



# Identification and Control of Selected Noxious Weeds

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**Garlic Mustard (*Alliaria petiolata*)**  
**Class A Noxious Weed**



# Garlic Mustard (*Alliaria petiolata*)

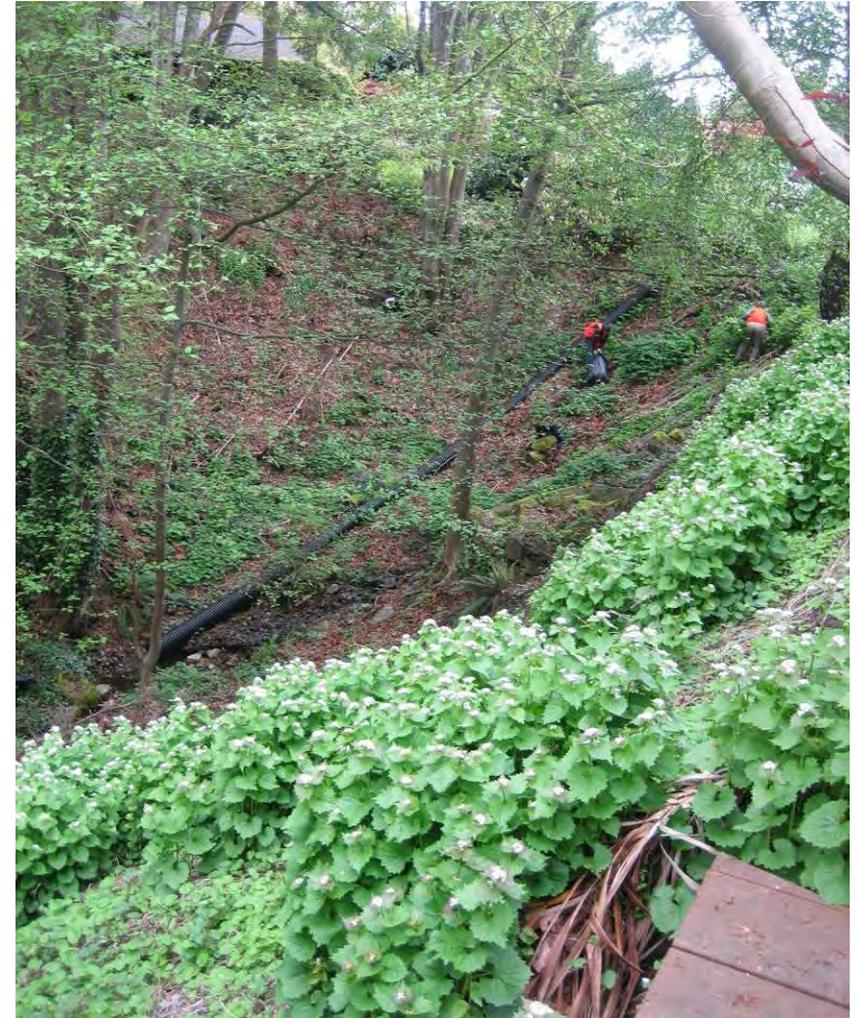


**Infestation along Longfellow Creek**



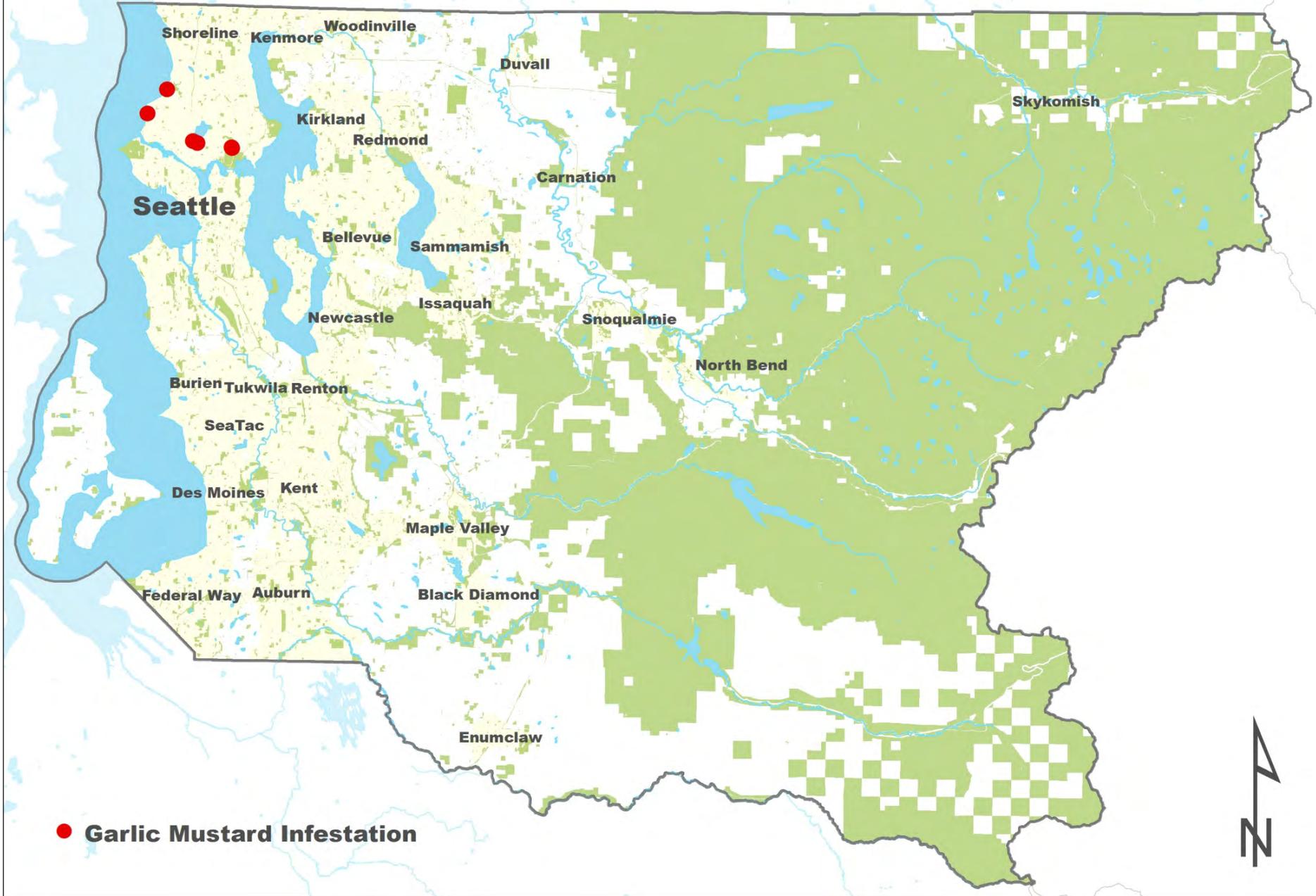
# Garlic Mustard

- Spreads up to 120 feet in one year, in undisturbed forests
- It inhibits tree growth through negative impacts on beneficial fungi.
- No natural enemies in North America.

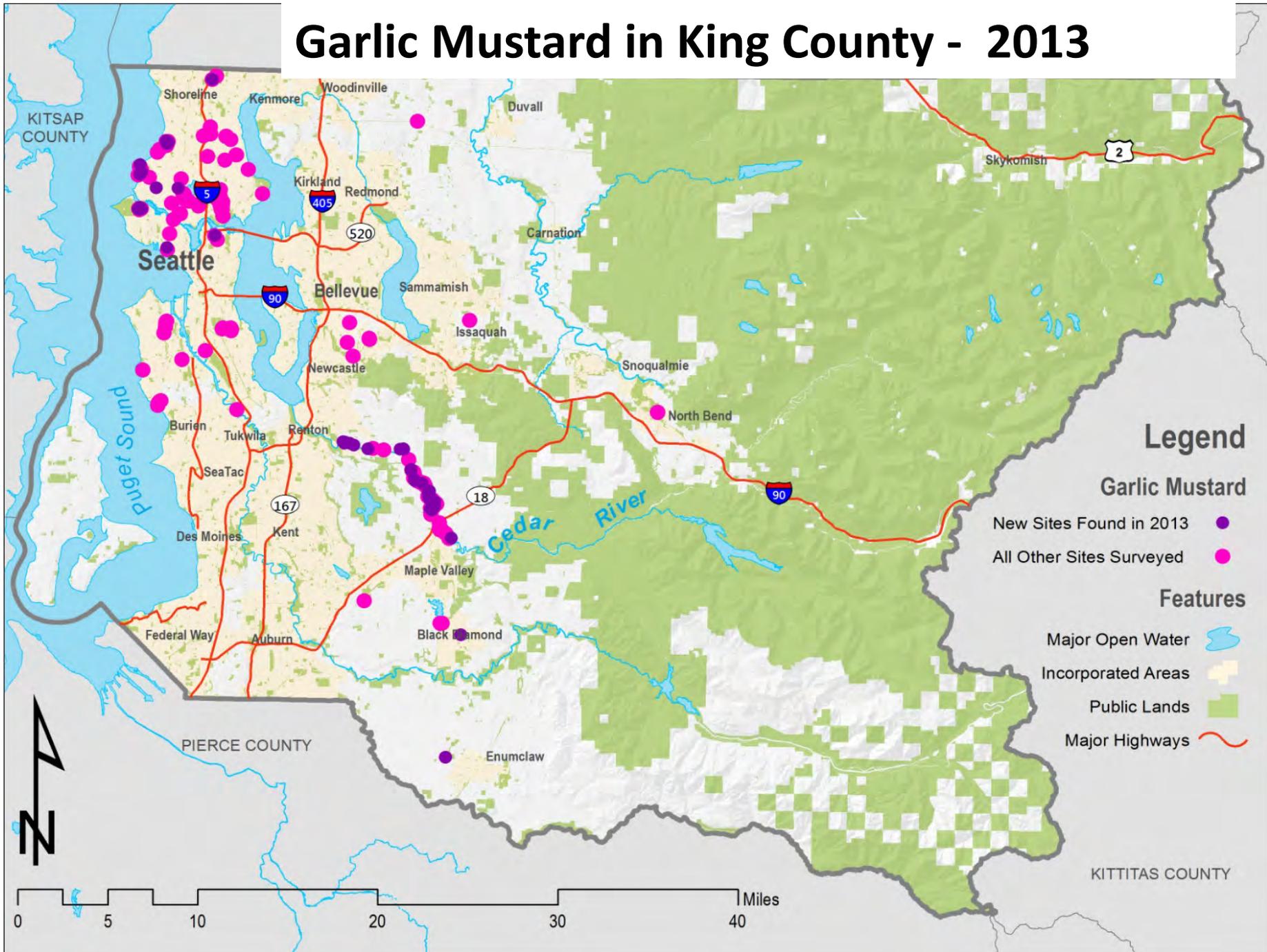


**Garlic mustard covering a hillside near Carkeek Park in Seattle.**

# Garlic Mustard in King County- 2000



# Garlic Mustard in King County - 2013



**Class A Noxious Weed**

**Garlic Mustard**  
*(Alliaria petiolata)*



# Garlic Mustard: How Bad Can it Get?



The green covering on the forest floor on the Bartell stream bank in Peoria is almost entirely covered by garlic mustard. Photo credit: Adam Davis, University of Illinois. <http://wssa.net/wp-content/uploads/Garlic-Mustard-Streambank.jpg>

