn yellow and drop.

Flower: Not showy, small, 5-petaled, yellowish and borne in clusters in the leaf axils.

Bloom time is May to July.

Fruit and Seed: Clustered in leaf axils along the stem, initially reddish maturing to purplish-black in late summer into autumn. Each fruit contains 2-3 seeds, dispersed by birds.

Life History: Reproduction is by seed and while birds disperse the seed, dense thickets suggest many seeds drop close. Shades out native shrubs and forbs creating monocultures in sites that typically support very diverse flora.

Habitat: An invader of wetlands, including sedge meadows, sensitive acidic bogs and calcareous fens. Tolerant of shade, yet will perform well in full sun on upland sites.



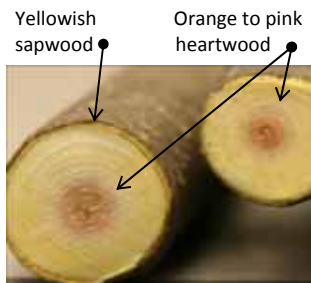
Management:

Caution should be exercised to avoid creating large bare patches and/or extensive soil disturbance. Both scenarios lead to soil erosion and create good habitat for glossy buckthorn regeneration.

Hand pulling or the mechanical advantage provided by a weed-wrench can help control small infestations. **Cutting** of stems must be accompanied by herbicide treatments or resprouting will occur. **Mowing** is typically not an option in sensitive wetland areas, but on upland sites may be a useful tool in seedling and small diameter stem control.

On upland sites **prescribed fire** can be used to control seedlings and small diameter stems and if used consistently can drain larger plants of reserves and provide control. However, sprouting will occur and a follow-up herbicide application should be considered.

Herbicide formulations of triclopyr, imazapyr, metsulfuron-methyl, 2,4-D, glyphosate or picloram are used as foliar applications. Herbicides include triclopyr or glyphosate for late autumn into winter applications to basal bark, cut stumps or frill cuts.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow	Yellow			Yellow	Yellow	Yellow	
	Foliar		Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	
	Cut stem				Dark Purple	Dark Purple	Dark Purple	Dark Purple	Dark Purple	Dark Purple
	Mow									
	Don't mow									
Flowering Period			Light Red	Light Red	Light Red					

Restricted

Common buckthorn : *Rhamnus cathartica* L.



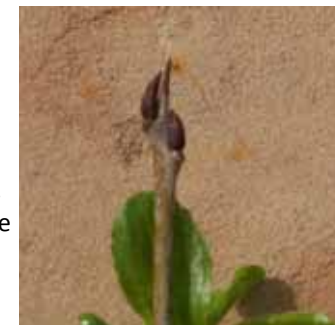
Identification: Compare to the native [cherries and wild plum](#) (*Prunus* spp.). See page 43.

Plant: Tall shrub at 20-26 feet with potential to become a small tree reaching 36 feet. Often one to a few stems with diameters up to 5-6 inches and occasionally larger. Light-colored lenticels on shiny gray to brown bark leads to confusion with young native cherries and plums (*Prunus* spp.). Many twigs are terminated by a small thorn-like spine.

Leaves: Sub-opposite, at times appearing opposite and on fast growing sprouts alternate. Shiny green, 1-2½ inches, oval with tiny teeth on leaf edges. Veins curving to the tip of the leaf (arcuate venation) provide a strong identification characteristic and green leaves persisting into autumn.

Flower: Male and female (dioecious) on separate plants, small, 4-parted and green.

Bloom time is May to June.



Fruit and Seed: Fruit on female plants only. At maturity a purplish-black, small (¼ inch), berry-like fruit held close to the stem in clusters. Typically, 3-4 seeds per fruit. Strong identification characteristic are these blackish fruits held close to twigs late into winter.

Life History: Reproduction is by seed and dispersal is often aided by birds. Heavy seed production combined with stems and stumps that sprout vigorously when damaged make control difficult.

Habitat: A strong competitor on upland sites in a variety of soil types and moisture regimes. Common buckthorn thrives in the understory, on the forest edge or in full sun often to complete exclusion of other species.

Management:

Keep in mind, if funds and/or time are limited female plants are the fruit producers and should be targeted first. Caution should be exercised to avoid creating large bare patches and/or extensive soil disturbance. Both scenarios lead to soil erosion and create good seed beds for common buckthorn regeneration.

Hand pulling or the mechanical advantage provided by a **weed-wrench** can help control small infestations. **Cutting** of stems must be accompanied by herbicide treatments or resprouting will occur. **Mowing** is typically not an option in sensitive wetland areas, but on upland sites may be a useful tool in seedling and small diameter stem control.

Prescribed fire is used to control seedlings and small diameter stems and if used consistently can drain larger plants of reserves and provide control. However, sprouting will occur and a follow-up herbicide application should be considered.

Herbicide formulations of triclopyr, imazapyr, metsulfuron-methyl, 2,4-D, glyphosate or picloram are used as foliar applications. Herbicides include triclopyr or glyphosate for late autumn into winter applications to basal bark, cut stumps or frill cuts.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow	Yellow			Yellow	Yellow	Yellow	
	Foliar		Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	Dark Blue	
	Cut stem			Dark Purple	Dark Purple	Dark Purple	Dark Purple	Dark Purple	Dark Purple	Dark Purple
	Mow									
	Don't mow									
Flowering Period			Light Red	Light Red						

Restricted

Common reed : *Phragmites australis* (Cav.) Trin. ex Steud.



Identification: Compare to [native phragmites](#) (*Phragmites australis* ssp. *americanus*). See page 42.

Plant: A perennial grass reaching heights of 15 feet. Dense stands develop from rhizomatous root systems with live stems and dead stems intermingled. Hollow stems are green in summer and yellow in winter.

Leaves: Dark green, grass-like elongated foliage that is at most 1½ inches wide. Leaf sheaths are typically retained on culms (stems) into winter even if leaves drop from dead culms. Compare to native phragmites that sheds leaves and leaf sheaths.

Flower: Bushy panicles of purplish or golden flowers appear in July.

Bloom time is July to September.

Fruit and Seed: As they mature, large, dense seed heads become gray. Hairy seeds give seed heads a fuzzy, fluffed appearance.

Life History: Rhizomes, rhizome fragments, root runners and copious amounts of seed provides common reed a strong competitive edge. It forms such dense stands and thick root systems that all native plants can be forced out. Rhizome segments can break free and coupled with seed production plants readily move into and take over new areas.

Habitat: Shorelines of lakes and rivers as well as pond edges and freshwater marshes. Disturbed areas and roadsides can support common reed very well.

Management: Once established, chemical treatments are recommended as a first step in restoration efforts.

Cutting or mowing will not kill plants or eradicate infestations, but can be effective at slowing the spread.

Prescribed fire after the plant has flowered. Used prior to herbicide treatments, fire (or mowing) removes biomass improving herbicide application to regrowth. Do not burn prior to flowering, as this timing may only encourage growth.

Herbicide applications, aquatic formulations of imazapyr or glyphosate are effective, even on established stands. Rapid recognition of infestations and treatments soon after increase effectiveness. Late summer/early autumn herbicide applications to foliage or to cut stems are best and repeat treatments in subsequent seasons are likely necessary.



