Oregon Department of Agriculture
Plant Pest Risk Assessment for
Herb Robert (*Geranium robertianum* L.)
February 2009

Common Name: Herb Robert, Robert Geranium, Stinky Bob, Red Robin, Fox Geranium
Family: Geraniaceae

Findings of This Review and Assessment: *Geranium robertianum* L. has been determined to be an invasive plant within the category of a **"B"** listed noxious weed as defined by the Oregon Department of Agriculture (ODA) Noxious Weed Policy and Classification System. This determination is based on two independent risk assessments following a literature review. Using a rating system adapted from United States Department of Agriculture, Animal Plant Health Inspection Services, Plant Protection, and Quarantine (USDA APHIS PPQ) Weed Risk Assessment Guidelines*, Geranium robertianum* received a score of **25** out of a potential score of **47.** Using the ODA Noxious Weed Rating system, *Geranium robertianum* received a score of **15** supporting a **"B"** listing.

Introduction: Weedy geranium populations have expanded exponentially in the Pacific Northwest in the last ten years. Two species, *Geranium robertianum,* and *Geranium lucidum* have aggressively invaded habitats (oak and fir woodlands) only marginally impacted by serious weed invasion in the past. Today herb Robert is becoming one of the most common woodland invaders in Western Oregon. An annual weed with a high reproductive potential, it has barely begun to infest all potential acreage available to it. Regionally, the species has been dispersed mainly by human activities into many if not most watersheds in Western Oregon. Locally, it is spreading by water movement, wildlife, recreationalists, gardeners, and through land disturbance activities. It can develop into populations of high density, up to 250 plants per meter square, pushing out native flora and impacting domestic gardens and parklands (Written Findings WSWB 2007). The full impacts of herb Robert invasion on flora, soil faunal communities, and pollinators have not been examined.

Plant Description and Growth Habits: *Geranium robertianum* is a branching, low growing winter and spring annual. The light green leaves are deeply dissected and release a pungent odor making this plant easy to recognize. As the plants mature the foliage turns red.

The red color is also more prevalent under high light conditions (King County 2008). The stems are highly pubescent, have multiple forks, and are brittle at the joints. The roots are shallow allowing for easy hand removal. The pink flowers are perfect and five petaled. The receptacle is elongated into a pointed structure called a "torus" or “storks bill”. Herb Robert propagates only by seed. Herb Robert tolerates a wide range of light intensities thriving best in open canopied forests or along the edges of forests though it is very happy under deeper shaded conditions. It can be highly competitive with native early spring forbs but less so against grasses. Often herb Robert takes advantage of habitats that have been opened up through weed control activities such as ivy or false brome removal.

Reproduction and Dispersal. Herb Robert reproduces only by seeds. Flowers are usually self-fertile creating uniform populations. Seeds are matured in elongated pointed capsules that eject their seeds up to 20 feet when disturbed. They can survive in the soil up to and probably beyond five years. (King county 2008)

Negative Economic Impacts: Invasive populations in parks and garden settings will increase landscape maintenance costs in some circumstances. Overall economic impact projected to be minor. Some increased costs related to invasive plant removal projects probable.

Positive Economic Impacts: Several traditional remedies for cancer, toe, and fingernail maladies, toothache, dysentery, and nosebleed have been derived from herb Robert. (Wikipedia Jan. 2009) (iVillage Garden Web 10/2004)

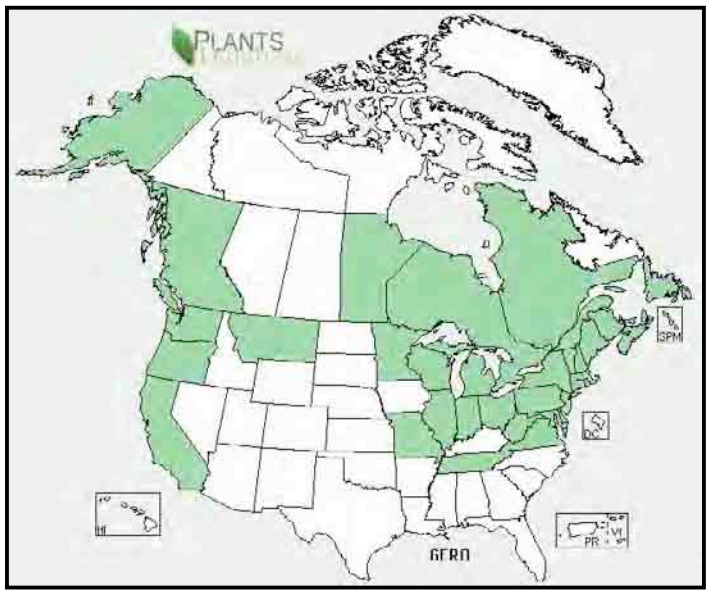
Ecological Impact: Competition to early spring forest forbs has been noted in the Pacific Northwest (King County 2009). The degree of impact this competition provides varies with the density of the weed population. It is unclear whether native species are being completely excluded at some sites or just reduced. Impacts to soil fungus and organisms may occur in situations where monocultures of herb Robert exist. Insect populations especially native pollinators may be impacted as weed densities increase. Except in some ecologically significant locations; regionally, observations of herb Robert infestations do not indicate that it is currently a serious ecological threat.