## Aggressive invader even in established forests



Spot the garlic mustard

Out competes native plants



# Garlic Mustard Identification

Class A Noxious Weed

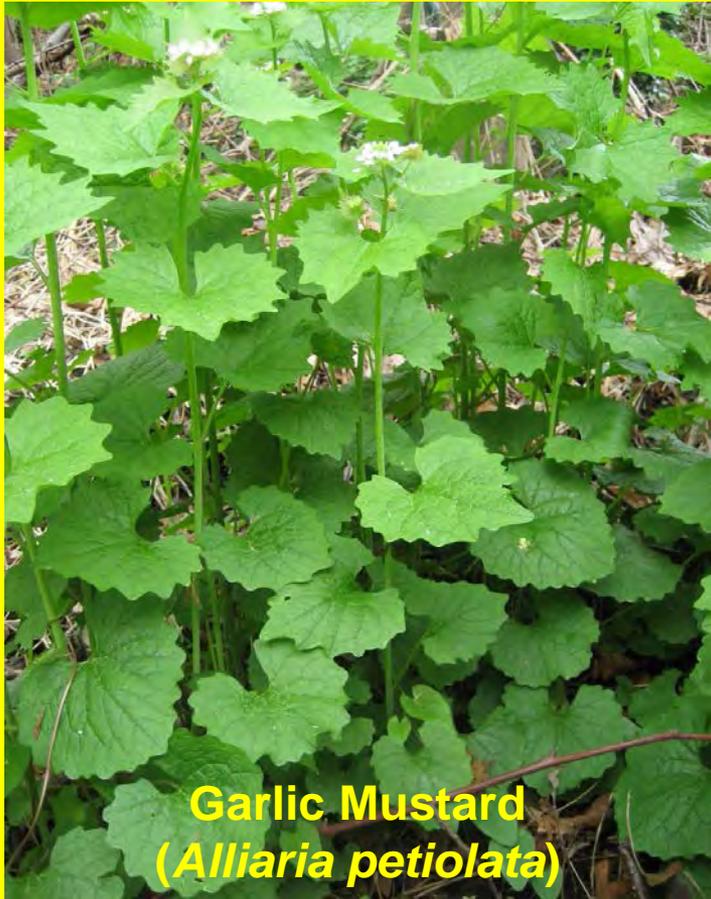


- Small white flowers with 4 petals
- Lower leaves rounded
- Upper leaves more like triangles or hearts
- Garlic smell when crushed



- Thin seed pods
- Curved roots

# Garlic mustard has lots of look-a-likes



**Garlic Mustard**  
*(Alliaria petiolata)*

Leaves are not fuzzy or hairy  
Flowers are white  
Seed pods are long and narrow



**Nipplewort**  
*(Lapsana communis)*



**Money Plant**  
*(Lunaria annua)*



**Large-leaf Avens**  
*(Geum macrophyllum)*



**Fringecup**  
*(Tellima grandiflora)*

Leaves on most of the look-a-likes are fuzzy

# Garlic Mustard Top Look- Alike: Money Plant (*Lunaria annua*)



**White-Flowered Money Plant**



**Garlic Mustard Money Plant**

Garlic Mustard Look- Alike:  
Nipplewort  
(*Lapsana communis*)



# How garlic mustard can spread



A deer standing in the middle of a garlic mustard infestation in Coal Creek Natural Area and a deer track through the same site in the early spring, covered in garlic mustard seedlings



Isaac Cunningham

# Garlic Mustard Control



Control Method depends on growth stage and site conditions:

- Pull plants with flowers and immature seed pods\*
  - Pull slowly to avoid breaking at bend in root, for older plants best to loosen soil with hori hori hand trowel or shovel
  - Bag and discard, do not compost
- \* rosettes almost always break off and regrow if pulled
- Rosettes & seedlings: dig up or spray
  - Glyphosate: 1 to 3% in early spring or late fall
  - Triclopyr: 1%, early spring
- Mulch with 4-6" of wood chips
- Propane torch - can control young plants if exposure to the flame is long enough to destroy the root

# Get the whole root!



# Ineffective Control Options

- Mowing /Cutting/Weed whacking
  - Will re-sprout from root and lower stem
  - Will flower again and seed
- Burning
  - Plants have thick, difficult to kill roots. (only seedlings can be controlled with a torch).
- Leaving on ground after pulling
  - Will continue to flower and set seed



Two dead stalks surrounded by new growth

<http://www.fosc.org/GM-Technique.htm>



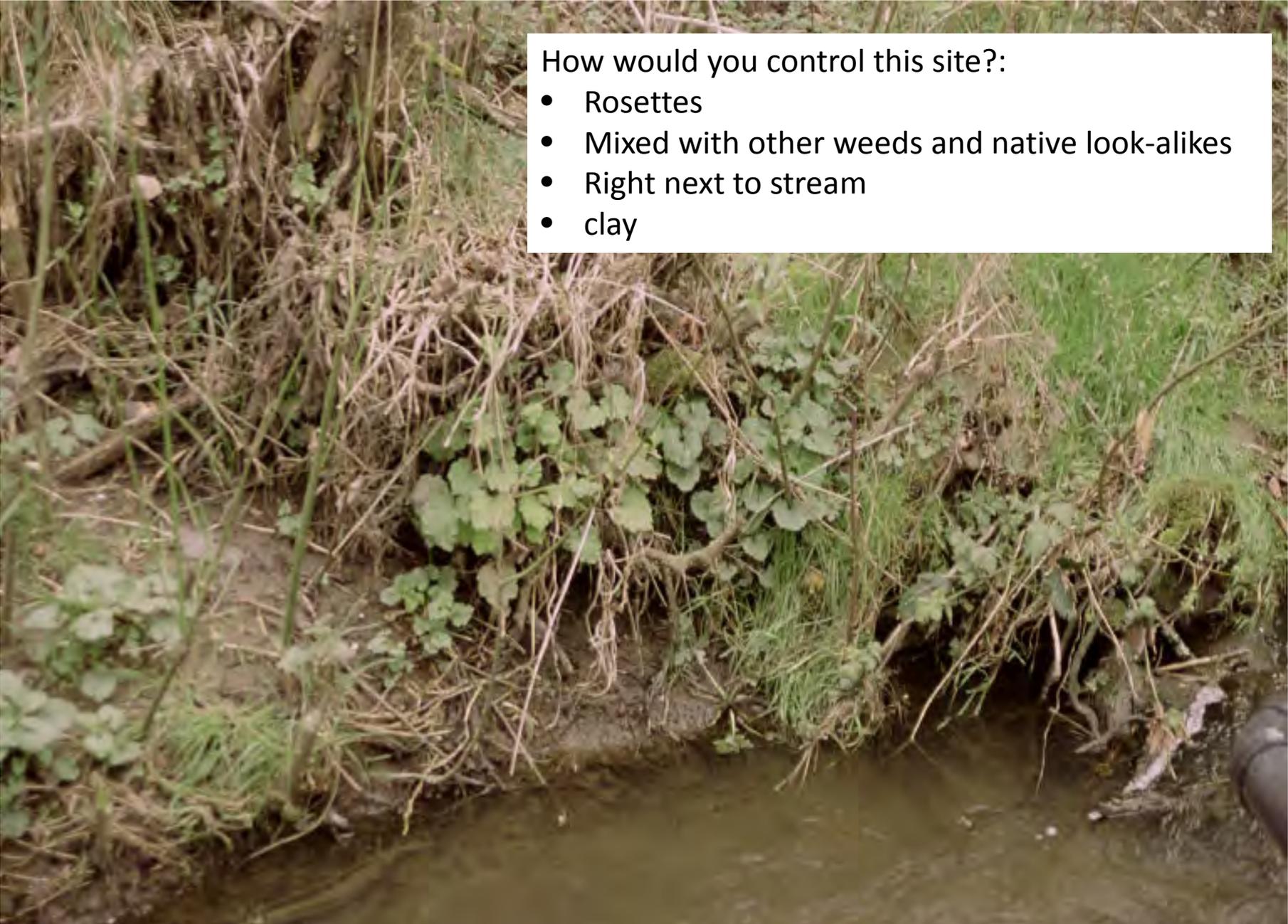
How would you control this site?:

- mature flowering plants
- monoculture
- residential
- rocky soil



How would you control this site?:

- pre flowering plants
- park
- mixed with native plants
- loamy soil



How would you control this site?:

- Rosettes
- Mixed with other weeds and native look-alikes
- Right next to stream
- clay



How would you control this site?

- Seedlings (with true leaves)
- Desirable grasses present
- Steep hillside
- Sandy soil

# Prevention of Spread

Don't take it with you



**Clean your boots and equipment**

Don't move it around

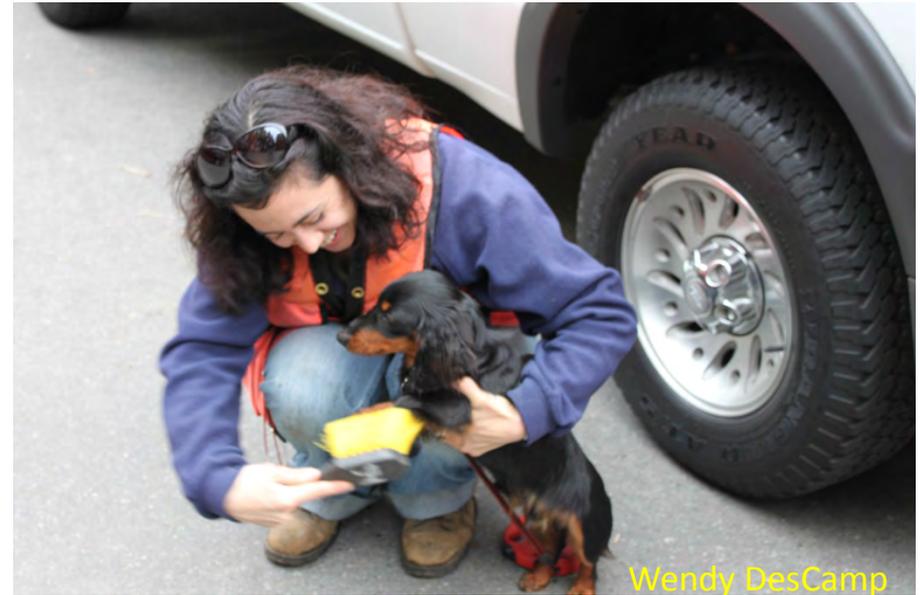


**Don't move mulch from infested sites**

# A weed's best friend?



Brush your pooch!



# Early detection & Control Make a difference!



**Over an acre of garlic mustard in Coal Creek Natural Area discovered by its garlic smell**

# Giant Hogweed



# Giant Hogweed (*Heracleum mantegazzianum*)



**15 feet tall with a stout,  
purple-blotched stem,  
white umbrella-shaped  
flower clusters, and  
giant, jagged leaves**



# Giant Hogweed ID



# Giant Hogweed



# Good Guy Look Alike: Native Cow Parsnip





Giant Hogweed (*Heracleum mantegazzianum*)

# Giant Hogweed Control – Use Caution



**Don't get hogweed juice on your skin. Always wear gloves, long sleeves, long pants and boots.**

# Caution: Giant Hogweed Can Cause Burns

- Juice of giant hogweed (and less so cow parsnip) contains skin toxins
- Can cause skin to be hypersensitive to sunlight
- Burns occur when skin is exposed to sunlight, even a day or two after contact with hogweed
- Causes blisters followed by purplish-dark blotches that persist and can continue to be sun-sensitive for several years
- Washing or flushing with water before sap dries can help reduce blisters
- People vary in their sensitivity



Sap from hogweed causes painful burns

# Giant Hogweed Control



First, cut off and bag flower heads



Next, dig up roots completely



The key is to control the roots – don't be fooled by small upper growth



Or, you can spray the plants with herbicide, either glyphosate or triclopyr

# Giant Hogweed Control



Chopping off flower heads with long-handled pruners is a safe way to go.

