

Washington Invasive Ranking System

Washington Natural Heritage Program

Leucanthemum vulgare (Oxeye Daisy)

Assessed by

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22 October 2024 (WIRS Version 1.5)

Ecological Impact Rank: **Moderate** (56)

Confidence: **Moderate** (50)

Management Difficulty Rank: High (91)

Confidence: High (80)

Biological Characteristics of Invasiveness: Low (37)

Confidence: High (67)

Concern Related to Distribution and Abundance: Moderate (62)

Confidence: High (80)



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Ranking Notes

It is possible that *Leucanthemum vulgare* may actually be a species complex (Clements et al., 2004).

Legal Listings

[Washington State Weed Board](#): List C, Washington State quarantine list

[Washington Invasive Species Council](#): No

Section 1: Distribution and Abundance



Figure 1. Distribution of counties where *Leucanthemum vulgare* has been documented in Washington State (CPNWH, 2023; EDDMapS, 2023; iNaturalist Contributors, 2023).

Q1: Current Range Size in Washington

Rating: High

Confidence: High

Leucanthemum vulgare is found in 85% of counties in Washington State (CPNWH, 2023; EDDMapS, 2023; iNaturalist Contributors, 2023).

Source: Herbarium records and other observations

Q2: Current Trend in Total Range

Rating: Low

Confidence: High

Leucanthemum vulgare was introduced to Washington in the 1800s (NWCB, 2000). It was already present in most of Washington 20 years ago and its range has not expanded significantly since (CPNWH, 2023; EDDMapS, 2023; iNaturalist Contributors, 2023).

Source: Herbarium records and other observations

Q3: Proportion of Potential Range Currently Unoccupied

Rating: Insignificant

Confidence: High

Models predict that *Leucanthemum vulgare* already occupies all counties in Washington where it is capable of persisting and that its range will likely contract on the Columbia Plateau (EDDMapS, 2023). Herbarium and iNaturalist records from the Columbia Plateau are already limited (CPNWH, 2023; iNaturalist Contributors, 2023).

Source: Herbarium records and other observations, Model predictions

Q4: Local Range Expansion or Change in Abundance

Rating: Moderate

Confidence: Low

Herbarium records over the last 20 years indicate very little change in abundance or local range for *Leucanthemum vulgare* (CPNWH, 2023), though the assessor has observed at least moderate infill for this species. Both iNaturalist and herbarium records are most abundant west of the Cascades, and least abundant on the Columbia Plateau. Other sources report greatest density of this species in the eastern Cascades and the northeastern portion of the state (EDDMapS, 2023) and in 2000, this species was reported as most abundant in southwestern and northeastern Washington (NWCB, 2000). Most sources agree that the Columbia Plateau has the least

abundance of this species (CPNWH, 2023; EDDMapS, 2023; iNaturalist Contributors, 2023).

Source: Informal publication, Professional expertise, Herbarium records and other observations

Q5: Diversity of Ecosystems Invaded

Ecosystem types: Grassland & Shrubland

Rating: Low

Confidence: High

Leucanthemum vulgare is a ruderal species that establishes in open, disturbed upland areas. This species can be found in grasslands and prairies, pastures (especially when overgrazed) and old fields, clearcuts, roadsides and other disturbed corridors, and disturbed forest openings and edges. A few sources also document this species occurring in forests in North America (e.g. (Brusati, 2005; Stutz et al., 2018)), but the assessor has not commonly observed this species under closed canopies. If it is found in forests, it is likely still associated with edges, clearings or other open disturbed areas.

This plant prefers moist climates, but tolerates drought and frost (Clements et al., 2004). *Leucanthemum vulgare* is most abundant in nutrient-poor soils and thrives in moist clay soils (Clements et al., 2004; Brusati, 2005; DiTomaso et al., 2013; NWCB, 2024). This species can grow at high latitudes (up to 70 degrees north in Europe) (Clements et al., 2004) and at relatively high altitudes (Khan et al., 2021). Its ability to invade in subalpine regions is of serious concern outside of North America, particularly in the Himalayas (Ahmad et al., 2019).