Control: Controlling herb Robert can be a challenging experience. Seed production can span many months so treatment methods must be reapplied throughout the year. Individual plants are easy to remove but treatment of larger populations requires creating undesirable impacts to non-target species. Manual pulling can be effective on very small sites when control is applied several times a year over multiple years. Mowing is useful and must be repeated several times a year to eliminate flower production. Chemical control is effective in killing herb Robert but is completely non-selective and will eliminate the very plants the application seeks to protect. Fall-applied pre-emergent compounds are effective in parklands or landscape settings though care must be taken to limit effects on desirable species. Re-infestation by wildlife or humans is an ongoing problem in all environments. Prevention and early detection offer the best tools for resisting weed invasion in many park or wildland settings.

Native range: The species is common in forested areas throughout the continents of Eurasia and North Africa. (Falinska and Piroznikow 1983)

North American Distribution: In the Pacific Northwest, herb Robert primarily inhabits forest lands on the wetter, west side of the Cascade Range though it is reported to successfully invade the drier oak and brush habitat on the east side of the Columbia River Gorge. It can be expected to further establish in wetter areas of eastern Oregon.

Image from Plants Profile: USDA Plants database



Assessing Pest Risk

The ODA-USDA modified risk assessment identifies several dominant factors that influence plant establishment, reproduction, dispersal, and impacts, and then applies numerical value to these factors. The choices taken by reviewers on each topic can often be very subjective and variable based on the knowledge, observations, and experience of the reviewer. Every effort was made by the authors to be inclusive in the descriptions as reasonably possible with the expectation that some weeds will not fit well in every category. It is intended that the risk assessment serve as a logical process for governmental agencies and weed control professionals for listing plant species as weeds and to help prioritize target species for control. Numerical values are often different for the various factors. This is done to add "weight" or increased value to certain factors over others.

Noxious Weed Qualitative Risk Assessment

Common Name: Herb Robert Scientific Name: *Geranium robertianum*

POINT CATEGORIES
(Intermediate scoring may be used e.g. = 4)

1) Habitat Availability: Habitat availability restrictive/non-restrictive on a plant's ability to survive and establish in the analysis area. *Abiotic* factors favor or restrict the ability of the plant to thrive in the available habitats. Choose the number that best applies and enter.

1. (Low) Susceptible habitat is very limited usually restricted to a small watershed or part of a watershed. Plant is severely confined by certain soil types, soil moisture holding capacity, freeze events, drought, precipitation.

2. (Medium) Susceptible habitat encompasses 1/4 or less of the analysis area. Plant only moderately confined by environmental factors such as certain soil types, soil moisture holding capacity, weather.

5. (High) Susceptible habitat is enormous covering large regions or multiple counties in the analysis area or limited to a restricted habitat of high economic/ecological value. Plant may demonstrate great adaptability to a variety of environmental conditions.

Score: 3
Explanation: Plant has capacity to invade large areas of western Oregon and forested regions of eastern Oregon.

2) Probability of Further Expansion in the State: *Biotic* factors may restrict establishment or expansion of weed in state. If plant is parasitic, do suitable host plants exist for establishment? Choose the number that best applies and enter.

1. Biotic factors *damage* plant growth and/or prevent reproduction. Obligate pollinator not present. Plant not self-fertile. Competing vegetation, and human intervention may restrict establishment. Biocontrol agents already present on related species.

2. Biotic factors *restrict* or moderately impact growth and reproductive potential or plant is poorly or clearly not self-fertile and opposite sex not present or only male plants present.

3. Environment *possesses* ideal conditions for growth and reproduction. Plant *expresses* full growth and reproductive potential in environment. If dioecious then either sexes present or plant is self-fertile.

Score: 3
Explanation: Plant expresses full reproductive potential in western Oregon.

3) Dispersal Potential After Establishment: Choose the number that best applies and enter.

