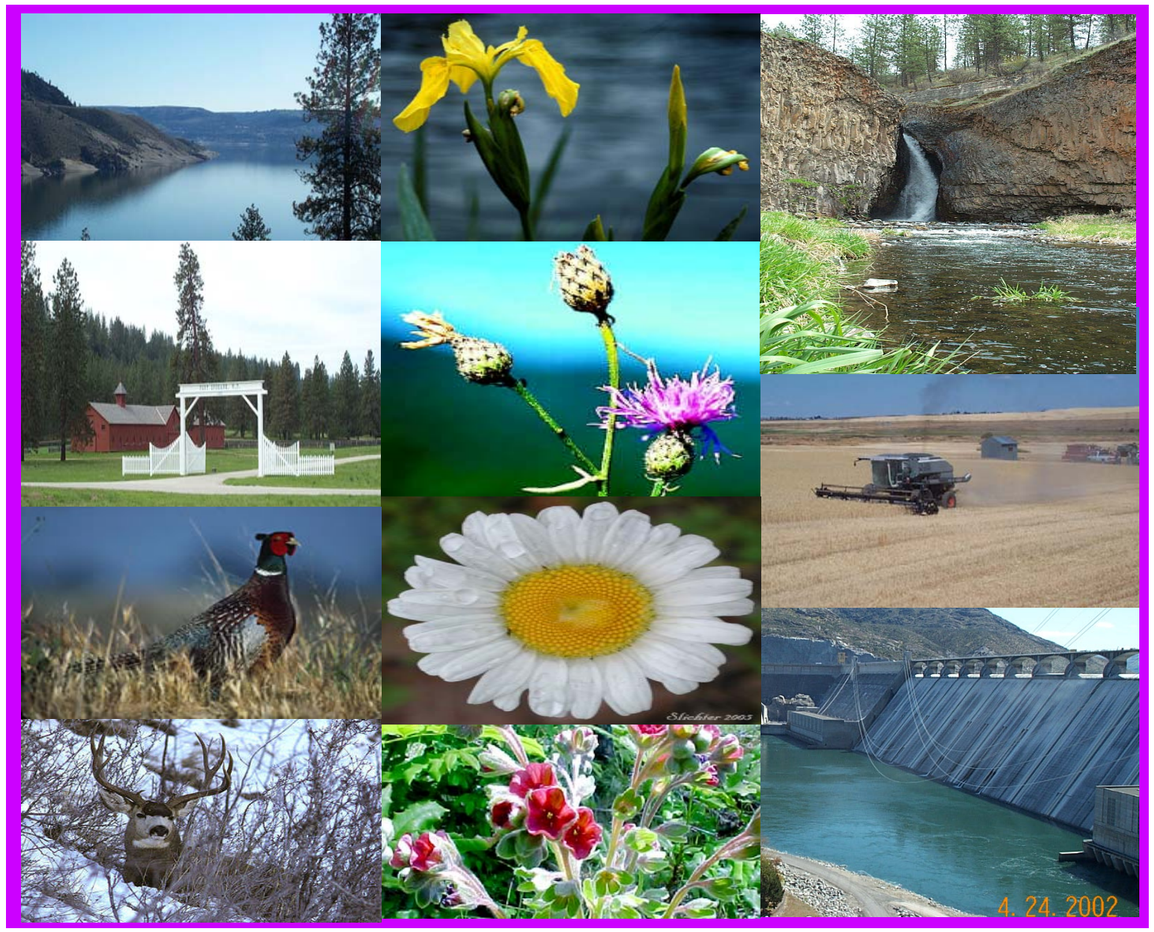
NOXIOUS WEEDS OF LINCOLN COUNTY



Lets all do our part in protecting our environment from noxious weeds

NOXIOUS WEED MANAGEMENT BOOKLET

The members of the Lincoln County Noxious Weed Control Board, the Coordinator and Administrative Assistant determined that there was a need for an identification book specific to Lincoln County and showing how to identify and control noxious weeds found in and around Lincoln County.

Weeds discussed in this publication were selected by the Coordinator and Administrative Assistant. Weeds were selected due to their occurrence in or their threat to establish in Lincoln County.

Herbicide recommendations are given in this publication. Because of the ever changing world of herbicides we ask that you obtain the most current copy of the Herbicide Recommendations Manual.

Also, there are references to certain Biological Controls for certain species of noxious weeds in this publication. We recommend that if you are interested in using biological control that you obtain a copy of the Biological Control Manual from the Noxious Weed Control Office.

We hope that you enjoy this publication. Be sure to alert the staff of any changes or additions that you would like to see for future updates.

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Or for this and other publications and information go to our website at:

WWW.CO.LINCOLN.WA.US/WEEDBOARD

REVISED 2/08

NOTES

Other Publications Available Free of Charge

(Available in hardcopy and/or from our website)

- Services We Provide
- Herbicide Recommendations
- Full Circle Noxious Weed Control
- Noxious Weeds of Lincoln County
- Biocontrol of Noxious Weeds in Lincoln County
- Lincoln County Noxious Weed List
- Herbicide Facts
- Noxious Weeds For Home Buyers
- No Tolerance Noxious Weeds
- Options for Control of:
  - Phragmites (Common Reed)
  - Kochia
  - Myrtle Spurge
  - Rush Skeletonweed
  - Puncturevine
  - Japanese Knotweed
  - Yellow Flag Iris
  - Western water hemlock
  - Whitetop/Hoary Cress
- Biological Control of:
  - Canada Thistle
  - Common mullein
  - Dalmatian Toadflax
  - Houndstongue
  - Knapweed
  - Poison Hemlock
  - Rush Skeletonweed
  - Russian Thistle

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INTRODUCTION

Staff and members of the Lincoln County Noxious Weed Control Board determined that there was a need for a comprehensive noxious weed identification and control booklet. The weeds discussed in this booklet are listed as noxious weeds in the State of Washington and Lincoln County at time of publication.

WHAT IS A NOXIOUS WEED?

Noxious weeds are non-native plants introduced to Lincoln County through human actions. Because of their aggressive growth and lack of natural enemies in the county, these species can be highly destructive, competitive or difficult to control. These exotic species can reduce crop yields, destroy native plant and animal habitat, damage recreational opportunities, clog waterways, lower land values and poison humans and livestock. RCW 17.10 defines "Noxious Weed" as a plant that when established is highly destructive, competitive, or difficult to control by cultural or chemical practices.

IS THERE A NOXIOUS WEED LAW?

Yes. In 1969, the Washington State legislature adopted RCW 17.10. The purpose of this law is to limit economic loss and adverse effects to Washington's agricultural, natural, and human resources due to the presence and spread of noxious weeds on all terrestrial and aquatic areas in the state.

The weed law also holds every owner responsible for controlling or seeing to it that the control of noxious weeds is performed. RCW 17.10 defines "Owner" as the person in actual control of property, or his or her agent, whether the control is based on legal or equitable title or any other interest entitling the holder to possession. "Control" means to prevent all seed production and to prevent the dispersal of the following propagules of aquatic noxious weeds — turions, fragments, tubers, and nutlets.

WHAT IS THE STATE NOXIOUS WEED LIST?

In accordance with RCW 17.10.080 a state noxious weed list of the names of those plants which the state noxious weed control board finds to be highly destructive, competitive, or difficult to control by cultural or chemical practices is adopted annually. The list is divided into the following classes:

1. Class A noxious weeds are non-native species with a limited distribution in the state. Preventing new infestations and eradicating existing infestations is the highest priority.
2. Class B noxious weeds are non-native species presently limited to portions of the state. Class B species are designated for control in regions where they are not yet widespread. Preventing infestations in these areas is a high priority.
3. Class B designate noxious weeds are Class B noxious weeds whose populations in a region or area are such that all seed production can be prevented within a calendar year.
4. Class C noxious weeds are non-native weeds found in Washington State. Many of these species are widespread in the state. Long-term programs of suppression and control are a local option, depending upon local threats and the feasibility of control in local areas.

Does Lincoln County have a Weed List?

Yes. By law every County Noxious Weed Control Board must adopt a weed list each year. County Noxious Weed Control Boards must adopt the Class A and Class B noxious weeds designated by the State Noxious Weed Control Board every year. Each County has the option to adopt the Class B non-designates and Class C noxious weeds to their list depending on the local threat. Consult the current Lincoln County Noxious Weed Control Weed List for more information.

Why should we care about noxious weeds?

Noxious weeds reduce crop yield and quality.

Five hundred introduced plant species have become invasive weed pests in agriculture. About 73 percent of agricultural weeds are non-natives. Crop losses due to non-native weeds are estimated at $24 billion per year. Additionally, $3 billion worth of herbicides are applied each year to manage invasive weeds.
Ranchers alone spend about $5 billion per year on weed control, but invasive weeds continue to spread rampantly in range and pasture land (Pimentel 2000). Invasive weeds have spread over 17 million acres of public rangeland in the western United States at a rate of 4,600 acres per day. The culprits, including leafy spurge, yellow starthistle and knapweed are unpalatable or even toxic to livestock (Westbrook 1998).

Invasive weeds reduce biodiversity and displace native plant and wildlife species.

Invasive weeds are considered to be the second most important threat to biodiversity, after habitat destruction (Westbrook 1998). Two-thirds of all endangered plant and animal species are threatened by non-native competitors. In many areas of the Pacific Northwest, invasive weeds such as yellow starthistle and dalmation toadflax grow in monoculture (solid stands) on ground that was previously diverse and productive in plant species and wildlife.

REFERENCES

WASHINGTON STATE NOXIOUS WEED CONTROL BOARD. WRITTEN FINDINGS. VARIOUS PRODUCTION YEARS.

STEVENS COUNTY NOXIOUS WEED CONTROL BOARD. WEED LIST FACT SHEET INFORMATION. VARIOUS PRODUCTION YEARS.

WYOMING WEED AND PEST COUNCIL. POST CARDS.

WEEDS OF THE WEST. 9TH EDITION, 2002. Tom D. Whitson, Larry C. Burrill, Steven A. Dewey, David W. Cudney, B.E. Nelson, Richard D. Lee, Robert Parker.

PACIFIC NORTHWEST WEED CONTROL HANDBOOK. ONLINE VERSION 2003

PACIFIC NORTHWEST'S LEAST WANTED LIST: INVASIVE WEED IDENTIFICATION AND MANAGEMENT. PIMENTAL, D., L. LACH, R. ZUNIGA, AND D. MORRISON. 2000. ENVIRONMENTAL AND ECONOMIC COSTS ASSOCIATED WITH NONINDIGENOUS SPECIES IN THE UNITED STATES. BIOSCIENCE 50;53-65. OREGON STATE UNIVERSITY EXTENSION SERVICE. EC 1563. JUNE 2003

PACIFIC NORTHWEST'S LEAST WANTED LIST: INVASIVE WEED IDENTIFICATION AND MANAGEMENT. WESTBROOKS, R.G. 1998. INVASIVE PLANTS; CHANGING THE LANDSCAPE OF AMERICA; FACT BOOK. FEDERAL INTERAGENCY COMMITTEE FOR THE MANAGEMENT OF NOXIOUS AND EXOTIC WEEDS (FICMNEW), WASHINGTON, D.C. 109 PP. OREGON STATE UNIVERSITY EXTENSION SERVICE. EC 1563. JUNE 2003

AN AQUATIC PLANT IDENTIFICATION MANUAL FOR WASHINGTON'S FRESHWATER PLANTS. WASHINGTON STATE DEPARTMENT OF ECOLOGY. JUNE 2001, PUBLICATION 01-10-032. PGS 122-123.

LINCOLN COUNTY NOXIOUS WEED CONTROL BOARD. OPTIONS FOR CONTROL SERIES. VARIOUS PRODUCTION YEARS.

YELLOW TOADFLAX (Linaria vulgaris)

Identification

- Perennial growing up to 3 feet tall. Reproduces from seeds and roots.
- Leaves are pale green, numerous, narrow, pointed at both ends and 2 1/2 inches long.
- Flowers are abundant yellow snapdragon type about 1 inch long with a bearded, orange throat.

Origin

Yellow toadflax was introduced from Eurasia in the mid-1800's as an ornamental. It has since escaped cultivation and is now widespread.

Impact

Under favorable conditions yellow toadflax can invade rangeland and cultivated fields and compete with desirable plants and reduce their yield. It is seldom eaten by livestock.

Habitat and ecology

Yellow toadflax is an aggressive invader of rangelands, displacing desirable grasses. It is also found along roadsides, waste places and cultivated fields. It can over winter as seeds and as rootstalks. Seeds germinate both in spring or fall whenever environmental conditions are adequate. Vegetative shoots are put out in the spring and fall. Flowering occurs from June to September, depending on local conditions. Mature seeds are formed by the end of summer and are often retained in the seed capsules.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.

Mechanical: Usually will not stand regular cultivation. Regular cutting and digging can weaken infestations, but must be repeated to be effective.

Herbicides: Applications of Tordon® (picloram), Telar® (chlorsulfuron)/Escort® (metsulfuron) and a surfactant can successfully eradicate plants. The use of a surfactant is a must for adequate herbicide penetration. **Consult the current herbicide recommendations. Read the label before applying herbicides**

Invasive weeds inhibit recreational activities and tourism.

Much of the land used for recreational and tourist activities is publicly owned. Thus, the cost of noxious weed management often is passed on to taxpayers. Noxious weeds such as gorse and yellow starthistle act as physical barriers that prevent the use of land for recreational activities.

Weed management in the turf industry is very costly. It has been estimated that $500 million per year is spent on invasive weed control in residential turf and $1 billion per year in the golf course industry (Pimentel 2000). Common dandelion, for example, was introduced to North America as a salad green in the 1600's, but is now ubiquitous in American lawns.

Noxious weeds impede water flow, reduce water availability, and increase soil erosion.

