

INVASIVE PLANT TREATMENT GUIDE - Summer Cabin Lots



Bull thistle or spear thistle (*Cirsium vulgare*)

– Unlike Canada thistle, bull thistle is not a perennial but a biennial species and produces a taproot instead of an extensive root system

containing rhizomes (underground stems). Bull thistle can be confused with other thistles, especially Canada thistle (*Cirsium arvense*) and the closely related musk thistles (*Carduus* spp.). Bull thistle stems are conspicuously spiny-winged and have coarse or stiff hairs while Canada

thistle stems are not. All species of *Cirsium* ("plumed thistle") have a pappus with branched hairs in contrast to the unbranched pappus hairs on *Carduus* ("plumeless thistle"). Bull thistle can be hand-pulled successfully. Dig out the entire plant including the taproot.

Butterfly bush (*Buddleja davidii*) -

Butterfly bush has not been observed in the summer home tracts, but summer homeowners should be made aware that this species, commonly sold at nurseries and garden shops, is not native to the Pacific Northwest and is invasive. It should not be planted or cultivated in the summer home tracts despite its attractiveness as an ornamental shrub and ability to attract butterflies.



Canada thistle (*Cirsium arvense*) - Canada thistle is a rhizomatous plant species (it has an extensive and deep underground root/stem system), making it difficult to control manually since it is very difficult to remove all of the system if attempting to dig up the plant. The plant can resprout and spread from rhizomes as well as from root fragments created by digging. Mowing temporarily reduces aboveground biomass, but does not kill Canada thistle unless repeated at 7-28 day intervals for up to 4 years; however, this intensity of mowing is not recommended in natural areas, where it would likely damage native vegetation. Tilling can reduce or eliminate Canada thistle, if conducted repeatedly for several years, but is also not recommended in natural areas because it could severely damage native vegetation. Additionally, tilling can sometimes spread Canada thistle across and between fields, and tilling affects only the upper part of the root system. In some cases, as little as a quarter of Canada thistle's roots are in the top 8 inches of soil and reached by normal tillage while the majority of roots are 8-16 inches deep and some roots reach to 1.8 meters deep. Covering Canada thistle with boards, sheet metal, or tar paper can kill the plants. This may be the best option to manually treat Canada thistle in the summer home tracts unless the population only consists of a few plants and they can be dug out carefully and thoroughly. (Website Source: tncweeds.ucdavis.edu)



Catchweed bedstraw (*Galium aparine*) - Catchweed bedstraw is a weedy species (Hitchcock and Cronquist 1994) and can be confused with desirable bedstraw species (e.g., *G. triflorum*, *G. oreganum*, *G. aspernum*). Catchweed bedstraw can easily be hand pulled from the soil although rhizomes (underground stems), from which new plants can sprout, may persist, giving rise to new plants. Repeated hand pulling may be necessary to control or eliminate catchweed bedstraw. (Source: Oregon State University Extension Service website)

Chickory (*Cichorium intybus*) – Introduced from Europe and now naturalized almost everywhere in the U. S., chicory has a deep taproot enabling it to grow in hard packed, rocky ground such as the shoulder of roads where other plants cannot. Chickory can reproduce by seed or (vegetatively) from roots. The attractive light blue flowers make the plant easy to spot. The flowers open and close daily. Chickory can be found growing along Highway 26 between Welches and Zigzag. Plants can be handpulled, but care should be taken to remove all pieces of roots to prevent reproduction. Repeated hand pulling over consecutive years may be needed. The very young leaves can be eaten fresh in salads and the older, bitter leaves can be boiled in several waters and eaten. The best known use of the plant is as a coffee additive or substitute. The roots are roasted and ground to make chicory coffee which has no caffeine.



Chickweed (*Stellaria media*) – This small herb can be hand-pulled; however, the plant is rhizomatous (it has underground stems) and hence can reprot from rhizomes left behind in the soil. A member of the pink family (Caryophyllaceae), chickweed has opposite leaves with stems enlarged (swollen) at the leaf nodes. Petals are deeply bilobed.



Common tansy (*Tanacetum vulgare*) - An aromatic perennial with a long history of medicinal use, common tansy has become a problem weed in pastures and along roadsides, fence lines, and stream banks. It spreads mainly by seeds, and less commonly



from creeping rhizomes to form dense clumps of stems. Each stem grows a cluster of numerous disc flowers during midsummer. These persist throughout the summer and into early fall. Pollination occurs through a variety of insects—flies, butterflies, moths, and honeybees. **Mowing or hand pulling provide alternatives to herbicide use near waterways and have been reported to marginally control common tansy. Other studies report, however, that hand pulling or mowing has little effect on tansy, except to reduce seed production.** Most of the big roots are near the surface, so it may feel like you can pull up smaller plant roots and all, but the

plant almost always comes back again and again. Tansy regenerates from root fragments, so cultivation could expand the size of an infestation. Mowing during the bud stage will prevent the growth of flowering stalks, limiting seed production and the spread of infestations by seed. If mowing is used, mower blades should be set high to limit impacts on desirable species. Gloves and other protective clothing should be worn to prevent possible absorption of toxins through skin if hand pulling plants. Common tansy is less common on the Mt. Hood National Forest than tansy ragwort. (Source: Montana State University Extension Service website)