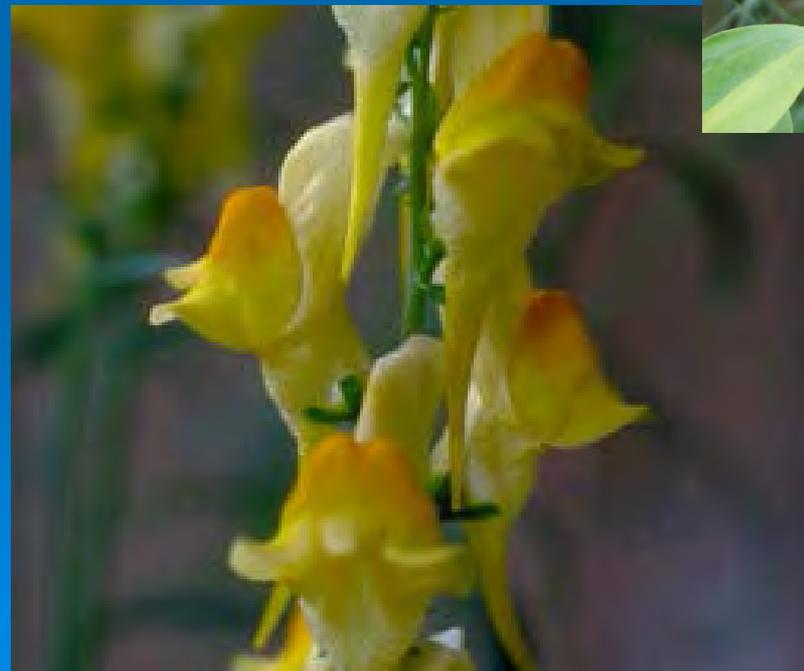
# Dalmatian Toadflax



# Dalmatian Toadflax (*Linaria dalmatica*)



- Leaves bluish-green, waxy coating, heart-shaped, clasp stem
- Flowers yellow tinged with orange, like snapdragon flowers



- Bolts: April-June
- Flowers: May-Sept
- Seeds: Aug-Sept

# Dalmatian Toadflax Impact



- Typically found on dry sandy soil in full sun
- In King County, found mainly on roadsides, railroads, industrial areas and vacant urban land
- Extensive root system allows it to survive adverse soil and/or climatic conditions
- Serious problem in eastern WA, re-invades King County via roads, railroads, fill and hay

# Typical Dalmatian Toadflax Habitat



Gravelly, dry soils with little competitive cover from grass, full sun



# Dalmatian Toadflax Control

- Dig up isolated plants making sure to get entire root
  - Roots are deep and extensive and can break off easily near the surface
- Large roadside/ROW areas:  
Telar 3 oz/acre
- Bud to full flower
- Treat 10 ft area around plants
- Glyphosate where no grass is present
- Repeat treatment as needed; likely to take multiple years



# Knapweeds



# Spotted Knapweed (*Centaurea stoebe*)

**Class B  
Noxious  
Weed**

- Grows 3 - 5 feet tall, perennial
- Pink to purple flowers, on the tips of stem branches
  - Dark fringe on bracts
- Bolts: April to July
- Flowers: May to October



# Spotted Knapweed Habitat



# Diffuse Knapweed (*Centaurea diffusa*)

**Class B  
Noxious  
Weed**

- Biennial: can be annual or short lived perennial
- Can produce up to 18,000 seeds



# Diffuse Knapweed Habitat



# Meadow Knapweed (*Centaurea jacea* x *nigra*)

**Class B  
Noxious  
Weed**



# Meadow Knapweed Habitat



# Bighead Knapweed (*Centaurea macrocephala*)

**Class A  
Noxious  
Weed**



- Large yellow flowerheads
- Bracts with papery fringed margins
- Flowers mid-July to Aug



- Tap-rooted perennial
- 2-5 ft tall
- Lower leaves up to 10 in. long and 3 in. wide
- Woody root crown
- Has been sold under the names "Lemon fluff", "Globe centaury", and "Pineapple thistle"

# Bighead Knapweed (*Centaurea macrocephala*)

- Reproduces by seed, (200/head) can propagate by root division
- Locally, it can be aggressive in gardens, but hasn't escaped beyond that
- Has been grown for cut flowers by farmers not familiar with the state quarantine list



Bighead knapweed is a threat to mountain meadows and open grasslands

# Knapweed Control

- Dig up or pull isolated plants unless soil is hard
- Mowing only temporarily suppresses seeding; plants will re-grow and flower again in the same season
- Chemical: broadleaf foliar
  - 2,4-D: rosette to early bolt (late April to early May)
  - 2,4-D+dicamba: up to early flowering stage
  - Aminopyralid: spring to early summer or in fall
  - Triclopyr: rosette to early bolt stage
- Goats – similar to mowing but more fun to watch!



Best control at rosette or early bolt stage



# Sulfur Cinquefoil



# Sulfur Cinquefoil (*Potentilla recta*)



# Sulfur Cinquefoil (*Potentilla recta*)

- Long-lived perennial with woody crown
- 1-2 feet tall
- Bolts late April-June, flowers: June-August
- Invades fields, meadows, disturbed areas
- Spreads mainly by seed
- Most competitive in poor, rocky soils



# Sulfur Cinquefoil Infestation



# Sulfur Cinquefoil Control

- Control before plants flower
- Mowing can spread weeds
  - Knocked down stems can produce roots at the nodes
- Dig up small infestations
  - Bag flowers and seed heads
- Selective herbicides for large infestations: triclopyr, aminopyralid, 2,4-D+Dicamba
- Fertilize and overseed grass to help resist re-invasion



# Tansy Ragwort



# Tansy Ragwort (*Senecio jacobaea*)



First year rosettes are low-growing with round-lobed leaves, visible spring to fall (even winter)



- Bolts May-July
- Flowers June-Sep (later if mowed)
- Seeds in August



Flowering stems are 1-6 ft tall with clusters of yellow, daisy-like flowers

# Tansy Ragwort (*Senecio jacobaea*)



- Spreads into fields, forest openings and roadsides
- Seeds are viable for 10 -16 years
- Toxic to horses, cattle and some goat breeds
- Often spread by mowing, animals, or in hay

# Tansy Ragwort Infestation



# Tansy Ragwort Control



- Can dig up rosettes when soil is moist

- Pull bolting plants (can leave on site, won't seed)

- Herbicide: selective broadleaf herbicide in spring and again in fall; 2,4-D or aminopyralid on rosettes; triclopyr, metsulfuron or dicamba up to bud stage

- Pull and bag flowering plants

- Don't leave cut or dried plants on ground (cut flowers can make seeds)

- Re-seed disturbed areas, maintain healthy competitive grass cover

# Don't Be Fooled: Tansy Ragwort Look-Alike: Common Tansy (*Tanacetum vulgare*) (control not required)



Button-like flowers are clustered  
at top of plant

Leaves are fern-like with sharply  
toothed edges and a strong odor



# Common Tansy (not Tansy Ragwort)



# St. Johnswort (*Hypericum perforatum*)



# St. Johnswort (*Hypericum perforatum*)



<http://tncweeds.ucdavis.edu/photos/hyppe01.jpg>

# Hawkweeds



# Hawkweeds (*Hieracium* spp.)

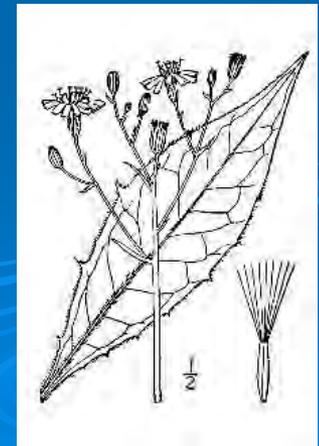
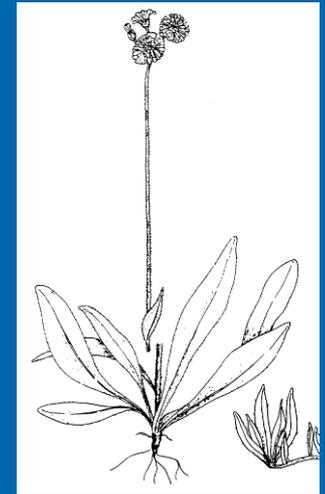
- Among the most troublesome weeds in the PNW
- First species arrived about 50 yrs ago and now there are over 14 species of invasive hawkweeds in the PNW
- Grow well in disturbed areas with soils that are well-drained, coarse-textured, low in organic matter
- Road shoulders are perfect habitat and seeds disperse with traffic and mowers

Orange and yellow hawkweed in meadows at Snoqualmie Pass



# Hawkweeds in Western WA

- **MEADOW HAWKWEED GROUP** – Leaves mostly basal without obvious teeth
  - **Mouseear Hawkweed** (*H. pilosella*); Class B
  - **Orange Hawkweed** (*H. aurantiacum*); Class B
  - **Yellow Hawkweed** (*H. caespitosum*); Class B
  - **Tall Hawkweed** (*H. piloselloides*); Class C
  - **Yellow Devil Hawkweed** (*H. floribundum*); Class A
  
- **WALL HAWKWEED GROUP** – Has leaves on stems, leaves toothed, flower heads often in looser cluster
  - **European Hawkweed** (*H. sabaudum*); Class A
  - **Common Hawkweed** (*H. lachenalii*); Class C



# Meadow Hawkweed Group – Key ID Characters

- Stems and leaves have stiff hairs
- Spatula shaped leaves, no teeth
- Often have stolons
- Small flowers, in tight clusters near tops of stems, buds and bracts covered with black hairs



# Orange and Yellow Hawkweed

Class B  
Noxious  
Weeds

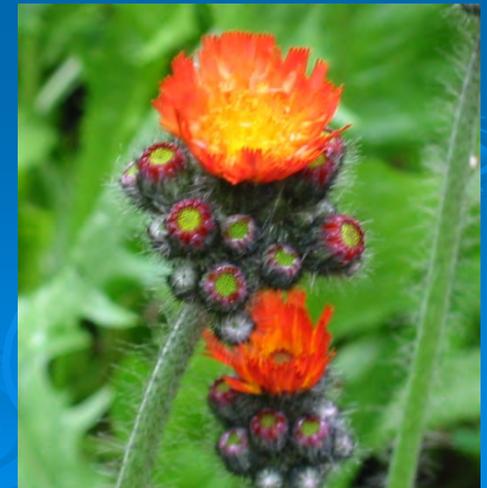


Orange and yellow hawkweed have escaped gardens to invade mountain meadows in the Cascades

# Orange and Yellow Hawkweed (*Hieracium aurantiacum*, *H. caespitosum*)



- Yellow or orange flowers in tight, flat-topped clusters
- Black hairs on buds and around base of flower heads
- Leaves are hairy on top and bottom and are not lobed
- Spreads by stolons and seed
- Flowers from May to July



# Non-native Hawkweeds (*Hieracium* spp.)





# Wall Hawkweed Group – Flowers yellow

## Leaves on stem, toothed

- No basal leaves at flowering; heads small, numerous, hairy; stem leaves about 50, crowded at base, plants 1 to 4 ft tall

