BEFORE THE SECRETARY OF THE INTERIOR

PETITION TO PROTECT THE WILLAMETTE PHLOX (*Navarretia willamettensis*) AS AN ENDANGERED SPECIES

Navarretia willamettensis, photo © Gerald D. Carr, Courtesy Professor, O.S.U.

CENTER FOR BIOLOGICAL DIVERSITY

September 9, 2025

Notice of Petition

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Pursuant to section 4(b) of the Endangered Species Act ("ESA"), 16 U.S.C. § 1533(b); section 553(e) of the Administrative Procedure Act ("APA"), 5 U.S.C. § 553(e); and 50 C.F.R. § 424.14(a), the Center for Biological Diversity ("Center") herby petitions the Secretary of the Interior, through the U.S. Fish and Wildlife Service ("Service"), to protect the Willamette Phlox (*Navarretia willamettensis*), as an endangered or threatened plant species under the ESA.

The Service has jurisdiction over this petition, which sets in motion a specific process, placing definite response requirements on the Service. Specifically, the Service must issue an initial finding as to whether the petition "presents substantial scientific or commercial information indicating that the petitioned action may be warranted." 16 U.S.C. § 1533(b)(3)(A). The Service must make this initial finding "[t]o the maximum extent practicable, within 90 days after receiving the petition." *Id.* The Center also requests that critical habitat be designated for the Willamette Phlox concurrently with the species being listed, pursuant to 16 U.S.C. § 1533(a)(3)(A) and 50 C.F.R. § 424.12.

The Center is a non-profit, public interest environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. Supported by more than 1.7 million members and online supporters, the Center works to secure a future for all species, great or small, hovering on the brink of extinction.

Petitioner submits this petition on behalf of the Center, our staff, and our members who hold an interest in protecting the Willamette Phlox and preventing its extinction.

Submitted this 9th day of September 2025.

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Executive Summary

The Willamette Phlox (*Navarretia willamettensis*) is an annual flowering plant endemic to the seasonally wet prairies and vernal pools of Oregon's southern Willamette Valley. With only 11 known occurrences, the Willamette Phlox faces severe and ongoing threats from habitat loss, invasive species, hydrological disruption, and climate change.

The delicate Willamette Phlox can flower only in the presence of seasonally dry vernal pools and ephemeral wetlands, flowering only once the standing water recedes and soils dry at the beginning of summer. Accordingly, any disturbance to these unique habitat features could cause this rare wetland-dependent flower to disappear forever.

More than 98 percent of the valley's native wet prairie habitat has already been lost to agriculture, urbanization, and river alteration. Human population growth and climate-related migration are expected to accelerate habitat loss and land-use conversion across the region, further intensifying these threats. Despite limited restoration efforts, the Willamette Phlox continues to decline. Several populations already have been extirpated, and those that remain face compounding threats from invasive plants, altered hydrology, and the increasing unpredictability of seasonal wetland conditions. The Willamette Phlox's extremely small range and population size leave it vulnerable to genetic bottlenecks and extinction from even a single catastrophic event. For these reasons, climate change is a significant threat to the Willamette Phlox, as even moderate changes in temperature and precipitation patterns in the southern Willamette Valley can harm the plant's sensitive vernal pool and seasonal wetland habitat. The best available science indicates that regulatory mechanisms are insufficient to protect the Willamette Phlox.

A species is endangered if it is at risk of extinction in all or a significant portion of range. A species is threatened if it is at risk of becoming endangered in the foreseeable future in all or a significant portion of range. The Service shall list a species if any one of five factors is present:

(A) the present or threatened destruction, modification, or curtailment of its habitat or range;
(B) overutilization for commercial, recreational, scientific, or educational purposes;
(C) disease or predation;
(D) the inadequacy of existing regulatory mechanisms; or
(E) other natural or manmade factors affecting its continued existence.