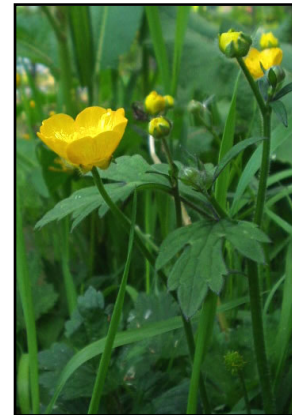


Common velvetgrass (*Holcus lanatus*) – Hoeing or hand pulling common velvetgrass are effective, although time-consuming, control methods. Intensive mowing suppresses the establishment and spread of velvetgrass on a site. Control of the grass is most effective when it is cut prior to seed dispersal. Elimination of the plant will be difficult, however, due to its perennial nature and ability to regenerate from decumbent tillers (prostrate stems) even when cut to only about 1 inch above the ground surface. The enormous seed bank of the species means that the grass can quickly re-establish itself after any disturbance. Common velvetgrass is considered a “low-fertility species,” meaning that it prefers soils low in nutrients (especially nitrogen, phosphorus, and potassium). Nitrogen or fertilizer application, therefore, can reduce the abundance of velvetgrass. (Website Source: tncweeds.ucdavis.edu)



Creeping buttercup (*Ranunculus repens*) -

Creeping buttercup can be distinguished from native buttercup species by its horizontal growth habit, creeping stems that root at the nodes, spherical head of achenes, and markedly long petals (1/4-3/8 of an inch). Creeping buttercup prefers moist soils and is frequently found in moist meadows, in lawns, and along ditch banks. It spreads by seeds and, similar to



strawberry plants, by stolons (surface stems) that root at the nodes. If hand pulling is used for control of creeping buttercup, all of the rooted branches must be tracked down and removed; otherwise, the plant may reestablish from stem fragments. Improving soil drainage will make areas less desirable to the plant. (Source: University of Alaska weed website)

Diffuse knapweed (*Centaurea diffusa*) – Diffuse knapweed is a highly competitive herb in the sunflower family (Asteraceae). Plants first form low rosettes and may remain in this form for one to several years. After reaching a threshold size, plants bolt, flower, set seed, and then die. They may behave as annuals, biennials, or short-lived perennials, bolting in their first, second, third, or later summer, respectively. Stems are upright, 10-60 cm (4-24 in) tall from a deep taproot, highly branched, and angled--with short, stiff



hairs on the angles. There are two types of leaves. The long, deciduous basal leaves, which form the rosette, are stalked and divided into narrow, hairy segments, 3-8 cm (1-3 in) long, and 1-3 cm (0.4-1 in) wide. The stem, or cauline, leaves, which are alternately arranged on the stems, are smaller, less divided, stalkless, and become bract-like near the flower clusters. Bracts of the flower heads (phyllaries) are yellowish with a brownish margin, sometimes spotted, fringed on the sides, and terminating in a slender bristle or spine 1-5 mm. The flowers are creamy (white) or sometimes purplish.

Hand pulling diffuse knapweed plants before they set seed each year may provide effective control. For example, diffuse knapweed densities were reduced by 97% on The Nature Conservancy's Tom McCall Preserve in northern Oregon by volunteers who hand pulled the mature plants and dug up rosettes every year for five years. Hand pulling can also be used to maintain or further reduce low knapweed densities brought about by herbicide treatments as was done at TNC's Clear Lake Ridge Preserve in northeastern Oregon. Hand pulling should be conducted three times annually (spring, summer, and late summer) to capture as many plants as possible. Pulling should be conducted before seed set; and if seeds have formed in the flower heads, the plants should be bagged to keep the seeds from spreading.

Although hand pulling has been effective in some areas, it failed to provide adequate control in others. A hand-pulling experiment on City of Boulder (CO) Open Space land failed to provide control. In 5 m x 25 m test plots, plants that were hand pulled twice annually for three years had densities nearly equal to those in adjacent plots where knapweed was not pulled. Although some of the reinfestation was a product of the existing seed stock in the soil, seeds spread from plants in neighboring unmanipulated plots seemed to play an important role in the reinfestation of diffuse knapweed. This suggests that clearing small areas within a larger area populated by knapweed may not provide adequate control.



Hand-pulling programs should be repeated annually for as long as diffuse knapweed is a problem in the surrounding area. Seeds in the soil may remain dormant for several years and an area can become quickly reinfested. Also, the “tumble weed” nature of diffuse knapweed allows it to distribute seed over a large area. A few rogue knapweed plants can quickly destroy years of hard work if left undetected. However, hand pulling can lead to significant reductions in knapweed populations and the labor required to maintain control should decrease over the years.

