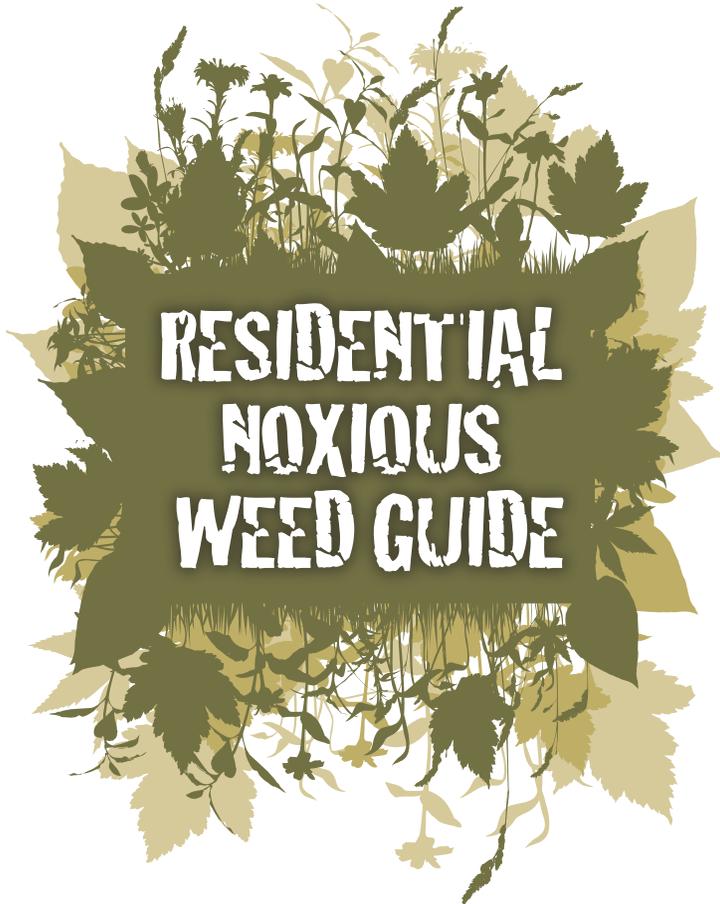




SALT LAKE CITY



GENERAL CONTENTS

Introduction	2
Purpose	3
General Weed Information	4
Precautionary Statements	5
Acknowledgements	6
Resources	7

WEED SPECIES

Garlic Mustard	8
Cheatgrass	10
Hoary Cress	12
Yellow Starthistle	14
Field Bindweed	16
Houndstongue	18
Russian Olive	20
Myrtle Spurge	22
Dyers Woad	24
Perennial Pepperweed	26
Dalmatian Toadflax	28
Purple Loosestrife	30
Scotch Thistle	32
Common Reed	34
Russian Knapweed	36
Saltcedar	38
Puncturevine	40

INTRODUCTION

SALT LAKE CITY ENFORCEMENT ON WEEDS

Every year the Salt Lake City Civil Enforcement Division sees approximately 1,200 cases involving weeds in residential or commercial properties. In recent years those numbers have increased, especially in dry years with extended growing seasons.

Here in the mountain west we know all too well the danger fire can present to property and personal safety. What most people don't realize is that this danger can occur within Salt Lake City. The purpose of the weed ordinance and enforcement is to ensure that real property within the City is cleaned and maintained. Doing so helps to prevent fire hazards, as well as insect and rodent harborages, and prevents the induction of hazardous pollens in the air. Managing weeds also helps prevent vegetation from obstructing pathways, sidewalks, and structures, and the buildup of plant waste that may affect public health, safety, and welfare. Lastly, managing weeds in our urban environment helps to prevent those weeds from escaping into adjacent and nearby open lands.

Title 9.16 of the City Code defines weeds as: “vegetation left growing upon any real property within Salt Lake City which will attain such a growth as to become a fire hazard when dry, or which is otherwise noxious, a nuisance or dangerous, as determined by the department”. Weeds include, but are not necessarily be limited to:

- A. Dry grasses, stubble, brush, tumbleweeds, and clippings which endanger the public health and safety by creating a fire hazard, insect or rodent haborage, or any other nuisance;
- B. Poison ivy, when the public health and safety in residential or other developed and populated areas are affected; and/or
- C. Those plants named in the Utah Noxious Weed Act, Title 4, Chapter 5, Utah Code Annotated, and its subsequent regulations and successor sections.
(Ord. 1-06 § 30, 2005: Ord. 36-99 § 1, 1999: prior code § 18-29-2).

Typically, notices are sent out to property owners based on complaints. The owner will have 10 days to cut the weeds. If weeds are not cut, a private contractor is hired by the city and a weed lien can be placed on the property.

For more information about the enforcement process, contact Civil Enforcement at 801-535-7225.