Given its restricted distribution, specialized habitat, declining trends, and inadequate existing protections, the Willamette Phlox clearly meets the criteria for listing as an endangered plant species under the Endangered Species Act. We therefore petition the U.S. Fish and Wildlife Service to list the Willamette Phlox as endangered and to designate critical habitat essential for its recovery. Alternatively, and less ideally, if found to not be endangered, we petition for listing the Willamette Phlox as a threatened species with a comprehensive 4(d) rule. This petition seeks ESA protection for this nationally and globally imperiled plant species based on the best scientific information and in the context of the five listing factors.

Introduction

Oregon's Willamette Valley is a 20- to 30-mile-wide alluvial plain that spans the southernmost reach of the Willamette Valley-Puget Trough-Georgia Basin ecoregion, which stretches north from Oregon into British Columbia.

Shaped by the Willamette River's meandering, the historic floodplains and mild, moist climate produced rich soils. Bordered by mountains and dense coniferous forests, the valley was once a mosaic of seasonally wet prairies, riparian forests, oak savannas, and upland prairies that supported both diverse ecosystems and the indigenous Kalapuyan peoples, who for thousands of years maintained the valley's open landscapes with low-intensity grass fires that prevented forest encroachment (Dunwiddie & Alverson 2020, 498; USFWS 2017, 2).

Once an abundant ecosystem throughout the Willamette Valley, native wetland prairies have declined dramatically in their extent since Euro-American settlement in the mid-1800s. Where the river's meander between the Cascades and Coast Range mountains once inundated and enriched floodplain soils, as the river was harnessed to make way for development, this dominant land type quickly disappeared. Settlers displaced Native communities and converted the valley's diverse wetland ecosystems to farmland, resulting in the loss of 74 percent of historic wetlands and causing extensive fragmentation of wetlands (Fickas et al. 2016, 74, 83).

Today, wetland prairie habitat is regarded as one of the most imperiled habitats in the Willamette Valley ecoregion, with less than 2 percent of its historic range remaining (Krueger et al. 2014, 2). Agriculture and urban development covers 95 percent of the valley floor (Wiley 2001, 6). The valley's wetlands were largely lost due to their conversion to agricultural lands, urbanization and human population growth, changes in hydrologic drainage, and colonization by invasive and woody vegetation (Dunwiddie & Alverson 2020, 492). What tiny wetland prairie remains is generally in a degraded condition and highly fragmented (Altman et al. 2001, 96). Due to its dynamic nature, this habitat is susceptible to ecological succession and invasion by non-native species, and it generally requires fire and active management to maintain its diversity and function (Krueger et al. 2014, 2).

The rapid loss of native habitats has led to Endangered Species Act listings to protect a dozen species (USFWS 2017, 3). One, Bradshaw's lomatium, was delisted due to recovery in 2021, but its largest known population was destroyed in 2024 for a golf course (Neumann 2024). Further land use conflicts will intensify in the Willamette Valley in the foreseeable future as the human population is projected to grow from 2.7 to 4 million by 2050 (USFWS 2017, 1), making the protection of rare and imperiled plants increasingly urgent.

One species at risk is the delicate Willamette Phlox, a rare wetland-dependent flower that survives in just 11 isolated sites in the southern Willamette Valley between Corvallis and Eugene. The Willamette Phlox grows only in seasonal wetlands and vernal pools, blooming briefly from mid-June to mid-July when standing water recedes and soils dry. Across the Willamette Valley, these sensitive ephemeral wetlands have been largely converted to agricultural lands, and expanding development, agriculture, pollution, and climate change continue to threaten remaining wetland areas. To prevent extinction, the Willamette Phlox and its seasonal wetland habitat require stronger protections.

The Willamette Phlox is critically imperiled globally (G1). Nationally, it is a federal species of concern (N1) and ranked on Heritage List 1. In Oregon, it is critically imperiled (S1), and in 2023, the Oregon Department of Agriculture proposed state endangered species protections.

Navarretia willamettensis © Gerald D. Carr, Courtesy Professor, O.S.U.

