

Minnesota Noxious Weed Risk Assessment

Developed by the Minnesota Noxious Weed Advisory Committee

Assessment information

Common name: Garden valerian

Scientific name: *Valeriana officinalis* L.

Family name: Valerianaceae

Current reviewer name and organizational affiliation: Emilie Justen, Minnesota Department of Agriculture

Date of current review: 06/25/2021

Species description

Photo



Photo caption: Garden valerian flowers, stem and leaves. Photo credit: Wikimedia commons.

Why the plant is being assessed

- It has been observed spreading in northern Minnesota. Reports have been documented in EDDMapS.org.
- 1854 Treaty Authority asked that it be assessed.

Identification, biology, and life cycle

Wisconsin Department of Natural Resources (WIDNR) (2021) has the following description:

- Opposite, pinnately compound leaves, 5-25 toothed lanceolate leaflets
- White to pale pink tiny flowers, arranged in tight clusters
- Small oblong capsules release abundant feathery seeds

- White, fleshy rhizomes with thick fibrous roots and a pungent odor

Current distribution

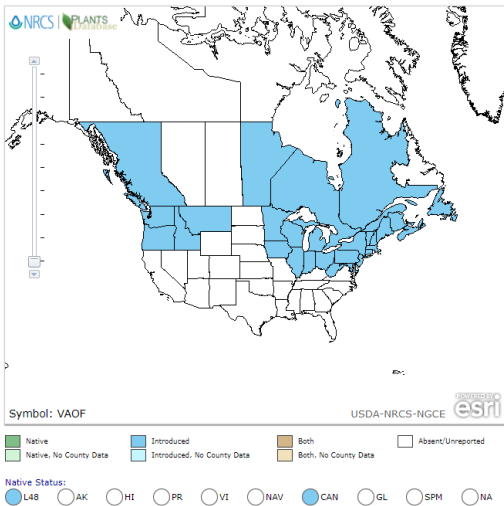


Photo caption: National level map of garden valerian from USDA Plants. Accessed 02/23/2021.

Description of where the plant is found in the United States: The plant is found in New England, upper Midwest, western states, and multiple Canadian provinces.

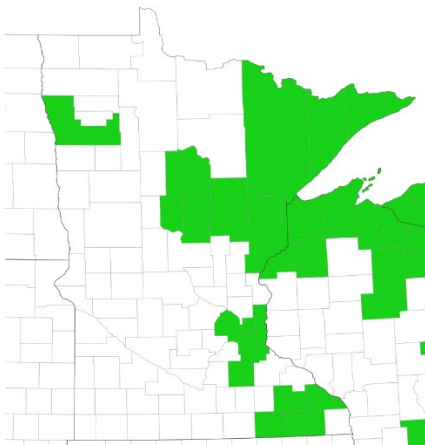


Photo caption: State level map from EDDMapS. Accessed 02/23/2021.

Found in multiple, mostly northern and eastern counties in Minnesota, 450 confirmed reports.

Current regulation

Not currently regulated in Minnesota.

Risk assessment

Box 1:

Is the plant species or genotype non-native?

Answer: Yes

Outcome: Go to Box 3

Garden valerian is native to Europe and Asia. It has been used for medicinal purposes in North America for over 150 years (Evstatieva et al 1993; USDA 2007).

Box 2:

Does the species pose significant human or livestock concerns or have the potential to significantly harm agricultural production?

Question 2A: Does the plant have toxic qualities that pose a significant risk to livestock, wildlife, or people?

Outcome: Decision tree does not direct to this question.

Question 2B: Does the plant cause significant financial losses associated with decreased yields, reduced quality, or increased production costs?

Outcome: Decision tree does not direct to this question.

Box 3:

Is the species, or a related species, documented as being a problem elsewhere?

Answer: Yes

Outcome: Go to Box 6

Prohibited from importation, movement, sale, purchase, transplanting, cultivation, and distribution by statute in Connecticut.

In Northern Wisconsin, it has been documented by the Great Lakes Indian Fish and Wildlife Commission (GLIFWC) naturalizing in moist to wet habitats, including roadsides, ditches, pastures, and meadows (Garske 2010).

Box 4:

Are the species' life history and growth requirements understood?

Outcome: Decision tree does not direct to this question.

Box 5:

Gather and evaluate further information

Outcome: Decision tree does not direct to this question.

Box 6:

Does the species have the capacity to establish and survive in Minnesota?

Question 6A: Is the plant, or a close relative, currently established in Minnesota?

Answer: Yes

Outcome: Go to Box 7

Herbarium records dating back to 1938 document garden valerian naturalizing around Duluth (Garske 2010).

Question 6B: Has the plant become established in areas having a climate and growing conditions similar to those found in Minnesota?

