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**APPENDIX B**

## **Invasive Species Control**



Washington State NWCB website 2010

# English Holly

## (*Ilex aquifolium*)

English holly is a suspect weed on the monitor list. Although slow-growing, this species survives in both sun and shade and can reach 15 to 50 ft in height and 15 ft in width. This growth can create dense thickets and suppress the establishment of native species. It reproduces via seed dispersal by birds or vegetatively through suckering or layering.

### Control:

#### **0-39% slopes** [Washington State Noxious Weed Control Board (2010)]

- **Manual:** Small plants can be dug or pulled up when soil is moist. Be aware that mature trees have deep and extensive roots; digging large holly trees or thickets is labor-intensive and results in considerable soil disturbance if all the roots are removed. Weed wrenches can be used on larger shrubs to pry up the entire plant.
- **Mechanical:** Cutting holly trees at the base usually results in re-sprouting, but with monitoring and follow up the holly can be suppressed.
- **Chemical:** When dealing with large trees or thick stems, chop or cut the holly as close to the ground as possible and apply a herbicide with the active ingredient glyphosate (such as Roundup) directly into the cut portion. Frilling (making deep cuts at 45 degree angles into the tree's bark using an axe or sharp chisel) and pouring glyphosate into the cuts immediately afterward is also effective. Always follow label rates and instructions. Monitor for seedlings and root re-sprouting. Foliar herbicide treatment (spraying herbicides directly on the leaves) is not recommended due to holly's thick, waxy leaves which prevent the chemicals from being absorbed.

#### **40-67% slopes**

- **Manual:** Small plants can be dug or pulled up when soil is moist, as long as slope damage or excessive soil erosion does not occur. Manual removal of mature trees with deep and extensive roots on steep slopes is not recommended.
- **Mechanical:** See 0-39% slopes.
- **Chemical:** See 0-39% slopes.

#### **Greater than 67%**

- **Manual:** Not recommended unless incorporated with engineering solutions or an erosion control program.
- **Mechanical:** See 0-39% slopes.
- **Chemical:** See 0-39% slopes.

## **References and Additional Information**

King County. 2008. *King County Noxious Weed Control Program Weed Alert: English Holly.* <http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/Brochures/English-Holly-Fact-Sheet.pdf>. November.

Washington State Noxious Weed Control Board website. 2010. *English Holly.* <http://www.nwcb.wa.gov/detail.asp?weed=152>. Accessed February 12, 2015.



Washington State NWCB website 2010

# English Ivy

## (*Hedera helix*)

English ivy is a Class C noxious weed. A shade tolerant vine species which is inhibiting the regeneration of native understory plants, this species produces adventitious roots that allow the vines to anchor to tree trucks, creating heavy foliage growth in the tree crown. This increases the weight of the tree canopy and increases the trees' potential for failure.

This species is a woody evergreen perennial. It grows as a vine when young (can reach up to 99 feet) and as a shrub after it matures. Its adventitious roots allow vines to anchor to a variety of surfaces. English ivy is capable of growing in a varying soil and light conditions, spreading rapidly by vegetative stem growth and, once mature, by seed (approximately 70% of seeds are viable).

Control:

### **0-39% slopes** [Washington State Noxious Weed Control Board (2010)]

- **Manual:** Plants can successfully be pulled by hand or dug out. In the case of plants climbing on trees, vines can be cut at a comfortable height (ivy rings) to kill the upper portions of the vine.
- **Cultural:** Burning plants and re-sprouts at regular intervals with a blow torch will eventually deplete the plant's energy.
- **Chemical:** Please refer to the [PNW Weed Management Handbook](#) (see below).
- **40-67% slopes**
  - **Manual:** Small plants can be pulled up when soil is moist, as long as slope damage or excessive soil erosion does not occur. The implementation of erosion control measures may be necessary for large scale removals from the ground surface.
  - **Cultural:** See 0-39% slopes.
  - **Chemical:** See 0-39% slopes.
- **Greater than 67%**
  - **Manual:** Not recommended unless incorporated with engineering solutions or an erosion control program.
  - **Cultural:** See 0-39% slopes.
  - **Chemical:** See 0-39% slopes.