Noxious weeds such as purple loosestrife and spartina can impede water flow in irrigation canals, streams and estuaries, thus reducing the amount of water available for irrigation and shellfish production and increasing the risk of flooding and shellfish loss. Other noxious weeds deplete water resources used by native plants and wildlife. Saltcedar (tamarisk), for example, can use up to 200 gallons of water per day.

Invasion by noxious weeds that have shallow root systems increases soil erosion on slopes and stream banks. Diffuse and spotted knapweed have very shallow root systems and do not protect erodible soils.

Noxious weeds cause fire hazards

Dormant or dead noxious weeds provide fuel for wildfires. In 1936, gorse provided the primary fuel source for a fire that burned the town of Bandon, Oregon. Gorse is highly flammable and grows in densely populated coastal areas where property values are high.

Noxious weeds decrease property value.

In Washington State, the presence of noxious weeds on residential property are considered a property defect and must be disclosed. Buyers who are aware of the presence of noxious weeds may ask for price reduction due to the cost associated with controlling noxious weeds or the seller may be required to control the noxious weeds as part of the agreement.

Some noxious weeds are toxic to animals and humans.

Several noxious weeds are not only unpalatable to livestock, but also can be toxic. The milky sap of leafy spurge, which dominates a large portion of pasture and rangeland in the western U.S., irritates cattle's eyes, mouth, and digestive tract. Noxious weeds that are poisonous to humans are not uncommon. Giant hogweed, a weed found in residential areas, ironically was introduced as an ornamental. Unfortunately, the sap is an irritant that, when combined with exposure to sunlight, causes severe skin blistering.

Why are some non-native plants invasive, while others are not?

The most successful noxious weeds share several biological characteristics:

- Specialized adaptations for spreading long distances by seed
- Seed dormancy that ensures germination and growth in environmental conditions that favor survival and reproduction
- Prolific reproductive capabilities—both as seed and as vegetative tissue (roots, rhizomes, etc)
- Long seed life in soil or water
- Rapid early growth and expansion of a root system
- Tolerance of low resource levels (e.g., nutrients and water)
- Absorption of excessive levels of nutrients and water that otherwise would be used by neighboring plants
- Genetic and environmental adaptability that ensures survival in a variety of climate, soil, and environmental conditions
- Ability to adapt to management strategies (e.g., to develop resistance to herbicides)

Noxious weed control options for landowners

Prevention

Avoid weed establishment; eliminate individual survivors.

1. Identify and map weed infestations; keep records over years.
2. Recognize and eliminate new weeds before they multiply and establish.
3. Employ sanitary procedures; prevent weed spread.
   - Clean equipment between sites or infestations.
   - Examine nursery plants, seed, and imported soil or media.
   - Screen irrigation water where weed seed contaminates surface water transported in canals and rivers or stored in lakes or ponds.
4. Control weeds and seed sources around the field or site.
5. Establish and maintain county and state weed laws and noxious weed control programs.

Biological

Manage other organisms against weeds.

1. Animals
- Geese (dormant strawberries, asparagus, peppermint, and trees; avoid during harvest season of crops except orchards).
- Pigs (fallow only; reduce yellow nutsedge infestations).
- Sheep and goats (controls many weed and bush species; may compact soil in orchards).
2. Insects (classical approach; development costs require use on extensive areas; insect populations lag behind weed population and may be too slow for intensive or high-value cropping systems).
- Klamath weed beetle on St. Johnswort (also called Klamath weed or goat weed).
- Cinnabar moth and ragwort flea beetle on tansy ragwort
- Knapweed flower beetle on diffuse and spotted knapweed
- Others (see Biological Control Manual).
3. Diseases (several examples of fungal and bacterial cultures for spraying to suppress or kill certain weeds; however, none in Pacific Northwest).

Cultural

Integrate numerous components to minimize impact of weeds.

1. Select manageable fields (identify weeds and choose crop according to feasibility of weed management strategies; e.g., avoid planting wheat into perennial weeds).
2. Rotate crops (disrupt weed life cycles or suppress weeds in competitive crop followed by planting a non-competitive crop).
3. Plant winter cover or competitive fallow crops in rotation to improve soils and crop management (specific cultivars are being evaluated).
- Consider legumes to supplement nitrogen requirements.
- Consider specific varieties of cereals with natural plant toxins (allelopathy); vegetation must remain uniform on soil surface; either perennial or large-seeded crops can be planted through undisturbed mulch.
- Consider crops or cultivars that winter kill after vigorous growth during fall to avoid springtime controls.
4. Alter planting dates (plant for maximum growth or delay planting to control first weed flush).
5. Transplant slow-growing crops.
6. Place and time fertilizer, especially nitrogen.
- Band or spot fertilizer beside plant or seed (reduces availability to surface-germinating weeds).
- Time additional side-dressings for maximum crop growth or to minimize weeds.
7. Develop crop canopy that shades weeds, suppresses weed germination.
- Select crops or varieties that form canopy quickly.
- Space plants in equidistant (triangular) arrangements and vary density depending on crop management constraints or harvest requirements (e.g., product quality).
- Interplant crops in space and time (consider mechanical limitations in commercial plantings).
- Combine broadleaf and taller, narrow leaf crops (corn or beans with pumpkins).
- Relay plantings or harvest short-duration crops with longer maturing crops (bush beans with corn; cucumbers with peppers; tree crops with vegetables).
- Manage appropriate living mulch (grass or legume) between perennial crop rows.
- Improve pasture management by re-seeding and /or fertilizing with or without control measures to reduce weed infestation (weeds often are a symptom of poor management).
8. Apply mulch or geo-textiles.
- Organic materials
  - —Straw (may reduce available N when decomposing; infested with weed seed).
  - —Sawdust (avoid vertebrate pests by maintaining mulch-free circle around tree; perennial weeds become a serious problem).
  - —Bark mulch.
  - —Newspapers (during emergence, rhizomes of some perennial weeds become disoriented when penetrating 6 to 16 layers of overlapped newspaper).
- Plastic
  - —Black excludes light, controls most annual weeds.
  - —Clear acts like greenhouse; poor weed control. New wavelength-selective plastics for pest management (research is progressing).
- Geo-textiles (available at ag and garden supply stores)
  - —Spun bonded fabrics (non-woven): lightweight, extruded polypropylene fibers; requires mulch cover due to moderate UV light sensitivity; weed roots and rhizomes can penetrate fabric unless removed before establishment; cheapest option.
  - —Woven fabrics; moderate weight polypropylene fabrics woven into a mat; can be used without mulch cover due to UV light stability; weed roots and rhizomes can penetrate fabric although tightness of weave can prevent some weeds; moderate cost.
  - —Laminates: highly porous, dense poly film bonded to capillary fibers with a pressed, non-woven bottom layer. Surface is slick and causes rapid wetting and drying to prevent weed establishment except for perennial rhizomes which can penetrate the laminate; most expensive geo-fabric.

YELLOW STARTHISTLE (Centaurea solstitialis)

Identification

- Annual growing up to 3 feet tall. Reproduces by seed only.
- Stem and leaves are a dull green color and covered with fine woolly hairs. The basal leaves are deeply lobed, upper leaves are not lobed and are small and sharply pointed.
- Flowers are bright yellow. The flower head are located singly on the ends of branches.
- Sharp spines or thorns 3/4"-1" long at base of flower heads.

Origin

Yellow starthistle is native to Eurasia. It was found in Seattle, WA. in 1898 and by 1920 it was widely distributed in Eastern Washington.

Impact

Yellow starthistle infests over 134,000 acres in Washington. Cattle feeding on yellow starthistle may be poorly nourished and can be damaged by the spiny heads. Seeds for crops and feed are becoming contaminated. Removal of yellow starthistle seeds increases the expense of certified seed. Recreation lands are becoming infested. Horses may be poisoned and develop "chewing disease" if they ingest 86-200% of their body weight over 1-2 months.

Habitat and ecology

Yellow starthistle has the ability to germinate and develop in nearly all of the semi-arid to sub-humid rangelands in the west. In Washington, it has its best performance in deep silt loams on the south slopes of the Blue Mountains. However, it also survives and forms dense infestations in shallow rocky soils with as little as ten inches of precipitation. This adaptability enables it to be established on poor quality rangeland, edges of cropland, idle farmlands and pastures, roadsides, railways and recreational areas. Yellow starthistle is a winter annual that begins its growth in the fall from seeds that germinate when moisture conditions improve and temperature is in the 60's. More than 150,000 seed are produced per plant per season. Flowers from June through October.

Management

Biocontrol: *Bangasternus orientalis* (yellow starthistle bud weevil) and *Eustenopus villosus* (yellow starthistle hairy weevil) have shown good results.

Cultural: Healthy competitive vegetation help lesson the chance of invasion, but doesn't prohibit such invasion.

Mechanical: Yellow starthistle is controlled by cultivation and tillage or by pulling; needs to be before bloom or, if after, bag plants; seed bank will be present for years.

Herbicides: Applications of Tordon® (picloram), Weedmaster® (dicamba+ 2,4-D), Redeem R&P® (Clopyralid+triclopyr) and other residual herbicides have shown good results. Consult the current herbicide recommendations. Read the label before applying herbicides

YELLOW HAWKWEED (Hieracium caespitosum)

Identification

- Perennial growing up to 3 feet tall. Reproduces from seed, below and/or above ground roots.
- Leaves are lance-shaped, hairy and are basal. Occasionally 1 to 2 small leaves on stem.
- Flowers are yellow and there are several heads per stem arranged in an umbrella like cluster.

Origin

Yellow hawkweed was first introduced from Europe into northern New York about 1879. It is a fairly recent importation from Europe, but it has spread rapidly.

Impact

Yellow hawkweed is destructive in rich pasturelands and may even invade cultivated fields. Yellow hawkweed is unpalatable and thus crowds out more palatable species.

Habitat and ecology

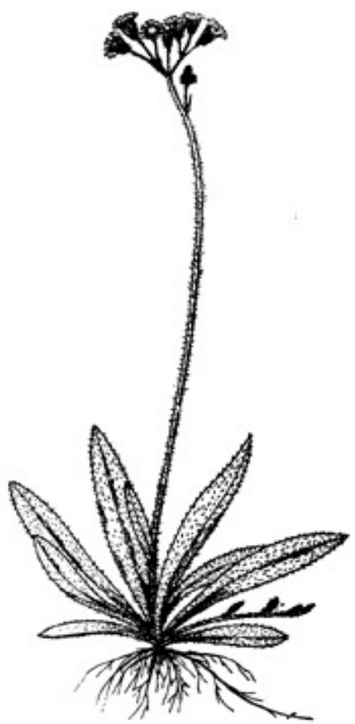
Yellow hawkweed is a perennial that spreads by windborne seeds, below and above ground roots. It can form monocultures with few other plants apparent on the dominated sites. It tolerates shade, but thrives in open meadows. Yellow hawkweed has a fibrous root system and can invade lawns, meadows, range and pastures. Flowers from late June to July.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.

Mechanical: Yellow hawkweed will not withstand regular tillage. Cutting and pulling are ineffective unless done with frequency and diligence to eliminate re-growth.

Herbicides: Weedmaster® (dicamba + 2,4-D), Tordon® (picloram) and Redeem R&P® (Clopyralid+triclopyr) are products that will show good results if used with a surfactant. Consult the current herbicide recommendations. Read the label before applying herbicides



—Laminates: highly porous, dense poly film bonded to capillary fibers with a pressed, non-woven bottom layer. Surface is slick and causes rapid wetting and drying to prevent weed establishment except for perennial rhizomes which can penetrate the laminate; most expensive geo-fabric.

- Solarization: thin plastic secured tightly over loose, moist soil for 10 to 12 weeks will suppress weed infestations and other pests during hot season.

Mechanical

1. Weed debris turned under; annual weeds controlled; perennial weeds suppressed if repeated every 10 to 14 days.
2. Tillage practices
   - Seedbed preparation/planting (plow down/mix debris). Plow, rototill, disc, harrow (compacts wet soils).
   - Cultivation for weed control.
     —Sweeps, rolling, cultivators, finger weeders, push hoe, rotary hoes, etc.
   - Hand pulling or hand hoeing
3. Minimum or no-till systems (often requires specialized equipment).
   - Seedbed preparation/planting accomplished in on operation where trash is separated, soil loosened, and crop planted.
   - Weed control achieved with herbicides or sometimes cultivators, depending on debris.
4. Flaming (requires difference between crop and weed growth or crop protection with hooded row cover or protein foaming agents).
5. Hot water or steam (a non-selective treatment for broadleaf weeds and some grasses; requires tremendous energy to generate heat).
6. Water management (drip placement or timing to reduce weed growth).
7. Stale seedbed (planting after controlling first weed flush).

Herbicides

Requires precision calculations, equipment, and application.

1. Selectivity
   - Crop naturally tolerates herbicide (internal selectivity).
2. Labeling requires extensive testing
   - Toxicology includes acute, sub-acute, and chronic toxicity; teratology (fetus); reproduction, mutagenicity (cancer); neurotoxicity (nerves); and metabolism studies along with worker exposure.

Birds and Mammals

An herbicide's toxicity is described by its LD50, which is the dose received either orally (taken through the mouth) or dermally (absorbed through the skin) that kills half the population of study animals. The oral LD50s reported here were determined for adult male rats. The dermal LD50s were determined for rabbits. The LD50 is typically reported in grams of herbicide per kilogram of animal body weight. LD50s are determined under varying circumstances so comparisons between different herbicides may provide only a rough sense of their relative toxicities. Dermal LD50 values may be more meaningful to herbicide applicators because they are more likely to be exposed to herbicide through their skin rather than by oral ingestion. In any event, very few people, even among applicators, are exposed to herbicide doses as high as the LD50.

- Most herbicides are considered low or moderately toxic. All chemicals have a half-life in the environment.
- "Half-life" is defined as the amount of time it takes to biodegrade one-half of the original amount. Herbicides are broken down by sunlight and microbial activity in the soil.
- All chemicals are assigned Lethal Dose (LD-50) numerical values through certain testing procedures. An LD-50 is the dose or amount of pesticide that can kill 50 percent of the test animals when eaten or absorbed through the skin. LD-50 is expressed in milligrams of chemical per kilogram of body weight of the test animal (mg/kg).