NOTE OF CAUTION: As a precaution, anyone working with diffuse knapweed or other knapweed species should wear protective gloves and avoid getting knapweed sap into open cuts or abrasions. Workers should wash their hands and exposed skin with soap and water following contact with this plant.

Dock – Native to Europe, broad-leaved dock (*Rumex obtusifolius*) and curly (curled) dock (*Rumex crispus*) are up to 1.5 m tall perennial herbs, with up to 40 mm thick fleshy taproots that may extend up to 2.5 m in the soil. Although no clear data are available on the longevity of dock plants, some have been observed to live for decades. It is reported that both species have a tendency to die after producing seeds; however, this may not be



the case in all environments. Under natural conditions, seeds of both species can germinate throughout the year. These two species are particularly successful as weeds because of their ability to flower several times a year, their production of large number of seeds, which remain viable in the soil for many years, their ability to quickly establish from seeds, and their ability to germinate whenever environmental conditions provide a reasonable probability for seedlings to survive. Additionally, these two species show considerable ability to re-grow from vegetative fragments left in the soil after cultivation or cutting. A thorough knowledge of the root system of dock is imperative for the development of sustainable control strategies against these species. Root growth of both species is greatest in spring and plants that have overwintered often develop adventitious roots when spring growth recommences. **Using a**

shovel to remove the crown about 2 inches below the soil surface may be a simple and effective control, but plants can potentially reproduce from roots, rhizomes (underground stems), and root fragments. Mowing prevents seed production and reduces top-growth of dock, but it won't control dock.

The main structure involved in clonal growth of these two species is the rhizome (underground stem) with its ability to produce adventitious roots and new taproots. Almost all 3-year-old plants develop secondary taproots, and 5-year-old or older plants

are usually heavily divided as secondary taproots become the main root system. The result is a dense population of clones that occupy an increasing area (i.e., a phalanx strategy in clonal growth), a survival strategy common in plants from closed communities. Regeneration of dock species from root fragments has been studied, and it is now confirmed that regeneration of shoots can take place only from the uppermost part of the taproot (i.e., botanically the rhizome). Regrowth ability seems related to the previous presence of buds, as fragments lacking buds (e.g., parts below the root-collar) have been shown to be unable to regenerate. However, there are also studies showing that regeneration is possible from all root parts, ranging from below 10% regeneration from pieces of root end and top parts, to a 90% regeneration of the middle parts of the roots. It is very likely that these contradicting results are due to difficulty and confusion distinguishing roots from rhizomes. (Source: Oregon State University Extension Service website; Zaller 2004)

English holly (*Ilex aquifolium*) -

Small plants can be hand pulled or dug up when soil is moist. Mature trees have deep and extensive roots, so digging is labor-intensive and results in considerable soil disturbance if all of the roots are removed. Cutting holly at the base usually results in it re-sprouting from the crown, but with monitoring and follow-up treatment cutting can suppress the holly. (Source: King County Natural Resources and Parks website)



English ivy (*Hedera helix*) - Even though it is labor-intensive, the most effective control measure is manual removal. Wear gloves and protective clothing. The sap of English ivy can cause a skin reaction in some people. When English ivy grows on trees, cut the vines or pry them off. This will kill the vines, but the lower rooted plants also need to be removed. Hand pull or dig out accessible plants. Remove (hand pull or cut) the vertical growing plants to stop flower production and further spread of the plant by seed. Mowing is effective if done regularly since cut plants can resprout. Clippings need to be removed. (Source: King County Noxious Weed Control Program website)

English laurel, cherry laurel (*Prunus laurocerasus*) - English laurel is an ornamental shrub sold at nurseries and garden shops and used as a common urban landscaping plant in the Pacific Northwest. It is widespread and common in Portland and other Oregon cities and towns. Its leaves are shiny green and leathery, like those of rhododendron, with serrate (finely toothed) leaf margins. Birds disperse the seeds. English laurel occurs along Highway 26 and in some lots in the summer homes tracts. This plant should not be planted or cultivated in the summer home tracts.



Field bindweed (*Convolvulus arvensis*) - Field bindweed is a persistent, perennial vine of the morning-glory family (Convolvulaceae) that spreads both by rhizomes and seed. It is a weak-stemmed, prostrate plant that can twine and form dense tangled mats. Stems can grow to 1.5m or longer, and its underground rhizomes may range from 5cm to 2.6m long. The extensive roots can measure 6-7 m long and penetrate deeply into the soil. The extensive underground root/stem system stores carbohydrates and proteins, helps field bindweed spread vegetatively, and allows it to resprout repeatedly following removal of aboveground growth. Most roots perish at the end of the season, but some persist through the winter. The roots and rhizomes become winter hardy in autumn and can withstand temperatures as low as -60°C. Rhizomes and attached lateral roots can persist independently if severed from the primary root. Freezing temperatures kill shoots.