### References and Additional Information

Pacific Northwest Weed Management Handbook website. 2015. *Ivy, Common or English (Hedra helix)*. <http://pnwhandbooks.org/weed/other-items/control-problem-weeds/ivy-common-or-english-hedera-helix>. Oregon State University. Accessed January 6.

Soll, J. 2005. *Controlling English Ivy (Hedera helix) in the Pacific Northwest*. The Nature Conservancy. <http://www.invasive.org/gist/moredocs/hedhel02.pdf>. January 14.

Washington State Noxious Weed Control Board website. 2010. *English Ivy*. <http://www.nwcb.wa.gov/detail.asp?weed=59>. Accessed January 6, 2015.



Washington State NWCB website 2010

# Himalayan Blackberry

*(Rubus armeniacus)*

Himalayan blackberry is a Class C noxious weed. An aggressively growing species with large hooked thorns, it creates dense thickets which severely impacts native vegetation. Its ability to reproduce from a variety of vegetative pieces increases its risk of creating monocultures in disturbed, sunny areas and inhibiting the growth of native understory.

This species is a woody evergreen, perennial shrub that can grow to 13 feet tall. Canes can reach 20-40 feet in length and root at the tip when they contact the ground. Himalayan blackberry also spreads via seeds, vegetative fragments, and re-sprouting rootstalks.

Control:

#### 0-39% slopes [Washington State Noxious Weed Control Board (2010)]

- **Manual:** Mechanical control methods include repeatedly digging out root crowns and large roots and repeated removal of above ground growth several times a year 3.
- **Chemical:** Please refer to the [PNW Weed Management Handbook](#) (see below).

#### Slopes 40% and greater

- **Manual:** Not recommended unless incorporated with engineering solutions or an erosion control program.
- **Chemical:** See 0-39% slopes.

#### References and Additional Information

Pacific Northwest Weed Management Handbook website. 2015. *Blackberry Vines, wild (Rubus spp.)*. <http://pnwhandbooks.org/weed/other-items/control-problem-weeds/blackberry-vines-wild-rubus-spp>. Oregon State University. Accessed January 6.

Soll, J. 2004. *Controlling Himalayan Blackberry (Rubus armeniacus [R. discolor, R. procerus]) in the Pacific Northwest*. The Nature Conservancy. <http://www.invasive.org/gist/moredocs/hedhel02.pdf>. March 30.

Washington State Noxious Weed Control Board website. 2010. *Himalayan Blackberry*. <http://www.nwcb.wa.gov/detail.asp?weed=111>. Accessed January 6, 2015.



Washington State NWCB website 2010

# Japanese Knotweed

*(Polygonum cuspidatum)*

Japanese knotweed is a Class B noxious weed. Once established, it is difficult to control this species. It can form dense stands that crowd out native vegetation and degrade wildlife habitat.

This species is a shrubby perennial and spreads via long, stout rhizomes. It is commonly found in disturbed, sunny areas near the slope crest and can reach 4-8 feet in height.

Control:

## **0-39% slopes** [Washington State Noxious Weed Control Board (2010)]

- **General:** Mowing or cutting plant shoots is ineffective alone; however, mowing followed by herbicide treatments will provide some control. Methods must be repeated if infestation is very large. Care must be taken not to produce new plants. All plant material should be removed. New plants can sprout from very small fragments.
- **Mechanical:** Grubbing out small clumps when discovered can prevent new colonies from establishing. Rhizomes and fragments left in the ground, or nearby, can regenerate and spread infestations. The entire root system must be removed since re-sprouting can occur from rhizomes.
- **Biological:** There are currently no registered biological control agents for use on any of these *Polygonum* species. Grazing may be an effective strategy to prevent establishment. Any grazing strategy should be carefully controlled to prevent damage in critical areas.
- **Chemical:** Please refer to the [PNW Weed Management Handbook](#) (see below).

## **Slopes 40% and greater**

- **Mechanical:** Not recommended unless incorporated with engineering solutions or an erosion control program.
- **Biological:** Not recommended due to steep slope conditions.
- **Chemical:** See 0-39% slopes.

## References and Additional Information

King County. 2008. *King County Noxious Weed Control Program Best Management Practices: Invasive Knotweeds*. <http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/Knotweed-Control.pdf>. January.