Glumes or seed covers vary in length. Upper and lower glumes are longer on the native subspecies. Best analyzed under a microscope.

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn					After flower				
	Foliar					After Flower				
	Cut stem					After Flower				
	Mow		Mowing must be repeated							
	Don't mow									
Flowering Period										



Identification:

Plant: Shrub with 6-13 feet long, wide arching canes reaching 6-15 feet tall. The canes armed with stiff, downward curved thorns form an impenetrable thicket.

Leaves: Alternate, pinnately compound, 5-11 sharply-toothed leaflets. The oval leaflets are nearly smooth on the topside and are covered with short hairs below. There are fringed stipules where leaves attach to stems.

Flower: Numerous, showy flowers. Five-parted, fragrant, white to slightly pink, ½-1½ inches across.

Bloom time is May to July.

Fruit and Seed: Rose hips, ¼ inch diameter, bright red fruits, develop during summer months and persisting into winter.

Life History: Plants reproduce by seed and by cane tips with ground contact taking root. The plants are prolific seed producers and seeds are viable in seed banks for up to 20 years.

Habitat: Readily invades disturbed areas such as woodlands, prairies, roadsides, along streams and has become a problem in pastures where the thorns discourage grazing.

Management:

Cutting or mowing frequently during the growing season (3-6 times) for 2-4 years can achieve good control of infestations.

Prescribed fire in the spring will provide good control of small stems and seedlings.

Herbicide applications to cut stems and to resprout stems with systemic herbicides such as glyphosate have proven successful. As with most species, late season applications of herbicides are effective as plants are moving photosynthates to storage in root systems.



		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow	Yellow						
	Foliar				Dark Blue	Dark Blue	Dark Blue			
	Cut stem					Purple	Purple	Purple		
	Mow	Green	Green	Green	Green	Green	Green	Green	Green	
	Don't mow									
Flowering Period			Pink	Pink	Pink					

Specially Regulated

Knotweed, Japanese : *Polygonum cuspidatum* Siebold & Zucc.



Identification: Synonym: *Fallopia japonica* (Houtt.) Ronse Decr. Compare to larger [giant knotweed](#) next page.

Plant: Perennial plants with non-woody stems from 5-8 feet. The stems are smooth, reddish-brown in color, hollow between nodes and swollen at nodes where leaves attach.

Leaves: Alternate, simple, can be 2 to 7 inches long with a truncate base (mostly straight across). The tip of the leaf is acuminate (narrowed to an abrupt point) and the underside of the leaf lacks the hairs found on giant knotweed.

Flower: Protruding from the leaf axils (where the leaf attaches) are branched structures holding many small, creamy white to greenish flowers. Japanese knotweed has a flower structure that is longer than the leaf, while the flower structure of giant knotweed is shorter than the nearby leaf.

Bloom time is August to early October.

Fruit and Seed: Like giant knotweed the seed is small, shiny black and three sided.

Life History: It is believed that seed production is limited and most reproduction is vegetative. Even small root parts will re-sprout after plants are manually removed. Stem fragments resulting from mowers or other machinery can sprout if in contact with moist soil. Plants uprooted by flooding or digging if in contact with the moist soil will likely re-root. Seeds that are produced are said to be viable four to five years if near the soil surface and up to 15 years if buried.

Habitat: Prefers moist soils in full sun to partial shade. Plants readily inhabit moist roadside ditches, wetlands, and areas along rivers and streams.

Management: Advice is to develop a four to five year plan. **Prescribed fire** in spring can set plants back and drain some energy while **mowing** can prevent or delay seed production. However, both can stimulate vegetative reproduction, thus potentially increasing stem counts. Monitor the infestation and utilize follow-up treatments of periodic mowing and/or herbicide.

Manual methods should not be considered eradication tools. These include **cutting, digging, hand pulling, grazing or tarping** if done repeatedly **and in conjunction** with other treatments may control infestations. Monitor and consider supplemental herbicide treatments. Plants should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility.

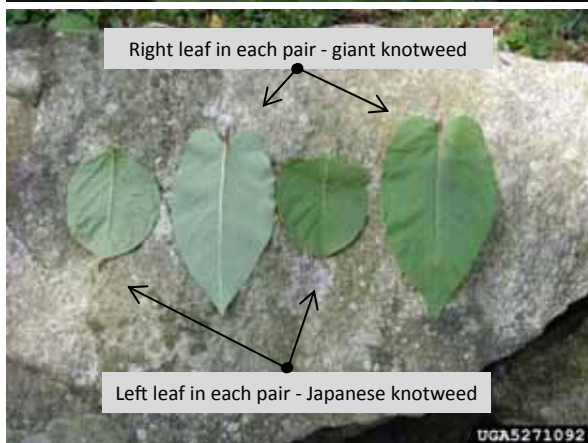
Prior to **foliar herbicide** treatments with aminopyralid, glyphosate, imazapyr, triclopyr, or 2,4-D it is recommended that the plants be cut twice when 3 feet tall. Follow with a fall **foliar application** when regrowth is 3 feet tall and still actively growing. **Cut stem applications** with glyphosate, triclopyr or triclopyr + 2,4-D can be made anytime during active growth when the plants are over 3 feet tall. **Stem injection** treatments with glyphosate can be made anytime during active growth periods. See glyphosate's supplemental label for hollow stem injection.

Specially Regulated is a unique category. Unadvisable to plant this species within 100 feet of a water body or its designated floodplain. See [page 53](#).

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar	
Herbicide	Inject			During active growth, treat when 3' tall.							
	Foliar	Mow / cut twice - fall treatment.									
	Cut stem			During active growth, treat when 3' tall.							
	Mow	Mowing is not recommended. If used, collect cuttings, monitor and repeat.									
	Don't mow	Follow-up with herbicide treatments at 3 feet of regrowth in fall.									
Flowering Period											

Specially Regulated

Knotweed, giant : *Polygonum sachalinense* F. Schmidt ex Maxim.



Identification: Synonym: *Fallopia sachalinensis* (F.schmidt ex Maxim.) Ronse Decr.

Compare to smaller [Japanese knotweed](#) previous page.

Plant: Perennial plants with non-woody stems from 6-16 feet. The stems are smooth, light green in color, hollow between nodes and swollen at nodes where leaves attach.

Leaves: Alternate, simple, can be up to up to 12 inches across and 6-14 inches long with rounded lobes at the base (heart-shaped). The tip of the leaf is blunt and the underside of the leaf may have scattered hairs early in the season.

Flower: Protruding from the leaf axils (where the leaf attaches) are branched structures holding many small, creamy white to greenish flowers. Unlike Japanese knotweed where the flower structure is longer than the leaf, the flower structure of giant knotweed is shorter than the nearby leaf.

Bloom time is August to early October.

Fruit and Seed: Like Japanese knotweed the seed is small, shiny black and three sided.