Successful control is most likely if the aboveground biomass is removed (by tillage, hand pulling, or herbicide application) followed by competition from other species (e.g., from surrounding vegetation or restoration efforts) and sites are frequently monitored for resprouts. One study found that 65% of a carefully selected set of plump 55-year old dry-stored seeds were still germinable, and those buried deeply in the soil can persist nearly as long. Most herbicides are not absorbed by

dormant seeds and are therefore ineffective at controlling them. Because of its wide distribution, abundance, and economic impact, field bindweed is considered one of the ten “world’s worst weeds.” Jepson claimed that it is “the most troublesome garden weed

yet naturalized in California...and is especially obnoxious in the richest lands and moist alluvial loams.” Field bindweed control entails chemical applications, discing, or hand-pulling on a regular basis (perhaps only once per year), plus yearly monitoring. (Website Source: tncweeds.ucdavis.edu)

Foxglove (*Digitalis purpurea*) - Hand pulling of stalks is effective. In spring, while soils are moist, stalks and root masses are easily pulled from the ground. Pulled material must be removed from the site and destroyed (flower stalks left on site will continue to mature and release thousands of seeds). It is easy to strip flowers from the stalks, and little additional effort is needed to pull up the entire plant. If flower stalks are cut back before seeds ripen, the plant can bloom again in mid- to late summer. Therefore, aboveground treatments such as clipping and mowing may be counter-productive unless repeated before resprouted plants have time to produce seed. Workers should protect themselves from extended contact with the poisonous leaves. (Source: University of California website)



Garlic mustard (*Alliaria petiolata*) - Garlic mustard is an invasive, non-native, biennial herb that spreads by seed. It is difficult to control once it has reached a site: it can cross-pollinate or self-pollinate, has a high seed production rate, outcompetes native vegetation, and can establish in open areas or closed-canopy interior forest habitat, dominating the forest understory. Garlic mustard is a self-pollinator,



so one individual can occupy a site and produce a seed bank in the soil. Populations can produce more than 62,000 seeds per square meter to quickly outcompete native vegetation, changing the composition and structure of plant communities on the forest floor. Garlic mustard is allelopathic, producing chemicals that inhibit the growth of other plants as well as beneficial mycorrhizal fungi.

Hairy Cats-Ear (*Hypochaeris radicata*) - Hairy cats-ear resembles the common dandelion (*Taraxacum officinale*) with yellow, star-shaped flower heads 1 to 1 ½ inches in diameter at the end of 10 to 16 inch stems; however, hairy cats-ear has branched or several flowering stems (a single flowering stem in common dandelion) and its basal leaves are hairier, more irregular, and have deeper lobes than those of the common dandelion. Also, unlike common dandelion, the outer bracts below the flower heads of cats-ear are *not* curved downward (reflexed). Cats-ear spreads by seeds, crown, and root sections. Scattered plants in lawns can be spaded out below the crown in early spring as soon as the leaves appear. Plants at the early rosette stage can be controlled by severing the plant below the crown. For large infestations, the best long-term control will likely be some form of integrated pest management requiring a combination of manual, mechanical, and herbicide treatment. (Sources: numerous websites)



Herb Robert (*Geranium robertianum*) - Herb Robert has little root structure (it has a taproot) and pulls from the ground easily at all stages of growth, although this disturbance may improve herb Robert's seed bed in the soil. Because the brittle stems break easily, pull from the base of the plant to remove the whole plant and the root. It may also be controlled using a string trimmer (weed eater) in early to mid summer before fruiting. (Source: Washington State Noxious Weed Control Board website)



Horseweed (*Conyza canadensis*) – Horseweed is common in disturbed areas such as along roadsides. An annual, horseweed reproduces by seed. Plants can be hand pulled, but they can cause skin dermatitis, so wear gloves.

Japanese knotweed (*Polygonum cuspidatum*) - Treatment with

herbicides (usually aquatic glyphosate, triclopyr, or imazapyr) is the only method known to control knotweed effectively. The Mt. Hood National Forest is awaiting approval of its recently completed invasive plant Environmental Impact Statement (EIS), which would allow herbicide use on the Forest to treat invasive species such as Japanese knotweed; however, only Forest Service personnel or Forest Service-approved contractors would be allowed to apply them (including in the summer home lots). Repeated cutting of knotweed stems/canes (at least three times during the course of the growing season) may weaken the rhizomes (underground stems), from which new plants can reproduce vegetatively. Cutting stems may also reduce the plant's growth and prevent it from flowering. However, new plants can sprout from stem fragments, root fragments, or rhizomes! Digging out knotweed is not recommended because of the plant's ability to reproduce from rhizomes and root fragments. Digging up or cutting knotweed may spread the plant.