Pacific Northwest Weed Management Handbook website. 2015. *Knotweed, Bohemian (*Polygonum bohemicum*) and Japanese (*Polygonum cuspidatum*) or Fleeceflower*.

<http://pnwhandbooks.org/weed/other-items/control-problem-weeds/knotweed-bohemian-polygonum-bohemicum-and-japanese-polygonum-cuspi>. Oregon State University. Accessed January 6.

Soll, J. 2004. *Controlling Knotweed* (*Polygonum cuspidatum*, *P. sachalinense*, *P. polystachyum* and hybrids) in the Pacific Northwest. The Nature Conservancy. <http://www.invasive.org/gist/moredocs/pol spp01.pdf>. January 16.

Washington State Noxious Weed Control Board website. 2010. *Japanese Knotweed*.  
<http://www.nwcb.wa.gov/detail.asp?weed=103>. Accessed January 6, 2015.



Washington State NWCB website 2010

# Old Man's Beard

## (*Clematis vitalba*)

Old man's beard is a Class C noxious weed. This species grows rapidly and blankets all layers of the forest, smothering vegetation and increasing the potential for tree failure.

Old man's beard is a deciduous perennial. Its climbing vines become woody and can grow up to 65 feet long. This species spreads via seed (each plant produces approximately 100,000 seeds, which are viable for up to five years) or stem fragmentation and prefers to have shaded roots but will grow quickly in full sun. Its taproot can reach several yards as well (King County 2010).

Control:

### **0-39% slopes** [Washington State Noxious Weed Control Board (2010)]

- **Mechanical:** Seedlings can be hand pulled. Larger stems need to be cut and removed from the area.
- **Chemical:** Please refer to the [King County Noxious Weed Control Program](#) (see below).

### **40-67% slopes**

- **Mechanical:** Small plants can be dug or pulled up when soil is moist, as long as slope damage or excessive soil erosion does not occur. The implementation of erosion control measures may be necessary for large scale removals from the ground surface.
- **Chemical:** See 0-39% slopes.

### **Greater than 67%**

- **Mechanical:** Not recommended unless incorporated with engineering solutions or an erosion control program.
- **Chemical:** See 0-39% slopes.

### References and Additional Information

King County. 2010. *King County Noxious Weed Control Program Best Management Practices: Old Man's Beard*. <http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/Old-mans-beard-Clematis-vitalba-control.pdf>. January.

Washington State Noxious Weed Control Board website. 2010. *Old Man's Beard*. <http://www.nwcb.wa.gov/detail.asp?weed=37>. Accessed January 6, 2015.



Washington State NWCB website 2010

# Reed Canarygrass

*(Phalaris arundinacea)*

- Reed canarygrass is a Class C noxious weed. This perennial grass can grow three to six feet in height and often forms dense monotypic stands in wetland ecosystems that provide little value to the wildlife habitat and prevent the establishment of more beneficial native species. Monocultures can withstand extended periods of inundation, and reproduction occurs via seeds, creeping rhizomes, or sprouting nodes of freshly cut stems.

Control:

## 0-39% slopes [Washington State Noxious Weed Control Board (2010)]

- **Manual:** Hand pulling and digging is only practical for small patches, be sure to remove the entire root mass. Infestations can be controlled by smothering with heavy cardboard and compost prior to the growing season, then planted with desired native species; however, this will not completely eliminate the infestation, only reduce the density.
  - **Mechanical:** Mowing may be a valuable control method, since it removes seed heads before seed maturation and exposes the ground to light, which promotes the growth of native species. Studies in Wisconsin indicated that twice-yearly mowings (in early to mid-June and early October) led to increased numbers of native species in comparison to reed canarygrass-infested plots that were not mowed.
  - **Chemical:** Please refer to the [PNW Weed Management Handbook](#) (see below).
- 40-67% slopes**
- **Manual:** See 0-39% slopes. Erosion control BMPs may be necessary for larger areas.
  - **Mechanical:** See 0-39% slopes.
  - **Chemical:** See 0-39% slopes.

## Greater than 67%

- **Mechanical and Manual:** Not recommended unless incorporated with engineering solutions or an erosion control program.
- **Chemical:** See 0-39% slopes.