The LD50 does not provide any information about chronic, long-term toxic effects that may result from exposure to lesser doses. Sub-lethal doses can lead to skin or eye irritation, headache, nausea, and, in more extreme cases, birth defects, genetic disorders, paralysis, cancer, and even death. Impurities derived from the formulation of the herbicide and the adjuvants added to the formulation may be more toxic than the herbicide compound itself, making it difficult to attribute increased risks of cancer or other effects directly to an herbicide (Ibrahim et al. 1991). The most dramatic effects of herbicides on non-target plants and animals often result from the habitat alterations they cause by killing the targeted weeds.

FIND OUT MORE—GET OUR HERBICIDE FACTS BROCHURE

The lower the LD-50 the more acutely toxic the chemical is.

Chemical Name	LD-50	Half-Life
Gasoline	19	- - -
Caffeine	190	- - -
2,4-D	300 to 1,000	7 to 28 days
Aspirin	1240	- - -
Banvel	1700	5 months
Table Salt	3320	- - -
Telar/Glean	5545	3 months
Roundup	5600	7.5 days
Tordon	8200	5 months/pint

IDENTIFICATION AND DESCRIPTIONS OF 40 NOXIOUS WEEDS FOUND IN AND AROUND LINCOLN COUNTY

YELLOW FLAG IRIS (Iris pseudocorus)

Identification

- Perennial forb forming dense stands of robust plants
- Stout rhizomes, 2.5-10 inches in diameter; roots 2-6ft long.
- Leaves erect with upper part arching; leaves flattened, arising in a fan from the soil; raised midrib, sword-like, fine-pointed; 3-4 feet in height.
- Flowers on erect stalks 3-4 feet in height; bisexual; large, showy, pale to deep yellow; the only yellow iris in U.S.; several flowers on each stem.
- Fruit is a capsule (seed pod); large (to 4 inches), glossy green; many flattened brown seeds.

Origin

Yellow flag is native to Europe, the British Isles, North Africa and the Mediterranean. It is a very popular garden plant for wet or very well mulched soil, and has been introduced as an ornamental throughout the world. It was first collected in North America in 1911 in Newfoundland, and was established in British Columbia by 1931. The earliest collection in Washington is from Lake McMurray in Skagit County in 1948. It has also been used to control erosion, and is known to take up metals and nutrients in waste water treatment facilities. The fleur-de-lis is a stylized design of an iris flower. Fleur-de-lis is literally translated from French as “flower of the lily”, and is widely thought to be a stylized version of *Iris pseudacorus.* While it appears on countless European coats of arms and flags over the centuries, the fleur-de-lis is particularly associated with the French monarchy. It is often linked with old French settlements like Louisiana or Quebec.

Impact

Yellow flag has been used medicinally. The roots have been used for several ailments, but all parts of the plant can also causes vomiting and diarrhea. Flowers have been used to make a yellow dye, and the roots a black or brown dye. It will sicken livestock if ingested, and is generally avoided by herbivores (although muskrats will eat the rhizomes). Contact with the resins can cause skin irritation in humans.

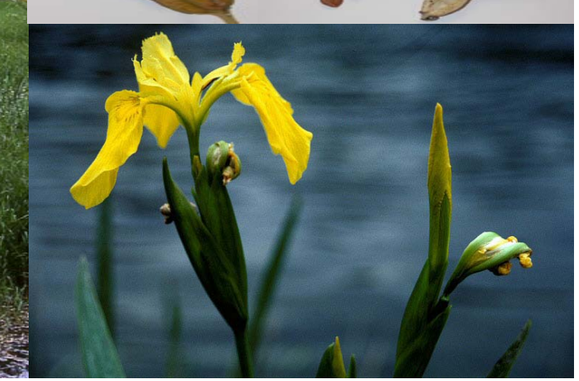
Habitat and ecology

Yellow flag grows in temperate wetlands (to 68° N in Scandinavia). It is found on both sides of the Cascades in wetlands and along the margins of lakes and slow-moving rivers. It will grow in water to 10 inches deep, though is most common in very shallow water or mud. Yellow flag iris tolerates high soil acidity, occurs from pH 3.6 to pH 7.7. It has a high nitrogen requirement. Can withstand long periods of anoxia (low soil oxygen). Yellow flag iris grows in salt marshes in Scotland. Yellow flag iris is adapted to receive two kinds of insect visitors, the Bumble Bee and the Honey Bee and also the long-tongued Hover-Fly which pollinate the plants. Yellow flag is a popular ornamental plant for wet areas or well-mulched soil. It is widely sold in nurseries and on the internet. It has often been planted in wastewater or storm water treatment ponds.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn’t stop it entirely. Mulch materials such as clear plastic, black plastic, Tarp (woven plastic) and landscape fabric have been used with some success. Percentage of control after one year are: Clear plastic 85%, black plastic 70%, Tarp (woven plastic) 99%, landscape fabric 95%.

Herbicides: Fall treatment shows a little better control than spring (87%-Spring to 97%-Fall. Both times are effective. Aquamaster and\or Habitat alone or together work well. Be sure to include a surfactant to get maximum product penetration.



SULFUR CINQUEFOIL (Potentilla recta)

Identification

- Perennial growing up to 2 feet tall. Reproducing from seed and transported roots.
- Leaves are palmate resembling Marijuana, 5-7 toothed leaflets. The sparsely hairy leaves appear green on the underside, not silvery as with native cinquefoils.
- "Green & Green = Mean; Green & White = It's all right"
- Flowers have five pale "sulfur" yellow, heart shaped petals in a flat-topped cluster. Flowers May to July.

Origin

Sulfur cinquefoil is native to Eurasia. It was brought to North America sometime before 1900. By 1950, the plant was well established in the eastern U.S, Canada and the Great Lakes region. By 1976, it was reported from Washington, Oregon, British Columbia and Alberta.

Impact

Although not a serious agricultural weed, it can form monocultures over large areas of rangeland, roadside, waste places and un-worked fields, where it is not easily controlled by mowing. Sulfur cinquefoil is a strong competitor that reduces grass production on many rangeland sites. Because of its high tannin content, sulfur cinquefoil is unpalatable to most wildlife and livestock. In areas where it grows with spotted knapweed, cattle will graze the knapweed over the cinquefoil.

Habitat and ecology

Sulfur cinquefoil is adapted to a wide range of environmental conditions. It occurs in open grasslands, shrubby areas, open forest and logged areas, roadsides, waste areas and abandoned fields. In abandoned fields, sulfur cinquefoil occurs in the earliest stages of succession until woody cover is present; it also grows in forest margins, but it cannot survive under a full forest canopy. It is a perennial that generates annually via new shoots emerging from the edges of the root mass; the central core of this mass slowly disintegrates. Therefore, long-lived plants consist of a circle of upright stems surrounding a core of old stems and leaves. There are many native species of cinquefoil in Lincoln County, but the flowers are either white or brighter yellow/gold rather than the "sulfur" yellow of sulfur cinquefoil

Management

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: In productive areas, cultivation with annual crops will control it. Hand pulling or chopping is also effective if the root crown is removed. Because the massive, woody root system stores extensive food reserves, mowing is not an effective tool; the roots send up new shoots after mowing.

Herbicides: Applications of Tordon (picloram) + 2,4-D is an effective combination for eradicating this plant. Consult the current herbicide recommendations. Read the label before applying herbicides

ABSINTH WORMWOOD (Artemisia absinthium)

Identification

- Long-lived perennial growing to 4 feet tall from a fibrous root system. Reproduces from seed.
- Leaves are alternate. Lower leaves are dissected 2-3 times into deeply lobed leaflets; upper leaves less lobed, 2-5 inches long.
- Leaves are covered with fine, silky hairs giving a light to olive green appearance. In moist habitats the plants are generally green and in drier habitats they are gray-green.
- Flowers are yellowish in color appearing from late July through August.

Origin

Absinth Wormwood is an escaped ornamental. It has a long history of use in Europe. It has been used by practitioners of the occult for psychedelic effects given by its essential oils.

Impact

Absinth Wormwood will taint the milk of cattle. Grain infested with absinth wormwood may be rejected. Pollen causes sensitized people great discomfort. The odor of absinth wormwood can cause illness to humans.

Habitat and ecology

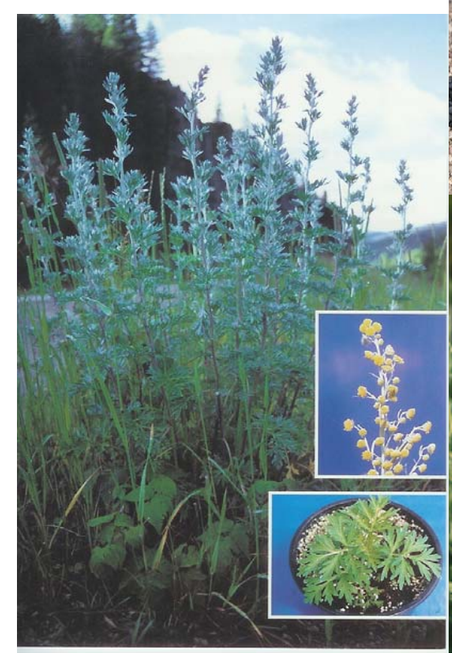
Absinth wormwood does best when there is abundant moisture. It is not able to maintain aggressiveness and vigor in dry areas. It does well on north-facing slopes and in ravines. It is tolerant of shade and can grow amongst trees. Absinth wormwood does best on loams to clay loams and although it can thrive on heavy clays, it does not become a problem in such soils. It is occasionally found as an invader of alfalfa and pastures, but is most prevalent along fencerows and roadsides. It's seedlings are not good competitors and it is out-competed by perennial grasses.
The plant readily invades disturbed areas where there is a lack of competition from other species.

Management

Cultural: Good perennial grasses resist infestation.

Mechanical: Summer fallow and fall tillage prevent establishment on cultivated land because of the large proportion of seeds that germinate at this time. Spring tillage is less effective because the rosettes are more tolerant to tillage. Repeated cultivation may eradicate an established stand. Mowing reduces seed production, but does not kill existing plants.

Herbicides: Absinth wormwood can be completely controlled by using Weedmaster (2,4-D and Dicamba). The use of a spreader/sticker is a must. Consult the current herbicide recommendations. Read the label before applying herbicides.



ANNUAL BUGLOSS (Anchusa arvensis)

Identification

- An annual plant that grows 6– 24 inches tall.
- Leafy herb with erect stems and alternate leaves.
- Leaves are lance-shaped, bristly hairy and crinkled on the margins
- Blue funnel-formed flowers are borne in helicoids clusters at the tip of the plant.

Origin

Native to Europe.

Impact

The scientific name means weedy in the field. It can be a serious pest in cropland, particularly small grains. High weed densities can reduce yields in lentils and peas.

Habitat and ecology

Annual bugloss produces only by seed, producing on the average 900 seeds per plant. 90% of the seeds remain viable for three years. It germinates primarily in spring, but some wait until fall. Annual bugloss germinates primarily in the spring, but some plants wait until fall. Grows in dry areas, roadsides, pastures, cultivated fields, including dry land alfalfa fields.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.

Mechanical: Cultivation, digging and pulling can all be effective if a majority of the taproot is removed.

Herbicides: Before flowering: 2,4-D, 2,4-D + Dicamba (Weedmaster). An added surfactant is a must in order to penetrate leaf hairs. Consult the current herbicide recommendations. Read the label before applying herbicides.

SPOTTED KNAPWEED (Centaurea biebersteinii)

Identification

- Biennial or usually short-lived perennial growing 1 to 3 feet tall. Reproduces from seed.
- Leaves are once or twice divided into lobes on each side of the center vein, are blue-gray in color.
- Flowers are pink to purple (rarely white) and occur in egg-shaped to oblong heads, which are solitary at the ends of clustered branches.

Origin

Current theories suggest that spotted knapweed was introduced to this country either with alfalfa seed from Asia Minor-Turkmenistan or with hybrid alfalfa seed from Germany. Some sources indicate its presence in the Pacific Northwest as early as 1893. It was first observed in Washington in 1923 in the San Juan Islands.

Impact

Spotted knapweed is a very aggressive species that can infest large areas quickly. The species has limited value as forage for cattle and seasonal value for sheep or big game. Spotted knapweed infestations increase production costs for ranchers, impair the quality of wildlife habitat, decrease plant diversity, increase soil erosion rates on valuable watershed areas, decrease the visual quality and appeal of recreational lands and pose wildfire hazards.

Habitat and ecology

In its native Europe spotted knapweed occurs in dry meadows, pastureland, debris, rubble, earthen banks, stony hills or upland rocky areas, along roadsides, and on the sandy or gravelly floodplains of streams and rivers. Soil conditions include light, porous, fertile, well-drained, and often calcareous soils in warm localities. In France, spotted knapweed may be found up to 3,000 feet in the Cevennes and to 3,300 feet in the Cantal. In northeastern Washington, the species occurs on glacial till and outwash soils, where it has been found up to 6,500 feet. Spotted knapweed can produce 400 or more seeds per flower stalk. Most seeds fall within a 3 or 4 foot radius of the parent plant. Longer distance dispersal is by rodents or livestock, in hay or commercial seed, or on vehicles.

Management

Biological: *Urophora affinis & Urophora quadrifasciata*—seed head gall flies and *Larinus minutus*—seed eating beetle all have shown good control on spotted knapweed. *Larinus minutus* can eliminate acres of spotted knapweed alone.

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.

Mechanical: Tillage, digging, pulling and cutting all reduce or eliminate plants and seed production if repeated frequently and thoroughly enough.