You can help us with this effort by identifying and controlling noxious weeds in your own yard!

PURPOSE

This brochure was created to increase public awareness of noxious weeds: the importance of identification; the value of a weed management program; and some methods of weed control based on local, state, and national research-based information. Salt Lake City is working to establish and support healthy ecosystems in our neighborhoods, parks, and public open space. This management, restoration, and maintenance work of our urban and native landscape provides benefits to environmental quality and human health. The existence of appropriate plants and trees in our city directly improve our quality of life. They clean our air, reduce heat-island effect and moderate temperatures, stabilize soil, provide scenic views, support wildlife, and add value to our community. Plants protect surface and ground water resources by filtering trash, debris, and chemical pollutants before stormwater and other surface waters enter the stormwater drainage system or our streams and creeks. The plants in our landscape also provide animal, bird, and beneficial insect habitat, a synergistic relationship from which we all benefit.

Noxious weeds can be a hindrance and detriment to our landscapes, interfering with both the aesthetic and environmental benefits of our urban landscapes. The management and control of noxious and invasive weeds are important aspects of protecting and preserving our private landscapes, neighborhoods, parks, and open spaces. In natural open space areas, weeds compete with native plants for valuable water and nutrients. Frequently growing faster than native plants, noxious and invasive weeds displace native plants from the natural landscape, removing sources of food and forage in the process. In urban landscapes, weeds also compete for water and nutrients, and choke out more attractive and desirable landscape plants. Weeds in urban settings can be transported to natural open space areas by visitors, and their pets and cars, so the control of weeds in urban settings helps to control weeds in more natural areas.

Home owners and other property owners have a vital role in our efforts to establish healthy and sustainable private and public lands. By managing weeds in our own landscapes, we can help to reduce weed populations in our neighborhoods and public spaces. Additionally, controlling weeds helps us to reduce water use, and controlling them early and consistently can mean we need to use fewer and less-toxic herbicides.

LANDSCAPE AND PLANT INFORMATION

The most important factor in the long-term sustainability of a community-supported, noxious and invasive weed control program is the establishment of desirable plant species—native in natural land areas and native or adaptive species in urban settings.

For information regarding general landscape design, installation, and maintenance best management practices consult the Salt Lake City BMPS for the Protection and Efficient Use of Water, available at slcsaveh2o.com. For landscape ideas and inspiration, and plant information, visit our interactive landscape website at slcgov.com/gardenwise.

GENERAL WEED INFO

This guide is intended to provide the home or property owner, or property manager with some basic tools to assist efforts at noxious and invasive weed control. Included in this guide is information to assist in weed identification, growth habits and cycles, and recommended control measures. Each listing provides the botanical and common name, and a color photograph.

WHAT IS A NOXIOUS WEED?

This guide pertains specifically to the management of noxious and invasive weed species. “Noxious weed” is a legal term used at the federal, state, and county level to identify and list plants that pose a significant threat to agriculture, the environment, recreation, and public health. Typically, noxious weeds are invasive non-native plants, that once established are not only difficult to control but spread aggressively.

CONTROL METHODS

Choosing the appropriate control action is important and should take into consideration the target species and which methods are least damaging to non-target plants, least hazardous to human health, least damaging to the general environment, most likely to reduce the need for weed control over the long term, and most cost-effective in the short and long term. Appropriate timing of the control method is also critical to achieving success.

Prevention is the first, and perhaps, most important step in a weed control program. In addition, prevention is probably the most cost-effective method of weed control. Preventive methods include maintaining healthy and competitive landscapes and natural lands; using weed-free seed and mulch; and cleaning mowing and tilling equipment.

Cultural methods include establishing and managing desirable landscape plants; mulching; and checking and clearing shoes, pets, vehicles, and equipment for weed seeds.

Mechanical methods refer to the removal of a weed either manually by pulling or hoeing, or through the use of equipment such as mowers and tillers.

Biological weed control involves the utilization of natural enemies for the control of specific weed species. This process can take many years, but can be successful, especially when combined with other methods.

Chemical controls can be either organic or non-organic. Weed control with herbicides is an effective tool for many target weed species. However, there are several aspects to consider when choosing a chemical program. These include the proper identification of the weed; the impact of the chemical on desirable plant or insect species; the number of applications per year and the timing of those applications; and the number of years of treatment. Always follow the instructions provided on product labels and only apply as recommended.

PRECAUTIONARY STATEMENTS

Many noxious and invasive plant species have developed natural defenses to reduce the likelihood that grazing animals will eat them. These defenses also deter humans from removing them, thus becoming established more easily. For example these defenses can include sharp spines and thorns, or irritating sap; therefore, caution must be taken. Wear gloves and a long-sleeved shirt when weeding or applying chemicals.