- **European (*H. sabaudum*)**

- Basal leaves persistent, leaf base tapered, heads large, 4-12, hairy, stem leaves 4-7, plants ½ to 2 ½ ft tall

- **Common (*H. lachenalii*)**



# WALL HAWKWEEDS

## European and Common Hawkweed



# European Hawkweed



<http://botanika.wendys.cz>

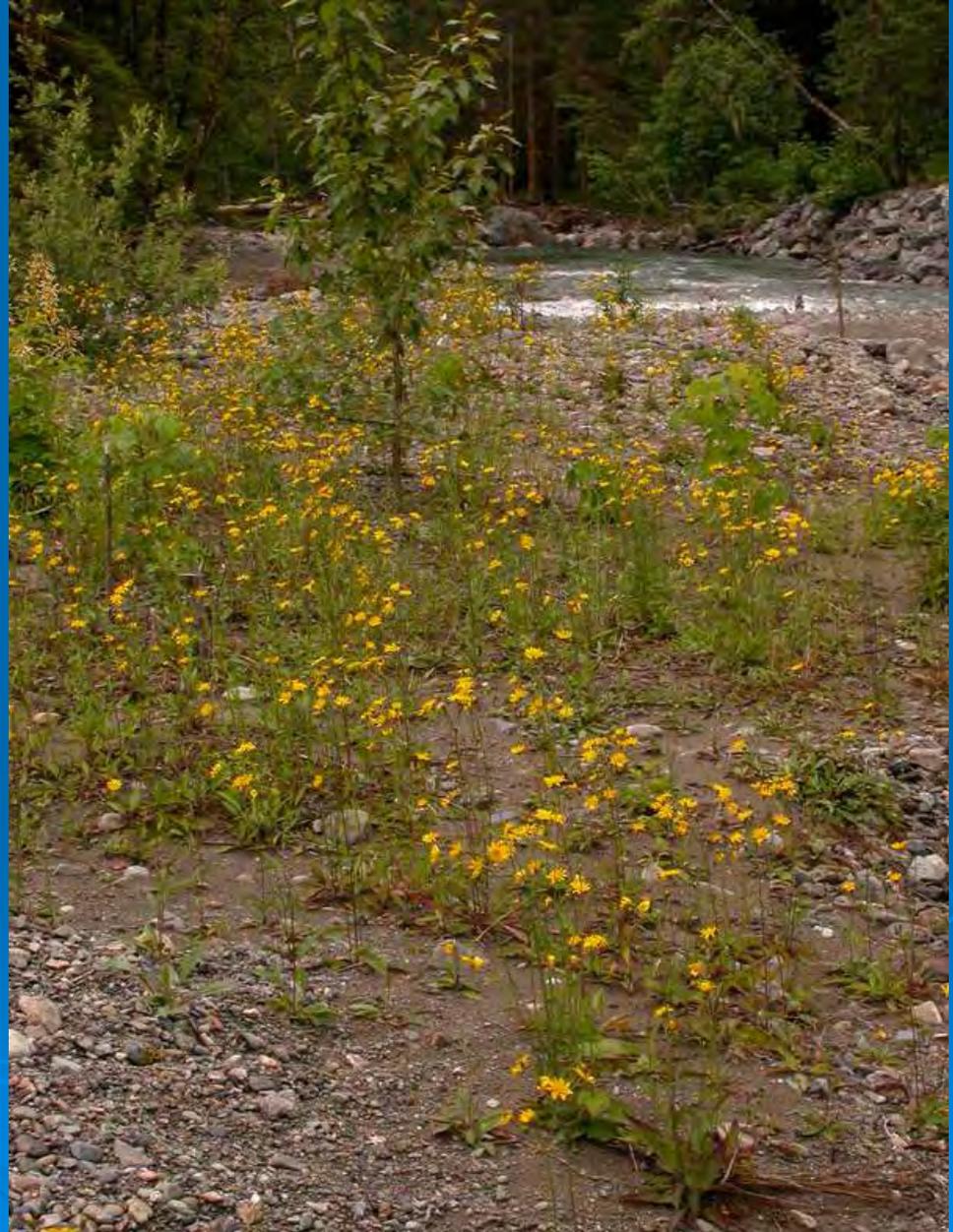


# European Hawkweed (*Hieracium sabaudum*)



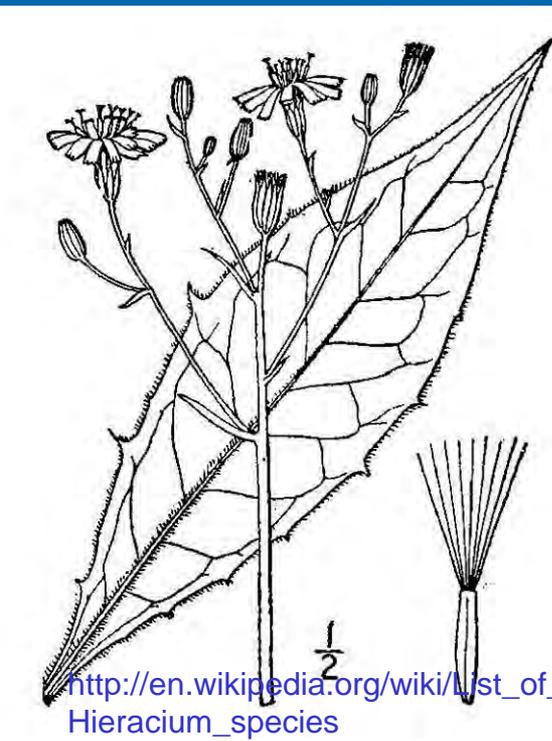
- Lots of stem leaves crowded at base, becoming smaller upwards
- Yellow flower heads small, numerous, hairy, in open, flat-topped cluster (candelabra-shape)
- Lower stem and lower leaf surface with long, firm, bulbous based hairs
- Plants 1 to 4 ft tall
- Flowers late July to September

# Common Hawkweed

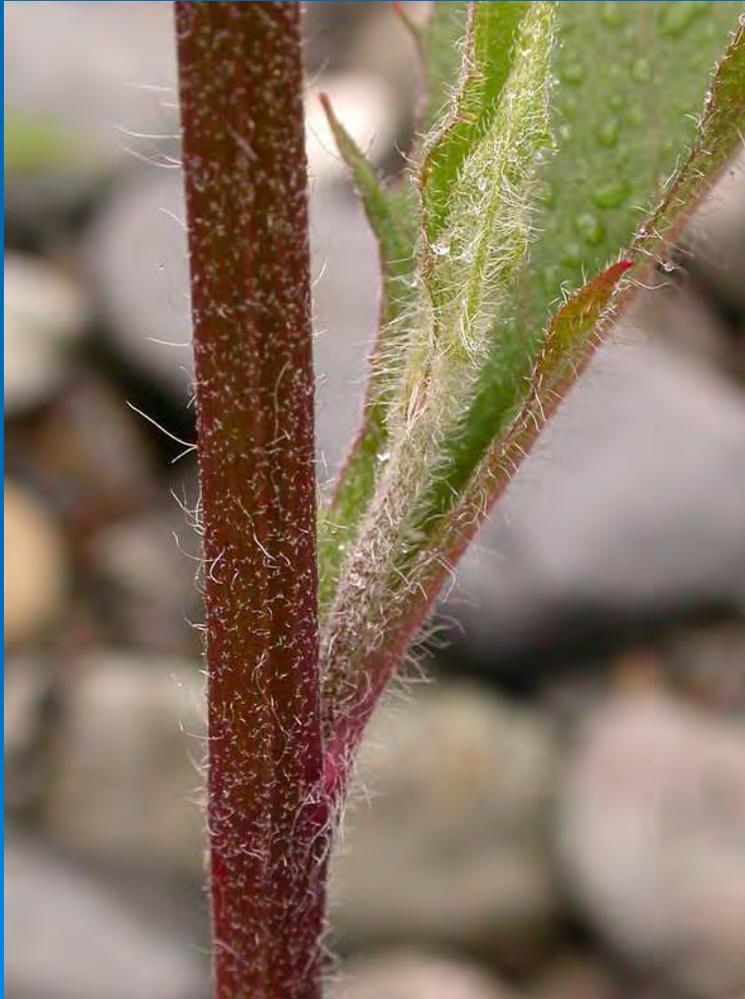


# Common Hawkweed (*Hieracium lachenalii*)

- Basal leaves coarsely toothed, tapered at base
- 4-7 stem leaves, also toothed, upper ones smaller, sessile
- Flowers yellow, 4-12 heads, open flat or round topped cluster
- Up to 2 ½ ft tall
- Flowers May to July



# Common Hawkweed



# Common Hawkweed



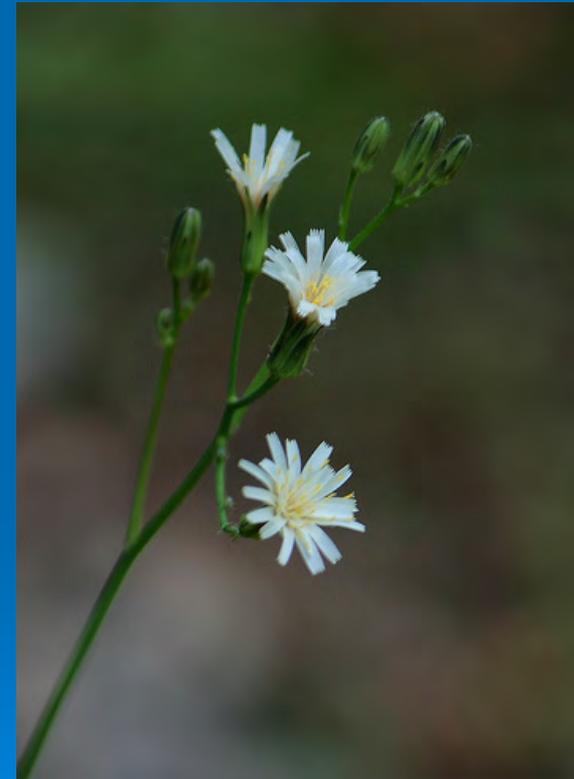
# Hawkweed Control

- Look for budding plants in late April to late May (later at high elevations)
- Dig up small patches (remove all runners)
- Bag flowering stems; will seed if left on ground
- Spray spring to early summer (bud to flower)
  - triclopyr; 2,4-D+dicamba; aminopyralid or clopyralid





# Native Hawkweed Look-alike: White Hawkweed



# More Hawkweed Look-alikes



Hawksbeard (*Crepis capillaris*)

Cat's Ear (*Hypochaeris radicata*)

# Policeman's Helmet



# Policeman's Helmet (*Impatiens glandulifera*)



Annual with fleshy, reddish stems, 3-10 ft tall, flowers resemble English policeman's helmet, vary in color from white to dark pink-purple