Herbicides: Applications of Weedmaster® (dicamba+2,4-D), Redeem R&P® (clopyralid + triclopyr) and Tordon® (picloram) have shown good control and eradication results. Application in the fall after plants have been cut will greatly increase results. Consult the current herbicide recommendations. Read the label before applying herbicides

SCOTCH THISTLE (Onopordum acanthium)

Identification

- Tap-rooted biennial grows up to 12 feet. Rosette forms the first year, flowering stem elongates the second year. Reproduces by seed.
- Leaves are large, coarsely lobed, hairy on both sides, velvety gray appearance. Margins are lined with sharp conspicuous spines. Basal leaves grow up to 2 feet long and 1 foot wide.
- Stems have spiny leaf wings that extend down onto the stem and are covered with dense fine hairs.
- Flowers are violet to reddish; bracts taper to a spine. Flower heads are numerous and 1 to 2 inches in diameter.

Origin

Scotch thistle is native to central Asia. It was introduced to the eastern U.S in 1900.

Impact

Scotch thistle is competitive in range, pasture and waste areas. Often grows along streams and rivers making it difficult to access.

Habitat and ecology

Scotch thistle invades roadsides, range land and disturbed areas. It thrives in sunny sites—does not tolerate shade. Scotch thistle is drought tolerant, but can flourish along open streams. Produces up to 50,000 seeds per plant; seeds are viable for 6 years. Repeated branching may result in plants 5 feet wide. Dense stands can create barriers that restrict livestock.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.

Mechanical: Mowing can stop seed production in short term, but plants can re-grow; digging, cutting and cultivation are effective; monitor for new growth all season long; seed bank will be present for years.

Herbicides: Applications of Weedmaster® (dicamba + 2,4-D), Redeem R&P® (clopyralid + triclopyr), and Tordon® (picloram) show good control results. Best timing is in early spring when plants are in rosette stage and again in fall when more rosettes germinate. The addition of a surfactant with increase control. **Consult the current herbicide recommendations. Read the label before applying herbicides.**

BABYSBREATH (Gypsophila paniculata)

Identification

- Perennial with widely branching stems to 3 feet in height.
- Leaves are opposite, 3/4 to 4 inches long covered with a dense bloom of hairs on both sides.
- The flowering part of the plant is branched, flowers are 1/16 to 1/8 inch wide. Flowers appear early to mid-June.

Origin

Babysbreath was first introduced into North America as a garden ornamental in the late 1800's. It is now widespread across Canada and the northern U. S.

Impact

Babysbreath is a problem in sub-marginal, sandy farmlands with introduced perennial grasses or where the native grasses have been disturbed. It also is a problem in vacant lots and along fence lines where the weed creates an untidy appearance. Babysbreath can reduce the crude protein content of hay in fields it infests.

Habitat and ecology

Babysbreath is able to invade and compete with other species in a number of habitats. Once established, plants are long-lived. The greatest density of plants usually occurs on protected slopes and in ravines where the supply of moisture and opportunity to trap mature tumbling seed-bearing plants is greatest. It can grow in both fine and coarse-textured soils, but is most aggressive on the latter. Fine-textured soils retard root development. Babysbreath grows in a wide variety of habitats. It occurs in lightly grazed pastures, roadside ditches, hay fields, and in abandoned fields. Babysbreath survives by a persistent root system. Root growth during the first two years of growth is rapid. Flowers do not appear until the third year. A single plant averages 13,700 seeds. Seeds show little or no dormancy.

Management

Cultural: Maintain a good competitive vegetative stand to help prevent infestation. A good stand of grass or crop does not guarantee protection against infestation.

Mechanical: Annual cultivation at a depth which severs the main stem of the plant at or below the surface (caudex) from the root is very effective.

Herbicides: The use of dicamba (Clarity®), dicamba and 2,4-D (Weedmaster®) and/or picloram (Tordon®) is effective at controlling Babysbreath. Any combination of these products will show results. **Consult the current herbicide recommendations. Read the label before applying herbicides.**

BUFFALOBUR (Solanum rostratum)

Identification

- Annual, up to 2 feet tall, reproduces by seed
- Leaves 2-5 inches long, deeply lobed, covered with spines on the under side
- Stems and fruits covered with sharp spines
- Flower is yellow, 1 inch wide, 5 lobes, blooms in late June to early August

Origin

Buffalobur is a native North American species, its range extending from central Mexico northward across the Great Plains of the U.S. It is widely introduced elsewhere, including Russia and Australia. The name "buffalobur" dates back to the time of settlement of the Great Plains when the plant grew abundantly in the disturbed soil of buffalo wallows. Buffalo carried the burs great distances in their shaggy coats.

Impact

Buffalobur is generally a "nuisance weed" of barnyards and corrals. Burs may cause injury to livestock and considerable loss in wool value of sheep. Buffalobur usually appears in gardens, where it was planted with flower or vegetable seeds.

Habitat and ecology

Buffalobur is common on disturbed wastelands and prairies. It is common on sandy soils, but grows on most soils. It is drought resistant and serves as a host for the Colorado potato beetle. The seeds are almost circular, 1/2 inch or slightly more in diameter, brown to reddish brown, flattened, irregularly angled, with finely pitted surface.

Management

Cultural: Maintain a good competitive vegetative stand to help prevent infestation. A good stand of grass or crop does not guarantee protection against infestation.

Cutting/Mowing: Prevent seed production by repeated, close mowing or by hoeing scattered plants before blossoms appear.

Mechanical: Pulling plants is effective as long as a majority of the taproot is removed.

Herbicides: Buffalobur is moderately susceptible to 2,4-D when seedlings are immature. It becomes very resistant to 2,4-D after flowering. A combination of 2,4-D plus Dicamba usually provides more complete control than either herbicide alone. Consult the current herbicide recommendations. Read the label before applying herbicides

SCOTCH BROOM (Cytisus scoparius)

Identification

- A woody perennial shrub growing up to 10 feet tall. Reproduces from seed.
- Lower leaves are mostly three parted with small, rounded leaflets. Upper leaves are simple.
- Flowers are bright yellow about 3/4 inch long, shaped like pea flowers and bloom from April to June.

Origin

Scotch broom was introduced as a garden ornamental by early settlers of the Pacific Coast. It has spread far beyond the bounds of cultivation and now covers many acres west of the Cascades.

Impact

A very aggressive species that occupies pasture land crowding out desirable forbs and grasses and is also crowding out native species. It has been reported as toxic by Europeans, but no known losses of livestock in the U. S. Scotch broom contains small amounts of the toxic quinolizidine alkaloids spartene and isosparteine. These toxins probably are found in all parts of the plant. Children develop nausea and vomiting from sucking on the flowers of French broom, a related species.

Habitat and ecology

Scotch broom has plenty of help from people to move it to new sites. Its seed is a regular hitchhiker on vehicle tires, heavy equipment, and in infested gravel. Scotch broom spreads slowly, but persistently. Seedpods split suddenly at maturity and eject the seeds. Also, it is reported that ants aggressively collect the seeds assisting in dispersal. Birds also assist with spread, but how well the seeds survive digestion varies with the species of bird.

Management

Biocontrol: Apion fuscirostre (scotch broom seed weevil) has shown good control.

Cultural: Maintain a good competitive vegetative stand to help prevent infestation. A good stand of grass or crop does not guarantee protection against infestation.

Mechanical: Plants can be controlled by grubbing out the crowns. After removing existing large plants, repeated cultivation will destroy seedlings of this weed; therefore it is not found in cultivated fields. Rotation of pastures or perennial plantings to cultivated crops for 1 to 2 years reduces the problems. The long-lasting seed provides a regular source of new plants that must be controlled. Periodic mowing will reduce seed production, but it tends to encourage branching until a meadow of scotch broom plants is produced.

Herbicides: Applications of Garlon 4 ® (triclopyr ester), Garlon 3A® (triclopyr amine) or Crossbow® (triclopyr + 2,4-D) have shown good control results. The addition of a surfactant will aid control. Consult the current herbicide recommendations. Read the label before applying herbicides

RUSSIAN KNAPWEED (Acroptilon repens)

Identification

- Perennial growing up to 3 feet tall. Reproduces from seed and black roots.
- Leaves are alternate and of several types: Upper leaves are small, narrow and have a smooth edge. Stem leaves are intermediate in size, slightly toothed on the edge. Basal leaves are deeply notched.
- Flowers are pink to purple in color and grow in solitary heads at the tips of leafy branches. Flowers June through September.

Origin

Russian knapweed is a native of Eurasia. It was introduced to the U.S. through alfalfa seed brought in from Turkestan in 1898. Once imported it was spread via domestically produced alfalfa containing Russian knapweed.

Impact

Russian knapweed is an aggressive and invasive noxious weed of pastures, non-crop areas, grain fields and other cultivated fields. Livestock may avoid this species; in addition, the plant is poisonous to horses, causing chewing disease. Can be grazed readily and without ill effects by other livestock.

Habitat and ecology

Russian knapweed is a tap-rooted perennial with limited seed production. It spreads mainly by underground rootstocks. Common on the heavier, often saline soils of bottomlands, as well as sub-irrigated slopes and flats. The species is also competitive in hayfields, pastures, grain fields, and along roads or irrigation ditches.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.

Herbicides: Applications of 2,4-D, Picloram and Metsulfuron separate or in combination will control and eradicate Russian Knapweed provided that a surfactant is used. **Consult the current herbicide recommendations. Read the label before applying herbicides**

BULL THISTLE (Cirsium vulgare)

Identification

- Biennial from a fleshy taproot; 1.5 to 5 feet tall, branched above; stems very prickly and winged by leaf bases that extend downward.
- Basal leaves up to 1 foot long, deeply lobed and spine-tipped, upper surface is coarse hairy.
- Stem leaves smaller, 2.5 to 8 inches long.
- Flower heads 1.5 to 2 inches in diameter, clustered at ends of branches, purple.

Origin

Bull thistle is a naturalized introduction from Europe. It occurs throughout the U.S. and north into Canada from Newfoundland to British Columbia. It is native of the Old World, having been introduced by impure seed or some accidental means.

Impact

Bull thistle is a weedy species in old fields, roadsides and waste places.

Habitat and ecology

Bull thistle can adapt to a wide range of climates. It is vigorous on heavier soils and responds favorably to an increased soil fertility, particularly nitrogen. It has thus become a major problem in pastures or other places that have been improved by the use of fertilizers. The weed can readily become established and spread in soils of high fertility that are bare of vegetation at the end of summer.

Management

Cultural: Good perennial grasses resist infestation.

Mechanical: Hand hoeing, providing that most of the root is removed, is effective against isolated plants. Mowing is variable in its effect, but if done just as the first flowers are opening the best results will be achieved. Repeated tillage is very effective against established stands of Bull thistle. To prevent establishment of Bull thistle, it is necessary to provide a dense perennial pasture or cover so that seedlings will not survive.

Herbicides: Bull thistle can be completely controlled by using Weedmaster (2,4-D and Dicamba), Curtail, Tordon, Milestone, Cimarron Max and Redeem. The use of a spreader/sticker is a must. **Consult the current herbicide recommendations. Read the label before applying herbicides.**

BUTTERFLY BUSH (Buddleja davidii)

Identification

- Butterfly bush is a deciduous shrub with arching branches that can reach a height of 15 feet with fragrant, cone-shaped flower spikes.
- Leaves are oppositely arranged, lance-shaped or egg-shaped and are usually between 4-10 inches long and 1-3 inches wide.
- Upper leaf surface is dark green or blue-gray, lower surface appears whitish, due to the dense covering of small branched hairs.
- Flowers have 4 petals and bell-shaped. At least fourteen different flower colors including, red, orange, yellow, blue, lavender, magenta, maroon and white.

Origin

In the U.S., it has established in California, Oregon, and Washington in the West, and about 15 New England, Great Lakes, mid-Atlantic, southeastern, and Midwestern states. In Washington State, Butterfly bush has escaped cultivation in at least Clallam, Jefferson, Whatcom, Skagit, Snohomish, King, Kitsap, Mason, Pierce, Thurston, Lewis, Cowlitz, Skamania, and Clark counties. It has also been noted that Butterfly bush was a common garden escapee along roadsides and railroad tracks in western Washington in 1973.

Impact

Butterfly bush is a problematic, noxious weed in several countries worldwide. It produces abundant, viable seeds that are easily dispersed into both disturbed and natural areas. It has been found that Butterfly bush rapidly colonized the gravelly sand edges along streambeds, thereby disrupting natural secession by native herbaceous and shrub pioneer species. The earlier maturation of Butterfly bush populations, as compared to the native pioneer shrubs that it rapidly displaces, would suggest that conversion of streambed habitat to high forest would be accelerated. Colonization by Butterfly bush may also alter soil nutrient concentrations, as the invasive utilizes and accumulates nitrogen and phosphorus differently from the native shrubs it out competes. Dense thickets restrict human access to river edges. Butterfly bush may detrimentally affect butterfly-plant interactions in Washington State in 3 ways. First, although Butterfly bush acts as a nectar source for many insects, it does not provide a food source for the larval stages of native butterflies here. Second, the non-native shrub may be displacing native nectar sources, such as spreading dogbane, which requires a similar habitat and is in decline. Third, it may be so effective at attracting butterflies and other insects, that it might be outcompeting native plants for pollinators.

Habitat and ecology

Butterfly bush is cultivated as a garden ornamental; however it is able to colonize disturbed and natural areas including roadsides, riverbanks, gravel bars, recently logged and /or burned forests. It is capable of growing in low-nutrient substrate, such as the gravely substrate of streambeds.

Management

Cultural: Good perennial grasses resist infestation.

Herbicides: Butterfly bush be completely controlled by using glyphosate. The use of a spreader/sticker is a must. Consult the current herbicide recommendations. Read the label before applying herbicides.

RUSH SKELETONWEED (Chondrilla juncea)

Identification

- Perennial growing up to 4 feet tall. Reproduces from seed and roots.
- Basal leaves are sharply toothed, lance-shaped (dandelion like). They wither away as stem develops.
- Flower petals number from 7-15 and are squared across the end with tiny lobes or teeth.