Herbicides have the potential to degrade the environment. Short-term degradation of habitats routinely occurs with herbicide application; therefore, the importance of maintaining native/adaptive desirable landscapes that

require minimal chemical input is our best chance to control weeds long-term. Where mechanical means of control have proven to be ineffective, herbicides should be used selectively. Herbicides and pesticides available at stores should be used with appropriate caution and the label should always be read and instructions followed.

ACKNOWLEDGEMENTS

A technical advisory group consisting of members of the Bonneville and South Shore Cooperative Weed Management Areas has been instrumental in identifying both the need for and methods of invasive weed control as a component of a long-term public lands management plan. These groups have been essential in providing a means for individuals and groups to coordinate and partner on issues that go beyond fences and political boundaries.

This guide was developed with cooperation from these Salt Lake City Departments and Divisions: Public Utilities, Housing and Neighborhood Development, and Parks and Public Lands. Generous support was provided by a National Fish and Wildlife Foundation Pulling Together Initiative Grant, and a Bureau of Reclamation Field Services Grant for Water Conservation. The BofR Field Services Grant funds the implementation of program measures articulated in adopted Water Conservation Master Plans. The Pulling Together Initiative program funds the development of community partnerships to help control invasive plant species. Technical support provided by SWCA, Environmental Consulting. A special thanks to John Rizza, Regional Specialist Small Acreage Management, Colorado State University Extension, for lending his expertise and resources towards the development of this guide.

RESOURCES

Salt Lake County Noxious Weeds

<http://www.weeds.slco.org/html/weedInfo/index.html>

State Noxious Weeds

<http://www.rules.utah.gov/publicat/code/r068/r068-009.htm>

Utah Weed Control Association

www.utahweed.org/weed

United States Department of Agriculture National Agriculture Library: National Invasive Species Information Center

www.invasivespeciesinfo.gov

Salt Lake City BMPs for the Protection and Efficient Use of Water

Provides guidelines for chemical storage, use, and disposal.

www.slcsaveh2o.com

Salt Lake City Interactive Landscape Database

Provides information and examples of regionally appropriate landscapes, best management practices for landscape maintenance, and weed identification and control information.

www.slcsaveh2o.com

Salt Lake City Civil Enforcement (Weed Enforcement)

(801) 535-7225

GARLIC MUSTARD (*Alliaria petiole*)

KEYS TO ID:

- Flowers are numerous, four-petaled, and white
- Leaves have a distinct onion-like odor when crushed

IDENTIFICATION:

- **Lifecycle:** Biennial
- **Growth form:** Forb
- **Flower:** Numerous white flowers with four petals in clusters atop flower stalk. April thru May.
- **Seeds/Fruit:** Fruits are slender capsules that produce a single row of black, oblong seeds with ridged seed coats. A single plant may produce hundreds of seed.
- **Leaves:** Lower leaves are rounded with scalloped edges and form a mounded rosette Stem leaves are toothed, alternate, and more triangular (King County Noxious Weed Control Program 2010).
- **Stems:** Mature plant has erect stems growing 1 to 4 feet in height.
- **Roots:** Thick taproot; roots produce allelopathic compounds that inhibit seed germination of other species.
- **Propagation:** Seeds; viable in soil for up to five years.

CONTROL:

- **Mech:** Hand pull from April to June, after they begin to bolt, until they are through flowering, and while the seed pods are still green. Plants in flower or even in bud are able to form viable seeds even after they are pulled, therefore plant pieces must be carefully bagged and disposed. In areas where mature plants are pulled, there are usually many small rosettes and seeds left in the soil. Carefully search the area for rosettes and dig them up with care as roots break off easily and re-sprout (King County Noxious Weed Control Program 2010).



CHEATGRASS (*Bromus tectorum*)

KEYS TO ID:

- Loose, drooping panicles that change from green to purple to brown
- Leaves are light green and hairy.

DESCRIPTION:

- **Life cycle:** Winter annual
- **Growth Form:** Grass
- **Flower:** The panicles measure 2-7.75 inches long, have numerous branches, retain an open quality and are generally nodding. The panicles bear from 3 to 8 drooping spikelets, each spikelet is 0.8-1.4 inches long. May to June.
- **Seed/Fruit:** Seeds encased in slender, straight awns, about 0.4 to 0.67 inches in length.
- **Leaves:** Leaves are light green and hairy. The lower sheaths are conspicuously hairy, whereas the upper sheaths are sometimes smooth. Sheaths are fused except near the node at the bottom of each sheath.
- **Stems:** Mature plants are generally 4–30 inches tall (Belliston et al. 2004).
- **Roots:** Fibrous
- **Propagation:** Seed can germinate in the fall or spring. When a seed germinates in the fall, the developing root system is able to expand over the winter, giving the plant an increased ability to exploit available water and nutrients in the spring.