Source: Published research, Informal publication, Professional expertise

Section 2: Biological Characteristics

Q6: Aggressive Mode of Reproduction

Rating: Yes

Confidence: High

Leucanthemum vulgare primarily reproduces by seed, but can also reproduce from root crowns, creeping

rhizomes, and root or rhizome fragments. This species usually does not flower in the first year, but once it starts flowering it can produce between 1300–4000 seeds per year—under ideal conditions a single plant can produce 26,000 seeds in a year. Seed production is most abundant in wet years. Creeping roots and abundant seed make *L. vulgare* an aggressive invader (Clements et al., 2004; Brusati, 2005; DiTomaso et al., 2013; EDDMapS, 2023). *Leucanthemum vulgare* plants from North America produce more flowers than plants from their native range (Stutz et al., 2018).

Source: Published research, Informal publication

Q7: Innate Potential for Long-Distance Dispersal

Rating: No

Confidence: Moderate

Leucanthemum vulgare achenes have no obvious adaptations for dispersal. Seeds are generally assumed to be spread by wind, water, or in animal manure. Studies have found that this species' seeds are unlikely to be transported in fur or wool (Clements et al., 2004). In a study from Great Britain—within *L. vulgare*'s native range—seeds did not travel far from parent plants, rarely moving further than 0.6 meters from seed sources. Grazing treatments also did not affect seed dispersal, as most seeds were dispersed by wind before grazing treatments occurred (Coulson et al., 2001). No seeds were found in manure after grazing. Though some *L. vulgare* seeds can survive an animal's digestive tract, no seeds were found in manure during additional experiments (Coulson et al., 2001; Clements et al., 2004). Natural long-distance dispersal is unlikely in this species.

Source: Published research, Professional expertise

Q8: Potential to be Spread by Human Activities

Rating: Yes

Confidence: High

Human activity is the main dispersal agent for *Leucanthemum vulgare*. This species was introduced into the Pacific Northwest in the 1800s and is spread by contaminated livestock feed, seed crops, and

machinery. *Leucanthemum vulgare* is also frequently raised and planted as an ornamental. Sale, purchase, and transport of this species is banned in Washington State, but *L. vulgare* is still a frequent component of commercial wildflower mixes, including wildflower mixes sold in Washington (NWCB, 2000; Clements et al., 2004; DiTomaso et al., 2013).

Source: Published research, Informal publication

Q9: Allelopathy

Rating: Yes

Confidence: Moderate

Leucanthemum vulgare produces many secondary compounds, some of which have been shown to have allelopathic properties in other species. Oil extracted from *L. vulgare* flowers has been shown to reduce germination and growth in some plant species (Magharri et al., 2015; Khan et al., 2021). Allelopathy likely contributes to this species ability to dominate grasslands in its invasive range (Khan et al., 2021).

Source: Published research

Q10: Competitive for Limiting Abiotic Factors

Rating: No

Confidence: Low

Leucanthemum vulgare is an early colonist of disturbed areas and is more common on low-nutrient soils (Clements et al., 2004). While it may outcompete other early colonists of ruderal areas, without ongoing disturbance, *L. vulgare* is likely to be outcompeted by perennial grasses (Clements et al., 2004). *Leucanthemum vulgare* may be a better competitor in its invasive range than in its native range. Plants in the Pacific Northwest are generally larger, produce more flowers, and experience less herbivore damage than plants in Europe. Release from herbivores may allow plants to allocate more energy to growth and reproduction. However, studies in the Pacific Northwest still found that competition (specifically increased vegetation cover) reduced number of flower heads and density of *L. vulgare* plants compared to plants in areas with reduced vegetation cover (Stutz et al., 2016). Instead of competing directly with other plant species, *L.*



vulgare appears to rely on avoiding competition through a long-lived seed bank that germinates readily after disturbance and an ability to grow in low nutrient areas that do not support aggressive competitors (Clements et al., 2004).