Origin

Rush Skeletonweed is native to Eurasia. It was first identified in the Pacific Northwest in Spokane County by a visiting Australian scientist interested in wheat production.

Impact

Rush Skeletonweed is a threat to irrigated lands of the Columbia Basin, to the sandy soils of dry land wheat areas and it is a threat to rangelands. Rangeland infestations impact the cattle industry when rush Skeletonweed displaces native or beneficial forage species grazed by livestock and wildlife. Forage production is lowered when rush skeletonweed successfully competes with beneficial species for limited resources, particularly nitrogen. Often, the cost of herbicide control is not economical due to low productivity of the land. Rush Skeletonweed spreads from rangeland to croplands by seed. Once established on roadsides adjacent to croplands, mechanical injury to the plant can produce shoots from any part of the main root, from the lateral roots, and from root fragments at least 4 feet deep. Once established in wheat-fallow systems, cultivation is the major factor of spread. Crop yields are also reduced as a result of rush skeletonweed out competing grain for soil moisture and nitrogen.

Habitat and ecology

Rush skeletonweed prefers two soil types found in the Pacific Northwest: the sandy to gravely and well drained soils typical in the glacial lobe soils and the shallow soils over bedrock, typical in the channeled scablands. Roadside populations of rush skeletonweed are established when the seed is moved along transportation corridors. Plant fragments can develop in areas not conducive to seedling establishment, with contaminated cultivation machinery responsible for the majority of this type of spread. Rush skeletonweed is a self fertilizer which results in well-adapted biotypes that can dominate an infested area. Parachute-like seeds easily spread by wind. Extensive deep roots make control difficult. Flowers from June to frost.

Management

Biological: (Cystiphora schmidti)-a leaf and stem gall fly, (Eriophes chondrillae)-a bud gall mite and (Puccina chondrillina) - a rust fungus are all well established and effective.

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: Any mechanical damage to the plant stimulates new growth. Cultivation as a control method can be considered on seedlings less that 36 days old, as they are unable to develop roots from root fragments.

Herbicides: Applications of Tordon® (picloram), 2,4-D, Weedmaster® and Redeem R&P® (clopyralid and triclopyr) are effective. Best time for control is in fall before rainy season. Consult the current herbicide recommendations. Read the label before applying herbicides.

PURPLE LOOSESTRIFE (Lythrum salicaria)

Identification

- Perennial, emergent aquatic plant. Reproduces from seed and rootstock.
- Leaves are simple, entire and opposite or whorled.
- Stems are somewhat squarish having 4 to 6 sides.
- Flowers are rose-purple colored, small, numerous and have 5 to 7 petals.

Origin

Europe and Asia are thought to be the geographic origin of purple loosestrife. The scientific name derived from a Greek medical man in Nero's Roman army when he called the plant Lytron, Greek for blood. Awareness of the medicinal properties or the flowering spike resemblance to blood or gore from a wound led to the name. The similarity of loosestrife leaves to those of the willow (*Salix spp.*) resulted in the species name *salicaria*.

Impact

The negative impact of purple loosestrife establishment in wetland habitat far outweighs any economic gain from horticultural or medicinal uses. Wetland ecosystems are altered. Purple loosestrife is invasive and competitive and unavailing to native wildlife. It can quickly adapt to environmental changes and expand its range to replace native plants used for ground cover, food or nesting material. It stands are dense at the top, and open at the base. Structures or root masses create a 3 foot opening, in the water, between plants. This provides no cover for nesting ducks. Large purple loosestrife infestations are hard to mow and manage recreational hunting or trapping grounds are lost, decreasing the land value to those that own or manage operational wetlands. Threatened and endangered species are impacted by monotypic stands of purple loosestrife that replace native vegetation. Agriculture is impacted by a loss of wild meadows, hay meadows and wetland pastures. When purple loosestrife invades irrigation systems, economic losses to agriculture can exceed $2.6 million annually.

Habitat and ecology

Purple loosestrife occurs in freshwater or brackish wetlands. It grows from a persistent tap root and spreading root stock. The stems are annual and they can reach 9 feet tall and form a crown that can reach 5 feet wide. A mature plant can produce 2.7 million thin-walled, flat seeds. The seeds are approximately the size of ground pepper. Some seeds sink in the water and resurface after germination. Water dispersal includes floating seedlings and floating ungerminated seeds. It also spreads vegetatively.

Management

Biological: Galerucella (a leaf-feeding beetle) and Hylobius (a root-mining weevil) have shown good success.

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: Small infestations can be dug, bagged and disposed of.

Herbicides: Rodeo® (glyphosate), Garlon 4® or Garlon 3A® (triclopyr) are aquatic herbicides approved for controlling purple loosestrife. Consult the current herbicide recommendations. Read the label before applying herbicides

CANADA THISTLE (Cirsium arvense)

Identification

- Perennial with a deep-seated complex system of roots spreading horizontally which give rise to aerial shoots.
- Leaves vary from light to dark green, oblong or lance shaped, deeply cut, spiny toothed margins
- Flowers 1/2 to 3/4 inch in diameter, purple or rarely white; all heads of a plant are either male or female. Flowering occurs during July and August

Origin

Canada thistle is native to southeastern Eurasia. It was introduced to North America by early colonists in the 17th century as a contaminant in crop seed. Control legislation was enacted in Vermont in 1795 and by New York in 1831. It was not reported west of the Allegheny Mountains until after 1835.

Impact

Canada thistle is found in virtually all crops, and is also found in pastures and rangeland where it reduces forage. The weed is an effective competitor for light, moisture and nutrients and is thus able to reduce crop yields. It also serves as an alternate host for insects and pathogenic microorganisms that attack various crops.

Habitat and ecology

Canada thistle can grow on a wide variety of soil types; clay loam, sandy loam, sandy clay and sand dunes. It does poorly on wet soils without much aeration. It grows poorly in shaded conditions and produces few flowers. Survival and spread of this species is due to the highly successful vegetative propagation carried on by the creeping horizontal roots which survive winters and continue to give rise to numerous aerial shoots year after year. Root fragments as small as 1/2 inch produce shoots 100% of the time. Since the flowers on each plant are either male or female, it is possible that a colony of male plants produce no seed, but still maintain itself. Flowers are mainly insect-pollinated. Average seed production is about 1,530, but exceptional plants may produce up to 5,300.

Management

Cutting/Mowing: Repeated mowing to weaken stems and prevent seeding is effective in low infestations.

Mechanical: Repeated tillage at 21-day intervals for about 4 months can be effective on mild infestations. All root fragments should be cleaned from equipment before changing fields.

Herbicides: Weedmaster® (dicamba + 2,4-D), Tordon® (picloram) and Redeem® (clopyralid + triclopyr) all show good control. For best control, use surfactants. Consult the current herbicide recommendations. Read the label before applying herbicides

CEREAL RYE (Secale cereale)

Identification

- Annual plant the grows 3-5 feet tall, vigorous root system
- Leaves are similar to wheat, but coarser and more bluish
- Seed head is a somewhat nodding 3-6 inch slender spike.
- Seeds are narrower than wheat kernels, about 1/2 inch long.

Origin

Cereal rye is native to central Asia and is now grown commercially worldwide.

Impact

Cereal Rye has a tendency to volunteer and appear in cultivated fields. It is an effective competitor and can contaminate the crop with its seeds. It serves as a suitable host for the fungus commonly known as ergot. It may contaminate wheat or barley crops and reduce yield and quality. Grain containing ergot sclerotia is considered dangerous for human consumption.

Habitat and ecology

Cereal Rye is well adapted to cool temperate conditions. It is most cold hardy of all cereal crops. It grows best on well-balanced rich soil, but is capable of growing on acidic, unfertile soils.

Management

Cultural: Good perennial grasses resist infestation.

Herbicides: Cereal Rye can be controlled by using Glyphosate using ropewick treatment, Achieve 40DG, Discover, Osprey, Axial and Everest. Consult the current herbicide recommendations. Read the label before applying herbicides.

PUNCTUREVINE (Tribulus terrestris)

Identification

- Annual, mat forming, trailing stems to 5 feet long. Reproduces from seed.
- Leaves are opposite, hairy, divided into 4 to 8 pairs of leaflets. Oval leaflets 1/4 to 1/2 inch long.
- Flowers are small yellow, 5-petaled borne on short stalks at leaf nodes.

Origin

Puncturevine was introduced into the U.S. with livestock imported from the Mediterranean region. It has become widespread since then.

Impact

Puncturevine is a serious weed in pastures, roadsides, waste places and cultivated fields. The spines of the fruit can cause damage to the feet of animals and are a nuisance to children. If growing in orchards or vineyards, it is a problem to the fruit pickers. If grazing animals happen to eat a bur, it may cause injury to the mouth, stomach and intestines. Generally Puncturevine is not grazed, but if it is, it is also toxic.

Habitat and ecology

Puncturevine is adapted to warm temperate conditions. It requires relatively high temperatures for germination and growth. It is highly adaptable to a wide range of conditions. Puncturevine prefers light-textured soils, but will grow on almost any type of soil. Puncturevine is found in pastures, roadsides, orchards, vineyards, waste places, parks, railway yards and agricultural areas. Puncturevine reproduces completely by seeds, and there is considerable seed dormancy over the autumn and winter. Seeds germinate in late spring and early summer under suitably moist conditions. Flowers may form within three weeks and continue for several months. Fruits are thus produced through summer and fall. Puncturevine flowers are cross-pollinated by insects. A single plant can produce as many as 400 fruits, each containing 2-3 seeds. Seed dispersal is by animals and by rubber-tired vehicles. The seeds have an initial dormancy and very few will germinate immediately after development. A germination rate of 84% has been reported in 6 month old seed. Seed may remain viable for many years if buried in the soil. Puncturevine is capable of large population increases over a short period of time. With its large seed production and the viability of seeds over a long period of time, Puncturevine can increase in numbers rapidly if given the right conditions.

Management

Biological: Two weevils (Microlarinus lareynii and Microlarinus lypriformis) have been introduced into the U.S. Three releases in Washington State have failed to establish.

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: Repeated cultivation just after germination is an effective control. If burs are produced before cultivation, it is necessary to remove the plants and burrs and bag them.

Herbicides: Applications of Weedmaster® (dicamba + 2,4-D), Predict® (norflurazon) and/or Pendelum® (pendimethalin) have shown good control. The addition of a surfactant will increase the efficiency of these herbicides. Consult the current herbicide recommendations. Read the label before applying herbicides

POISON HEMLOCK (Conium maculatum)

Identification

- Biennial, spread by seeds. Normally grows 6 to 8 feet tall, occasionally grows up to 10 feet. Reproduces by seed.
- Leaves are shiny green, fern-like, finely divided 3 and 4 times. Lower leaves have long stalks clasping the stem. Upper leaves are on short stalks. Leaves have a musty odor.
- Flowers are tiny, white and formed in many umbrella shaped clusters, each supported by a stalk.
- All plant parts including the white fleshy root are poisonous to humans and livestock.

Origin

Poison hemlock is a native of Eurasia and was introduced to North America from Europe as an ornamental plant. It has spread rapidly, particularly on the west coast. It was the liquid extracted from this plant that Socrates reportedly used to kill himself in 399B.C.

Impact

All parts including the white fleshy root are poisonous to humans and livestock.

Habitat and ecology

Poison hemlock is adapted to a wide range of climates. It prefers moist soil conditions, but is adaptable to drier soils. It occurs in disturbed sites, pastures, along roadsides and waterways. The seeds, leaves, roots and stems are poisonous. The highest concentration of poisonous alkaloids is in the seeds. The plants are capable of over wintering in the vegetative stage or as seeds. The seed germinate in autumn and the plants develop rapidly. It over winters and in the spring it commences growth. Some plants produce flowering stems in the first spring and die in the summer. Plants in moister situations usually wait until the second spring to produce flowering stems. After producing seeds in the summer they die. A well-developed plant can be a prolific seed producer. The seeds being quite small are easily dispersed by wind or water. Seed are viable for up to 6 years.

Management

Biological: The poison hemlock moth (Agonpterix alstromeriana) has been a very effective defoliator of poison hemlock plants.

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: Hand pulling of individual plants or cultivation or larger areas before flowering is effective. Follow-up cultivation may be necessary to deal with seedlings. Mowing or slashing plants before flowering, with follow-up treatment to the new growth is also effective.

Herbicides: The application of 2,4-D is effective. Applying herbicide to freshly cut plant stumps greatly improves uptake of herbicide into plant. The addition of a surfactant will increase effectiveness of herbicide. Consult the current herbicide recommendations. Read the label before applying herbicides

COMMON BUGLOSS (Anchusa officinalis)

Identification

- Perennial, 1-2 feet tall, reproduces by seed.
- Leaves are fleshy with a rough hairy surface; basal leaves grow up to 8 inches long and oblong, stem leaves narrow and smaller.
- Flowers are blue and purple with white centers and straight rather than curved tubes.
- Flower stem initially coiled like a fiddleneck, but uncoils as flowers open. Blooms May to July.

Origin

Common bugloss is native to Europe.

Impact

Common bugloss invades alfalfa fields pastures and waste areas; fleshy stalks can cause hay bales to mold.

Habitat and ecology

Common bugloss emerges as a rosette the first year of growth; the second year a single flower stalk emerges; each following year multiple stalks will grow from a single taproot. Grows in dry areas including dry land alfalfa field where it's succulent leaves cause mold in baled hay.

Management

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: Cultivation, digging and pulling can all be effective if a majority of the taproot is removed.

Herbicides: Common bugloss is susceptible to 2,4-D, 2,4-D plus dicamba (Weedmaster®), clopyralid plus triclopyr (Redeem R&P®) before flowering. Consult the current herbicide recommendations. Read the label before applying herbicides.

COMMON ST. JOHNSWORT (Hypericum perforatum)

Identification

- Long-lived perennial, 1-3 feet tall, reproduces by seeds or short runners.
- Leaves are opposite, about 1 inch long, and attach directly to stem. Covered with transparent dots.
- Stems are woody at the base, rust colored with 2 ridges.
- Each flower has 5 yellow petals. The black dots often visible along the margins are glands containing hypericin.