Life History: It is believed that seed production is limited and most reproduction is vegetative. Even small root parts will re-sprout after plants are manually removed. Stem fragments resulting from mowers or other machinery can sprout if in contact with moist soil. Plants uprooted by flooding or digging if in contact with the moist soil will likely re-root. Seeds that are produced are said to be viable four to five years if near the soil surface and up to 15 years if buried.

Habitat: Prefers moist soils in full sun to partial shade. Plants readily inhabit moist roadside ditches, wetlands, and areas along rivers and streams.

Management: Advice is to develop a four to five year plan. **Prescribed fire** in spring can set plants back and drain some energy while **mowing** can prevent or delay seed production. However, both can stimulate vegetative reproduction, thus potentially increasing stem counts. Monitor the infestation and utilize follow-up treatments of periodic mowing and/or herbicide.

Manual methods should not be considered eradication tools. These include **cutting, digging, hand pulling, grazing or tarping** if done repeatedly **and in conjunction** with other treatments may control infestations. Monitor and consider supplemental herbicide treatments. Plants should be disposed of onsite or contained (e.g., bagged) and removed to an approved facility.

Prior to **foliar herbicide** treatments with aminopyralid, glyphosate, imazapyr, triclopyr, or 2,4-D it is recommended that the plants be cut twice when 3 feet tall. Follow with a fall **foliar application** when regrowth is 3 feet tall and still actively growing. **Cut stem applications** with glyphosate, triclopyr or triclopyr + 2,4-D can be made at anytime during active growth when the plants are over 3 feet tall. **Stem injection** treatments with glyphosate can be made anytime during active growth periods. See glyphosate's supplemental label for hollow stem injection.

Specially Regulated is a unique category. Unadvisable to plant this species within 100 feet of a water body or its designated floodplain. See [page 53](#).

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar	
Herbicide	Inject			During active growth, treat when 3' tall.							
	Foliar	Mow / cut twice - fall treatment.									
	Cut stem			During active growth, treat when 3' tall.							
	Mow	Mowing is not recommended. If used, collect cuttings, monitor and repeat.									
	Don't mow	Follow-up with herbicide treatments at 3 feet of regrowth in fall.									
Flowering Period											

Specially Regulated

Poison ivy : *Toxicodendron radicans* (L.) Kuntze



Identification: **Common poison ivy** [*T. radicans* (L.) Kuntze ssp. *negundo* (Greene) Gillis] is potentially a larger shrub (up to 10 feet) and possibly a vine in southeastern Minnesota's riparian areas.

While both species are subject to regulation, information provided below focuses on **western poison ivy** [*T. rydbergii* (Small) Green] which is a frequently occurring shrubby plant with an extensive natural range across Minnesota.

Plant: A 1-2 foot **native** shrub with gray to tan bark and little if any branching.

Leaves: Alternate, compound leaves, 3 shiny or dull surfaced leaflets. Leaflet edges are variable from smooth to very coarsely toothed. Lower leaf surfaces are pale and often hairy.

Flower: Small, greenish flowers on erect spikes (panicles). Flower spikes are borne in leaf axils on new or current years growth with male and female flowers on separate plants (dioecious).

Bloom time is June to July.

Fruit and Seed: Creamy white to tannish berry-like drupes, approximately ¼ inch diameter. Drupes mature in August through September and persist through the winter providing a good identification characteristic on female plants.

Life History: Forms dense colonies by seed and through vegetative reproduction from surface or subsurface rhizomes.

Habitat: Invades disturbed areas such as roadsides, trail sides, fencerows, parks and can also be found in prairie (full sun) and forested settings (partial shade).

***Specially Regulated** is a unique category. Poison ivy, although irritating to humans, is a native plant that benefits wildlife by providing a food source to birds, small mammals and large browsers. See [page 53](#).*

Management: **Caution!** Use protective clothing, rubber gloves and long sleeves, contact with the sap (urushiol) from broken plant parts can cause blistering (dermatitis), even during the winter months. **Caution!** Smoke from burning poison ivy can deliver urushiol to airways and lungs. Do not compost as resprouting can occur and urushiol may persist in compost. Urushiol can stay on pets, tools, toys and other objects for long periods to be effectively transferred and cause irritation at a later date.

Grazing, cutting or mowing can inhibit flowering but must be continued in order to deplete energy reserves in the plants and to deplete the seed bank.

Prescribed fire generates potentially harmful smoke, see cautionary note above. So, while prescribed fire can provide control and often does control infestations of poison ivy, this tool should not be the first choice.

Herbicide formulations of triclopyr, 2,4-D, glyphosate, imazapyr or aminocyclopyrachlor applied to foliage or to cut stems are effective. Repeat applications will be required to exhaust seed banks.



Left: Shrub form
Above: Vine form

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow							
	Foliar		Dark Blue	Dark Blue	Dark Blue					
	Cut stem					Purple	Purple	Purple	Purple	
	Mow	Green	Green	Green	Green	Green	Green	Green	Green	
	Don't mow									
Flowering Period				Red	Red					



Identification: *Provided for comparison to [leafy spurge](#) on page 19.*

Plant: Yellow rocket (a.k.a. winter cress, garden yellowrocket) was introduced from Eurasia and is common in Minnesota. A biennial plant (also described as perennial) that forms a basal rosette its first year. Subsequent growing seasons, flower stalks are erect at 8 to 36 inches tall, typically multi-branched and terminated by clusters of bright yellow flowers.

Leaves: Basal leaves and some stem leaves are pinnately lobed to deeply toothed and up to 6 inches in length. Often the terminal end of leaves is a larger rounded lobe in addition to 1-4 lesser side lobes. Leaves near the top of the plant are alternate, typically smaller, oval and often stalkless.

Key difference - *Leaves of leafy spurge are simple (not lobed) and narrowly linear at 1-4 inches in length.*

Flower: Crowded, rounded clusters of bright yellow stalked flowers. Flower clusters are terminal to branch ends. Individual flowers range from 1/8 to 1/2 inch wide and have 4 bright yellow petals. As flower clusters elongate, flowers are produced above with seed pods produced below.

Key difference - *Leafy spurge has greenish-yellow flowers without petals. The greenish-yellow bracts beneath the true flowers provide the appearance of a petaled flower. Confusion occurs due to overlap in bloom periods.*

Bloom time is April to June.

Fruit and Seed: Slender pods develop along stems as flower clusters stretch upwards. The roundish pods are approximately 1 inch long, upward curved and contain small brown seeds at maturity.

Habitat: Considered a weed of lawns, gardens and agricultural fields. Often along roadsides and other disturbed sites. An infestation of yellow rocket indicates a disturbed site on which ground cover of native forbs and grasses is thin.





Identification: Provided for comparison to [plumeless](#) and [Canada thistles](#). See pages 17 and 18.

Compare to Minnesota native [swamp thistle](#) (*Cirsium muticum*), page 37.

Compare to non-natives [alfalfa](#) and [vetches](#). See pages 33.

Plant: Herbaceous, biennial thistle, basal rosette in its first season. Second season, mature flowering stalks 1-7 feet tall.