Leucanthemum vulgare senesces in the fall, but basal rosettes may persist until spring in mild climates (Clements et al., 2004).

Source: Published research, Professional expertise

Q11: Growth Form

Rating: No

Confidence: Moderate

While *Leucanthemum vulgare* doesn't produce stands as dense and as large as some other invasive species in the Pacific Northwest, it is visibly dominant where it occurs, turning old fields and pastures white with flowers in the summer in the Pacific Northwest. This species frequently occurs as part of a community of introduced species in grasslands, particularly *Daucus carota* and introduced perennial grasses. *Leucanthemum vulgare* grows in clonal clumps, and populations are generally dense enough to reduce native diversity and cover in plant communities where this species occurs (Clements et al., 2004; Brusati, 2005; NWCB, 2024).

Source: Published research, Informal publication, Professional expertise

Q12: Germination Requirements

Rating: No

Confidence: Moderate

Leucanthemum vulgare germinates readily in bare soil and is more likely to germinate in disturbed areas than undisturbed areas. This species may require grazing or other disturbances to establish. Thick leaf litter can impede germination (NWCB, 2000; Clements et al., 2004).

Source: Published Research, Informal Publication, Professional expertise

Q13: Invasiveness of Other Plants in Genus

Rating: No

Confidence: Moderate

The ornamental Shasta daisy (a hybrid of multiple *Leucanthemum* species) and closely related *Leucanthemum irtutianum* (part of the *L. vulgare* complex) are present but not considered invasive in North America (Clements et al., 2004; Stutz et al., 2016).

A small patch of *Leucanthemum maximum* is reported from Lake Crescent, but this species does not appear to be widespread in North America (EDDMapS, 2023). A literature review did not reveal any information indicating this species is considered invasive.

Source: Published research, Informal publication, Google Scholar search results

Q14: Shade Tolerance

Rating: Low/Insignificant

Confidence: High

Leucanthemum vulgare is usually found in open disturbed areas such as old fields, clearcuts, and grasslands, and is not usually found under closed canopies (Clements et al., 2004). Seeds germinate at relatively cool temperatures, perhaps to escape competition for light as seedlings. Light reduction from competing plant species can reduce abundance of *L. vulgare*. This species may also be less able to benefit from nutrients in shaded conditions (Clements et al., 2004).

Source: Published research, Professional expertise

Q15: Disturbance Tolerance

Rating: Yes

Confidence: High

Leucanthemum vulgare is frequently found in disturbed areas such as old fields, clearcuts, roadsides, pastures and abandoned places. This species is an early colonizer of disturbed areas and may require grazing or other disturbances to establish (Clements et al., 2004; DiTomaso et al., 2013). Mowing can increase vegetative abundance for this species, as can a single round of tilling. However,

annual tilling can deplete seedbanks and prevent establishment (Clements et al., 2004; DiTomaso et al., 2013; EDDMapS, 2023), though such treatment would of course be devastating to the native plant community.

Source: Published research, Informal publication, Professional expertise

Q16: Propagule Persistence

Rating: >10 years

Confidence: High

Leucanthemum vulgare seeds are not innately dormant and most seeds will germinate in the fall, after dispersal, or the following spring (Clements et al., 2004). However, dormancy can be induced and seed longevity trials have found that most buried *L. vulgare* seeds remain viable for at least 10 years in the soil, with some seeds persisting in the seed bank for up to 20 years. Approximately 1% of seeds remain viable for more than 20 years (Clements et al., 2004).

Source: Published research

Q17: Palatability

Rating: No, plant is palatable

Confidence: Moderate

Cattle generally avoid grazing *Leucanthemum vulgare*, but horses, sheep, and goats will eat this species. However, livestock generally prefer grasses to *L. vulgare* (Clements et al., 2004; Brusati, 2005). Grazing can help deplete the seed bank via trampling, but at the same time disperses seeds through livestock digestive tracts (EDDMapS, 2023).