## References and Additional Information

King County. 2011. *King County Noxious Weed Control Program Weed Alert: Reed Canarygrass*.  
<http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/Brochures/Reed-Canarygrass-factsheet.pdf>. August.

Tu, Mandy. 2004. *Reed Canarygrass (Phalaris arundinacea L.) Control and Management in the Pacific Northwest*. The Nature Conservancy's Wildland Invasive Species Team.  
<http://www.invasive.org/gist/moredocs/phaaru01.pdf>. June 7.

Pacific Northwest Weed Management Handbook website. 2015. *Canarygrass, reed (Phalaris arundinacea)*. <http://pnwhandbooks.org/weed/other-items/control-problem-weeds/canarygrass-reed-phalaris-arundinacea>. Oregon State University. Accessed February 12.

Washington State Noxious Weed Control Board website. 2010. *Reed Canarygrass*.  
<http://www.nwcb.wa.gov/detail.asp?weed=100>. Accessed February 12, 2015.



Washington State NWCB website 2010

# Scotch broom

(*Cytisus scoparius*)

- Scotch broom is a Class C noxious weed. This species is a multi-branched perennial shrub that can range from 3 to 10 feet tall. It can produce thousands of seeds each year, which are poisonous to some animals and have the potential to remain viable up to 80 years in the soil. Scotch broom spreads aggressively in sunny, dry areas, outcompeting understory vegetation and young trees.

## Control:

- **0-39% slopes** [Washington State Noxious Weed Control Board (2010)]
  - **General:** Because plants can produce thousands of seed each year and these seeds can survive for a long period of time in the soil, methods must be repeated for many years. Continue to monitor areas for seedlings after plants have been controlled. Soil disturbance can cause a flush of seed germination. Aim to control plants before seed pods mature.
  - **Mechanical:** Hand pulling and digging up plants are an option for small infestations. Use a tool like a Weed Wrench, Extractigator, or Uprooter to leverage plants out of the ground, along with their roots. Chopping, cutting or mowing is an option for flat areas. Cutting plants close to the ground when they are drought stressed, late summer, can provide control on plants with stems wider than 2 inches. Monitor plants for resprouts. Cutting followed by an herbicide application on new growth can also be effective.
  - **Biological:** The Scotch broom seed weevil, Exapion fuscirostre, larvae feed on seeds of Scotch broom in developing seed pods. The adults also feed on flowers and the tips of stems, though their damage is not significant. The Scotch broom bruchid, Bruchidius villosus, larvae feed on developing seeds and impact the plant's reproduction.
  - **Chemical:** Please refer to the [PNW Weed Management Handbook](#) (see below).
- **40-67% slopes**
  - **Mechanical:** Small plants can be dug or pulled up when soil is moist, as long as slope damage or excessive soil erosion does not occur. Manual removal of mature shrubs with deep and extensive roots on steep slopes is not recommended without the implementation of erosion control BMPs.
  - **Biological:** See 0-39% slopes.
  - **Chemical:** See 0-39% slopes.

- **Greater than 67%**
  - **Mechanical:** Not recommended unless incorporated with engineering solutions or an erosion control program.
  - **Biological:** See 0-39% slopes.
  - **Chemical:** See 0-39% slopes.

## References and Additional Information

King County. 2008. *King County Noxious Weed Control Program Best Management Practices: Scotch Broom, Scot's Broom*. <http://your.kingcounty.gov/dnrp/library/water-and-land/weeds/BMPs/Scotch-Broom-Control.pdf>. January.

Huckins, E and J. Soll. 2004. *Controlling Scotch (Scots) Broom (*Cytisus scoparius*) in the Pacific Northwest*. Lincoln County Soil and Water Conservation District and The Nature Conservancy. <http://www.invasive.org/gist/moredocs/cytsco01.pdf>. April 5.

Pacific Northwest Weed Management Handbook website. 2015. *Broom, Scotch (*Cytisus scoparius*)*. <http://pnwhandbooks.org/weed/other-items/control-problem-weeds/broom-scotch-cytisus-scoparius>. Oregon State University. Accessed February 12.

Washington State Noxious Weed Control Board website. 2010. *Scotch Broom*. <http://www.nwcb.wa.gov/detail.asp?weed=44>. Accessed February 12, 2015.