Leaves: Rosettes can be twenty inches or more in diameter with rosette foliage deeply lobed, a light colored midrib and leaf edges that are light colored and spiny. Foliage on flowering stalks is alternate with spiny wings from leaf bases onto the stem and both surfaces are without hairs. Compare to [plumeless thistle foliage that is hairy below](#).

Flower: Large at 1½-3 inches wide and deep pinks to purple. Composite flowers are solitary on branch ends, often nodding with large dark-colored spiny bracts beneath. Compare to [plumeless thistle's flowers that are ½ to 1½ inches wide with short spiny bracts and winged, spiny stems](#).

Bloom time is June to August.

Fruit and Seed: Seeds are tufted with feathery plumes that are easily wind dispersed and most are deposited within 160 feet of plants. Do not mow after seed has developed as this strongly aids dispersal.

Life History: Plants have thick taproots but no rhizomes; thus, musk thistle is not clonal. Seed production is high with individual plants producing thousands of seed which can persist in seed banks up to 10 years.

Habitat: Infestations are found on dry to moist soils in woodlands, waste areas, roadsides, ditches and stream banks.

Management:

Cutting taproots 1-2 inches below ground is effective but time consuming for large numbers of plants. **Mowing** should be timed at flower bud stage to prevent seed production and should be repeated 2-3 times per season to be effective. Care should be taken to avoid spreading seed with hay or straw and with mowing and vehicle movement through infestations.

Prescribed fire can be used to encourage stands of native grasses that will outcompete thistle. However, monitoring is needed to check for thistle that germinates in bare soil soon after burns are completed.

Herbicide applications timed at the early bolting phase are foliar applications of 2,4-D ester or dicamba formulations. For foliar applications at the budding to flower stage or fall applications to basal rosettes turn to formulations of aminopyralid, clopyralid, metsulfuron-methyl or triclopyr.

		April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.-Mar
Herbicide	Burn	Yellow	Yellow	Yellow			Yellow	Yellow	Yellow	
	Foliar	Dark Blue	Dark Blue	Dark Blue				Dark Blue	Dark Blue	
	Cut stem									
	Mow		Green	Green						
	Don't mow				Red	Red	Red	Red	Red	
Flowering Period				Light Red	Light Red	Light Red				

Non-Natives

Alfalfa : *Medicago sativa* L.



Identification: Provided for comparison to purple flowered weeds such as thistles or knapweeds. Return to [meadow](#), [brown](#) or [spotted](#) knapweeds (pgs. 13, 14, 15) / [plumeless](#) or [Canada](#) thistles (pgs. 17, 18).

Plant: **Fabaceae** family, 4-sided stem supports a 1-3 foot tall plant.

Leaves: Alternate, 3-parted, compound leaves with individual leaflets measuring $\frac{3}{8}$ to $1\frac{3}{8}$ inches long, stipulate.

Key difference - Thistles and knapweeds have simple leaves (divided or lobed) not compound.

Flower: 5-parted, purplish to blue (occasionally cream colored) and approximately $\frac{1}{4}$ to $\frac{1}{2}$ inch long. Alfalfa has a clustered, somewhat conical flower head.

Key difference - Thistles and knapweeds are disk flowers which have ray flowers on the perimeter.

Bloom time is June to September.

Fruit and Seed: Coiled pods, brown in color.

Habitat: Introduced to North America for livestock forage and is an agriculture crop. Common in roadside ditches, and similar disturbed areas.



Non-Natives

Vetches : *Coronilla varia* L. and *Vicia villosa* Roth.



Crown vetch flower and compound leaf.



Identification: Provided for comparison to purple flowered weeds such as thistles or knapweeds.

Plant: **Fabaceae** family, some vetches (annuals / biennials) have a spreading form and may have tendrils to climb nearby plants up to 3 feet. Crown vetch (*C. varia*) is an erect perennial plant at 1-2 feet tall that forms dense tangled colonies.

Leaves: Alternate, compound leaves, pinnately divided, numerous oval leaflets. Hairy vetch (*V. villosa*) - 5-10 pairs with tendrils terminal. Crown vetch - 11-25 leaflets on a stalk-less leaf.

Key difference - Thistles and knapweeds have simple leaves (divided or lobed) not compound.

Flower: Hairy vetch (image to right) has 5-parted, purple flowers about $\frac{3}{4}$ inch in length. Typically 10-40 flowers in a one-sided cluster.

Crown vetch (images to left) has a dense cluster (crown-like) of 5-parted, $\frac{1}{8}$ - $\frac{1}{2}$ inch long pinkish flowers.

Key difference - Thistles and knapweeds are disk flowers with ray flowers on the perimeter.

Bloom time is May to September.

Fruit and Seed: Pods - hairy vetch has a $\frac{1}{2}$ - $\frac{3}{4}$ inch long pod while crown vetch has a 4-angled multi-segmented pod.

Habitat: Old fields, pastures and roadsides. Crown vetch has been planted extensively for erosion control due to its dense, colony forming habit.



Hairy vetch



Above: Calyx tapered both ends, parallel veins.

Below: Curled petals, purplish stamens.



Identification: Provided for comparison to [Dalmatian toadflax](#) on page 9.

Plant: Similar to and often confused with bladder-campion (*Silene vulgaris*). Classed as a biennial/perennial that stands as tall as 40 inches. Stems are smooth, pale grayish-green.

Strongly resembles Dalmatian toadflax's gray-green color and form as well as habitat preference.

Leaves: Opposite, simple leaves have entire margins (no teeth on leaf edges), smooth, waxy and grayish-green.

Key difference - *Leaves of Dalmatian toadflax are alternate on the stem, not opposite.*

Flower: Flowers are five-parted, white with petals that are often rolled. The flower typically has purple tinged stamens extending forward and behind the petals is a smooth bladder-like calyx or cup that will hold the seeds. The calyx is light green, tapers at the ends and has parallel veins.

Key difference - *Flowers are significantly different. Dalmatian toadflax has yellow snapdragon like flowers, while Balkan catchfly has creamy-white 5-parted flowers.*

Bloom time is May to October.

Fruit and Seed: Held in the calyx or bladder behind the petals. At maturity the bladder turns light tannish-brown and the five tips curl backward.

Habitat: Full sun, dry, disturbed sites such as roadsides, abandoned lots, fields and gravel pits.

Opposite, simple leaves, clasping and blue-gray.



Form, opposite foliage, and plants are blue-gray.



Squares = ¼ inch.



C. orbiculatus, yellowish husks, fruit in leaf axils

C. scandens, orange husks and bright red arils

Identification: Provided for comparison to [Oriental bittersweet](#) on page 4.

Plant: Woody vine, twiny, no tendrils or aerial roots to assist in climbing.

Leaves: Alternate, elliptic to oblong or obovate, typically twice as long as wide. At bud break, leaf edges unroll in a scroll-like fashion.

Flower: Terminal panicles of numerous 5-parted flowers. Dioecious plants (male and female) producing small, rather inconspicuous whitish flowers.

Key difference - terminal panicles. Flower location is observable on early growth.

Bloom time is May to June.

Fruit and Seed: Like the flowers, terminal panicles. Orange colored husks covering bright red 3-parted arils (fleshy, berry-like fruits) containing 1-2 seeds each. Fruits persist into late winter.