Biology

Taxonomy:
Kingdom: Plantae
Phylum: Anthophyta
Class: Dicotyledoneae
Order: Solanales
Family: Polemoniaceae
Genus: Navarretia
Species: *Navarretia willamettensis* (Spencer & Spencer 2003).
Willamette Phlox

Officially described by Spencer and Spencer in 2003, the Willamette Phlox's taxonomy is accepted by the scientific community. (Spencer & Spencer 2003; Flora of Oregon, USDA PLANTS, Consortium of Pacific Northwest Herbaria, and others).

Navarretia willamettensis © Gerald D. Carr, Courtesy Professor, O.S.U.

Species Description:

Navarretia willamettensis © Gerald D. Carr, Courtesy Professor, O.S.U.

The Willamette Phlox is a small, annual flowering herb that completes its entire life cycle—from germination to seed production and death—within a single growing season. It typically grows 0.75 to 6.3 inches (2 to 16 cm) tall and wide. Its flower heads are compact, about 0.5 to 1 inch (12 to 25 mm) across, and made up of 3 to 50 tiny flowers that are nearly stalkless (subsessile). The main flower head appears at the tip of the central stem, usually accompanied by up to 20 smaller heads on side branches. The stems and branches range from green to reddish-brown and are covered in fine, soft hairs (puberulent). Lower leaves may be opposite or alternate, with narrow (linear) segments that are either hairless (glabrous) or finely hairy. These leaves are 0.4 to 2 inches (10 to 50 mm) long and can have up to 13 simple or branched lobes. Upper leaves are smaller—0.4 to 0.8 inches (10 to 22 mm) long—arranged alternately, and have a sharp, needle-like shape (acerose). Their supporting stems are also finely hairy and measure 0.15 to 0.4 inches (4 to 10 mm) long. (ODA, 1).

The calyx—the green, outer floral structure that encloses the developing flower—is 0.25 to 0.31 inches (6.3 to 8 mm) long. It forms a thin, membranous tube that may be hairless, gland-dotted, or rarely finely hairy. Tiny outgrowths (trichomes) with 3 to 4 cells line the rim and ribs of the calyx. The five calyx lobes are hairless and needle-like; the two longest are often forked and measure 0.12 to 0.18 inches (3.0 to 4.5 mm), while the three shorter ones are 2.2 to 3.2 mm long and unbranched. (ODA, 1).

The flower (corolla) is funnel-shaped, pink to lavender in color, and measures 0.18 to 0.25 inches (4.7 to 6.5 mm) long—longer than the shortest calyx lobes but shorter than the longest. (ODA, 1).

Navarretia willamettensis © Gerald D. Carr, Courtesy Professor, O.S.U.

After flowering, the plant produces small, membranous seed capsules that are 2.3 to 3 mm long. These capsules remain within the dried flower heads and break open with autumn rains, as water causes the seed coat fibers to swell. Each capsule contains 2 to 6 brown, oval-angled seeds that are 1.3 to 2 mm long. The seeds have a pitted (reticulate) surface and become sticky (mucilaginous) when wet, aiding in dispersal. (ODA, 1).

Life History and Habitat Requirements:

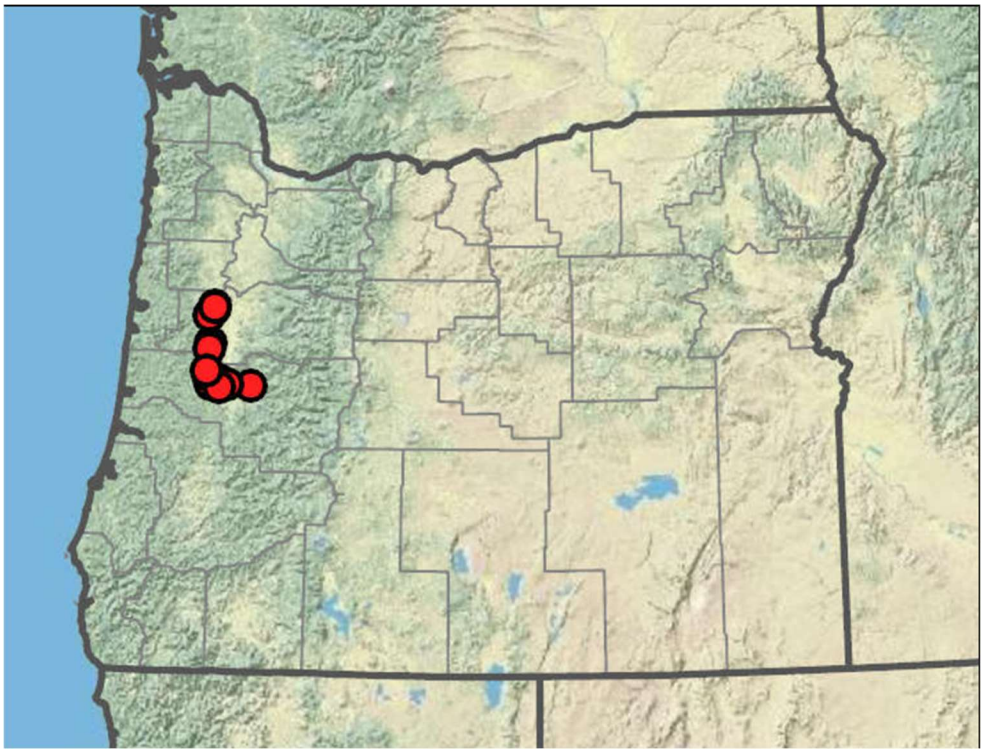
The Willamette Phlox grows in vernal pools and seasonally wet prairies of the southern Willamette Valley. A key characteristic of its habitat is that the wetlands must lose all standing surface water

each year and the soils must dry, as the Willamette Phlox only begins to flower once the water recedes and the soil starts to dry, typically between mid-June and mid-July (ODA, 2).

Willamette Phlox Flower (left photo © Gerald D. Carr, Courtesy Professor, O.S.U.), and Willamette Phlox Habit (center and right photos, from Oregon Department of Agriculture staff).

Range and Population Status:

The Willamette Phlox is endemic to the southern Willamette Valley and was originally described from Benton County and Lane County, Oregon. Currently, however, the Willamette Phlox is presumed extirpated in Benton County, and it has been found at only 11 sites between Corvallis and Eugene. These sites have varied ownership including federal, state, local, and county lands, and one site is protected by a conservation easement by the McKenzie River Trust (*See* Table 1 below).



Distribution of Willamette Valley phlox in Oregon,
Map © 2024 OregonFlora, OSU Dept. Botany & Plant Pathology

The most recent positive identification of the Willamette Phlox in Benton County, Oregon, was in 2008, but subsequent surveys in 2012 and 2013 were unable to locate the plant there. There has been one occurrence adjacent to the Marys River Natural Area, which may indicate that the Willamette Phlox benefitted from native plant reseeding and restoration work there over the last several years.

In Lane County, Oregon, only a few extant populations remain. A 2013 survey discovered the Willamette Phlox on the Lomatium Prairie property, which is protected by a McKenzie River Trust conservation easement. However, no detailed information exists for this population. At Fern Ridge, the Willamette Phlox has been located at Kirk Pond, Horkelia Prairie, and Royal Amazon. In 2009, the Willamette Phlox was discovered at the BLM West Eugene Wetlands sites.

The City of Eugene initiated a seed increase program for the Willamette Phlox in 2004.

In 2023, the Oregon Department of Agriculture ("ODA") Native Plant Conservation Program assessed the status of the Willamette Phlox to determine whether the plant warranted listing under the state Endangered Species Act. ODA's Native Plant Conservation Program is responsible for periodic review of the Oregon State List of Endangered and Threatened Plants (OAR 603-073-0060 & 0070). Data compiled for ODA's status assessment are included in Table 1 below.

Table 1. Willamette Phlox plant counts by Element Occurrence ID with population trend, if known. If a site has multiple names, all names are given.