Leucanthemum vulgare produces several secondary compounds that function as defenses against insect herbivory (NWCB, 2000). *Leucanthemum vulgare* plants in the Pacific Northwest experience less herbivory than they would in their native range, because very few insects are adapted to feed on *L. vulgare* in North America (Stutz et al., 2016).

Source: Published Research, Informal Publication

Section 3: Ecological Impact

Q18: Impact on Ecosystem Abiotic Processes

Abiotic Processes: Geomorphology, Nutrient dynamics, Light availability

Rating: Moderate

Confidence: Moderate

Though *Leucanthemum vulgare* doesn't always grow in classic smothering monocultural stands, it is frequently abundant enough that it can reduce light availability for co-occurring species. Bare soil is common in areas heavily invaded by *L. vulgare*, and this species' shallow roots do not hold soil in place well. Areas with large populations of *L. vulgare* experience increased erosion and reduced soil nutrients and organic matter (NWCB, 2000; Clements et al., 2004).

Source: Published research, Informal publication, Professional expertise

Q19: Impact on Ecosystem Structure

Rating: Low

Confidence: Moderate

Presence of *Leucanthemum vulgare* can increase bare soil in ecosystems (Clements et al., 2004).

Source: Published research

Q20: Impact on Ecosystem Composition

Rating: High

Confidence: Moderate

In its native range, *Leucanthemum vulgare* is frequently used in restoration projects to promote biodiversity. However, outside its native range, this species significantly reduces community diversity where it occurs (Coulson et al., 2001; Clements et al., 2004; Khan et al., 2021). A study in Kashmir also found that removal of *L. vulgare* from invaded meadows lead to increased species diversity (Khan et al., 2021).

Source: Published Research, Professional expertise

Q21: Impact on Particular Native Species

Rating: Unknown

Confidence: Not Rated

Leucanthemum vulgare is one of the most abundant introduced forbs in Willamette Prairies restored for and managed for threatened and endangered plant species such as *Lupinus oreganus*, *Sidalcea nelsoniana*, and *Castilleja levisecta*. The height and abundance of this species may obscure host plants from rare butterfly species (e.g., Taylor's checkerspot). In Washington, federal and state endangered species list candidate *Lathyrus holochlorus* occurs with *Leucanthemum vulgare*, and competition with introduced species is a significant threat to this species (Fertig, 2020). However, it seems likely that *L. vulgare*'s documented effects on native species in Washington are due to community-wide impacts and not direct interactions between species.

Source: Informal publication, Professional expertise

Q22: Observed Ability to Invade Undisturbed Ecosystems

Rating: Low

Confidence: Moderate

Leucanthemum vulgare is an early colonizer of disturbed sites. It may occasionally invade undisturbed sites, but usually needs disturbance to establish (Clements et al., 2004; Brusati, 2005).

Source: Published research, Informal publication, Professional expertise

Q23: Observed Ability to Invade Naturally Disturbed Ecosystems

Rating: Yes

Confidence: High

Leucanthemum vulgare is present in remnant Willamette Prairie habitats and can take advantage of small soil disturbances by burrowing animals or other causes to establish in naturally disturbed areas when there is a nearby seed source. This species is

described as "common in native grasslands" (NWCB, 2000; Clements et al., 2004).

Source: Published research, Informal publication, Professional expertise

Section 4: Management Difficulty

Q24: General Management Difficulty

Rating: High

Confidence: High

Control of *Leucanthemum vulgare* is difficult or infeasible in many cases. Successful treatment involves both removal of the introduced species and restoration or revegetation with desirable species that are more competitive than *L. vulgare* (Stutz et al., 2024).