Answer: ***This information is supplemental and is not part of the flow chart pathway for this risk assessment***
Documented populations in northern Wisconsin with similar habitats to northern Minnesota.

Question 6C: Has the plant become established in areas having a climate and growing conditions similar to those projected to be present in Minnesota under future climate projections?

Outcome: Decision tree does not direct to this question.

Box 7:

Does the species have the potential to reproduce and spread in Minnesota?

Question 7A: Are there cultivars of the plant that are known to differ in reproductive properties from the species?

Answer: No

Outcome: Go to Question 7B

No documentation on cultivars was found.

Question 7B: Does the plant reproduce by asexual/vegetative means?

Answer: Yes

Outcome: Question 7C

There is a subspecies that produces short stolons which allows it to form dense colonies (Garske 2010). It also produces short aerial stolons and small rhizomes (USDA 2007).

Question 7C: Are the asexual propagules - vegetative parts having the capacity to develop into new plants - effectively dispersed to new areas?

Answer: Yes

Outcome: Go to Question 7I

Human movement via equipment (mowing, tillage) can move stolons and rhizomes.

Question 7D: Does the plant produce large amounts of viable, cold hardy seeds? For woody species, document the average age the species produces viable seed.

Answer: Yes

Outcome: Go to Question 7G

The plants produce small, oblong seeds with numerous hairlike structures, which allow the seed to be carried by the wind (Jacobs et al 2010; Voss 1996). They produce large amounts of powdery seeds that displace native vegetation, and in the past it has been sold in the nursery industry for use in gardens and herbal medicine (USDA 2007).

Question 7E: For species that produce low numbers of viable seeds, do they have a high level of seed/seedling vigor or remain viable for an extended period (seed bank)?

Outcome: Decision tree does not direct to this question.

Question 7F: Is the plant self-fertile?

Outcome: Decision tree does not direct to this question.

Question 7G: Are sexual propagules – viable seeds – effectively dispersed to new areas? List and consider all vectors.

Answer: Yes

Outcome: Go to Question 7I

Seed can be spread by animals, humans, wind, and water (Garske 2010; St. Aubin 2011).

Question 7H: Can the species hybridize with native species (or other introduced species) and produce viable seed and fertile offspring in the absence of human intervention?

Outcome: Decision tree does not direct to this question.

Question 7I: Do natural controls, species native to Minnesota, which have been documented to effectively prevent the spread of the species in question?

Answer: No

Outcome: Go to Box 8

No evidence of natural controls endemic to MN.

Question 7J: Was the answer to Question 7A (Are there cultivars that differ in reproductive properties from the original species) “Yes”?

Outcome: Decision tree does not direct to this question.

Box 8:

Does the species pose significant human or livestock concerns or have the potential to significantly harm agricultural production, native ecosystems, or managed landscapes?

Question 8A: Does the plant have toxic qualities, or other detrimental qualities, that pose a significant risk to livestock, wildlife, or people?

Answer: No

Outcome: Question 8B

Garden valerian is a medicinal herb primarily used as a sleeping aid. The roots and rhizomes are the plant parts used in medicine, which are unlikely to be consumed by livestock or wildlife (Sharma et al 2010). It is not attractive to mammals such as deer and is considered a deer resistant plant (Illinois Wildflowers 2021).

Question 8B: Does, or could, the plant cause significant financial losses associated with decreased yields, reduced crop quality, or increased production costs?

Answer: No

Outcome: Question 8C

This species tends to be a roadside invader. It is possible it could encroach into agricultural fields such as hay fields or pastures, but no information is available on associated costs or financial losses to agricultural lands.

Question 8C: Can the plant aggressively displace native species through competition (including allelopathic effects)?

Answer: Yes

Outcome: Go to Box 9

In disturbed areas, wet meadows, and wooded swamps, it establishes and outcompetes high quality native plant communities (St. Aubin 2011; USDA 2007). In its native range, garden valerian inhabits “river and streams, damp meadows, woods, and scrubs” (Evstatieva et al. 1993). Garske (2010) has observed garden valerian inhabiting “a variety of moist to wet, sunny to partly shaded habitats, including roadsides, ditches, pastures, and moist to wet meadows...it often becomes abundant in these habitats, displacing native plant species and the insects, animals and other organisms that depend on them.”

Question 8D: Can the plant hybridize with native species resulting in a modified gene pool and potentially negative impacts on native populations?

Outcome: Decision tree does not direct to this question.

Question 8E: Does the plant have the potential to change native ecosystems (adds a vegetative layer, affects ground or surface water levels, etc.)?

Outcome: Decision tree does not direct to this question.

Question 8F: Does the plant have the potential to introduce or harbor another pest or serve as an alternate host?

Outcome: Decision tree does not direct to this question.