Origin

St. Johnswort is native to all of Europe, North Africa and Asian except for the Arctic regions. In the United States, it arrived in Philadelphia in June, 1696 with German pilgrims fleeing religious persecution. This was one of many herbs used in mystic rites, and it was thought to exorcise the devil, protect newborns and ward off imps and demons of melancholy.

Impact

St. Johnswort is invasive as well as toxic to livestock. It is a vigorous competitor in pastures, rangelands and natural areas. Introduced to California around 1900, it spread over 2 million acres by 1950. At one time, St. Johnswort was considered the leading cause of economic loss to California, attributed both to the loss of pasture and rangeland and to stock fatalities. St. Johnswort contains hypericin, a phototoxin that travels to the skin after ingestion. It is activated by ultraviolet rays responsible for dermatitis, inflammation of the mucus membranes, itching, swelling, blisters and open sores. Light skinned livestock (horses, cattle, and to lesser extent sheep and goats) are affected, and humans can experience the same reactions when using herbal remedies containing hypericin. Once a sensitivity to hypericin is developed, it is cumulative. Secondary reactions include infections of the affected areas, and these infections in livestock can lead to starvation or dehydration.

Habitat and ecology

St. Johnswort is well adapted to a variety of temperate climates and soil types. It prefers poor soils and full sun, and can be found primarily in meadows, dry pastures, rangelands, roadsides and empty fields. However, it has the capability to invade healthy rangelands. It is not considered a serious threat to cultivated fields. Germination occurs during summer and seedlings are not considered competitive. St. Johnswort spreads by underground and above-ground creeping stems and by seed. Annual seed production ranges from 15,000 to 33,000. Seed viability ranges from six to ten years in the ground. Germination is increased after rainy periods, due to a germination inhibitor that is washed off by heavy rains. Dead plants are rust color in appearance.

Management

Biological: *Chrysolina hyperici/Chrysolina quadrigemina*— Leaf and flower eating beetles.
Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.
Mechanical: Pulling should only be considered an option on new or small infestations, and repeated pulls will be necessary to ensure removal of the whole plant and any lateral roots. Wear gloves and avoid touching the eyes.
Herbicides: Weedmaster® (dicamba + 2,4-D) is an effective control. Consult the current herbicide recommendations. Read the label before applying herbicides.

- One key way to identify common St. Johnswort is by taking a leaf and holding it up to the light, you will be able to see the light shine through the perforated dots on the leaf.
- In Lincoln County St. Jonhswort is also known as "goat weed".

PHRAGMITES/COMMON REED (Phragmites australis)

Identification

- Perennial grass or reed with creeping rhizomes and often with stolons. The woody stems can grow to 12 feet tall.
- Leaves grow alternatively along the top half of the stem. Leaves are strap-like; and inch or more wide, tapering to a long point, growing up to 2 feet long.
- Erect, smooth stems can grow as high as 6-15 feet tall.
- Silky inflorescence grow at the tops of the stems, draping to one side growing one to two feet long, and several inches wide.
- Because of the closeness with the native genotypes of Phragmites, the noxious, non-native genotype is very hard to differentiate.

Origin

Phragmites is often thought to originate from Eurasia. The current distribution of Phragmites includes Europe, Asia, America and Australia, however, the origin of the species is unclear. The rapid spread of Phragmites in recent years in North America has led wetland ecologists to believe that the species may be introduced. However, Phragmites rhizomes were found in North American peat cores dated 3,000 years old. Several different hypotheses have been proposed to explain the recent population explosion in North America, including the introduction of more aggressive European genotypes about 100 years ago.

Impact

The non-native genotype of Phragmites is frequently regarded as an aggressive, unwanted invader. It displaces native species that provide valuable forage for wildlife. The non-native genotype of Phragmites is a problem when and where stands appear to be spreading while other species typical of the community are diminishing. Disturbances or stresses such as pollution, alteration of the natural hydrologic regime, dredging, and increased sedimentation favor invasion and spread of Phragmites. Non-native genotype of Phragmites invasions may increase the frequency of marsh fires during the winter when the above ground portions of the plant die. In addition, Phragmites invasions can also have adverse aesthetic impacts. The Non-native genotype of Phragmites will colonize, and displace the other plants in a wetland community, often forming, dense monospecific stands. Wildlife is displaced when wetland hydrology, structure and function are altered. Water quality deteriorates when water flow or circulation is adversely affected by this species. In Washington, Phragmites is rapidly invading the riparian zone of the Snake River displacing native wetland vegetation. In the Winchester waste way, it is noted to aggressively invade areas following the eradication of purple loosestrife. There are also noted problems on our wildlife refuges in eastern Washington. Currently, about 12 sites have been identified as non-native Phragmites in Lincoln County.

Habitat and ecology

Phragmites is found in disturbed and non-disturbed (pristine) sites that hold water, including roadside ditches and depressions. It is typically found in or near wetlands including marshes, swamps, fens, prairie potholes, and marsh upland areas. Phragmites has been known to inhabit areas near freshwater, brackish (slightly saline) and alkaline wetlands in the temperate zones world wide. Phragmites will inhabit any slight depression that has the ability to hold water. It has become increasingly common along railroad tracks, roadsides, and dredge spoils. Phragmites is found on every continent except Antarctica and is thought to have the widest distribution of any flowering plant. Phragmites seeds are shed from November through January. When seeds germinate and become established the young plants will usually persist for at least two years in a small, inconspicuous stage where they resemble many other grass species. Phragmites primary mode of reproduction is vegetative, through its extensive rhizomatous network. Individual rhizomes live for 3 to 6 years developing buds at the base of the vertical rhizomes in late summer each year. The buds grow horizontally before going dormant until spring.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.
Mechanical: Since it is a grass, mowing\cutting several times during a season, at the wrong times, may increase stand density. However, if cut just before the end of July, most of the food reserves produced that season are removed with aerial portion of the plant, reducing the plant's vigor. This regime may eliminate a colony if carried out annually for several years. Care must be taken to remove cut shoots to prevent their sprouting and forming stolons.
Herbicides: Aquatic Glyphosate's are labeled for control. For best results, treat during late summer or fall months when plants are actively growing and in full bloom. Due to the dense nature of the vegetation, which may prevent good spray coverage and uneven stages of growth, repeat treatments may be necessary to maintain control. Visual control symptoms will be slow to develop. You must have an Aquatics Pesticide license to purchase or apply an aquatic herbicide. Read label instructions before applying any herbicides.

PERENNIAL PEPPERWEED (Lepidium latifolium)

Identification

- Perennial growing 1 to 3 feet tall, reproducing from seed and deep-seated rootstocks
- Leaves are alternate, lance shaped, bright green to gray-green, waxy, smooth to toothed margins, basal leaves larger than upper leaves.
- Flowers are small, white and in dense clusters mainly at the ends of the stems. Flowering occurs from early summer to fall.

Origin

Perennial pepperweed is native to Europe. It was inadvertently introduced to North America in contaminated sugar beet seed imported from Europe near the 1900's. It is abundant in Central Washington and known to be scattered across Western Washington.

Impact

Perennial Pepperweed is competitive in pastures and irrigated areas. The plant is grown and collected for dry flower arrangements. Weyerhaeuser is known to have been involved in the collection, preservation and shipment to California for dried flower arrangements.

Habitat and ecology

Perennial pepperweed prefers wet sites, but can invade cropland—more often in pastures, ditches and roadsides. Its deep-seated rootstocks and waxy leaves make this plant difficult to control. A wide and fluctuating range of winter temperatures favors seed germination.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.
Mechanical: Repeated hand pulling and digging are good for small infestations. Clean tillage equipment to avoid the spread of the root system.
Herbicides: Applications of Tordon® (picloram) + 2,4-D, Weedmaster® (dicamba+ 2,4-D), Redeem R&P® (clopyralid + triclopyr) are effective at controlling this plant. Any combination of these products will improve control, as well as, the addition of a surfactant. Consult the current herbicide recommendations. Read the label before applying herbicides.

COMMON TANSY (Tanacetum vulgare)

Identification

- An aromatic perennial, 1 1/2 to 6 feet tall. Reproduces from seed and rootstalk.
- Leaves are dark green, alternate, deeply divided into numerous narrow, toothed leaflets (fern-like).
- Flowers are yellow, button-like, without petals, 1/2 inch across in flat topped dense clusters.
- Stems are often purplish-red in color.

Origin

Common Tansy is native of Europe and became established in the U.S. when introduced as an ornamental and for medicinal purposes.

Impact

Common Tansy has been reported to be poisonous to animals, but is seldom grazed because of its strong odor. In pastures it displaces plants that provide good forage.

Habitat and ecology

Common Tansy can form dense patches in moist areas; found along roadsides, in waste areas and in pastures usually with good subsoil moisture. It is found most often on dry, sandy or gravelly soils.

Management

Cultural: Healthy competitive vegetation helps lessen chance of invasion, but doesn't prohibit such invasions.
Mechanical: Common Tansy will not persist under cultivation. Mowing and digging the rootstalks is also effective, but must be performed regularly to have lasting effects.
Herbicides: Weedmaster® (dicamba + 2,4-D) is an effective control tool. Addition of Tordon® (picloram) increases control effectiveness and may lead to eradication. Consult the current herbicide recommendations. Read the label before applying herbicides

DALMATION TOADFLAX (Linaria dalmatica)

Identification

- Short-lived perennial, grows at least 3 feet tall, reproduces from seed and underground root stalks
- Leaves are light green, waxy, alternate, heart-shaped and clasp the stem.
- Flowers are bright yellow tinged with orange and resemble snapdragon flowers. Flowers mid-summer until early fall.

Origin

Because of its showy flowers Dalmatian toadflax has been cultivated since the 16th century and has subsequently become widely distributed throughout the world. Dalmatian toadflax was probably introduced to North America in the late 1800's as an ornamental. The first records of the species in Washington date back to the 1920's near Spokane.

Impact

Mature Dalmatian toadflax plants are strongly competitive with shallow-rooted perennials and winter annuals. Because of its competitive ability, Dalmatian toadflax is a concern in pasture and rangelands, as well as natural areas, where it can out compete more desirable, native species.

Habitat and ecology

In North America, Dalmatian toadflax is know from at least 15 states and six Canadian provinces, with a latitudinal range of 35° N to 56° N. It occurs in a variety of habitats, including: roadsides, pastures, rangeland and waste areas. It has spread most extensively west of the 100th meridian, occurring primarily on coarse-textured soils, ranging from sandy loams to coarse gravels. Dalmatian toadflax is a short-lived perennial that spreads by horizontal or creeping rootstocks and by seed. A mature plant can produce up to 500,000 seeds, which may live up to ten years in soil.

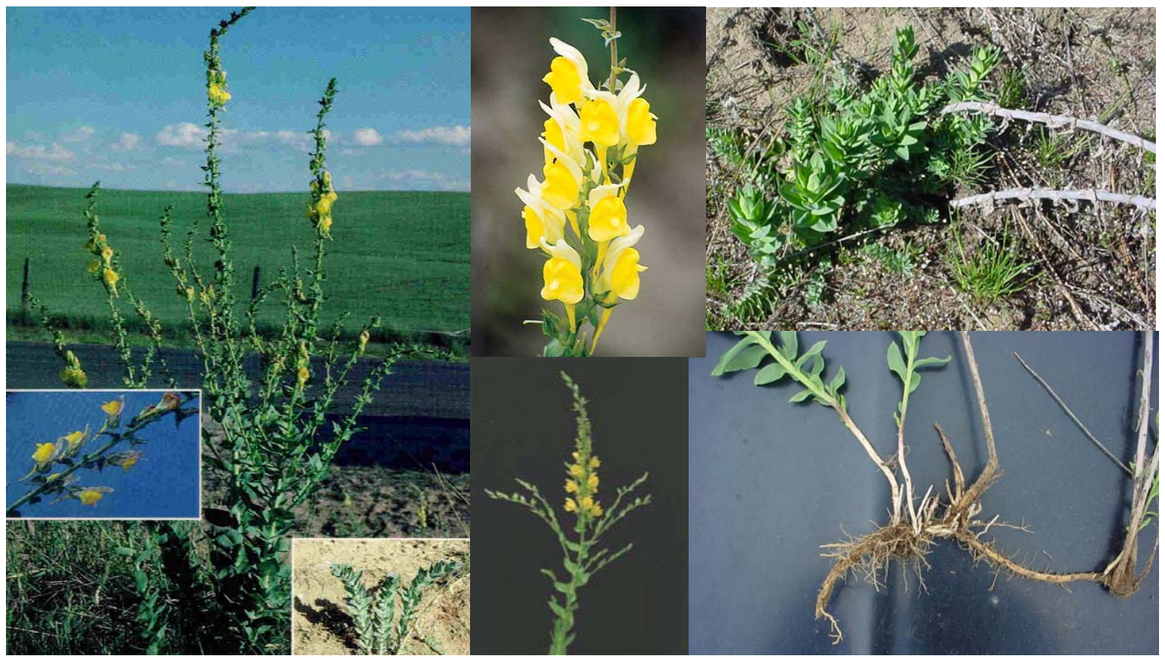
Management

Biological: A stem-boring weevil (Mecinus Janthinus) has shown early indications that it will be effective.

Cultural: Maintain a good competitive vegetative stand to help prevent infestation. A good stand of grass or crop does not guarantee protection against infestation.

Mechanical: A successful cultivation approach includes at least a two year effort, with eight to ten cultivations in year one and four to five in year two.

Herbicides: Tordon® (picloram), Telar®/Escort® (chlorsulfuron/metsulfuron) and surfactant can successfully eradicate plants. The use of a surfactant is a must for adequate herbicide penetration. Consult the current herbicide recommendations. Read the label before applying herbicides.