Mayweed chamomile

(*Anthemis cotula*) - Small

infestations can be eliminated by hand pulling and digging, but this is not practical for large infestations. Hand pulling mayweed chamomile before it goes to seed will prevent new infestations. Mowing mayweed chamomile is not effective. If mowed too early, the plant grows more prostrate

and can produce flowers below the height of a mower blade. (Source: Washington State University Whitman County Extension website)





Nipplewort (*Lapsana communis*)

- Nipplewort is easily uprooted, so hoeing or hand pulling is the easiest way to control this weed in the garden before it can set seed, preferably at the seedling or rosette stages. The seeds are not very persistent and the germination rate declines greatly in a few years provided the plants are not allowed to produce more. The most distinctive feature of nipplewort is the two side lobes



on the lower leaves that resemble "nipples," hence the common name. Because "wort" is an old-fashioned word for "plant," the common name literally means "nipple-plant." (Source: Down Garden Services and Illinois Wildflowers websites)

Norway maple (*Acer platanoides*) – Norway maple is an ornamental shrub that is *not* native to Pacific Northwest forests. The ends of the 5-lobed leaves are crowned with pointed teeth or sharp projections. Norway maple might be confused with bigleaf maple (*Acer macrophyllum*), Douglas maple (*Acer glabrum*), or vine maple (*Acer circinatum*), which are all native species. Bigleaf maple has 3-5 lobed leaves, but the leaves are deeply lobed and very large with smooth leaf margins. Douglas maple has 3-5 lobed leaves with serrate (toothed) leaf margins. Vine maple has 7-9 lobed leaves with serrate leaf margins. Bigleaf maple grows to be a large and tall tree in the forest overstory. Douglas and vine maple grow to be only shrubs or small trees in the forest understory.



Orange hawkweed (*Hieracium aurantiacum*) – Orange hawkweed is highly invasive and a small population was found on one lot in the summer home tracts. The plants were hand pulled. This plant reproduces sexually by seed and asexually by stolons (aboveground runners), rhizomes (underground stems), and root fragments. Hand pulling may be effective for small populations, but will need to be repeated for successive years since plants can resprout and spread from stolons, rhizomes, or root fragments. Larger populations are difficult to control with manual treatment and probably require herbicide application. An orange hawkweed population about 2-3 acres in size has been found in the nearby Mt. Hood Wilderness Area, and large populations can be found along Highway 18 (Lolo Pass Road) in the vicinity of the Bonneville Power Administration



utility (powerline) corridor. Although strikingly attractive, orange hawkweed is highly invasive and listed as a noxious weed by the Oregon Department of Agriculture. It invades meadows and forest openings, rapidly taking over sites and displacing native plant communities, including native hawkweeds such as white-flowered hawkweed (*Hieracium albiflorum*) and western hawkweed (*Hieracium albertinum*).

Oxeye daisy (*Leucanthemum vulgare*) - Root systems are shallow and the plant can be dug up and removed. Be sure to remove the entire root system, though, as remaining roots may produce new shoots. Hand removal will have to be continued for several years because seeds may remain viable in the soil for a long time. Oxeye daisy should be mowed before flowers appear to reduce seed production. Mowing may have to be repeated during a long growing season because mowing may stimulate shoot production and subsequent flowering. (Source: Montana State University Extension Service website)



Periwinkle (*Vinca major* and *Vinca minor*) – Common periwinkle (*V. minor*) and bigleaf periwinkle (*V. major*) are attractive ground-cover plants sold at nurseries and garden shops, but both are non-native and invasive, displacing native vegetation. Muenscher (1955) suggests manual removal of periwinkle. He advocates raising the runners (creeping stems) with a rake and mowing them close or digging them out by hand. (Website Source: tncweeds.ucdavis.edu)

Plantain (*Plantago lanceolata* and *Plantago major*) – English plantain (*P. lanceolata*) has

long, narrow, lance-shaped leaves while common plantain (*P. major*) has broad, elliptical leaves. Early removal of new seedlings has been successful when practiced diligently. Digging out perennial plantain plants must be done regularly for several years to be successful. Pulling or hand-hoeing is helpful if done periodically during the year; however, regrowth from the extensive crown system limits the effectiveness of this method. Mulching with landscape fabrics can be effective for controlling seedlings of both species. Even established broadleaf plantain can be controlled if the fabric is overlapped and no light is allowed to penetrate to the soil. Use a polypropylene or polyester fabric or black polyethylene (plastic tarp) to block all plant growth. Cover fabric mulches with an organic mulch to improve aesthetics. Organic mulches may also effectively control plantain seedlings if they are at least 3 inches deep and are managed in such a way that prevents the mulch from serving as a growth medium for new plantain seedlings.