Key differences - terminal clusters, orange colored husks, bright red 3-parted arils.

Habitat: Typically found in rich soil, full to partial sun often along roadsides and woodland edges.



Terminally clustered fruits, orange husks and bright red arils.



Foliage typically twice as long as wide. Oriental tends toward oval.



Staminate (male) flowers with yellow pollen.



Pistillate (female) flowers clustered at branch ends

Synonym: *Epilobium angustifolium* L.

Identification: Provided for comparison to [purple loosestrife](#) on page 20.

Plant: Perennial, erect, rounded, single stems reaching 2-6 feet tall. **Key difference** - rounded stem, not 4-6 sided.

Leaves: Alternate, crowded leaves that are lance-like and stalkless. **Key difference** - alternate (not opposite).

Flower: Four-parted, colors range from pink to purple. The flowers are showy at ¾ to 1½ inches wide and arranged along a tall terminal spike. **Key difference** - four-parted (purple loosestrife has 5-parted flowers).

Bloom time is June to August.

Fruit and Seed: Long, slender capsules or pods that split to release small seeds with long tufted hairs.

Habitat: Often present following burns on moist soils at forest edges or in clearings.



Identification: Provided for comparison to non-native thistles; [plumeless](#) and [Canada thistle](#) on pages 17, 18.

See also: [BWSR Featured Plant: Minnesota's Thistles](#), Publication date 2013-3-6.

Plant: Biennial, mature plants from 2-7 feet tall with multiple-branches terminated by many heads. Stems are not spiny but woolly, especially lower portions of the plant.

Leaves: Alternate, deeply divided leaves have lance-like or oblong segments that are described as softly spiny.

Flower: Purples to pinks typically not white. Composite flowers are 1½ inches wide held together by whitish, woolly, non-spiny bracts that have a visible light-colored dorsal (central) ridge.

Bloom time is July to October.

Fruit and Seed: Tufted seed matures and is wind-dispersed late summer into autumn.

Habitat: Swamps, bogs and areas like wet meadows, moist woods and thickets.

Key difference - Woolly, non-spiny bracts with a light colored dorsal ridge.

Key difference - Deeply divided foliage that is softly spiny. Stems are hairy or woolly, not spiny.





Above: Bur cucumber foliage and flowers.

Below: Bur cucumber foliage and prickly seed structure.



Key difference - Both cucumber species have prickly seed structures. Below: Wild cucumber



Wild cucumber (*E. lobata*) and bur cucumber (*S. angulatus*).

Identification: Provided for comparison to [Japanese hops](#) on page 5. Compare to [common hops](#) on page 40.

Plant: Annual vines (non woody) with tendrils, often found covering shrubs and small trees to approximately 20 feet.

Leaves: Simple, alternate, 3-5 triangular lobed wild cucumber leaves have small teeth along the leaf edge. Bur cucumber differs with its 3-5 shallowly lobed leaves having hairy undersides as well as sticky hairs on its stems.

Flower: Wild cucumber has creamy white flowers with 6 strap-like petals. These are male flowers. One rarely noticed female flower is at the end of the flower spike. Bur cucumber has 5-petaled greenish-white male flowers clustered and separate from the female flowers clustered elsewhere on the plant.

Bloom time is July to September.

Fruit and Seed: Solitary, prickly bladders distinguish wild cucumber from bur's grouped, up to 10, prickly pods.

Habitat: Can be found growing side-by-side. Plants can be found in partial shade to full sun along the edge of the woods or in thickets or open areas with moist soils.



Above: Wild cucumber hanging on a fence in winter

Key difference - cucumber vines have tendrils.



Above: Bladder-like seed pod remaining in winter, seeds dispersed.

Below: Wild cucumber foliage and flowers.





Identification: Provided for comparison to [giant hogweed](#) on page 6.

Plant: Perennial, single-stemmed large plants at 3-10 feet tall. Fuzzy stems are hollow and described as foul smelling. **Key difference** - hogweed has purplish stems with coarse hairs.

Leaves: Alternate, compound, 3-parted with toothed, palmate leaflets. The petiole or leaf stalk has an enlarged base that clasps the stem.

Key difference - hogweed has strongly dissected leaves up to 5 feet wide.

Flower: Many small, white, 5-parted flowers with notched petals, in a 4-8 inch flat umbel.

Key difference - outer flowers are often larger with irregular, notched petals.

Bloom time is June to July.

Fruit and Seed: Many flattened fruits that when dry split into 2 seeds.

Habitat: Often found in rich, moist soils along streams or river bottoms in full to partial sun.



Clasping, 3-parted leaf



Outer flowers, larger, notched and irregular.





H. lupulus, developing stout, hooked hairs.

Identification: Provided for comparison to [Japanese hops](#) on page 5.

Plant: Herbaceous, perennial vine, rhizomatous (spreads by rhizomes). Leaf petioles and annual stems with stout hooked hairs.

Leaves: Opposite, for the most part 3 lobed (up to 5 lobes), higher on the vine leaves may be unlobed. Typically, a cordate (heart shaped) base to the leaf and leaves nearly as broad as long.

Key difference - 3 (maybe 5) lobed leaves, higher on the vine leaves may be unlobed.

Flower: Inconspicuous, wind pollinated and dioecious (male and female) plants.

Bloom time is July to August.

Fruit and Seed: Fruiting structure is cone like, comprised of papery bladders covering individual seeds. Fragrant when crushed. Fruit persists into late winter. **Key difference** - Fragrant when crushed.

Habitat: Moist soils, disturbed sites in woodlots and along fencerows.



H. lupulus, 3-lobed and un-lobed leaves.



H. lupulus, 3-lobed, opposite leaves.



H. lupulus seed in winter.



Woodbine, palmately compound leaves.



Woodbine (likely), climbing a fence post.



Virginia creeper, aerial roots holding onto elm bark.

Virginia creeper [*Parthenocissus quinquefolia* (L.) Planch.] and woodbine [*P. vitacea* (Knerr) Hitchc.], synonym: *P. inserta* (Kerner) K. Fritsch.

Identification: Provided for comparison to [Japanese hops](#) on page 5. Compare to [common hops](#) on page 40.

Plant: Woody, perennial vines, with tendrils that assist climbing into trees and onto structures (Virginia creeper and woodbine) or sprawling on the forest floor (woodbine). Virginia creeper may develop aerial roots while woodbine does not. Tendrils of Virginia creeper develop adhesive disks while tendrils of woodbine usually attach by wrapping around an object, seldom developing adhesive disks.

Leaves: Alternate, palmately compound with 4-5 leaflets (typically 5). Leaflet bases are tapered and the leaf edges are toothed (possibly doubly toothed).

Key difference - *Leaves of Japanese hops are simple not palmately compound.*

Flower: Both species have greenish flowers held on compound cymes (branched, flat-topped structures with terminal flowers opening first). Virginia creeper's structure has a central axis while woodbine's does not.

Bloom time is June to July.

Fruit and Seed: Fruits are berries, bluish at maturity and held on red structures.