# Policeman's Helmet (*Impatiens glandulifera*)

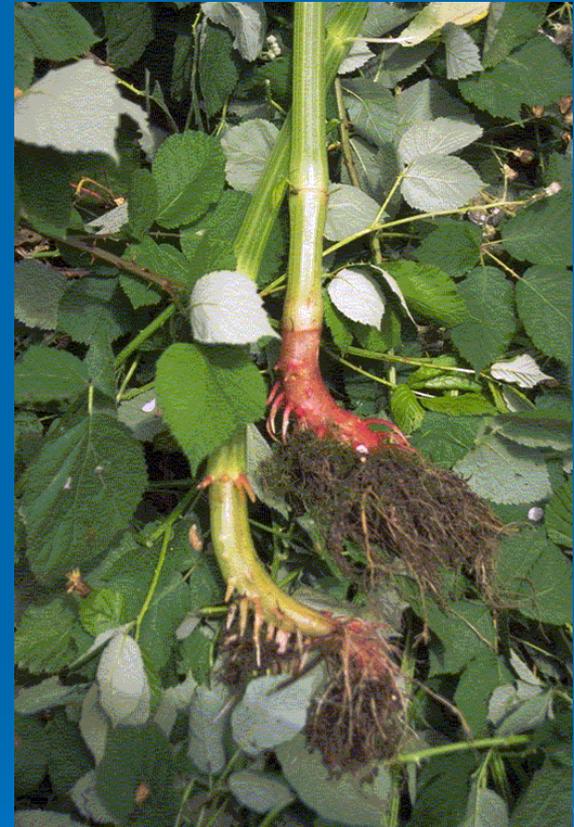


Flowers resemble  
English policeman's  
helmet



Foto: Anna-Lena Anderberg

Annual with fleshy, reddish  
stems, 3-10 ft tall



Roots often buttress

# Policeman's Helmet (*Impatiens glandulifera*)



Often found invading along creeks

Can grow to 10 feet tall in one season

# Policeman's Helmet on Roadside



# Policeman's Helmet Control



- Hand pulling is best and easy due to shallow roots
- Pile stems on tarps, crush and allow to compost



# Purple Loosestrife



# Purple Loosestrife (*Lythrum salicaria*)



## *Key characteristics:*

- Perennial rhizomatous emergent with showy magenta flower spikes
- Branched stems are square, can root at nodes
- Leaves opposite, lanceolate
- Up to 2.5 million tiny seeds/plant
- Flowers July and August



# Look-alikes:

## Purple Loosestrife vs. Spiraea, Fireweed, & Watson's Willowherb

*Noxious weed*

*Native plant*

*Native plant*

*Native plant*



Purple Loosestrife

Douglas Spiraea  
(hardhack)

Fireweed

Watson's Willowherb

# Purple Loosestrife Control

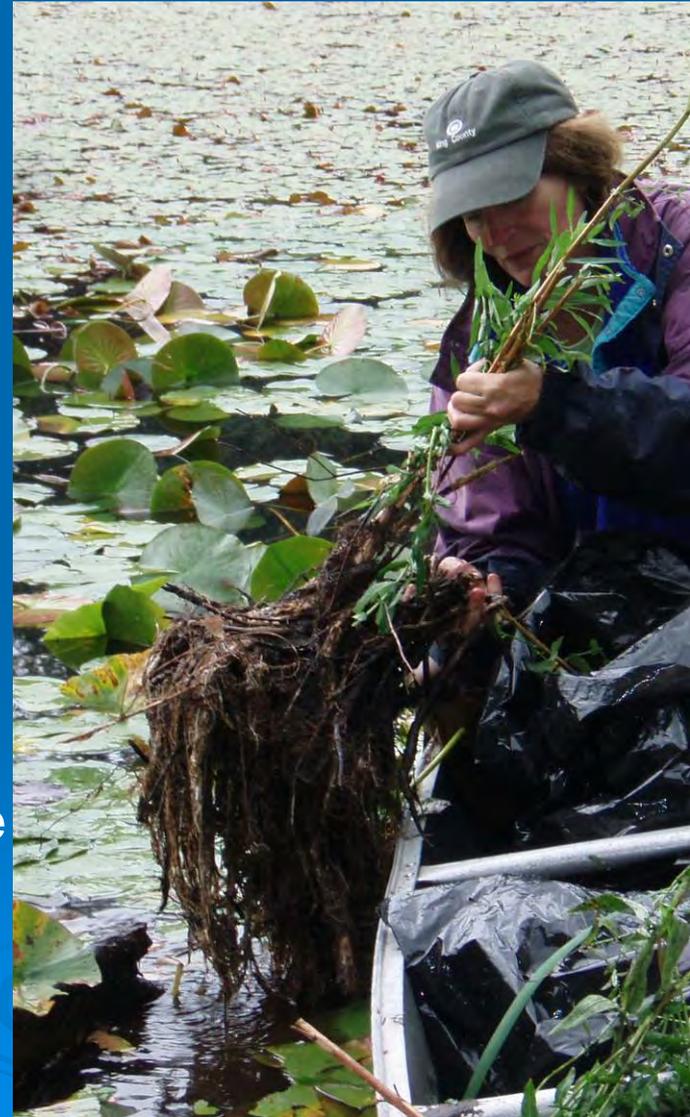


## Manual/Mechanical:

- It is possible to pull even large emergent plants, roots and all, from soft mucky soil.
- Mowing will temporarily stop seed production. Cutting alone will not kill the plants.
- Plant fragments will root if left behind.
- Always dispose of purple loosestrife in a landfill, do not compost.

Chemical: Glyphosate, triclopyr and imazapyr are all effective (1 – 2%).

Cultural: Covering with weed cloth will not kill mature plants.



Before bugs



# Purple Loosestrife Biological Control

After bugs



Leaf feeding beetles  
*Galerucella spp.*



Root feeding weevils  
*Hylobius spp.*



# Garden Loosestrife



# Garden Loosestrife (*Lysimachia vulgaris*)

**Class B  
Noxious  
Weed**

garden loosestrife

**2-10 foot tall perennial of  
wetlands and shorelines**



Flowers: showy yellow  
primrose-like flowers  
clustered at top of stem  
(terminal pannicle)

Flowers in July and August

Leaves: opposite or whorled  
(in threes or fours),  
leaves usually have small  
orange or black glands  
visible with magnification



# Garden Loosestrife

*garden loosestrife*

Produces extensive red stolons that will reach out more than 10 feet into the adjacent open water

Stems have soft hairs and are round, occasionally flattened (fasciated)



# Garden Loosestrife - Impacts

Outcompetes other plants, even tough ones

*garden loosestrife*



**With purple loosestrife**



**With common cattail**



**Even Himalayan blackberry**

# Garden Loosestrife - Control

*garden loosestrife*

Manual/Mechanical: Does not pull well. Rhizomes break off and create new plants. Careful digging can work on isolated patches rooted in sand, muck or loose soil without other plant roots around. Removing/pulling red stolons in late summer may help prevent spread.

Chemical: glyphosate, tricopyr and imazapyr all reduce vigor, but do not kill all plants. More research is needed.

Cultural: weed fabric recommended to suppress plants on sensitive shorelines, but won't kill mature plants.



# Parrotfeather



# Parrotfeather

## *Myriophyllum aquaticum*

Class B  
Noxious  
Weed

parrotfeather

*Key characteristics:*

- emergent up to 1 ft. above water
- leaves in whorls around stem
- leaves feathery like milfoil
- dense mat of brownish rhizomes



# Parrotfeather - control

## Manual

- Small populations can be pulled or raked up, being very careful to remove all fragments from the water. Manual control requires persistence over many years.

## Chemical

- Good control can be achieved by using a foliar spray of 1.5% triclopyr (aquatic approved Ex: Renovate 3, Garlon 3A) or imazapyr and a good aquatic surfactant



# Yellow Flag Iris



# Yellow Flag Iris (*Iris pseudacorus*)





# Control of Yellow Flag Iris

- Deadhead flowers to prevent seed production
- Digging out the entire rhizome mass can control small isolated patches, but even small rhizome fragments can re-sprout
  - May promote germination of seeds, monitor area
- Mowing or cutting – repeat every year for several years to weaken plants
- Chemical Control Options
  - Foliar application of glyphosate (5 to 8% solution) plus a non-ionic surfactant
  - Apply a 25% solution with a dripless wick/wiper
  - Apply concentrated glyphosate to freshly cut leaf and stem surfaces

# Thistles



# Milk Thistle (*Silybum marianum*)



Flower heads have stout, spiny bracts

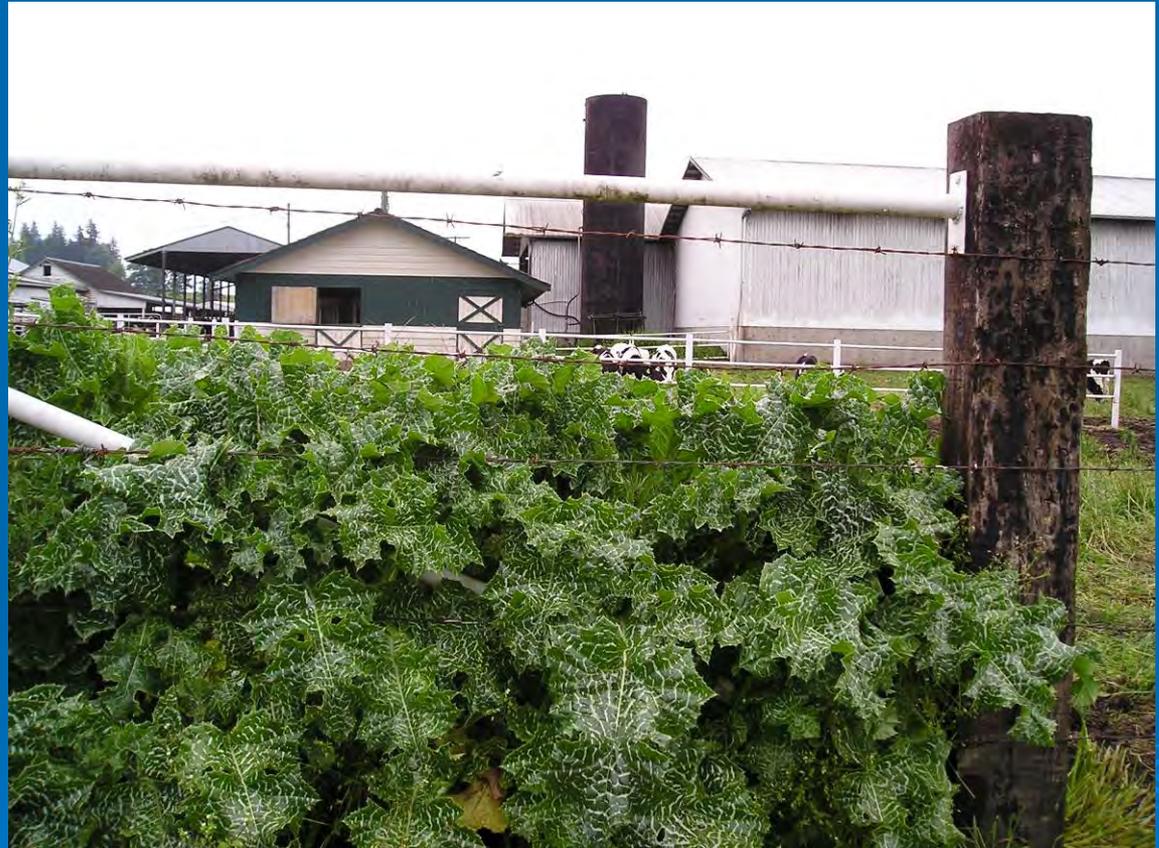


Distinct, white marbling on leaves, even on seedlings

# Milk Thistle (*Silybum marianum*)



Grows up to 6 feet tall



Found in dairy farms and neighboring fields in south King County, difficult to control once established

# Milk Thistle Control

Class A  
Noxious Weed

- Dig up small patches; bag flowers and seed heads
- Spray large populations early spring and fall; in grass use 2,4-D ester or aminopyralid, or glyphosate if not in grass
- Monitor for seedlings and treat again as needed
- Do not mow flowering plants; this spreads the plant