CONTROL:

- **Mech:** Mowing cheatgrass is not recommended since seed can still be produced on mowed plants. A combination of hand pulling and tilling is most effective. Hand pull cheat grass in spring and fall and repeat when new plants appear. Till in spring and fall before seed heads turn purple and repeat when new plants appear.



HOARY CRESS (*Lepidium draba*)

KEYS TO ID:

- White flowers
- Erect growth to 10 to 24 inches tall
- Leaf is $\frac{3}{4}$ to 4 inches long with blunt end and fine white hairs

IDENTIFICATION:

- **Lifecycle:** Perennial
- **Growth form:** Forb
- **Flower:** Numerous white flowers with four petals giving plant a white, flat-topped appearance. Flowers May thru June.
- **Seeds/Fruit:** Seed capsules are heart-shaped and contain two reddish-brown seeds. Germinates in the fall.
- **Leaves:** Alternate, blue-green, and lance-shaped. Lower leaves are stalked, while the upper leaves have two lobes clasping stem.
- **Stems:** Mature plant has erect stems reaching 2 feet tall.
- **Roots:** Rhizomatous; 29 to 32 inches deep (Belliston et al. 2004)
- **Propagation:** Seeds germinate in the fall; overwinters as rosettes. Also spreads by rhizomes.

CAUTIONS:

Some people are allergic to hoary cress and have respiratory symptoms when exposed to flowering plants.

CONTROL:

- **Mech:** Because of the extensive root system, removing new shoots is extremely important. Where physical conditions permit, hoeing or tilling at intervals of 3 to 4 weeks may effective. Soils must remain moist between hoeing so that plants can regenerate and deplete their root reserves. Plants must be completely removed within 10 days after emergence throughout the growing season for 2 to 4 years (USFS 2006). Mowing several times before the plants bolt stresses it and allows for better chemical efficacy.

SYNONYMS: Whitetop



YELLOW STARHISTLE (*Centaurea solstitialis*)

Keys to ID:

- Winged stems
- Flowers have yellow rays and disk with stiff spines at flower base
- Leaves are blue-green

Identification:

- **Lifecycle:** Winter annual
- **Growth form:** Forb
- **Flowers:** Yellow flower heads located singly at the ends of branches. Flower heads are distinguished by sharp, straw-colored thorns, which are up to 0.75 inches long. Yellow starthistle bolts in late spring, and flowers June through August.
- **Seeds/Fruit:** Two types of seed: plumed and plumeless.
- **Leaves:** Basal leaves are deeply lobed while the upper leaves are entire and sharply pointed.
- **Stems:** Mature plants are 2 to 3 feet tall and have rigid, branching, winged stems that are covered with cottony hairs.
- **Roots:** Taproot
- **Propagation:** Seedlings usually emerge in the fall, form rosettes, and begin growing a taproot. Root growth continues throughout the winter. It reproduces entirely by seeds that may remain viable for several years. Plumed seeds are dispersed by wind shortly after maturity. Plumeless seeds remain in the seedhead until it disintegrates in the fall or winter.

Caution:

Be careful of spines, as they are very sharp and can get imbedded under your skin. Make sure you do not spread seeds from this plant after entering infested areas.

Control:

- **Mech:** Hand pull, making certain to pull all the roots. Remove all parts of plant including dry skeletons. Timing of mowing is critical; early season mowing can increase starthistle density. It is best to mow when plants had just started to bloom to reduce flower head density and mow again to remove re-growth.



FIELD BINDWEED (*Convolvulus arvensis*)

Keys to ID:

- Flowers are funnel-shaped, white to pink, and have two small bracts one-inch below the flower base
- Leaves are shaped like arrowheads

Identification:

- **Lifecycle:** Perennial
- **Growth form:** Forb
- **Flower:** Funnel-shaped, white to pink, and have two small bracts one-inch below the flower base. Flowers last for only one day, and are produced late in June until conditions are no longer favorable.
- **Seeds/Fruit:** Seeds are extremely persistent, and can lie dormant in the soil for many years. The seed coat must be exposed to adequate water, moist air, or fluctuating soil temperatures in the surface soil layers in order for a seed to germinate. New introductions of field bindweed are most likely by seed. Seeds fall near the parent plant, but can be transported by water or birds. Seeds pass through the stomachs of migrating birds with little or no damage (CSU 2000). The seeds are poisonous.
- **Leaves:** Alternate, arrowhead-shaped. Pale green to blue-green.
- **Stems:** Perennial, twining vine
- **Roots:** Rhizome. The extensive underground root/stem system allows some to persist through the winter, and the lateral roots can persist independently if severed from the primary root. Young plants extend a taproot deep into the soil, and then form lateral roots. Lateral root growth was found to be 15 feet per year, but depends on the soil permeability and water table depth (TNC 2006).
- **Propagation:** Roots and seed.