0. (Negligible) Weed has no potential for natural spread in the analysis area

1. (Low) Weed has potential for local spread within a year. Moderate reproductive potential or some mobility of propagules. Propagules may be moved locally by animals, wave action in lakes.

3. (Medium) Weed has moderate potential for natural spread with either high reproductive potential or highly mobile propagules. Propagules spread by moving water, humans or animals. Movement possible through long distance commerce.

5. (High) Weed has potential for rapid natural spread throughout its potential range. Weed has high reproductive potential and highly mobile propagules. Seeds are wind dispersed.

Score: 3
Explanation: Weed has potential for rapid natural spread though seeds are not wind dispersed.

4) Economic Impact: Plant has potential to cause or demonstrates negative impacts throughout analysis area resulting in reduced crop yield, lowered commodity value, increased cost of production or a loss of markets due to contamination or weed also may cause financial impacts to recreation, livestock health, fishing and hunting and property values. Control costs to manage infestations also considered. Circle the number that best applies and enter.

0. (Negligible) Weed causes none of the above impacts.

1. (Low) Plant has *potentia*l to cause or *demonstrates* moderate to low impacts throughout analysis area in one or few of the above categories.

3. (Medium) Plant has *potentia*l to cause or demonstrates moderate impacts in few of the above economic categories or moderate to low impacts over a wide range (over 5 types) of economic plants, recreation, products or livestock throughout analysis area.

5. (High) Plant has *potentia*l to cause or *demonstrates* significant impacts in many of the above categories throughout analysis area. Plant directly linked to human health concerns (e.g. poisoning, burns or contribute to increases in vertebrate or invertebrate pests which serve as infectious disease carriers). Control costs would be significant.

Score: 0
Explanation: Plant does not impact agriculture, recreation, or effect human health.

5. Environmental Impact: Descriptions of environmental harm: Causes impacts on ecosystem processes; causes changes in plant community composition and function; causes indirect impacts that are measured by a reduction in aesthetic value, reduced opportunities for recreation and reductions in other non-monetary values. Choose the number that best applies and enter.

0. (Negligible) None of the above impacts probable.

1. (Low) Plant has *potential* to cause, or demonstrates few or minor environmental impacts throughout analysis area or impacts occur in degraded or highly disturbed habitats.

3. (Medium) Plant has *potential* to cause, or demonstrates moderate impacts throughout analysis area or impacts occur in less critical habitats.

5. (High) Plant has *potential* to cause, or demonstrates significant impacts in several of the above categories. Or plant causes impacts in select priority habitats such as aquatic, riparian, salt marsh, T&E plant sites, and other sites deemed critical.

Score: 2
Explanation: Plant has limited ability to seriously impact native communities or ecosystems.

6) Weed is a Pest in Similar Climactic Zones: Choose the number that best applies and enter.

1. Plant is strictly limited to one minor climactic area or zone. Plants exhibit little adaptability to new environments or complete information is lacking on plant distribution in climate zones.

2. Plant demonstrates weedy characteristics in non-origin areas only. Plant limited to a few climactic zones.

4. Plant is known to be a significant pest in similar climactic zones at place of origin or demonstrates significant adaptation to multiple climactic zones wherever it is found.

Score: 2
Explanation: Plant currently limited to moist temperate zones.

7) Proximity to State: Choose the number that best applies and enter.

1. Plant found in more distant US regions or foreign country only.

3. Weedy populations found in Western US regions but not directly adjacent to Oregon border.

6. Weedy populations directly adjacent to Oregon border.

Score: 3
Explanation: Plant widely distributed throughout western Oregon.

8) Probability of Detection at Introduction Point: Choose the number that best applies and enter.

1. Plants growing where probability of rapid detection high, plants showy, public easily recognizes plant, access not limited.

2. Plant easy to identify by weed professionals, ranchers, botanists, and some survey and detection infrastructure in place.

5. Plant populations growing with high probability of no initial detection, plant shape and form obscure/not showy for much of growing season, introduction probable on lands remote or with limited access to weed professionals.

Score: 3
Explanation: Plant easy to identify by weed professionals, homeowners, land managers.

9) Probability of Weed Imported or Moved to Suitable Habitat by *Human Factors*: Choose the number that best applies and enter.

1. Low probability of introduction or movement. Plant not traded or sold or plant not found in agricultural commodities, gravel, or other commercial products.

2. Moderate probability of introduction or off-site movement. Plant not widely propagated, not highly popular with limited market potential or may be a localized contaminant of gravel or landscape products.

3. High probability that weed will be introduced or moved within state annually. Plant widely propagated, highly popular and widely sold or traded or plant propagules are a common contaminant of agricultural commodities. Or, high potential exists for movement by contaminated vehicles and equipment or by recreational activities.