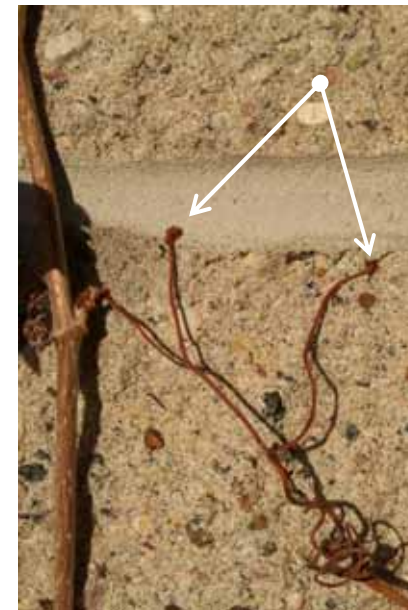
Key difference - *Japanese hops does not produce berries.*

Habitat: Virginia creeper is often found in forest interiors where it climbs high into the canopy. Woodbine on the other hand will sprawl over the ground, on fences, rock piles unless it encounters a structure or tree suitable for climbing.

Full sun to partial shade of the forest, moist soils, along fencerows or found growing on disturbed sites where animals and birds have dropped the seeds.



Fall foliage and blue berries.



Adhesive disks at tendril ends.

Minnesota Natives

Native phragmites : *Phragmites australis* ssp. *americanus* Saltonstall



Left: Introduced - diffuse fungal spots and leaf sheaths intact on yellow winter stems.
Right: Native - sharply defined fungal spots may be present on some stems and note the maroon to pink color.
 Images 2012/12/04.



Left: Introduced - green stems at the nodes.
Right: Native - maroon to pink color at the stem nodes.
 Images: 2009/08/18



Above: Introduced - larger, grayish, fuzzy seed head.
Right: Native - smaller, golden, some fuzziness to seed heads.

Complete nomenclature from USDA GRIN: *Phragmites australis* (Cav.) Trin. ex Steud. subsp. *americanus* Saltonstall

Identification: *Provided for comparison to common reed on page 26.*

Plant: Perennial grass. Stand density can be similar to introduced common reed but, often stands have other native plants interspersed. In comparison to introduced form, native plants are typically shorter and foliage appears yellowish.

Leaves: Summer leaves are yellowish. Leaves and leaf sheaths will drop from plants in winter leaving bare reddish stems (photo at left). Ligule length determined under a dissecting microscope is diagnostic, typically > 1.0mm.

Flower: appear approximately 3-4 months after spring growth begins.

Bloom time is June-September.

Fruit and Seed: plumes are sparse and likely not persistent through winter. Glume lengths are diagnostic and as with ligules a dissecting microscope is useful for measurement and comparison.

Habitat: **native phragmites** occurs near water sources such as rivers, streams, shorelines of ponds and lakes as well as within wetland systems. Native phragmites occurs in disturbed areas and in wet roadside ditches.



Native phragmites seed heads are less dense, less fuzzy and typically not as large.



Left foreground: Introduced - dark green foliage with larger, grayish, seed heads.
Right background: Native - yellowish foliage with smaller, golden, seed heads.



Native phragmites has maroon stems at the nodes or segment joints.
 Image 2009/11/02



Identification: Provided for comparison to [glossy](#) and [common buckthorn](#) on pages 24 and 25.

Plant: Plums, chokecherry and fire or pin cherry are small sized trees. Black cherry may be a small tree, but reaches medium to large tree status. All have smooth, gray to brown bark that is often shiny and lenticled. Couple that bark and American plum's thorn-like twigs and it is no surprise that it is frequently confused with buckthorn.

Leaves: Alternate, elliptic to oblong or ovate, typically finely toothed with acuminate or drawn out leaf tips.

Key difference - *Prunus* species have glands on the leaf petioles. Additionally, arcuate venation of common buckthorn.

Flower: Numerous 5-parted, white, fragrant flowers are fairly showy or obvious. Cherries have panicles of white fragrant flowers while the plum's white flowers are clustered along the stem. In Minnesota wild plum is one of the earliest trees to bloom, typically small groups of trees along the forest edge.

Key difference - 5-parted, white, fragrant flowers are fairly showy or obvious.

Bloom time is May to June.

Fruit and Seed: Choke and black cherries panicles (loose, hanging clusters) of black fruit are readily taken by birds. Pin or fire cherry fruits mature to a bright red. Plums have a ¾-1 inch, reddish to purplish fruit that contains a large seed.

Key difference - birds eat fruits of cherries and plums after ripening. Buckthorn fruits remain on shrubs into late winter.

Habitat: Typically found in rich soil, full to partial sun often along roadsides and woodland edges.

Above: Mature, bright red fruit and foliage of pin cherry.

Below: Flower of black cherry and maturing fruit of chokecherry.



Below: Thorns of wild plum on a dead branch. Wild plum flowers and fruit.



Pyramidal inflorescence of Canada goldenrod

In particular, compare common tansy to stiff goldenrod (*Solidago rigida* L.).

Identification: Provided for comparison to [common tansy](#) on page 22.

Plant: Perennial plants, often clumped, typically erect, single stems. Species typically ranges in height from 1-4 feet while species may reach heights of 7 feet.

Leaves: Alternate, simple, depending on species leaves are lance shaped, may or may not be toothed and may or may not be hairy.

Key difference - tansy foliage is pinnately divided, toothed and aromatic when crushed.

Flower: Yellow ray flowers typically arranged in branched clusters. Depending on species the inflorescence may be pyramidal, flat-topped or one-sided.

Key difference - goldenrod flowers have ray petals surrounding central, disk-like florets.

Bloom time is late July through September.



Ray petals of stiff goldenrod

Fruit and Seed: Dry, light seeds often tufted with light-colored to brownish hairs easily carried by wind.

Key difference - Tansy seed is not tufted and persists into winter in the flower heads.

Habitat: goldenrod species thrive in a variety of sites. They can be found in dry to wet prairies, dry to moist forests and on a variety of roadsides. Partial to full sun.



Flat-topped inflorescence of stiff goldenrod



One-sided inflorescence of gray goldenrod



Golden alexander [*Zizia aurea* (L.) W.D.J. Koch] and similar heart-leaved golden alexander [*Z. aptera* (A. Gray) Fernald].

Identification: Provided for comparison to [wild parsnip](#) on page 21.

Plant: Herbaceous, perennial reaching 1-2 feet tall.

Key difference - golden alexanders smooth, shiny stems compared to the grooved stem of wild parsnip.

Leaves: Alternate 2-3 inch stem leaves, mostly 3-parted with finely toothed edges. Basal leaves of heart-leaved golden alexanders are simple and oval (heart-shaped) while those of golden alexanders are compound like the upper stem leaves.

Key difference - the basal leaves of wild parsnip are pinnately compound with 5-15 leaflets.

Flower: Terminal panicles of numerous 5-parted, yellow flowers.

Bloom time is May to July.

Fruit and Seed: Similar to wild parsnips, but smooth - when mature appears dry and splits into 2 parts.

Key difference - wild parsnip seeds are ridged or ribbed.