# Canada Thistle (*Cirsium arvense*)

**Non-  
Regulated  
Noxious  
Weed**



# Canada Thistle Control



Spreads by seed to new sites



Spreads underground to form dense infestations in sunny fields

- In pastures, avoid over-grazing, mow thistle after grazing and fertilize to promote grass
- Mowing alone: once a month over several growing seasons
  - Mow when green buds appear
- Mow in summer followed by fall herbicide treatment on regrowth
- Spring spraying (early bud stage) and again in the fall (late September/early fall)
  - 2,4-D, triclopyr, dicamba, clopyralid, or aminopyralid
- **Competitive grass cover helps contain thistle**

# Bull Thistle (*Cirsium vulgare*)



Biennial thistle with large spines on stems, leaves and under the flower head

# Bull Thistle Control



- Cutting twice a season close to the ground will prevent seeding if done before flowers open
- Herbicides – many products are effective, depending on site
  - Best time is late fall or early spring on rosettes before stalks appear
  - Don't treat when under drought stress

Best Control: Dig up or cut 1 to 2 inches below ground level with a sharp shovel (remove flowering plants to avoid spreading seeds)

# Identifying Thistles at Rosette Stage

Canada



Bull



# Poison-Hemlock



# Poison-Hemlock (*Conium maculatum*)



# Poison-Hemlock Identification



“Umbrella” blooms



Leaves resemble parsley



Stems stout,  
non-hairy,  
hollow, reddish-  
purplish blotches



1<sup>st</sup> year plants low-growing



2<sup>nd</sup> year plants 6 to 10 feet

# Poison-Hemlock Infestation



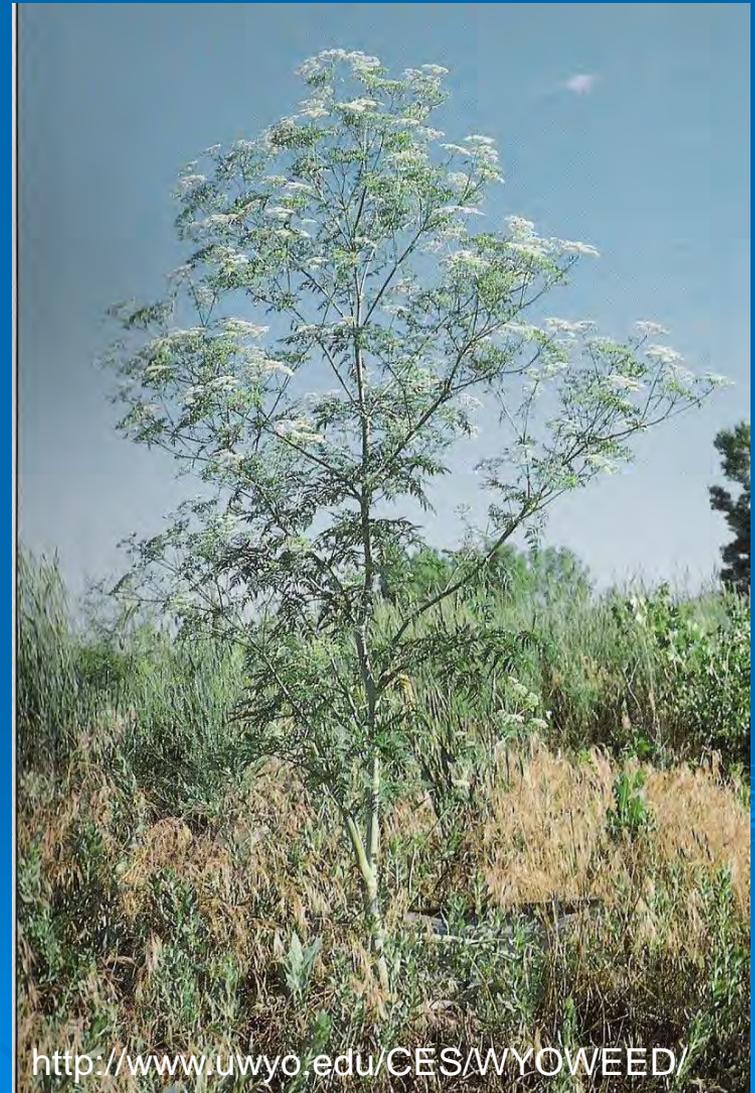
# Poison-Hemlock Control

- **Poisonous – use caution**
- Dig up plants when soil is moist
  - Wear gloves
  - Remove entire root
  - Throw away plants in garbage or yard waste containers
- If can't dig, cut stems below root crown before seeds mature
  - Mow with a face mask to avoid breathing in toxins



[http://4.bp.blogspot.com/-8YZMEz3Sciw/TbyQMREFLpuI/AAAAAAAAA\\_o/NpwlrArQx2I/s1600/P1000069.JPG](http://4.bp.blogspot.com/-8YZMEz3Sciw/TbyQMREFLpuI/AAAAAAAAA_o/NpwlrArQx2I/s1600/P1000069.JPG)

Poison-hemlock root looks like a large, white carrot



<http://www.uwyo.edu/CES/WYOWEED/>

# Knotweed



# Invasive Knotweed (*Polygonum bohemicum* et al)



# Knotweed Control Issues

- Problem is massive roots and rhizomes, not seeds
  - It's all one big plant underground
  - Roots spread 20 feet or more, to 7 feet deep
  - Fragments as little as ½ inch can form new plants
- When cut or damaged, vigorously and rapidly re-sprouts from latent buds on root crowns and rhizomes
- Young, isolated patches are much easier to control old growth knotweed
- Requires multiple years of repeated effort to eliminate
- Chemical control is likely to be part of the plan for most infestations
- Tougher to control in wetter places
- Aquatic pesticide treatments require:
  - Aquatic endorsement on pesticide license
  - National Pollutant Discharge Elimination System (NPDES) permit from Washington Department of Ecology



# Knotweed Control – Non-Chemical

➤ Three methods that are most effective:

1. Dig up individual plants

- Digging knotweed is possible but tough and re-sprouting is likely
- Dispose of roots and rhizomes in the garbage

2. Cut to ground level twice a month between April and September

- Don't let stems exceed 6 inches
- Cut stems can be dried, crushed and composted

3. Cover with heavy-duty erosion control fabric or sturdy plastic

- Weigh down with rocks or cement blocks (no stakes)
- Monitor and maintain (stomp down re-growth, pull or spray re-sprouts along edges, fix holes)
- Leave in place for five years



Loose covering allows growth without it breaking through

# Knotweed Control - Chemical

- Often the only way to completely control this plant, especially when knotweed covers a large area
- Spray the leaves and stems
  - Best results when done in summer when plants are full size and flowering
  - Imazapyr (most effective) or glyphosate (next best)
  - Usually mid-June to September
  - Continue to monitor sites for at least three years after knotweed appears to be gone
- Stem injection with concentrated glyphosate
  - Need to inject every stem
  - July to September
  - Highly effective and reduces drift



Spraying knotweed re-growth



Injecting knotweed

# Yellow Archangel



# Yellow Archangel

*Lamium galeobdolon* (a.k.a. *Lamium*)



Small yellow mint-type flowers in leaf axils



Silvery markings on leaves of this popular garden plant make it easy to spot invading into shady forests

Yellow archangel can completely take over the understory of even very shady forests.



# Effective Manual Control of Yellow Archangel

## ➤ Careful hand-pulling

- Really only works in loose, forest soils when done by someone obsessive about getting every last piece and following up

## ➤ Covering or sheet-mulching done right

- Use in areas without a lot of other vegetation
- Cut back top growth first; best in fall/winter
- Cover completely; lots of overlap and no holes
- If using cardboard, overlap pieces and cover with 3 to 6 inches wood chip mulch
- Follow up and remove escapees and repair covering
- Leave in place long enough to kill plants, at least a few years (cardboard needs to be re-installed every year or more)

# Tips for **Effective** Chemical Control of Yellow Archangel

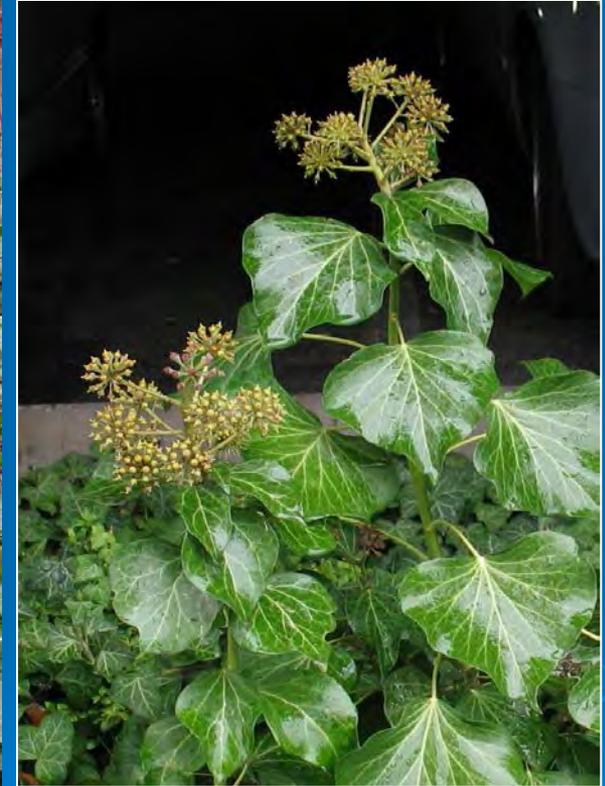
- **Combine** glyphosate and either triclopyr, imazapyr or aminopyralid
- **Use a surfactant** that helps with hairy leaf surface
- Make sure to get really **good coverage** (remember those multiple layers)
- **Be selective** to avoid off-target damage
- **Be patient**; will not know results until after following spring growth
- **Tim's rates\***: 2.5% Roundup Pro plus either
  - 1% Habitat or
  - 1.5% Garlon or
  - 0.1% Milestone
- Spring or fall better than in the hot, dry part of the summer
- **Spray when foliage is dry but not wilted** – no dew or rain; allow 6 hours of contact time before rainfall
- **Repeat as needed** (most likely at least two or three applications)

\* Tim Miller, WSU Extension, Weed Specialist, based on control trials with yellow archangel in Kirkland, WA