Control:

- **Mech:** Pulling or cutting is only effective when plants are cut below the surface, in the early seedling stage. Mowing and tilling are ineffective and can spread seed and roots. Control is most effective when plant is consistently removed, causing underground stores of energy to be tapped. Three to five years may be required to effectively reduce the seed

source, deplete food reserves in the root system, and prevent seedling re-growth.

- **Bio:** The bindweed gall mite, *Aceria mahlerbae*, and bindweed moth, *Tyta luctuosa* are effective.
- **Chem:** Most effective just after full bloom.



HOUNDSTONGUE (*Cynoglossum officinale*)

Keys to ID:

- Panicles of reddish-purple flowers with five petals and five soft, hairy sepals
- Velcro-like seeds with four nutlets

Identification:

- **Lifecycle:** Biennial
- **Growth form:** Forb
- **Flower:** Flowers are reddish-purple that bloom in early summer.
- **Seeds/Fruit:** Fruit is composed of 4 prickly nutlets. The nutlets break apart at maturity and cling to clothing or animals; reproduction is solely by seed (Belliston et al. 2004).
- **Leaves:** Leaves are alternate and range from 1 to 12 inches long, and are rough and hairy (resembling a hounds tongue), and lack teeth or lobes.
- **Stem:** Produces a single flowering stem; stem is erect, stout, and heavy, growing 1.5 to 3 feet tall.
- **Roots:** Thick, black woody taproot.
- **Seedling:** It forms a rosette the first year and sends up a flowering stalk the second year.
- **Propagation:** Seed

Caution:

Do not touch eyes after pulling due to a substance that may irritate eyes.

Control:

- **Mech:** Cut or pull, removing entire crown when in the rosette stage. Remove accumulated dense litter layer to allow growth of desirable plants, including stimulating germination. Mow or cut flower stems before seed nutlets develop and bag to prevent seed dispersal.



RUSSIAN OLIVE (*Elaeagnus angustifolia*)

Keys to ID:

- Thorny stems
- Silvery fruits

Identification:

- **Lifecycle:** Perennial
- **Growth Form:** Woody plant; a small, a usually thorny shrub or small tree that can grow to 25 feet in height.
- **Flowers:** Highly aromatic, the initial creamy yellow flowers.
- **Seeds/Fruit:** Clusters of abundant silvery fruits
- **Leaves:** Leaves are egg or lance-shaped, smooth margined, and alternate along the stem. Leaves and buds have a dense covering of silvery to rusty scales.
- **Stems:** The twigs are flexible, coated with a gray, scaly pubescence and often have a short thorn at the end. The bark is thin with shallow fissures and exfoliates into long strips. Shrubby tree to 25 feet.
- **Roots:** Deep taproot and well-developed lateral root system (ISSG 2006).
- **Propagation:** Seeds and suckers from lateral root system.

Caution:

This plant has pokey little spikes and can make it difficult to get through thick stands.

Control:

- **Mech:** Cutting trees and removing the stumps. Stumps can re-sprout if left in the ground. If stumps cannot be removed, they should be treated to prevent re-sprouting. Care should also be taken to remove seeds from the area and disposed of properly. Mowing Russian Olive with a brush type mower and removing cut material is probably the most effective way to attempt to eradicate new sprouts.



MYRTLE SPURGE (*Euphorbia myrsinites*)

Keys to ID:

- Bright yellow bracts surrounding small flowers
- Fleshy, blue-green leaves arranged in a spiral

Identification:

- **Lifecycle:** Perennial
- **Growth Form:** Forb
- **Flower:** Inflorescences are umbels with small inconspicuous flowers subtended by yellow bracts that appear from March to May.
- **Seeds/Fruit:** Round seeds, pale green and less than ¼ inch. Very prolific. The soil seed reserve of myrtle spurge is estimated to be eight years.
- **Leaves:** Fleshy, blue-green, alternate, appearing spirally arranged.
- **Stems:** Low growing perennial reaching 8 to 12 inches tall, with new stems originating from the taproot each spring; spreading habit.
- **Roots:** Taproot
- **Propagation:** Spreads by seed; plants are capable of projecting seeds up to 15 feet. The plant grows from a taproot, with new stems emerging in early spring and dying back in the winter.

Caution:

- Thick latex-like sap can cause serious eye and skin irritation. Full coverage gloves, long-sleeved shirts and long pants with no gap at the wrists are warranted.

Control:

- **Mech:** The key to effective control of myrtle spurge is to remove plants prior to seed set and to detect and remove new populations early on. Small areas can be easily removed by mechanical means but should be done early to prevent triggering seed launching.

Hand pull or dig when soil is moist. Make certain to pull all the roots. Treatment follow up is important to check root fragment resprouts that will occur when the tap root is severed too shallow. The site must be monitored for at least nine years after the last flowering adult plants have been eliminated and treatments repeated when necessary.