Habitat: Found in moderately moist to wet - sandy, loamy soils, full sun to shade.



Z. aptera heart-shaped basal leaves.



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Alfalfa: *Medicago sativa* L. Page 33

Image citations – Bugwood.org:
Foliage - Gerald Holmes, Valent USA Corporation;
Flower - Keith Weller, USDA Agricultural Research Service.
Identification:
<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=MEDSAT>

Vetches: *Coronilla varia* L. and *Vicia villosa* Roth. Page 33

Image citation: all images - Dave Hanson, MnDOT.
Identification:
<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=VICVIL>
<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=CORVAR>

Balkan catchfly: *Silene csereii* Baumgarten. Page 34

Image citation: Dave Hanson and Ken Graeve, MnDOT;
Identification:
<http://wisplants.uwsp.edu/scripts/detail.asp?SpCode=SILCSE>
<http://www.minnesotawildflowers.info/flower/balkan-catchfly>

Minnesota Native Plants:

American bittersweet: *Celastrus scandens* L. Page 35

Image citation: all images - Dave Hanson, MnDOT.
Identification:
<http://dendro.cnre.vt.edu/dendrology/syllabus2/factsheet.cfm?ID=913>

Fireweed: *Chamerion angustifolium* (L.) Holub ssp. *angustifolium* Page 36

Image citation: all images - Dave Hanson, MnDOT.
Identification: <http://www.minnesotawildflowers.info/flower/fireweed>

Swamp thistle: *Cirsium muticum* Michx. Page 37

Image citation: all images - Dave Hanson, MnDOT.
Identification: <http://www.minnesotawildflowers.info/flower/swamp-thistle>

Cucumbers, wild and bur: *Echinocystis lobata* Michx. and *Sicyos angulatus* L. Page 38

Image citation: all images - Dave Hanson, MnDOT.
Identification: <http://www.minnesotawildflowers.info/flower/wild-cucumber>
<http://www.minnesotawildflowers.info/flower/bur-cucumber>

Cow-parsnip: *Heracleum lanatum* Michx. Page 39

Image citation: all images - Dave Hanson, MnDOT.
Identification: <http://www.minnesotawildflowers.info/flower/common-cow-parsnip>

Common hops: *Humulus lupulus* L. Page 40

Image citation: all images - Dave Hanson, MnDOT.
Identification:
http://www.hort.purdue.edu/newcrop/duke_energy/humulus_lupulus.html

Virginia creeper and woodbine: *Parthenocissus* spp. Page 41

Image citation: all images - Dave Hanson, MnDOT.
Identification:
Smith, Welby R. 2008. *Trees and shrubs of Minnesota: the complete guide to species identification*. Minneapolis, MN: University of Minnesota Press.

Native phragmites: *Phragmites australis* (Cav.) Trin. ex Steud. ssp. *americanus* Saltonstall Page 42

Image citations: Ken Graeve and Dave Hanson, MnDOT.
Identification: <http://www.ars-grin.gov/cgi-bin/npgs/html/taxon.pl?451454>
<http://www.nps.gov/plants/alien/fact/pdf/phau1-powerpoint.pdf>
<http://greatlakesphragmites.net/ecology/>

Cherries and wild plum: *Prunus* spp. Page 43

Image citation: all images - Dave Hanson, MnDOT.
Identification: <http://wisplants.uwsp.edu/VascularPlants.html> Genera: Prunus

Goldenrods: *Solidago* spp. Page 44

Image citation: all images - Dave Hanson, MnDOT.
Identification: <http://www.minnesotawildflowers.info/>
Search plant name: solidago

Golden alexanders: *Zizia aurea* (L.) W.D.J. Koch and *Z. aptera* (A. Gray) Fernald Page 45

Image citation: all images - Dave Hanson, MnDOT.
Identification: <http://www.minnesotawildflowers.info/flower/golden-alexanders>
<http://www.minnesotawildflowers.info/flower/heart-leaved-alexanders>

Additional Book and Web Resources:

Black Merel R., Emmet J. Judziewicz. 2009. *Wildflowers of Wisconsin and the Great Lakes Region: a comprehensive field guide*. Univ of Wisconsin Press. 275 pages.

Invasive.org – images at Bugwood. Online. <http://www.invasive.org/species/forbs.cfm>
Factsheets. Online. <http://www.nps.gov/plants/alien/fact.htm>.

Midwest Invasive Plant Network. Online. <http://mipn.org/>
Education, identification, control and management.

Minnesota Department of Agriculture. Online.
- [Noxious weed list](#) - [Noxious weed law](#) - [Identification](#)
- [Bad Plants](#) - [Biological control](#) - [Pest management](#)

Minnesota Department of Transportation. 2011. *Herbicide Options for Vegetation Control on Mn/DOT Rights-of-Way*. Internal Document. herbicidepreseasontables.pdf

Mortenson, Carol. 2003. *Noxious Weeds of Minnesota*. Leech Lake Division of Resources Management.

PCA Alien Plant Working Group. 2010. *Least Wanted: Alien Plant Invaders of Natural Areas*. Factsheets. Online. <http://www.nps.gov/plants/alien/fact.htm>.

Sarver, Matthew. et al. 2008. *Mistaken Identity? Invasive plants and their native look-alikes*. online. http://www.nybg.org/files/scientists/rnaczi/Mistaken_Identity_Final.pdf 12/2012.

Smith, Welby R. 2008. *Trees and shrubs of Minnesota: the complete guide to species identification*. Minneapolis, MN: University of Minnesota Press.

Wisconsin DNR. 2010. *A field Guide to Terrestrial Invasive Plants in Wisconsin*. Ed. Thomas Boos, Kelly Kearns, Courtney LeClair, Brandon Panke, Bryn Scrivner, and Bernadette Williams.

Wisconsin Department of Natural Resources factsheets:
Online. [Terrestrial Invasive Species: List, Factsheets, Images](#)

Web links in this document verified March 21, 2014.

Miscellaneous images: Dave Hanson, MnDOT

Cover photo: Dalmatian toadflax, Kittson County, MN.

Photos page 2: Dalmatian toadflax, Japanese hops and garlic mustard.

Photos page 3: western poison ivy and stiff golden rod

Biocontrol images including: spotted knapweed root weevil, loosestrife beetle, leafy spurge flea beetle and spotted knapweed seedhead weevil.