Box 9:

Does the species have clearly defined benefits that outweigh associated negative impacts?

Question 9A: Is the plant currently being used or produced and/or sold in Minnesota or native to Minnesota?

Answer: No

Outcome: Go to Box 10

Based on nursery survey, it is not currently sold in Minnesota. It is possible it is sold through online vendors.

Question 9B: Is the plant an introduced species and can its spread be effectively and easily prevented or controlled, or its negative impacts minimized, through carefully designed and executed management practices?

Outcome: Decision tree does not direct to this question.

Question 9C: Is the plant native to Minnesota?

Outcome: Decision tree does not direct to this question.

Question 9D: Is a non-invasive, alternative plant material or cultivar commercially available that could serve the same purpose as the plant of concern?

Outcome: Decision tree does not direct to this question.

Question 9E: Does the plant benefit Minnesota to a greater extent than the negative impacts identified at Box #8?

Outcome: Decision tree does not direct to this question.

Box 10:**Should the species be regulated as Prohibited/Eradicate, Prohibited/Control, or Restricted Noxious Weed?**

Question 10A: Is the plant currently established in Minnesota?

Answer: Yes

Outcome: Go to Question 10D

It has been documented in Minnesota since at least the 1930s. There are over 400 confirmed EDDMapS reports.

Question 10B: Would prohibiting this species in trade prevent the likelihood of introduction and/or establishment?

Outcome: Decision tree does not direct to this question.

Question 10C: Does this risk assessment support this species being a top priority for statewide eradication if found in the state?

Outcome: Decision tree does not direct to this question.

Question 10D: Does the plant pose a serious human health threat?

Answer: No

Outcome: Question 10F

It is a medicinal plant that is used to reduce tension and anxiety, as a treatment for insomnia (St. Aubin 2011; Sharma et al 2010).

Question 10E: Is the health threat posed by the plant serious enough, and is the plant distribution sufficiently small enough to be manageable, and are management tools available and effective enough to justify listing as Prohibited / Eradicate species?

Outcome: Decision tree does not direct to this question.

Question 10F: Is the plant known to cause significant ecological or economic harm and can the plant be reliably eradicated (entire plant) on a statewide basis using existing practices and available resources considering the distribution, reproductive biology and potential for spread?

- *For distribution, note if the distribution is well documented, the number and acreage of known infestations and how widespread they are in the state. Note if there are infestations in border areas.*
- *For reproductive biology, note if there are reproductive biology factor that make the plant easier to control and eradication more likely (for example, long pre-reproductive period, self-incompatible pollination, short-lived seed bank).*
- *For potential for spread and re-invasion of controlled areas, note its potential to spread beyond places where it is being controlled such as deliberate planting by people, wildlife vectors, re-infestation from border states, or other factors that facilitate spread.*

- *For known management tools, note what management tools are available, potential non-target impacts, and the reasonableness of state management or mandating that landowners throughout the state use the management tools to eradicate or control existing plants.*
- *For available resources, consider the capacity of state and local personnel and availability of funding to respond to new and existing infestations.*

Answer: No

Outcome: go to Question 10G

Currently established populations seem limited to the Duluth area (Greenlee 2021). At least two entities have focused efforts on managing garden valerian in the Duluth area: US Forest Service and 1854 Treaty Authority. According to Jeffrey Flory of 1854 Treaty Authority, not all known infestations have been recorded in EDDMaps, satellite infestations have been recorded but only with point data and not with polygons, and if accurate infestation data were to be needed, it would require a huge effort that entities don't presently have the resources for (2021). Based on this information, the infestations appear to be beyond the eradication phase.

In addition, because it produces a large amount of seed and can spread vegetatively, eradication would be much more difficult. Its preference for inhabiting disturbed, wet areas also make managing this species difficult.

Though the plants are shallow rooted, hand pulling risks leaving behind roots and stems because the stems are brittle and break off easily (St. Aubin 2011). Triclopyr has been an effective herbicide treatment with small populations (Greenlee 2021).

Question 10G: Is the plant known to cause significant ecological or economic harm and can the plant be reliably controlled to limit spread on a statewide basis using existing practices and available resources? Would the economic impacts or other hardships incurred in implementing control measures be reasonable considering any ongoing or potential future increase of ecological or economic harm?

- *Also consider all bullet points listed under 10F when evaluating 10G*

Answer: No

Outcome: Question 10H

Greenlee (2021) states that the US Forest Service spends approximately \$5,000 (around 10 seasonal employee days) per year managing satellite infestations at Superior National Forest. Since it is not sold in the MN nursery trade, sales are limited to online sales. Economic hardships would fall to the entities and local governments focused on prioritizing and managing this species; counties and townships may have more difficulty securing funds to manage garden valerian.