It is important to remove the taproot, and all flowers should be bagged or burned as the seeds can continue to mature after the plant has been cut.

Landscape Substitutions:

A popular ornamental perennial, Myrtle Spurge is rapidly escaping into urban/wildland interface areas. Alternatives to planting myrtle spurge include native plants such as sulphur flower (*Erigeron umbellatum*), Kinnikinnick (*Artocostaphylos uvursi*), or creeping mahonia (*Mahonia repens*).



DYER'S WOAD (*Isatis tinctoria*)

Keys to ID:

- Bright yellow flowers
- Shiny black seed pods

Description:

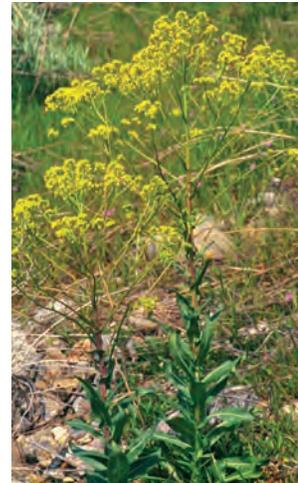
- **Life cycle:** Biennial,
- **Growth Form:** Forb
- **Flower:** Bright yellow; late spring.
- **Seeds/Fruit:** Seedpods are black or purplish-brown with a single seed.
- **Leaves:** Basal rosette leaves are 3 to 4 inches long, and are lance-shaped and connected to the stem with a petiole. The upper stem leaves are simple, alternate, bluish green with a whitish nerve on the upper surface. These leaves clasp the stem with an ear-like projection, and decrease in size toward the top of the stem.
- **Stem:** Erect; 1 to 4 feet in height.
- **Root:** Thick taproot plus roots near soil surface.
- **Propagation:** Mainly by seed, which germinate in the fall or early spring, and develop rosettes that produce large taproots during the first year. The following spring, new leaves grow from the crown bud in the rosette, and bolting begins (CSU 2000) (Belliston et al. 2004).

Control:

- **Mech:** Hand pulling is the simplest and most effective method of control. The taproot may be as deep as 5 feet and so removing as much of it as possible is important to effective control. Plant pieces must be carefully bagged and disposed of, particularly the seed.



Steve Dewey, Utah State University, Bugwood.org



PERENNIAL PEPPERWEED (*Lepidium latifolium*)

Keys to ID:

- White flowers in dense clusters near the ends of branches
- Reddish-brown, rounded, flattened, slightly hairy seeds

Description:

- **Life Cycle:** Perennial
- **Growth Form:** Forb
- **Flower:** White, dense clusters near the ends of branches, occurring early summer to fall.
- **Seeds/Fruit:** 2 seeds per fruit; reddish-brown, rounded, flattened, slightly hairy seeds. Fruits remain on plant, dropping throughout winter months.
- **Leaves:** Lance-shaped, bright green to gray-green, and entire or toothed. Basal leaves are stalked, up to a foot long and 3 inches wide and have serrate margins. Stem leaves are smaller, ranging from 3 to 10 inches in length, tapered at the base, and entire to weakly serrate.
- **Stems:** 3 to 4 feet in height; multiple stemmed and stiffly erect masses. Base of stem is semi-woody.
- **Roots:** Roots are creeping, and enlarged at the soil line creating a woody crown. Root length is dependant of soil tilth, but can be up to 6 feet.
- **Propagation:** New plants grow from creeping roots.

Cautions:

Some people are allergic to the flowers.

Control:

- **Mech:** Hand-pull or till seedlings. Dig out established plants, removing as much root as possible, as root segments as small as 1 inch may re-sprout. Persistence and planting quick-growing competitive plants are key.



Steve Dewey, Utah State University, Bugwood.org



DALMATIAN TOADFLAX (*Linaria genistifolia* ssp. *dalmatica*)

Keys to ID:

- Showy yellow snapdragon-like flowers with an orange throat
- Thick, waxy, bluish, heart-shaped leaves that wrap the stem

Identification:

- **Lifecycle:** Perennial
- **Growth Form:** Forb
- **Flower:** Loose, elongate racemes of bright yellow flowers on vertical stems resembling snapdragons. May thru August.
- **Seeds/Fruit:** Fruits are egg-shaped to nearly round capsules, and contain numerous small, black-brown, ridged seeds.
- **Leaves:** Leaves are broad, ovate, and alternate. Thick, waxy, bluish.
- **Stems:** A single toadflax plant may contain up to 25 flower stems. Mature plants are up to 3 feet tall (CSU 2000).
- **Roots:** Taproot may penetrate the soil up to 3 feet deep. Horizontal roots may grow several yards long, and can develop adventitious buds forming independent plants.
- **Propagation:** Seeds and horizontal roots.
- **Other:** Yellow Toadflax (*L. vulgaris*) is similar, but has more linear pointed leaves and is generally smaller.