[Source: University of California Integrated Pest Management (IPM) website]



Policeman's helmet (*Impatiens glandulifera*) -

Policeman's helmet germinates from February to March. Its roots extend four to six inches deep, with adventitious roots found along the lower stem nodes, sometimes buttressing. Flowers are present from June to October, with shaded environments producing later flowers. Policeman's helmet can grow as high as ten feet tall in shaded areas. The fruit is a five-chambered capsule. When a mature

capsule is touched, it explodes and ejects up to 800 seeds as far as 20 feet away. Seed set occurs about 13 weeks after flowering. Seeds can travel along waterways and germinate under water. The seeds are viable for 18 months or more. As an annual species with a shallow root system, policeman's helmet can be easily hand-pulled. A seed bank is present with two-year viability, so follow-up control is recommended. (Source: Washington State Noxious Weed Control Board website)

Queen Anne's lace (*Daucus carota*) – This plant is an early successional invader, but does not appear to significantly inhibit the establishment and recovery of native grass species. Its abundance in sandy soils generally declines as natives become reestablished.

Queen Anne's lace is particularly troublesome when it occurs on railroad and highway rights-of-way with heavy soils where frequent mowing keeps the area bare and, since incorrectly timed, simply allows for germination or scatters seeds. The plant normally does not occur on newly abandoned fields because seeds do not survive for more than 1-2 years and are not often present in a newly disturbed area. Once dispersed to an area, the seedlings can emerge and survive in several types of ground cover, including those with thick vegetation. Queen Anne's lace is commonly found in fields 4-7 years after abandonment. Control is achieved by hand-pulling or mowing close to the ground before seed set. Use gloves when handling this plant since it can cause skin irritation in some people. Burning does not help control this invasive plant and fire may induce seed to sprout. (Website Sources: tncweeds.ucdavis.edu and U.S. Forest Service Weed of the Week)



Reed canary grass (*Phalaris arundinacea*) - Reed canary grass is difficult to control due to its ability to reproduce either vegetatively (from rhizomes and rhizome fragments)



or sexually (from seed). RCG survives prolonged flooding by possessing anoxia-tolerant rhizomes. Laboratory studies indicate that 74% of new shoots originate from rhizomes and the remainder from axillary buds on basal nodes. Isolated or small patches of RCG

can be removed successfully by digging out and removing the entire root mass. Removal is easiest when the soil is moist. Be sure to remove all rhizomes and roots since small rhizome fragments can resprout. Properly dispose of plant material since rhizomes and stems can develop new roots if inundated or if kept in contact with moist ground. Be sure to follow-up to catch any resprouted stems.

Mowing or cutting (using a mower, brush cutter, weed eater, tractor-drawn mower, machete, etc.) by itself will not kill RCG. In fact, if RCG is mowed only once or twice per year, it actually stimulates additional stem production. There is evidence that hand chopping the culms at flowering time may kill small clones. Manual control is very slow and too labor-intensive for large infestations. Mowing is probably not effective as a control measure. RCG responds quickly by growing back from rhizomes and seed remaining in the soil following mechanical removal. Fire can help control the spread of reed canary grass and keep it out of high quality wetlands. Repeated late autumn or late spring burning for several years can control this species. Annual burning may be needed for 5-6 years before good control is apparent. Burning is most effective where other species are present or in the seed bank since fire allows native, fire-adapted species to compete successfully. Fire is not very effective in dense monocultures of this grass where seeds or plants of native species are absent. (Website Sources: tncweeds.ucdavis.edu and Illinois Nature Preserves Commission)

Scotch broom (*Cytisus scoparius*) - Control, not eradication, is the best we can hope for with Scotch broom because the seeds are extremely long-lived in the soil seed bank (up to 80 years). Plants can be hand pulled or pried out with a weed wrench. Plants can also be mowed, but will resprout. It is best to hand pull or mow plants in the spring or early summer before it has produced seed pods; otherwise, removal of plants may spread the seed. Uprooted plants need to be removed from the treated site since seed pods can continue to mature and eventually release seeds.



Self-heal (*Prunella vulgaris*) - Self-heal can be hand pulled, but it regenerates from shoot fragments if the plant is disturbed and is able to rapidly colonize cleared areas. Self-heal also spreads vegetatively by short rhizomes (belowground stems) or stolons (aboveground prostrate or creeping stems). It also spreads by seed. Seeds can persist for at least 5 years in cultivated soil. Seeds have been recorded in large numbers in the soil beneath pasture even when the plant was poorly represented in the vegetation cover. Mowing and trampling encourages prostrate growth with the creeping stems rooting at the nodes when they touch the ground. (Source: organicweeds.org.uk)



Speedwell (*Veronica chamaedrys*) – Native to Europe, Germander or bird's-eye speedwell is an attractive ground-covering plant but a weedy non-native species in North American forests. Speedwell is often used as an ornamental ground cover and commonly sold at garden shops. A perennial plant, speedwell has simple, opposite, narrow leaves near the base that are slightly elongated. Blue, violet, or white flowers are produced in the spring. The mature fruit is heart-shaped. Speedwell has a fibrous root system, spreads rapidly in patches, and is considered difficult to control. Repeated hand pulling may be necessary since the plant can reproduce from root fragments left in the soil.