Mowing *L. vulgare* can reduce seed production for the year of mowing but will increase vegetative growth and potentially even the following year's seed set (Clements et al., 2004; DiTomaso et al., 2013). Tilling needs to occur over multiple years to reduce population sizes, with significant impacts to native plants. A single round of tilling may also increase populations of this species. Hand pulling may be effective against small populations, if care is taken to remove root fragments as well. Broad-scale herbicides can be effective, but *L. vulgare* is known to develop herbicide resistance (Clements et al., 2004; DiTomaso et al., 2013). At least one study in Washington found that applying nitrogen fertilizer, which provides a competitive advantage for other species in the community, can be as effective as herbicide in reducing *L. vulgare* populations (NWCB, 2000).

While *Leucanthemum vulgare* is not closely related to any native species in North America (biocontrol spillover is not of concern), biocontrol agents have been difficult to develop (Clements et al., 2004). A specialist herbivore moth species (*Dichrorampha aeratana*) showed biocontrol potential as of 2021. Feeding activity of this moth is specific enough that it has limited effect on the closely related ornamental (non-invasive) Shasta daisy, while still having significant impact in *L. vulgare* (Stutz et al., 2021).

Source: Published research, Informal publication, Professional expertise

Q25: Minimum Time Commitment

Rating: High

Confidence: High

Leucanthemum vulgare has a persistent seed bank and a significant proportion can maintain viability up to 20 years. This suggests that monitoring and treatment to prevent reestablishment from this seedbank needs to last at least 20 years. Herbicide treatments need to be reapplied every 3–5 years to treat plants from the seed bank (Clements et al., 2004). Mechanical treatments such as tilling also need to be repeated to be effective (DiTomaso et al., 2013), though tilling is not recommended in areas with significant native plant cover. Given the prevalence of this species in the Pacific Northwest, ongoing monitoring to prevent reinvasion may be needed well after local seed banks have been exhausted.

Application of nitrogen fertilizer over seven years was effective in reducing *L. vulgare* populations in Washington (NWCB, 2000), but this treatment could leave behind viable propagules and may promote invasion by other introduced species. For example, the introduced perennial grass *Arrhenatherum elatius* is known to increase with the presence of nitrogen fixing species (R. Johnson, pers. comm. 2024).

Source: Published research, Informal publication, Professional expertise

Q26: Impacts of Management on Native Species

Rating: High

Confidence: High

All effective herbicide treatments for *Leucanthemum vulgare* affect legumes and other broad-leaved plants (Clements et al., 2004; Stutz et al., 2024). Treatments that involve broadcast spraying or tilling will likely have long-term negative effects on native plant abundance and diversity.

Source: Published research, Professional expertise

Q27: Inaccessibility of Invaded Areas

Rating: Low

Confidence: Moderate

Leucanthemum vulgare does not have much innate potential for long distance dispersal and is spread mainly by human activities. Invasion of this species in North America likely followed roadsides and other travel corridors (Clements et al., 2004).

Source: Published research, Informal publication

Q28: Sociopolitical Implications of Management

Rating: Moderate/Low

Confidence: Moderate

Leucanthemum vulgare's agricultural impacts—particularly in reducing the value of pasture forage and hay—and its function as a reservoir for yellow dwarf potato virus and potentially other diseases (Clements et al., 2004; Brusati, 2005) mean that support for management of this species is likely. However, *L. vulgare* is also an attractive species with a long history of use as an ornamental. As of 2004 in Canada, task forces were set up to educate people about the invasiveness of *L. vulgare* and suggest less problematic alternatives for ornamentals (Clements et al., 2004) and this may also be a useful part of management plans for this species in the Northwest. Development of biocontrols has been slowed because of potential spillover effects to ornamental Shasta daisies (DiTomaso et al., 2013; Stutz et al., 2020).

Source: Published research, Informal publication, Professional expertise

Additional Comments

Aedes aegypti (an introduced mosquito that spreads yellow fever among other diseases) is attracted to *Leucanthemum vulgare* and may nectar on it (Clements et al., 2004). Male mosquitoes are nectar feeding pollinators.

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