Control:

- **Mech:** Hand pull, making certain to pull all the roots. Tilling can be effective if done repeatedly. The cut roots can re-sprout resulting in a larger problem if not tilled again immediately when new sprouts are coming through the soil. This may need to be repeated 3 to 4 times per season for several years to deplete the root reserves as well as the soil seed bank (Whitson 1999).
- **Bio:** *Calophasia lunula*, a predatory noctuid moth; *Eteobalea intermediella*, a root boring moth; and *Mecinus janthinus*, a stem boring weevil are available.



PURPLE LOOSESTRIFE (*Lythrum salicaria*)

Keys to ID:

- Showy pinkish-violet flowers bloom in long, vertical spike
- Smooth, lance-shaped leaves
- Four-sided stems

Identification:

- **Lifecycle:** Perennial
- **Growth Form:** Forb or woody sub-shrub
- **Flower:** Pinkish-violet flowers with 5 to 7 petals arranged in vertical spike, usually July to mid-September.
- **Seeds/Fruit:** Fruits are many-seeded capsules; seeds are small and ovid.
- **Leaves:** Simple, entire, either opposite or whorled.
- **Stems:** Annual stems arise from a perennial rootstock. Stems are erect, and 1.5 to 8 feet tall. Plants become tall and bushy as the rootstock matures.
- **Roots:** Short rhizomes and taproot.
- **Propagation:** Primarily by seed, as it produces up to a million seeds per plant and can have high levels of viability in seeds. Can also spread vegetatively from stem cuttings (Belliston et al. 2004, USDA 2006).
- **Other:** Sometimes confused with Fireweed (*Epilobium* spp.) which has four-petaled flowers.

Control:

- **Mech:** Hand removal, prior to seed set; digging to remove entire rootstalk. Flower stalks must be cut, bagged, and disposed of properly. Seeds may be viable even after spraying, so removal and bagging of flower stalks is key.



SCOTCH THISTLE (*Onopordum acanthium*)

Keys to ID:

- Purple flowers in clusters of 2 to 5 flowers
- Leaves are alternate, stalkless and hairy underneath
- Thistle-like appearance

Identification:

- **Lifecycle:** Biennial
- **Growth Form:** Forb
- **Flower:** Purple to rosy violet flowers with spine-tipped bracts in clusters, with dozens of flowers per plant. Blooms mid-summer.
- **Seeds/Fruit:** One-seeded fruit is wrinkled, brown to grayish black, and tipped with a plume of slender bristles.
- **Leaves:** Leaves are alternate, large, irregularly lobed, and have sharp yellow spikes. Rosette leaves may be up to 2 feet long and 1 foot wide. Upper and lower surfaces are covered with a thick mat of cotton or woolly-like hairs, giving the plant a gray-green color.
- **Stems:** Mature plant can grow up to 12 feet tall. Stems are numerous, branched, and have spiny wings.
- **Roots:** Thick, fleshy taproot.
- **Propagation:** Seeds. From 110 to 140 seeds per flower; seeds can lay dormant up to 5 years, and are dispersed by water, wind, animals, and human activity (Belliston et al. 2004).

Caution:

Sharp spines have a tendency to punch through even the thickest leather gloves. Caution is advised when pulling and long-handled cutting tools are often helpful.

Control:

- **Mech:** Sever the root below the surface. Removal by pulling or digging the rosettes before they have begun to flower is the simplest and most effective method of control. Plant does not reproduce vegetatively so severing the roots will kill the plant. Tilling is another effective method in a garden area, while mowing is not as effective because the flower can still

produce seed. Plant pieces must be carefully bagged and disposed of to prevent spread. Control of these plants must include preventing new seed dispersal for up to 6 years.



COMMON REED (*Phragmites australis*)

Keys to ID:

- Tall grass, up to 15 feet in height
- Dense, fluffy purple to grey flower heads July to October

Description:

- **Life Cycle:** Perennial
- **Growth Form:** Grass
- **Flowers:** Dense, fluffy purple to grey flower heads appear July to October. Persist throughout the winter.
- **Seeds/Fruits:** The seeds are brown, light weight, and about 0.3 in inch long.
- **Leaves:** 6 to 24 inches long; wide, flat, and glabrous. Light to medium dull green leaves turn brown in autumn.
- **Stems:** Forms dense thickets.
- **Roots:** Rhizomatous
- **Propagation:** Mostly from roots, though some from seed (TNC 2006). Vertical rhizomes often produce horizontal rhizome buds and these rhizomes provide the plant with a large absorbent surface that brings the plant nutrients from water or soils. The aerial shoots arise from the rhizomes. Following seed set, nutrients are translocated down into the rhizomes and the above-ground portions of the plant die back for the season (Belliston et al. 2004).

Control:

- **Mech:** Physically removing new shoots from plants has been effective in reducing spread of this plant.