OXEYE DAISY (Leucanthemum vulgare)

Identification

- Perennial growing 10 to 24 inches tall. Reproduces by seed and short rootstocks.
- Leaves progressively reduce in size upward on stem. The toothed, spatula-shaped to round basal leaves occur on long stalks. The stem leaves are alternate and lack stalks; they are generally lance-shaped, with coarse teeth and often have a few lobes at the base.
- Flowers are showy. Each flower head is composed of numerous bright yellow disk flowers encircled by white ray flowers that appear as a fringe of 20 to 30 petals.
- The entire plant has a disagreeable odor when crushed.

Origin

A European native, oxeye daisy has spread to become a weed in 40 countries, from Africa to Australia to North and South America. It is found in every state in the U.S. It was introduced to the Pacific Northwest in the late 1800's and spread primarily as a contaminant of forage grass and legume seed. By 1937, it had spread to half the counties in the region. Although sale/distribution of the plant is prohibited in Washington, it is still sometimes sold as an ornamental.

Impact

Oxeye daisy can replace pasture forage and it's bitter nature can impart a disagreeable flavor to milk of grazing animals. Grass seed production can be hampered as small weed seed is difficult to clean from grass seed.

Habitat and ecology

Oxeye daisy can survive over a wide range of environmental conditions. It is found in native grasslands, overgrazed pastures, waste areas, meadows, railroad rights-of-way and roadsides. It can flourish on a variety of soil types and is often prevalent on acidic sites low in nutrients. It is frost-tolerant and survives drought well. Oxeye daisy aggressively invades fields, where it forms dense populations, thus decreasing plant species diversity. Even in heavy infestations, bare soil is more common, which increases the potential for erosion. Plants are high in fiber and low in protein. Cows and pigs avoid it.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.

Mechanical: Oxeye daisy has a shallow root system and is easily controlled by intensive cultivation. Mowing as soon as the first flowers open can eliminate seed production. However, mowing may stimulate shoot production.

Herbicides: Weedmaster® (dicamba + 2,4-D) and Redeem R&P® (clopyralid + triclopyr) provide control. Application of nitrogen fertilizer can reduce canopy cover. Consult the current herbicide recommendations. Read the label before applying herbicides

ORANGE HAWKWEED (Hieracium aurantiacum)

Identification

- Fibrous rooted perennial up to 12 inches tall
- Leaves are basal, lance-shaped, hairy, occasionally 1 to 2 small leaves on the stem.
- Flower heads are about 1 inch in diameter and usually red on the margin, merging into an orange-colored center. Flowering occurs in late June and July.
- Stems are about 12 inches tall with stiff black glandular hairs and only occasional small leaves.

Origin

Orange hawkweed was first introduced from Europe in to New England, because of its attractive flame-colored flowers. Originally it was a garden ornamental. This species was introduced to Spokane in 1945. It continues to be spread around by wildflower enthusiasts and sometimes shows up for sale in nurseries.

Impact

Orange hawkweed is an aggressive competitor of pasture and range plant species. It is unpalatable and thus crowds out more palatable species.

Habitat and ecology

Orange hawkweed occurs in permanent meadows, grasslands, range and pastures. It spreads by seed, below ground runners and above ground runners, like strawberry plants. It contains a milky juice and can form near monocultures with few other plants apparent on the dominated sites. Tolerates shade, but thrives in open meadows. Orange hawkweed has fibrous roots and does well in lawns.

Management

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: In scattered patches of small size, the simplest mode of attack is to dig them out, making sure that all of the below-ground growth is also removed, since even a small piece may develop into a new plant. Plants removed should be carried away and either burned or placed in a refuse pile where they can do no harm. It will not withstand tillage, but cutting and pulling are ineffective unless done with frequency and diligence to eliminate re-growth.

Herbicides: Weedmaster® (dicamba + 2,4-D), Tordon® (picloram) and Redeem R&P® (clopyralid+triclopyr) are products that will show good results if used with a surfactant. Consult the current herbicide recommendations. Read the label before applying herbicides.

DIFFUSE KNAPWEED (Centaurea diffusa)

Identification

- Biennial or short-lived perennial, long tap root, grows 1-2 feet tall.
- Leaves are grayish-green, alternate, hairy and bitter. Basal leaves are short-stalked and divided into lobes on both sides of the center vein. Stem leaves are stalk less, becoming smaller and less divided near the top of the stem.
- The flowers, which are generally white, occur in urn-shaped heads that grow in clusters at the ends of the branches. The bracts of the flower heads are leathery, with obvious veins. The lower and middle bracts are yellowish-green with a buff or brown margin; they are edged with a fringe of spines plus a longer, spreading spine at the tip. Flowers June through September.

Origin

Current information indicates that Diffuse knapweed may have been introduced as a contaminant of alfalfa from the Caspian Sea region of Turkestan. The species was first reported in Washington in 1907 (near Bingen). It appears to have spread along roadsides and irrigation ditches in the Northwest, and, by 1937, it was becoming common in Okanogan County.

Impact

Diffuse knapweed is a very aggressive species that can infest large areas quickly. The species has little value as forage for cattle and limited seasonal value for big game. Infestations increase production costs for ranchers, impair the quality of wildlife habitat, decrease plant diversity, increase soil erosion rates, decrease the visual quality and appeal of recreational lands and pose wildfire hazards.

Habitat and ecology

Diffuse knapweed has been found in a wide range of habitats of Lincoln County, including sandy river shores, gravel banks, cracks in rock on cliffs and outcrops, rangelands, pastures and hayfields on sandy loams, loams and silt loams. Grows best in well drained light textured soils. A single flower stalk produces 1,200 seeds. Reproduces from seed only.

Management

Biological: A seed head weevil (Larinus minutus) can eradicate populations.

Mechanical: Cultivation, digging and pulling can eliminate plants and seed production if repeated frequently.

Herbicides: Clopyralid plus Triclopyr, 2,4-D plus Dicamba and Picloram have been used to eradicate infestations. Consult the current herbicide recommendations. Read the label before applying herbicides.

EURASIAN WATERMILFOIL (Myriophyllum spicatum)

Identification

- Submersed, perennial plant
- Submersed leaves are feather-like, arranged in whorls of 4 around the stem, 12 or more leaflet pairs.
- Emergent leaves smooth edged to toothed, located on the flower spike with one leaf beneath each flower, leaves are shorter than flowers.

Origin

Eurasian watermilfoil is native to Europe, Asia, northern Africa and also occurs in Greenland. It is debated that Eurasian watermilfoil was either introduced in the 1880's or 1942. One thing is for sure, by 1985 Eurasian watermilfoil had been found in 33 states. It appears to be primarily spread from water body to water body through boating activity, although anglers have been known to deliberately plant this species in lakes.

Impact

Eurasian watermilfoil adversely impacts aquatic ecosystems by forming dense canopies that often shade out native vegetation. Monoculture stands of Eurasian milfoil provide poor habitat for waterfowl, fish and other wildlife. Significant rates of plant sloughing and leaf turnover, as well as the decomposition of high biomass at the end of the growing season, increase the internal loading of phosphorous and nitrogen to the water column. Dense mats alter water quality by raising pH, decreasing oxygen under the mats, and increasing temperature.

Habitat and ecology

Eurasian watermilfoil is an extremely adaptable plant, able to tolerate and even thrive in a variety of environmental conditions. It grows in still to flowing waters, can tolerate salinity, grows rooted in water depths from 3 to 33 feet and can survive under ice. It is able to tolerate pHs from 5.4-11. Relative to other submersed plants, Eurasian watermilfoil requires high light, has a high photosynthetic rate and can grow over a broad temperature range. Grows best in fine-textured, inorganic sediments and relatively poorly on highly organic sediments. Can reproduce from plant fragments. Sprouting from seed is rare.

Management

Biological: A weevil is currently available for control.

Cultural: Localized control can be achieved by covering the sediment with an opaque fabric which blocks light from plants.

Mechanical: Rotovation and harvesting should only be performed as a last resort.

Herbicides: Sonar® (fluridone) has been successful at eradicating Eurasian watermilfoil. To be effective, fluridone concentrations of 10-15 parts per billion must be maintained in the water column for 10 to 12 weeks. Consult the current herbicide recommendations. Read the label before applying herbicides.

MYRTLE SPURGE (Euphorbia myrsinites)

Identification

- Perennial forb that can grow 8-12 inches tall on ascending to trailing stems rising at the tips.
- Inconspicuous yellow-green flowers are surrounded by heart shaped bracts.
- Oval, blue-green, fleshly, succulent-like leaves are arranged in close spirals around the stems.
- Stems grow from a prostrate woody base.
- Leaves are covered with a waxy cuticle.

Origin

Myrtle spurge is native to Eurasia, historically it is thought to be native to the Mediterranean regions ranging from the Balearic Islands throughout parts of Italy. It was brought to the United States as an ornamental.

Impact

Myrtle spurge can inhabit disturbed ground crowding out native habitat for deer and other wildlife. It also poses dangers to children and adults who come in contact with its caustic latex sap. It causes nausea, vomiting and diarrhea when ingested. Contact with the skin results in redness, swelling and blisters. Wearing gloves, long sleeves and shoes is highly recommended when in contact with this plant, as all plant parts are considered poisonous. Although sometimes grown as a decorative plant in gardens, Myrtle spurge is considered highly invasive and noxious. This plant can rapidly expand into sensitive ecosystems, displacing native vegetation and reducing forage for wildlife.

Habitat and ecology

Myrtle spurge prefers well-drained dry to moist soils with partial shade to full sun. This plant is an escaped ornamental that inhabits disrupted areas and waste places. It is primarily found in municipal areas and near wild lands. It is highly invasive and usually spread by seed, although root fragments can also produce new plants. Capable of projecting seeds 15 feet. Flowering occurs in March and April. Livestock and animal generally avoid Myrtle spurge and has been touted as deer proof.

Management

Cultural: Good competitive vegetation helps prevent infestation, but doesn't stop it entirely.

Mechanical: NOT RECOMMENDED!

Herbicides: Fall treatment works a little better than spring. Most any herbicide such as 2,4-D will work, in fall, use a residual herbicide. Be sure to include a surfactant due to the waxy leaf surface. Read the label instructions before applying any herbicides.

MUSK THISTLE (Carduus nutans)

Identification

- Musk Thistle is a biennial although it may occasionally act as a winter annual. It is a robust thistle and given the right conditions may grow to 7 feet tall.
- Flower heads droop at maturity. Each plant may have 50 to 100 flower heads with up to 1,000 seeds per head.
- Stems are spiny and winged except just below the flower head. Leaves are alternate on the stem, deeply lobed and spiny.

Origin

Musk thistle is native to Europe and Asia and has been present in the eastern U.S. for nearly 100 years. Most western states report some level of infestation.

Impact

Musk thistle invades pastures, meadows, and fields. In so doing it crowds out other more desirable forage plants. Livestock will not graze in areas heavily infested with Musk thistle thus decreasing available pasture. It spreads rapidly by seed. It also invades stream banks, hindering access and has been reported as problematic in grain fields.

Habitat and ecology

Musk thistle can be found in pastures, rangeland, native meadows, roadsides, forests, stream banks and occasionally grain fields. It spreads by seeds that are wind dispersed for short distances.

Management

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Biological: A seed eating beetle (Rhinocyllus conicus) is very effective at eliminating seed production.

Mechanical: May be hand pulled with much success. Properly managed pastures will resist Musk thistle infestations, so long as adjacent infestations are controlled. In cropland situations cultivation will kill young seedlings.

Herbicides: Applications of 2,4-D + Dicamba (Weedmaster) + surfactant has shown good control. As well as, Curtail, Telar, Milestone Redeem and Cimarron Max. Consult the current herbicide recommendations. Read the label before applying herbicides.

FIELD BINDWEED (Convolvulus arvensis)

Identification

- Perennial vine, growing 1 to 5 feet long. Reproduces from seed and roots.
- Leaves are alternate, arrowhead-shaped, rounded or blunt tipped.
- Flowers have a funnel shape and are white to light pink in color, up to 1 inch wide, two small scale-like bracts attached below flower on flower stem. Flowers from June until frost in fall.

Origin

Field bindweed is native to Eurasia. It was introduced to North America around 1739 in the state of Virginia. It spread westward rapidly with the building of railroads. By 1900, all of the western states were infested.

Impact

Infestations can severely reduce crop yields. It is a poor competitor for light, but an effective competitor for soil moisture. It interferes with harvesting operations due to its twining growth habit and often causes lodging of the crop. It is an alternate host of the viruses which cause potato X disease, tobacco streak, tomato spotted wilt and vaccinium false bottom.