Score: 3
Explanation: Plant moved easily throughout western Oregon though it is not propagated or sold in commercial trade.

10. Current Distribution: Choose the number that best applies and enter.

1. Widespread occurrence throughout the state.

3. Regionally abundant (eastern/western Oregon, coastal area, Willamette Valley, central Oregon, etc.)

5. Not known to occur, rare or uncommon in state.

Score: 3
Explanation: Plant is regionally abundant in western Oregon.

The total risk score for *Geranium robertianum* (out of a possible **47**) with the USDA-APHIS Risk Assessment is: **25**

36-47 "A" Weed 24-35 "B" Weed Below 24: Unlisted

Risk assessment modified from USDA-APHIS Risk Assessment for the introduction of new plant species,Vers. 1.4 2/13/08

Oregon Department of Agriculture
Noxious Weed Rating System

Herb Robert	*Geranium robertianum*
Common Name	Scientific Name

Points Category

1) 2 Detrimental Effects: Circle all that apply, enter number of circles

1. Health: Causes poisoning or injury to humans or animals
2. Competition: Strongly competitive with crops, forage, or native flora
3. Host: Host of pathogens and/or pests of crops or forage
4. Contamination: Causes economic loss as a contaminate in seeds and/or feeds
5. Interference**:** Interferes with recreation, transportation, harvest, land value, or wildlife and livestock movement

2) 3 Reproduction & Capacity for Spread: Circle the number that best describes, enter that number

1. Few seeds, not wind blown, spreads slowly
2. Many seeds, slow spread
3. Many seeds, spreads quickly by vehicles or animals
4. Windblown seed, or spreading rhizomes, or water borne.
5. Many wind-blown seeds, high seed longevity, spreading rhizomes, perennials

3) 5 Difficulty to Control: Circle the number that best describes, enter that number

1. Easily controlled with tillage or by competitive plants
2. Requires moderate control, tillage, competition or herbicides
3. Herbicides generally required, or intensive management practices
4. Intensive management generally gives marginal control
5. No management works well, spreading out of control

4) 2 Distribution: Circle the number that best describes, enter that number

1. Widely distributed throughout the state in susceptible habitat
2. Regionally abundant in part of the state, five or more counties, more than 1/2 of a county
3. Abundant throughout 1- 4 counties, or 1/4 of a county, or several watersheds
4. Contained in only one watershed, or less than five square miles gross infestation
5. Isolated infestation less than 640 acres, more than 10 acres
6. Occurs in less than 10 acres, or not present, but imminent from adjacent state.

5) 3 Ecological Impact: Circle the number that best describes, enter that number

1. Occurs in most disturbed habitats with little competition
2. Occurs in disturbed habitats with competition
3. Invades undisturbed habitats and crowds out native species

4. Invades restricted habitats (i.e., riparian) and crowds out native species

TOTAL POINTS: 15

Note: Noxious weeds are those non-native plants with total scores of 11 points or higher. Any plants in 4.1, 4.2, and 4.3 should not be classified as "A" rated weeds.
Ratings: A= 16+, B= 11– 15

References:

Falinska, K., and E. Piroznikow. 1983. Ecological structure of *Geranium robertianum* L. populations under natural conditions and in the garden in Poland. Polish Journal of Ecology. 31(1): 93-121.

PLANTS Profile for **Geranium robertianum** (Robert **geranium**) | USDA **...** A PLANTS profile of **Geranium robertianum** (Robert **geranium**) from the USDA PLANTS database. plants.usda.gov/java/profile?symbol=GERO

Geranium robertianum - Wikipedia, the free encyclopedia - Dec 9, 2008 **… Geranium robertianum**, (syn. Robertiella robertianum) commonly known as Herb Robert, Red Robin, or (in North America) Robert **Geranium**, **...**en.wikipedia.org/wiki/**Geranium_robertianum**

Information about herb Robert **Geranium robertianum**-Mar 31, 2007 **...**www.nwcb.wa.gov/weed_info/Written_findings/**Geranium_robertianum**.html

Paghat's Garden: **Geranium robertianum** - Jan 5Herb Robert (**Geranium robertianum**), sometimes called Fox **Geranium**, is a wild **geranium** with very finely cut fern-like leaves which are stiffer than most **...**www.paghat.com/cranesbill_robert.htm

Herb Robert Identification - **Geranium robertianum** - Jan 5Picture and description for herb Robert or **Geranium robertianum**, a noxious weed in King County, Washington State and the maritime pacific northwest.www.kingcounty.gov/environment/animalsAndPlants/noxious-weeds/weed- identification/herb-robert.aspx