# English Ivy

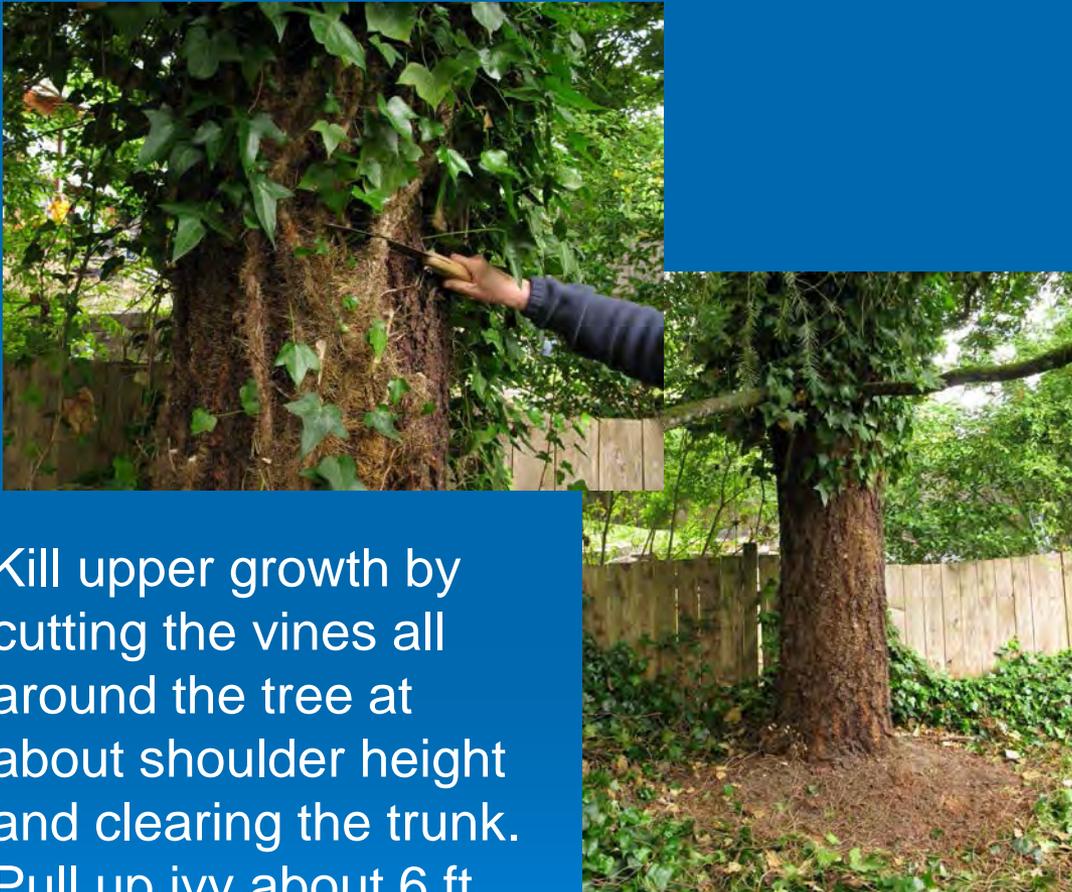


# English Ivy (*Hedera helix*)



Ivy leaves are different on immature stems and flowering stems

# English Ivy Control Usually Non-Chemical



Kill upper growth by cutting the vines all around the tree at about shoulder height and clearing the trunk. Pull up ivy about 6 ft from base of tree and maintain ivy-free area.



Then get a big group of volunteers or crew to pull up the ivy vines on the ground.

# Ivy Chemical Control Tips

## ➤ Challenges

- Waxy leaves and overall toughness of plant
- Often growing with desirable plants

## ➤ What's worked for some folks

- Combo of glyphosate plus triclopyr
- Use rates given for tough perennials and brush species
- Portland recommendation 2 to 5% Roundup plus 1-2% Garlon 3A plus 1-2% MSO surfactant (like Competitor).
- According to Portland, most effective timing is summer to fall (July-Sep)
- Earlier TNC trials suggested late winter (Jan-Feb) spraying but more recent trials showed this was not as effective as summer

# Old Man's Beard (Clematis)



# Old Man's Beard (*Clematis vitalba*)



# Old Man's Beard on the Snoqualmie River



# Old Man's Beard Control

- Combination of cutting and chemical treatment
- Cut climbing vines in the winter at waist height (leave the top stems to wither)
- Spray the foliage in the spring to summer with triclopyr or glyphosate, avoid natives
- Mature plants – use cut stump method
- Stem and root fragments should be collected and burned or disposed of; do not compost



# Butterfly Bush



# Butterfly Bush (*Buddleia davidii*)



Leaves opposite (attach to stem in pairs), gray green above and white and fuzzy on the underside, finely toothed on margins

Can grow 5 to 8 feet in a single season

# Butterfly Bush quickly invades along rivers



# Butterfly Bush Control

- On isolated shrubs, cut off fading flowers before seed forms
- Manual Removal
  - Young plants are easy to dig up or hand pull
  - Big plants are difficult to dig out; use of a weed wrench may help
  - Disturbance caused by removal often results in new plants
  - Establish ground cover of a non-invasive species, which will prevent butterfly bush from re-establishing
- Chemical control
  - Cut plants and treat stumps with herbicides such as triclopyr or glyphosate (follow label for cut stump treatment of woody plants)
- Goats (from USDA Forest Service Fact Sheet)
  - Areas that can be fenced can be treated with goats if a 3-4 year treatment program is acceptable



Seedlings thrive in open sandy soil

# English Holly



# English Holly (*Ilex aquifolium*)

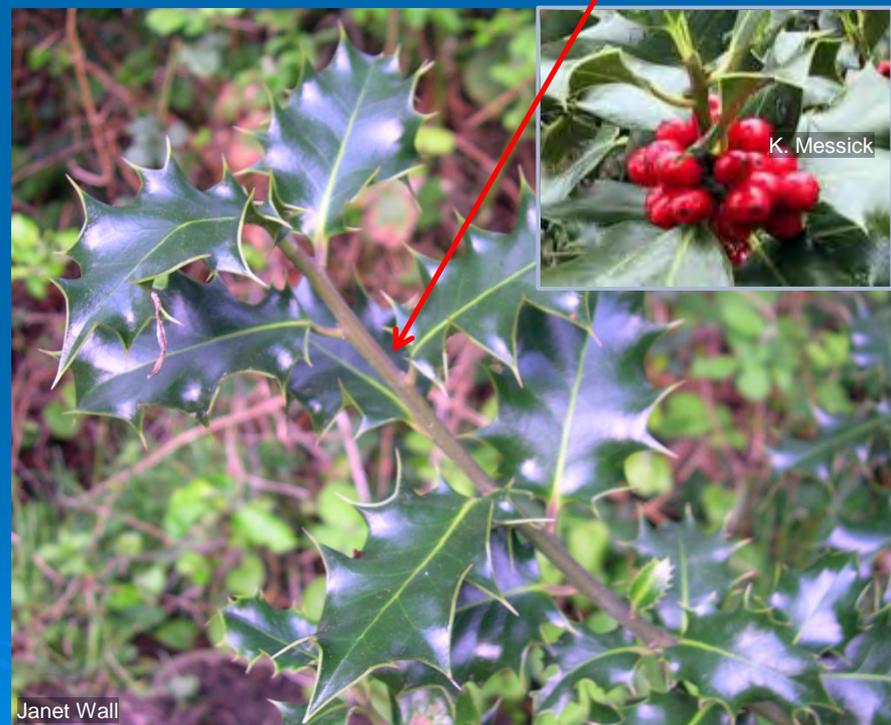


# Oregon Grape is a Look-Alike For Young Holly

Oregon Grape – leaves in pairs, berries blue



English Holly – leaves not in pairs, berries red



# English Holly Control

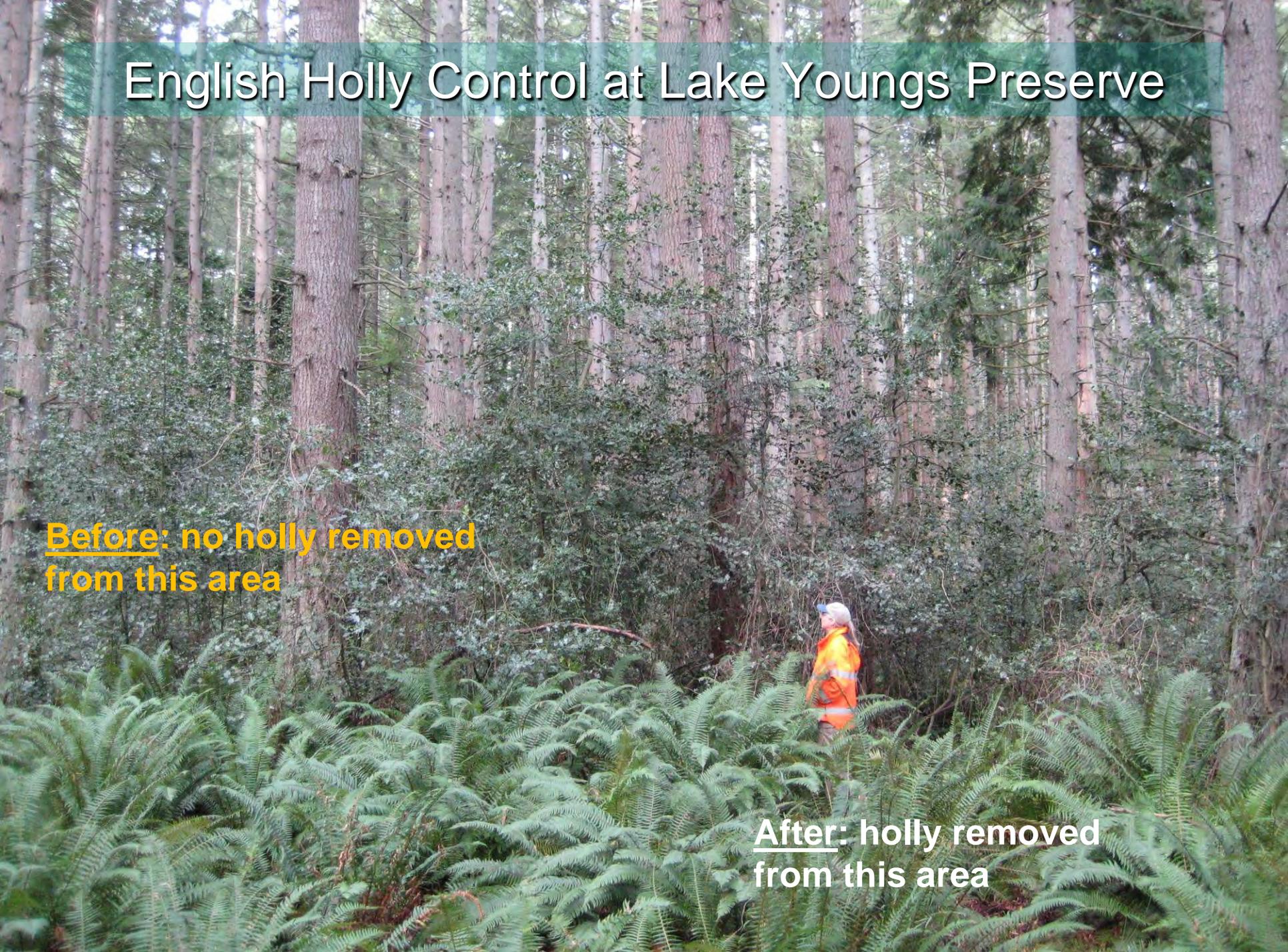
- Young plants can be pulled but larger plants have to be dug up
  - Holly has extensive, tough roots
  - If you can't remove all the roots, cut them below ground
- Cutting is not very effective
  - Holly sprouts from root crowns and stems
  - Follow up by removing new shoots
- Can apply herbicide to freshly cut stump or use the hack-and-squirt, girdling or injection methods