Bernd Blosssey, Cornell University, Bugwood.org



Jill Swearingen, USDI National Park Service, Bugwood.org

RUSSIAN KNAPWEED (*Rhaponticum repens*)

Keys to ID:

- Pointed, papery tips of flower bracts
- Roots are dark brown and have scale leaves

Identification:

- **Lifecycle:** Perennial
- **Growth Form:** Forb
- **Flower:** Heads are urn-shaped, solitary, and composed of disk flowers. Floral bracts are broad, ovoid, entire, and greenish at the base with papery, finely hairy edges. The petals are pinkish-purple.
- **Seeds/Fruit:** Seeds are oval, grayish or ivory, with long white bristles at the tips when young.
- **Leaves:** Alternate; lower stem leaves are narrowly oblong to lance-shaped, and deeply lobed. The upper leaves are oblong, toothed, and become progressively smaller. Rosette leaves are lance-shaped, tapering at both ends, but broadest at the tip.
- **Stems:** Mature plants are between 18 and 36 inches tall. Stems are erect, thin, stiff, branched, and when young are covered with soft, short, grey hair.
- **Roots:** Black in color, with small-scale leaves.
- **Propagation:** Primarily by aggressive root growth, but can be spread by seed, which is viable up to 8 years in soils. It can release chemical substances into the soils that inhibit the growth of competing vegetation (Belliston et al. 2004).
- **Other:** There are other variety of knapweed species listed in Salt Lake County as noxious weeds, but this species is common in the northwest part of the County and along the Jordan River.

Caution:

Russian knapweed can cause severe allergic reaction in certain individuals. Care should be taken to limit exposure of skin to freshly cut or pulled plants and if any respiratory difficulty is experienced, the person should be monitored for a more severe reaction.

Control:

- **Mech:** Mowing repeatedly before plant bolts. Pulling and mowing may reduce seed production, but roots of plants may remain viable in the soils after these treatments.

Steve Dewey, Utah State University, Bugwood.org



SALT CEDAR (*Tamarix spp.*)

Keys to ID:

- Small pink flowers in tight clusters
- Fine, scale-like foliage

Identification:

- **Life Cycle:** Perennial
- **Growth Form:** Woody shrub to small tree.
- **Flower:** Small pink flowers in tight clusters along ends of branches; late spring through late summer.
- **Seed/Fruit:** Each flower can produce thousands of tiny seeds that are contained in a small capsule usually adorned with a hairy tuft that aids wind dispersal. Seeds can also be dispersed by water.
- **Leaves:** Scale-like, reminiscent of junipers, only looser and more finely textured. Deciduous.
- **Stem:** Upright, multi-stemmed structure.
- **Root:** Taproot
- **Propagation:** Spreads by roots or seed (CSU 2000).

Control:

- **Mech:** Hand pulling or digging of seedling; however, root system is extensive and roots may re-sprout. Identification and persistence is key.



PUNCTUREVINE (*Tribulus terrestris*)

Keys to ID:

- Yellow, 5-petaled flowers
- Spiny, sharp bur
- Prostrate habit

Description:

- **Life Cycle:** Annual
- **Growth Form:** Forb
- **Flower:** Small, yellow, 5-petaled flowers are produced in the center of the branched leaves, and appear June thru September.
- **Seed/Fruit:** Spiny fruits are made up of five burs with two spines each that break apart at maturity, and each bur contains two to four seeds (Belliston et al. 2004).
- **Leaves:** Opposite, hairy, and divided into 4 to 8 pairs of leaflets, each about ¼ to ½ inch long and oval.
- **Stem:** The horizontal branching stems radiate out from the root crown to form a mat. The hairy stems often grow to 6 feet long, and are green to reddish in color.
- **Root:** Simple taproot branching into a network of fine roots.
- **Propagation:** Spreads by seed.

Cautions:

Spiny thorns can be painful if you step on them and can attach readily to soft shoe soles. They may also stick into fingers, so wear gloves while weeding. Dog and cat paws are also sensitive to these thorns, and they can pop bike tires. Care should be taken not to drag seeds from one place to another when walking through infestations or driving a car through infested parking lots.

Control:

- **Mech:** Hand pulling is very effective; try to weed before flowers and burs appear. Special care should be taken to rake up all remaining burs and bag and dispose of in the garbage. Large groups of volunteers have been systematically removing puncturevine along community bike paths and on the Jordan River Parkway.



Steve Dewey, Utah State University, Bugwood.org



Utah State University Archive, Utah State University, Bugwood.org

*This guide was developed with
cooperation from these Salt Lake City
Departments and Divisions:*

*Public Utilities, Housing and
Neighborhood Development, and
Parks and Public Lands*

Salt Lake City/County Building
451 South State Street
Salt Lake City, UT 84111
www.slcgov.com/gardenwise