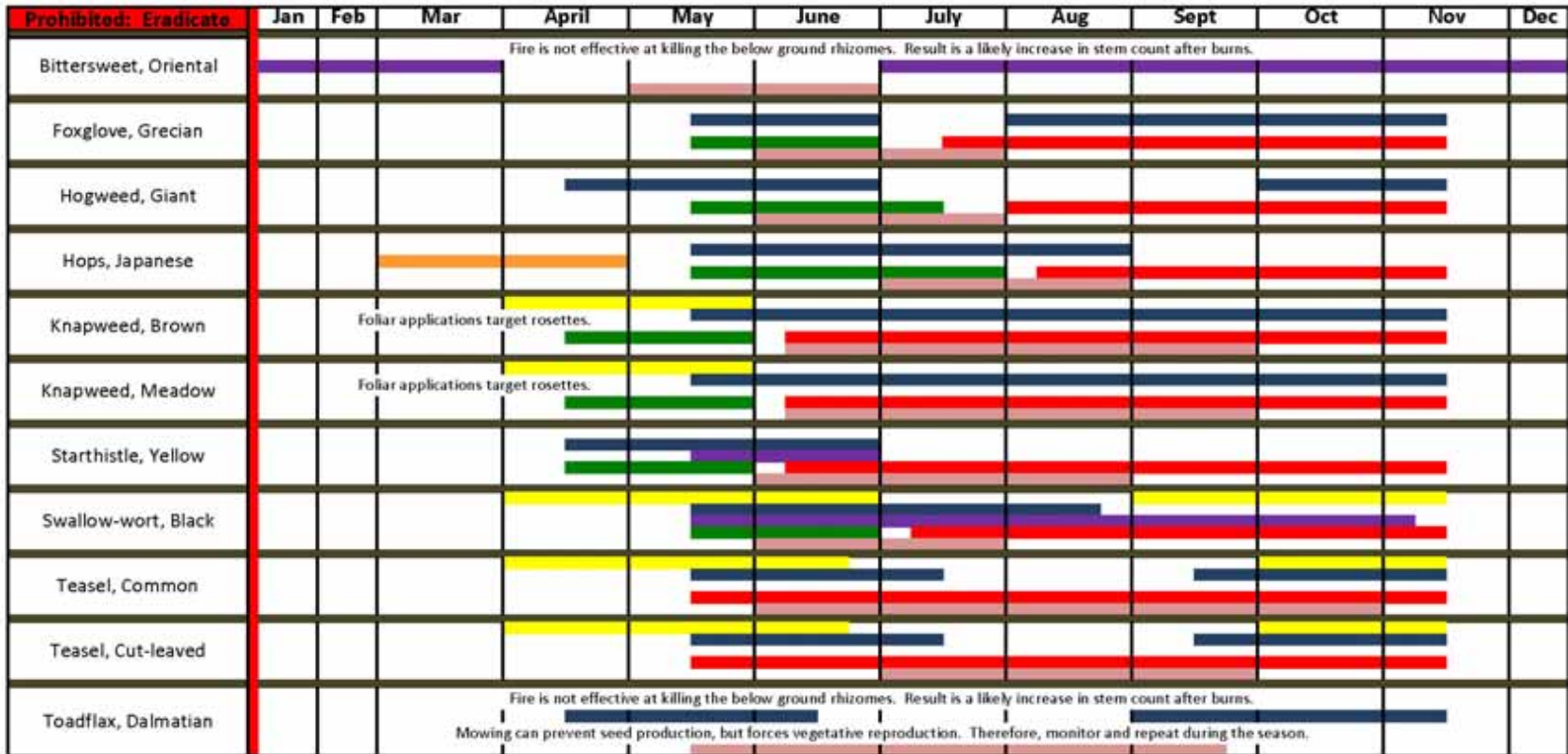
Miscellaneous image: MnDOT

Photo page 3: herbicide application.

Miscellaneous images: Ken Graeve, MnDOT

Photos page 3: mowing and prescribed fire.

Suggested Timing of Control Options for
Minnesota Noxious Weed Species (2014)



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dlh (March, 2014).

Suggested Timing of Control Options for
Minnesota Noxious Weed Species (2014)

Prohibited: Control	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Bittercress, Narrowleaf												
Knapweed, Spotted												
Loosestrife, Purple												
Parsnip, Wild												
Spurge, Leafy												
Tansy, Common												
Thistle, Canada												
Thistle, Plumeless												
Restricted	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Buckthorn, Glossy												
Buckthorn, Common												
Mustard, Garlic												
Reed, Common												
Rose, Multiflora												
Specially Regulated	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
Knotweed, Japanese or giant												
Poison Ivy, Common or Western												

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djh (March, 2014).

Definitions of the noxious weed categories from the Minnesota Department of Agriculture web page: <http://www.mda.state.mn.us/plants/badplants/noxiouslist.aspx>

State Prohibited Noxious Weeds

Prohibited noxious weeds are annual, biennial, or perennial plants that the commissioner designates as having the potential or are known to be detrimental to human or animal health, the environment, public roads, crops, livestock or other property. There are two regulatory listings for prohibited noxious weeds in Minnesota:

1. **Eradicate List:** Prohibited noxious weeds that are listed to be eradicated are plants that are not currently known to be present in Minnesota or are not widely established. These species must be eradicated, meaning all of the above and below ground parts of the plant must be destroyed, as required by Minnesota Statutes, Section 18.78. Additionally, no transportation, propagation, or sale of these plants is allowed. Measures must also be taken to prevent and exclude these species from being introduced into Minnesota.
2. **Controlled List:** Prohibited noxious weeds listed to be controlled are plants established throughout Minnesota or regions of the state. Species on this list must be controlled, meaning efforts must be made to prevent the spread, maturation and dispersal of any propagating parts, thereby reducing established populations and preventing reproduction and spread as required by Minnesota Statutes, Section 18.78. Additionally, transportation, propagation, or sale of these plants is prohibited.

Restricted Noxious Weeds

Restricted noxious weeds are plants that are widely distributed in Minnesota and are detrimental to human or animal health, the environment, public roads, crops, livestock or other property, but whose only feasible means of control is to prevent their spread by prohibiting the importation, sale, and transportation of their propagating parts in the state except as allowed by Minnesota Statutes, Section 18.82. Plants designated as Restricted Noxious Weeds may be reclassified if effective means of control are developed.

Specially Regulated Plants

Specially regulated plants are plants that may be native species or have demonstrated economic value, but also have the potential to cause harm in non-controlled environments. Plants designated as specially regulated have been determined to pose ecological, economical, or human or animal health concerns. Plant specific management plans and or rules that define the use and management requirements for these plants will be developed by the Minnesota Department of Agriculture for each plant designated as specially regulated. Measures must also be taken to minimize the potential for harm caused by these plants.

Knotweeds, giant and Japanese: Any person, corporation, business or other retail entity distributing Japanese and/or giant knotweeds for sale within the state, must have information directly affixed to the plant or container packaging that it is being sold with, indicating that it is inadvisable to plant this species within 100 feet of a water body or its designated flood plain as defined by Minnesota Statute 103F.111, Subdivision 4.

Poison ivy: Must be eradicated or controlled for public safety along rights-of-ways, trails, public accesses, business properties open to the public or on parts of lands where public access for business or commerce is granted. Must also be eradicated or controlled along property borders when requested by adjoining landowners.

Reference herein to any specific commercial products, process, or service by tradename, trademark, manufacturer, or otherwise, does not constitute or imply its endorsement, recommendation, or favoring by Mn/ DOT and the State of Minnesota.

Minnesota Noxious Weeds

<http://www.dot.state.mn.us/roadsides/vegetation/pdf/noxiousweeds.pdf>

Based on the list developed by:
Minnesota Noxious Weed Advisory Committee
for 2014.
Commissioners Order from Minnesota Department of Agriculture.

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June, 2014