Habitat and ecology

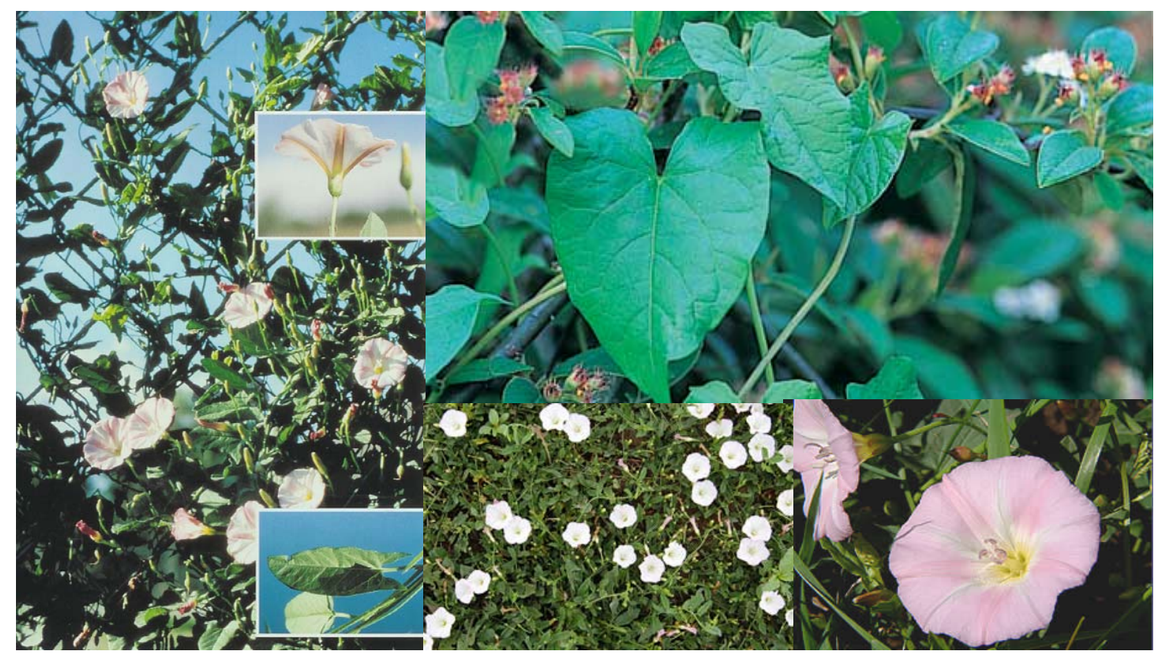
Field bindweed can survive on a variety of soil types. It is found on dry or moderately moist soils and is not a weed of wetlands normally. It is extensively distributed in cultivated fields and waste places. Because of its remarkable adaptability to different environmental conditions, it may be found at altitudes as high as 10,000 feet. It is difficult to eradicate, because of a root system that can penetrate the soil to a depth of 20 feet and gives rise to numerous long lateral roots. The rough texture of the stem and leaves makes the plant difficult to wet with herbicidal spray. Flowers are pollinated by insects. Seed set is variable. Dry, sunny weather and dry habitats are the most favorable to seed set. It may fail altogether in rainy periods and on poorly drained soils. Under favorable conditions, a plant may produce between 25-300 seeds. In a pure stand, between 25,000 to 10 million seeds per acre may be produced. Dispersal can be by animals after ingestion, by water, and as a contaminate of crop seeds. Seed remain viable for up to 50 years.

Management

Cultural: Competitive crops such as winter wheat or perennial forages are able to reduce infestations significantly after 3 to 5 years, particularly when combined with herbicide use.

Mechanical: From 1 to 5 years of repeated tillage may be required to exhaust root carbohydrate reserves.

Herbicides: Weedmaster® (dicamba + 2,4-D), Tordon® (Picloram) and or other residual products used separate or together along with a surfactant show good control. Consult the current herbicide recommendations. Read the label before applying herbicides.



HOARY CRESS (Cardaria draba)

Identification

- Deep-rooted perennial up to 2 feet tall, reproducing from root segments and seeds.
- Leaves are alternate, mostly toothed, blue-green in color and lance-shaped. Lower leaves are stalked; upper leaves have two lobes clasping the stem.
- Flowers are white with four petals, giving the plant a white, flat-topped appearance.

Origin

Hoary cress was first reported in the U.S. in 1862 on Long Island, NY, and was probably introduced in soil used as ship's ballast. It is now present in much of the U.S.

Impact

Hoary cress is highly competitive with other species once it becomes established. It has the potential to reduce the value of high-price wheat lands.

Habitat and ecology

Hoary cress is a significant hazard to crop production under moist conditions and on irrigated land, but is unlikely to be a problem in arid areas. It shows a preference to alkaline soils, but does well on a variety of soils where moisture conditions are moderate. It grows under open, unshaded conditions in grain fields, hayfields, sugar beets, vegetable crops and along roadsides. The root system consists of vertical and lateral roots from which grow new rosettes and flowering shoots. It survives and spreads primarily by an extremely persistent root system. These over wintering roots give rise to new shoots in the spring. Flowers commonly do not form until after two years of age. The plant usually blooms in Mid-May. A single plant established in the absence of competition has been reported to spread over an area 11 feet in diameter during its first year of development. The plants are capable of producing up to 455 shoots in one year. The flowers are pollinated by insects. One mature plant produces 1,200 to 4,800 seeds. A one year old seed will germinate 84% of the time, two year old seed will germinate 31% of the time and a third year seed will not germinate.

Management

Cultural: A well established vegetative stand will help reduce the possibility of infestation by Hoary cress, but is not a guarantee.

Mechanical: Studies have shown that it takes three consecutive years of intensive tillage to kill the root system. Other studies indicate that seeds are killed after being buried in moist, compacted manure for one month.

Herbicides: Weedmaster® (dicamba + 2,4-D), Tordon® (picloram), Telar® (chlorsulfuron) and Escort® (metsulfuron) separate or together with the addition of a surfactant show good results in controlling Hoary cress. Consult the current herbicide recommendations. Read the label before applying herbicides.

LEAFY SPURGE (Euphorbia esula)

Identification

- Perennial, 1 1/2 to 3 feet tall
- Leaves are alternate, narrow, 1 to 4 inches long
- True flowers are yellow-green and inconspicuous
- Leaves, stems and roots all exude a milky, irritating sap when broken

Origin

Leafy spurge is native to Eurasia and was brought into the U.S. as a seed impurity about 1827. It appears that multiple strains were imported at different times. Leafy spurge of European origin is found along the east coast and areas of the Great Plains are infested with Leafy spurge from Russia.

Impact

Leafy spurge reduces the livestock carrying capacity of pasture and rangeland by 20-50%, causing an estimated $35-45 million loss per year in U.S. beef and hay production in addition to the millions of dollars spent for control. It has been reported to cause severe irritation of the mouth and digestive tract in cattle which may result in death. The milky sap can cause serious skin irritation or blindness to humans.

Habitat and ecology

Leafy spurge can survive under a wide range of unfavorable conditions

Management

Biocontrol: The Leafy Spurge Flea Beetles (Apthona flava, Apthona nigriscutis and Apthona lacertosa) have shown mixed results in Lincoln County.

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: Cultivation, digging and pulling can all be effective if done often.

Herbicides: Applications of 2,4-D, picloram and metsulfuron separate or in combination will control and eradicate Leafy Spurge provided that a surfactant is used. Consult the current herbicide recommendations. Read the label before applying herbicides.

KOCHIA (Kochia scoparia)

Identification

- Annual, 1 to 7 feet tall, spreads by seed.
- Leaves are alternate, lance-shaped, 1/2 to 2 inches long, margins fringed with hair; the upper surface is usually smooth, the lower surface is usually covered with soft hairs; leaf blades with 3 or 5 prominent veins.
- Flowers are inconspicuous. Flowering occurs August to October.

Origin

Kochia is native to Europe and has escaped from cultivation as an ornamental. It is now naturalized across the northern half of the United States and is spreading westward.

Impact

In the Great Plains, where Kochia is widespread, it is considered a serious pest of late-maturing crops such as sorghum, soybeans and sugar beets. It is also a problem in the fallow portion of the cereal-fallow systems. Montana considers Kochia the fourth most important weed affecting cereal production. Kochia is an effective competitor for light, nutrients, and soil moisture and can reduce yield.

Habitat and ecology

Kochia is highly adaptable. It is very drought tolerant and can spread rapidly in these conditions. Kochia has a wide tolerance of soil types and is even adapted to salty soils. It is common in cultivated fields, gardens, roadsides, ditch banks and waste areas. Kochia can accumulate high nitrate concentrations under certain conditions making it toxic to livestock. Also, Kochia has been linked to photosensitivity. Kochia typically produces 14,600 seeds per plant. Seeds are dispersed in the fall when the plant becomes a tumbleweed. Laboratory tests report seeds buried in the soil have 5% viability after one year and 0% after two years.

Management

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: Kochia grows very rapidly through the spring and summer and sends down a very long taproot (up to 16 feet). Because of its annual growth pattern hand pulling can be successful. Mowing or slashing the plants before flowering is effective in reducing the seed production.

Herbicides: Applications of 2,4-D + fluroxypyr + surfactant has shown good control. As well as, Weedmaster®, Telar® and Escort®. Consult the current herbicide recommendations. Read the label before applying herbicides.

HOUNDSTONGUE (Cynoglossum officinale)

Identification

- Biennial, spread by seeds. Grows 1 to 4 feet tall. Rosette is formed first year, flowering stalk elongates second year.
- Leaves are velvety to the touch. Outer edge of leaves has a purple tint. Basal leaves are broad, lance-shaped. Upper leaves are narrower, pointed, clasping stem.
- Flowers are a dull reddish-purple color about 3/8 inch wide and 5-lobed. Flower from June to July.

Origin

Houndstongue was introduced to the United States from Europe. It was probably brought over as seeds entangled in the hair of livestock.

Impact

Houndstongue is a problem plant in pastures where it competes with desirable forage and its rough seeds cling to animals. Houndstongue is toxic, containing pyrrolixidine alkaloids, causing liver cells to stop reproducing. Animals may survive for six months or longer after they have consumed a lethal amount. Sheep are more resistant to Houndstongue poisoning than are cattle or horses. Horses may especially be affected when confined in a small area infested with Houndstongue and lacking desirable forage.

Habitat and ecology

Houndstongue has adapted to temperate climates. It is mostly found on gravelly somewhat alkaline soils, i.e. roadsides, meadows and disturbed places. Houndstongue tolerates shade but is more robust in sunlight. The fruit consists of 4 flattened bur-like nutlets, each 1/4 inch long with short barbed appendages.

Management

Cultural: Good competitive vegetation helps prevent Infestation, but doesn't stop it entirely.

Mechanical: Cultivation, digging and pulling can all be effective if done often.

Herbicides: Applications of 2,4-D, Tordon® (picloram) and Escort® (metsulfuron) separate or in combination will control and eradicate Houndstongue provided that a surfactant is used. Consult the current herbicide recommendations. Read the label before applying herbicides.

JAPANESE KNOTWEED (Polygonum cuspidatum)

Identification

- Perennial plant with rhizomes that can extend 30 feet from the parent plant and grow as much as 7 feet below the soil.
- Can grow to a height between 4 to 8 feet tall and is often shrubby.
- Stout stems are smooth (bamboo-like) and swollen at the joints where the leaf joins the stem.
- Flowers are minute, greenish-white and occur in branched sprays followed by small winged fruit.
- The broadly-ovate leaves are petiole, truncate and a little triangular; their tips are pointed, some 2-6 inches long, and 2-5 inches wide.

Origin

Japanese knotweed was introduced to North America in the 1800's for use in estate gardens after receiving wide horticultural attention in Europe and for erosion control. A native of Japan, however, it has naturalized in North America, where it can be found from Newfoundland and many parts of the northeastern states, west to California and the Pacific Northwest. In Lincoln County, 3 sites have been located along Lake Roosevelt and another along Bald Ridge Road north of Davenport.

Impact

Japanese knotweed is a very aggressive species that is capable of crowding out all other vegetation. It is an escaped ornamental that is becoming increasingly common along stream sides and rights-of-way in Washington. The species forms dense stands that crowd out all other vegetation, degrading native plant and animal habitat. In addition, Japanese knotweed can create a fire hazard in the dormant season. This perennial plant is difficult to control because it has extremely vigorous rhizomes that form a deep, dense mat. In addition, the plant can re-sprout from fragments; along streams, plant parts may fall into the water to create new infestations downstream.

Habitat and ecology

Japanese knotweed is a perennial species with spreading rhizomes and numerous reddish-brown, freely branched stems. It tolerates a variety of adverse conditions including full shade, high temperatures, high salinity and drought. It can be found near water sources, in low-lying areas, waste places, utility right of ways, and around old home sites. Very susceptible to spring and fall frosts. Dense colonies can produce 11 to 16 ton per acre of dry matter and rhizome weights of 5 to 14 ton per acre.

Management

Herbicides: Foliar application of Roundup, Aquamaster, Habitat or Arsenal can result in 68%-94% control. Stem injection\cut stem treatment of Aquamaster or Roundup Concentrate involves an injection gun to get herbicide into the stems. Read the label instructions before applying an herbicides. Continue to monitor the site.

JOINTED GOATGRASS (Aegilops cylindrica)

Identification

- Winter annual grass growing 15 to 30 inches tall with one to many erect stems or tillers.
- Leaves are alternate 1/8 to 1/4 inch wide with hairs on the leaf margins and at the stem juncture.
- Flower spike (seed head) is cylindrical and distinct from wheat. Two to four flowers are arranged in each of the spikelets which form the elongate cylindrical spike.

Origin

Jointed goatgrass was introduced into the U.S. in the early 1900's, reported in the Pacific Northwest in 1917. Found in wheat producing areas of the Pacific Northwest. Known to occur in every county in Eastern Washington.

Impact

Jointed goatgrass is highly competitive in winter wheat, CRP and rangeland. Grain contaminated with it cannot be certified. Fields rejected for jointed goatgrass remain ineligible for future production of certified classes of small grain seed until a reclamation program is developed. Jointed goatgrass is a serious problem in small grains because the similar seed size and weight makes for a very difficult job in separating jointed goatgrass from small grain seed (especially wheat seed). This means clean fields may be easily contaminated with wheat seed containing jointed goatgrass.

Habitat and ecology

Jointed goatgrass is found mostly in wheat fields, but it survives along roadsides, in waste areas, alfalfa fields and pastures. It is very difficult to commercially separate jointed goatgrass segments for wheat seed due to similar size or to spray or cultivate goatgrass effectively in winter wheat due to common characteristics and ancestry. Hybridization may occur with wheat. The hybrid then consists of spikelets of both wheat and jointed goatgrass. The seed, when produced in hybrids are usually sterile. Jointed goatgrass is usually spread as a contaminant of winter wheat or by wheat harvesting equipment.

Management

Cultural: Change the crop for at least 2 years to a late spring crop. To prevent jointed goatgrass from producing seed, the infested area must not be planted to fall-sown grains. Seed can remain viable for several years. Therefore, to prevent infestation, the crop must be changed for at least 3 years.

Mechanical: Will not stand spring tillage. Small infestations may be removed by hand.

Herbicides: The Clearfield wheat program is an effective control. Consult the current herbicide recommendations. Read the label before applying herbicides.