Additionally, management strategies are not well documented and appear to be limited to herbicide applications. Stems break off while hand pulling and mowing this species in areas such as wet meadows or wetlands is not an option.

Question 10H: Would prohibiting this species in trade have any significant or measurable impact to limit or reduce the existing populations or future spread of the species in Minnesota?

Answer: No

Outcome: go to Question 10I

Not currently sold in the nursery trade.

Question 10I: Are there any other measures that could be put in place as Special Regulations which could mitigate the impact of the species within Minnesota?

Answer: No

Outcome: DO NOT LIST THE PLANT

Literature for this species focused primarily on the medicinal properties of the plant. There was very little literature on its ecological impact, especially in more sensitive ecosystems such as wet meadows. Further, there were limited references on successful management of this species in sensitive ecosystems; for example, mowing may be a management strategy along roadsides but would not be an option for wetlands and hand pulling may not be effective since the stems can break off easily.

The listing subcommittee would support local governments listing this species as a county noxious weed or through city ordinances to enforce control at the local level.

Box 11:

The species is being proposed to be designated as a Specially Regulated Plant. What are the specific regulations proposed?

Answer: Decision tree does not direct to this question.

Final recommendations of risk assessment (2021)**NWAC Listing Subcommittee**

Outcome: Do not list

Comments:

The listing subcommittee had lengthy discussions about the lack of research on impacts and management options for garden valerian. Because it can displace plants in wet meadows, wetlands, and other difficult to manage areas, the subcommittee has questions of whether the species could be reliably controlled, making enforcement of the noxious weed law challenging. Since its full distribution is not well documented, and it appears to be limited to northeast Minnesota, the subcommittee would support local governments if they chose to add it to county noxious weed lists or city ordinances. The subcommittee would also appreciate any research studying the plant and efficacy of various management tactics.

NWAC Full Committee

Outcome: Do not list

Comments: Vote was 15-0 in favor and 2 abstained regarding the recommendation.

MDA Commissioner

Outcome: Do not list

Comments: No comments

Risk Assessment Current Summary (08/03/2021)

- Research on effective management strategies is needed for this species, since it grows in difficult to manage areas such as wetlands.
- Little evidence was found to support listing garden valerian as a noxious weed, including peer reviewed articles on its invasiveness and displacement of native species.

- The subcommittee could not determine if the species could be reliably controlled, based on the lack of research on management.
- The subcommittee would support local governments if they chose to add it to county noxious weed lists or city ordinances.

References

Evstatieva, L. N., N. V. Handjieva, S. S. Popov, and P. I. Pashankov. 1993. A biosystematic study of *Valeriana officinalis* (Valerianaceae) distributed in Bulgaria. *Plant Systematics and Evolution* 185 (3-4): 167-179.

Flory, Jeffrey. 2021. Invasive Species Specialist, 1854 Treaty Authority. Personal communication with Emilie Justen on 8 April 2021.

Garske, S. 2010. GLIFWC Invasive Plant Risk Assessment/Prioritization Models. Project Report 10-01. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.297.855&rep=rep1&type=pdf>. Accessed 05 April 2021.

Greenlee, Jack. 2021. Ecologist, Forest Service: Superior National Forest. Personal communication with Emilie Justen on 8 April 2021.

Illinois Wildflowers. 2021. <https://www.illinoiswildflowers.info/weeds/plants/valerian.html>. Accessed 25 June 2021.

Jacobs, B., Bell, C., & Smets, E. 2010. Fruits and Seeds of the Valeriana Clade (Dipsacales): Diversity and Evolution. *International Journal of Plant Sciences*, 171(4), 421-434. doi:10.1086/651243

Sharma, M., U.K. Jain, A. Patel, and N. Gupta. 2010. A comprehensive pharmacognostic report on valerian. *International Journal of Pharmaceutical Sciences and Research*. 1 (7):6-40.

St. Aubin, E. 2011. Garden valerian (*Valeriana officinalis*) risk assessment. https://dnr.wisconsin.gov/sites/default/files/topic/Invasives/LR_Valeriana_officinalis.pdf. Accessed 25 June 2021.

USDA, Forest Service. 2007. Weed of the Week: Garden Valerian. <https://www.conservemc.org/wp-content/uploads/2012/06/USFS-Garden-Valerian-Brochure.pdf>. Accessed 05 April 2021.

Voss, E. G. 1996. Michigan Flora, Part III. Dicots (Pyrolaceae-Compositae)). Cranbrook Institute of Science and University of Michigan Herbarium, Ann Arbor, MI, USA.

Wisconsin Department of Natural Resources. 2021. Garden Heliotrope or Valerian. <https://dnr.wisconsin.gov/topic/Invasives/fact/Valerian.html>. Accessed 25 June 2021.