# English Holly Control at Lake Youngs Preserve

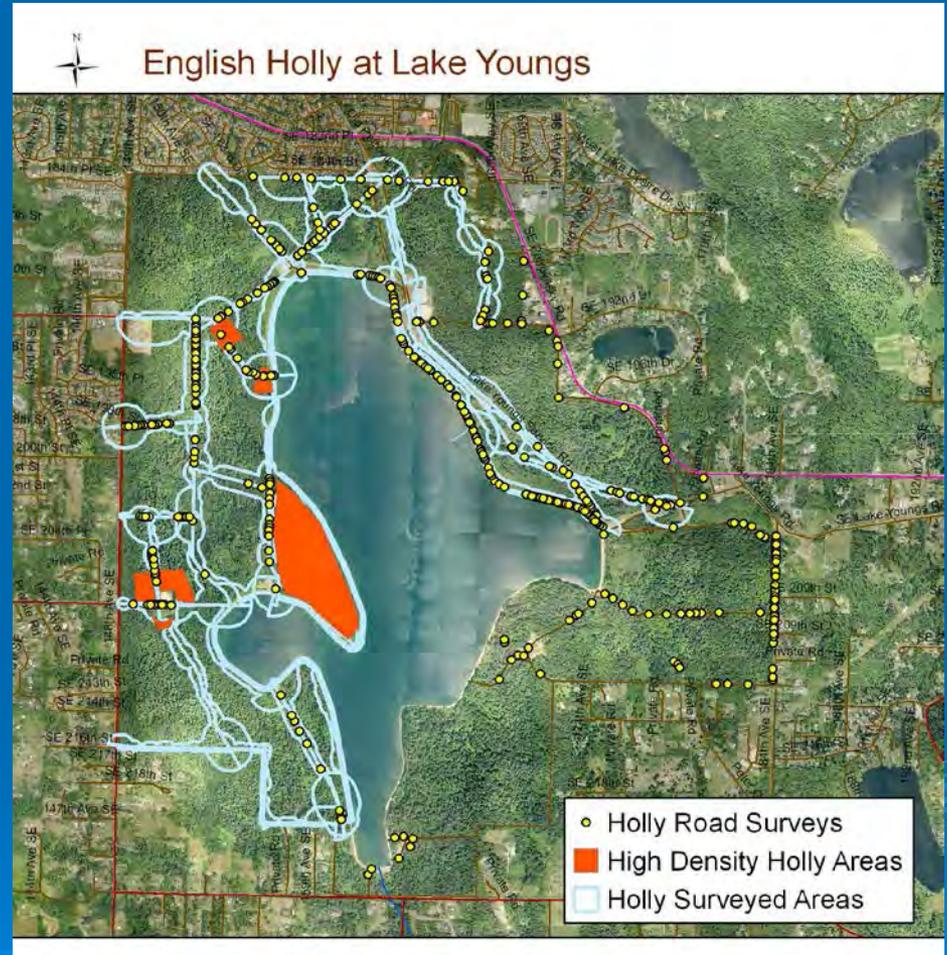
Before: no holly removed from this area

After: holly removed from this area



# English Holly Control at Lake Youngs Preserve

- SPU mapped tons of holly around woods of Lake Youngs
- For the biggest area, paid a crew to grub out roots
- **Cost was \$73,000**
- 35 crew days over two seasons (2007 and 2008)
- Only finished half of the 50 acre infestation before they ran out of money



# EarthCorps Holly Control Study

➤ Compared three methods of chemical control in spring and fall

- **Cut stump**

- Triclopyr ester
- Glyphosate

- **Frilling**

- Triclopyr ester
- Glyphosate

- **EZ-Ject capsules**

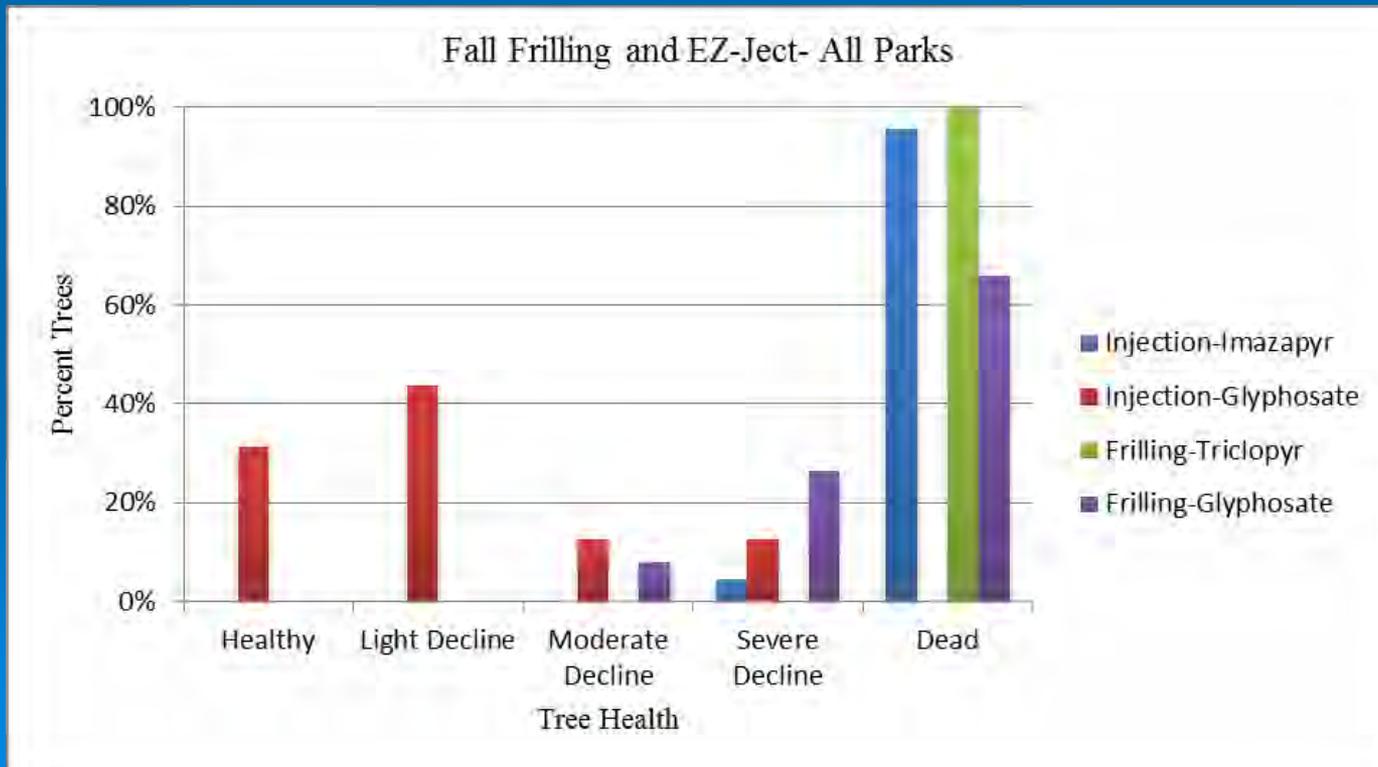
- Imazapyr
- Glyphosate



# EarthCorps Holly Control Study

## ➤ Most effective methods:

- Frilling or cut stump with triclopyr ester
- EZ-Ject with imazapyr



# Blackberry



# Himalayan Blackberry (*Rubus armeniacus*)



- Originally from Europe, late 1800's to early 1900's, for berry production
- Thrives in almost all types of areas in our region
  - One cutting can produce a 15 foot diameter thicket in under 2 years
  - Only limited by deep shade
- Forms impenetrable thickets
- Prevents establishment of trees such as Douglas fir
- Provides habitat for rats
- Limits movement of large animals between forests and meadows for grazing
- Doesn't provide same diversity of food sources as the native plants it replaces

# Himalayan Blackberry (*Rubus armeniacus*)



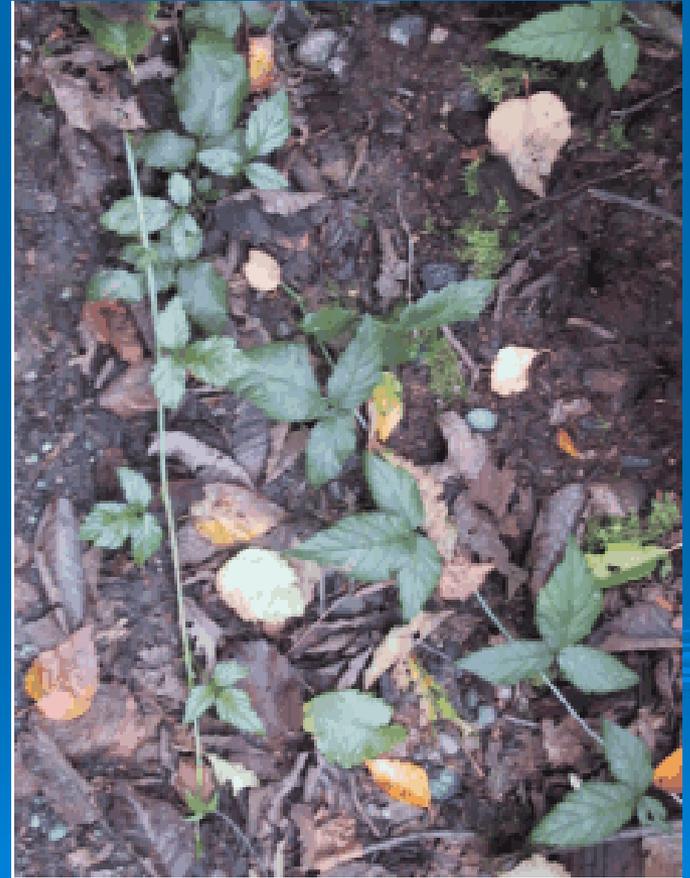
# Evergreen Blackberry (*Rubus laciniatus*)



# Good Guy Look-Alike: Native Trailing Blackberry (*Rubus ursinus*)



Native blackberry should be left for habitat  
although it's a good idea to keep it back from  
new plantings



# Blackberry Control

- Plan work based on ability to maintain
  - Preserve beneficial vegetation
  - Mulch and re-vegetate as needed to avoid soil erosion and weed problems
  - Plant conifers: dense shade will ultimately reduce blackberry problems
- Clear mature blackberry with hand tools or brush mowers (or goats)
- Dig up root crowns or spot spray re-sprouting canes at about 2 ft tall in late summer or fall
- Can also cut several times a year to suppress
- Foliar spray is also effective but timing depends on product
  - e.g., glyphosate works in the fall; triclopyr spring or summer



# Reed Canary Grass



# Reed Canarygrass (*Phalaris arundinacea*)



- Rhizomatous grass, 3 to 6 feet tall
- Sturdy, hollow stems, sometimes reddish near top
- Leaf blades flat, no hairs, to  $\frac{3}{4}$  inch wide
- Flowers June-July
- Flowers on 3 to 7 inch long clusters high above leaves
- Forms dense stands, excluding other plants and filling in small waterways, blocking fish passage and increasing flooding

# Reed Canary Grass Control

- Hand-pulling/digging 2-3 times per year for five years over whole population
- Cutting at least 5 times a season
- Cover with landscape fabric or plastic
  - Best results with thick woven plastic fabric (e.g. Mirafi or Amoco brands); for at least one year
- Glyphosate 2% plus surfactant in mid-summer (just prior to summertime dormancy) or preferably in late fall (before frost dieback)
  - Cut first and spray re-growth for best results
- Shade out with dense plantings of willows or other thicket forming shrubs
  - This won't work if not dense enough, often fails
  - Willow stakes: no more than 2-3 foot spacing and pre-treat grass before installing



Photograph 1. Individual stem with rhizome

# King County Noxious Weed Program Website

[www.kingcounty.gov/weeds](http://www.kingcounty.gov/weeds)

Weed Photo Page:

Search by Common Name or Latin Name

Annual bugloss	▲	Abutilon theophrasti	▲
Bighead knapweed	▬	Acroptilon repens	▬
Bittersweet nightshade	▬	Alliaria petiolata	▬
Black knapweed	▼	Anchusa arvensis	▼

Or click thumbnail picture of plant for weed information and photos