Spotted knapweed (*Centaurea biebersteinii*) – Spotted knapweed is a biennial or short-lived perennial composite with a stout taproot. It has 1-20 slender, upright stems, 3-10 dm tall, most branching in the upper half. Seedling leaves form a rosette; stem leaves are canescent, the lower once or twice pinnately divided into linear or lanceolate lobes on each side of center vein, tapered at both ends, the broadest part above the middle to 10 cm long and 3 cm wide; the upper with fewer lobes or entire, becoming smaller up the stem to less than 1 cm long. The best way to distinguish spotted knapweed is by the dark tips and fringed margins of its phyllaries (bracts below the petals of the flower). Seeds germinate in the fall and early spring. Thirty percent of seeds may be viable up to eight years in the soil

seed bank. Seed dispersal is generally passive, occurring in late summer (but may continue throughout the fall, winter and spring), as seeds are shaken from drying capitula (flower heads). The short pappus and weight of the seed (1.7 mg) keep dispersal distances relatively short; seeds generally fall within a 3-12 dm radius of the parent plant. Movement over greater distances requires transport by rodents, livestock, vehicles, or hay or commercial seed.



Spotted knapweed can be removed by hand-pulling or digging with a spade in less dense areas (0 to 10 plants per m²) during volunteer work days. In denser areas (>10 plants per m²) repeated spot-burning with trained individuals is more effective and efficient. Gloves should be worn when hand-pulling due to the plant's allelopathic compounds that are thought to be carcinogenic in large quantities. Mechanical removal of spotted knapweed involves the use of a Weed Popper™. This tool consists of a row of spikes at the end of a spring-loaded pedal.

The user inserts the spikes into the ground at the base of the plant, steps on the square foot pad on the top of the pedal and pushes down lightly (the same movement as when using a shovel). In one motion, the spikes move forward and up, thus uprooting the plant, and a plate moves forward that pushes the plant off of the spikes. (Website Source: tncweeds.ucdavis.edu)



St. Johns-wort (*Hypericum perforatum*) - St. Johns-wort is difficult to eradicate because of its extensive root system and long-lived seeds. Each plant may include several well-spaced crowns, each with lateral roots. Lateral root buds are capable of producing new crowns. Plants connected by these lateral roots



separate when these roots rot. St. Johns-wort spreads by underground and aboveground creeping stems and by seed. The seeds are viable in the ground from 6 to 10 years. Hand pulling and mowing can be used to control St.



Johns-wort, but plants will probably resprout and vegetative reproduction may be stimulated. Pulling should only be

considered an option on new or small infestation sites and repeated pulls will be necessary to ensure removal of the whole plant and any lateral roots. Do not leave hand-pulled plants at the site, since vegetative growth will occur, and the seed source will remain.

Parts of the plant contain florescent pigments that, when exposed to light, cause severe dermatitis in animals. Reports of contact photosensitivity include second-degree blisters on eyelids and forehead. Wear gloves and avoid touching the eyes after handling plants. Biological control has been relatively successful using several introduced beetles. These beetles feed on foliage as plants begin to flower in April and May. The following season, beetles emerge in spring and feed on plants as they begin growth. St. Johns-wort is known to be poisonous to animals. (Source: USGS and Washington State Noxious Weed Control Board websites)

Tansy ragwort (*Senecio jacobaea*) – Tansy ragwort is a tap-rooted biennial or short-lived perennial with 2 to 4 ft. tall erect stems, branched near the top, with dense clusters of bright yellow daisy-like flower heads. First-year plants are dense rosettes with dark green ruffled or lobed leaves on purplish stems. The plant's fibrous system of coarse, light-colored roots spreading from the crown can produce small adventitious shoots when stimulated by mechanical treatment (mowing) or hand pulling. Small infestations can be effectively hand pulled or dug up. Pulling when the soil is moist will help to remove the whole root, but tansy ragwort will resprout from root fragments. Isolated plants should be carefully removed in order to stop them from infesting a larger area. Pull the plants after they bolt (produce a flowering stem) but before they flower. In areas where mature plants are pulled, there are usually many small rosettes and seeds left in the soil. Carefully search the area for rosettes and dig them up. Roots break off easily and re-sprout with new plants, so use a digging tool. Completely removing plants is easiest when the soil is loose or wet. Return to the same location the following spring and summer to remove plants coming up from seeds already in the soil and continue to monitor the area for several years. Because tansy ragwort is a toxic plant, gloves and protective clothing should be worn.

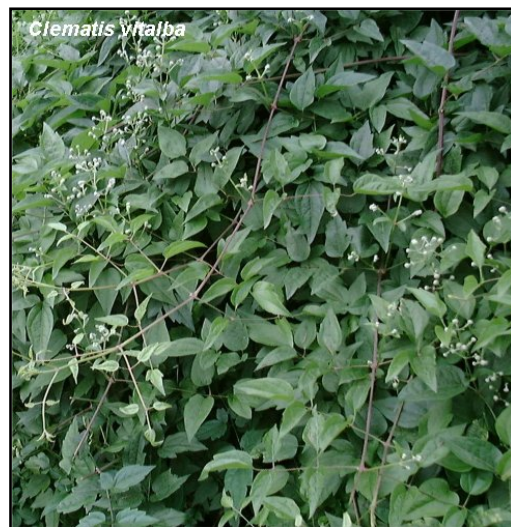


Covering treated sites with mulch will help prevent seed germination. Mowing is not recommended. Although mowing will prevent seed production, damage to the flowering stalk will force tansy ragwort to keep growing as a perennial. Established vegetative plants remain as low-growing rosettes which can prevent desirable vegetation from establishing on a site. Tansy ragwort seeds have a white pappus and are wind-carried, resulting in rapid spread of tansy ragwort infestations. A single large plant may produce 150,000 seeds. Seeds can remain viable in the soil for as long as 15 years. Seeds in the upper 2 cm of soil generally are viable for 4 to 5 years. Plants in flower can form viable seeds even after they are pulled, so carefully bag and dispose

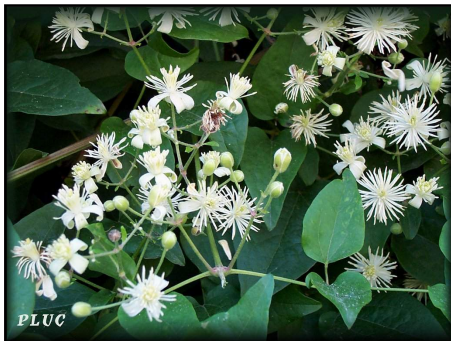
of all flowering plants. If the plants are seeding, it is very difficult to bag the seed heads without dispersing the seeds, so bag flowering plants well before seeds mature. (Source: King County Noxious Weed Control Program website).

Three natural enemies of tansy ragwort were introduced in California between 1959 and 1966: the ragwort flea beetle (*Longitarsus jacobaeae*), the ragwort seed fly (*Pegohylemyia seneciella*), and the cinnabar moth (*Tyria jacobaeae*). These insects are the biological agents used to control tansy ragwort in California, Oregon, and Washington. On the Mt. Hood National Forest, larvae of the cinnabar moth feed on tansy ragwort and can be observed on plants during the summer months. The cinnabar moth and the ragwort flea beetle are unable to establish east of the Cascade Mountains (Rees et al. 1996). (Source: Washington State Noxious Weed Control Board website and <http://dnr.metrokc.gov/weeds>)

Traveler's joy (*Clematis vitalba*) – A non-native perennial vine, traveler's joy requires high light levels for growth and reproduction, but is tolerant of moderate shade. In seedling germination studies done in forests, traveler's joy seedlings did not survive in undisturbed forests with low light levels. It was also found that nitrogen may be the limiting nutrient resource. Invasive characteristics include rapid growth rate, early reproductive maturity, easy vegetative spread from fragmentation, quick recovery from physical damage, and the ability to resprout. Traveler's joy is also a prolific seed producer.



Seeds are dispersed by wind, water, people, and animals. Stems can produce 5 meters of new growth each season. The trailing stems along the ground can produce roots at each node, giving traveler's joy the capability to produce a new plant every 15 cm (6 inches). Traveler's joy can also spread by fragmentation, when roots are produced from stem fragments and from attached stems.



Vegetative spread by fragmentation occurs more often from older plants, since older stem tissue holds more water and has higher carbohydrate reserves. Fragments are spread by water and from garden cuttings. Plants mature faster in full sunlight, and seed production is possible after one to three years, depending on exposure to full sunlight. Asexual reproduction is possible after one year. An estimated 17,000 viable seeds are produced per 0.5 m² in areas where

traveler's joy is a canopy species. Seedlings can be hand pulled. Larger stems need to be cut and removed from the area. (Source: Washington State Noxious Weed Control Board website)

Wall lettuce (*Mycelis muralis*) – Formerly named *Lactuca muralis*, wall lettuce is a weed of European origin that is common and widespread throughout the Pacific Northwest. It is found in disturbed areas (roadsides, landings, clearcuts, old skid roads), along streambanks, and in forests. This species is so widespread, abundant, and “dirt-common” that it may be impractical to try to get rid of it. It is considered neither a noxious nor a problem weed (Invaders Database System 2003, USDA 2002). Wall lettuce is an annual or biennial species. The plant dies back after flowering but overwinters as a rosette. Its leaves can be eaten raw in salads.



White Clover (*Trifolium repens*) – White clover is common and widespread in disturbed areas, fields, and lawns in the Pacific Northwest. Plants can be hand pulled, but the stolons (aboveground prostrate stems/runners) must also be pulled; otherwise, plants will resprout. Repeated hand-pulling over successive years may be necessary.



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