EO ID	Land ownership	Site name	Presence	Years since last obs.	Obs. year	Count	Pop. trend
31418	Benton County	Jackson-Frazier Wetland	Presumed extirpated	9	2013	0	Unknown
				14	2008	present	
				17	1995	present	
				43	1979	herbarium	
31417	City of Corvallis / Private	Marys River Natural Area / Brooklane Dr	Presumed extirpated	9	2013	0	Unknown
				43	1979	herbarium	
31419	USFWS	Finley NWR McFadden Marsh	Presumed extirpated	9	2013	0	Unknown
				10	2012	0	
				70	1952	herbarium	
35757	ODOT		Presumed extirpated	9	2013	0	Unknown
				30	1992	herbarium	
35756	Private, Easement	Lomatium prairie	Presumed extant	9	2013	7,700	Unknown
33036	US Army Corps of Engineers (USACE)	Fern Ridge Kirk Pond	Presumed extant	12	2010	250-500	Unknown
33037	USACE	Fern Ridge Horkelia Prairie, Royal Amazon	Presumed extant	12	2010	~5,000	Unknown
				13	[1]2009	1,000s combined	
33072	BLM West Eugene Wetlands / USACE	Hansen / Fern Ridge Royal Amazon	Presumed extant	12	2010	~5,000	Unknown
				13	[1]2009	1,000s combined herbarium	
33062	USACE	Fern Ridge Fisher Butte	Presumed extant	12	2010	~5,000	Unknown

EO ID	Land ownership	Site name	Presence	Years since last obs.	Obs. year	Count	Pop. trend
	City of Eugene	Dragonfly Bend (Restoration)	Extant	2	2020	present	Unknown
33886	BLM West Eugene Wetlands	Turtle Swale	Presumed extant	13	[1]2009	1,000s combined herbarium	Unknown
33887	BLM West Eugene Wetlands	Isabelle	Presumed extant	13	[1]2009	1,000s combined herbarium	Unknown
	City of Eugene	Coyote Prairie (Restoration)	Extant	2	2020	present	Unknown
38796	City of Eugene	Willow Corner (Restoration)	Extant	2 10+ 14	2020 2006-2012 2008	present present herbarium	Unknown
	ODOT	Greenhill Mitigation Bank (restoration)	Extant	2	2020	present	Unknown
	Unknown	(Lane Co., east of Springfield)	Presumed extirpated	88	1934	herbarium	NA

[1]Data from BLM West Eugene Wetlands in 2009 is a combined count across Turtle Swale, Isabelle, and either (or both) Hansen and Royal Amazon sites

ODA's status assessment indicates that the Willamette Phlox is presumed to be extirpated from five sites, presumed to be extant at seven sites, and extant at only four sites. Most sites where Willamette Phlox is presumed extant, however, have not had any recorded positive observations for over a decade or more (*See* Table 1).

Threats to the Willamette Phlox (Five Listing Factors)

Present or Threatened Destruction, Curtailment, or Modification of Habitat or Range:

The primary threat to the Willamette Phlox is the ongoing loss of and harm to its native habitat—seasonally wet prairies and vernal pools in the southern Willamette Valley. The Willamette Phlox's extremely limited distribution, small population size, and reliance on narrow, isolated habitat patches make it particularly susceptible to even minor habitat disturbances. These vulnerabilities, in turn, also substantially increase the Willamette Phlox's risk of extinction.

The Willamette Phlox's wetland prairie habitat is regarded as one of the most imperiled habitats in the Willamette Valley ecoregion, with less than 2 percent of its historic range remaining (Krueger et al. 2014, 2). What tiny wetland prairie remains is generally in a degraded condition and highly fragmented (Altman et al. 2001, 96). Because of the dynamic nature of this habitat, it is highly subject to ecological succession and invasion by non-native species, and generally requires fire and active management to maintain its diversity and function (Krueger et al. 2014, 2).

The vernal pools and wet prairies upon which the Willamette Phlox depends must dry fully each year to support the species' unique life cycle. By their nature, these ephemeral habitats are especially vulnerable to harm from agricultural expansion, urban development, and other land-use changes. Seasonal wetlands, and particularly seasonal wetlands that are small in size, are frequently altered through land clearing, drainage, plowing, or conversion to permanent water bodies—activities that often occur without regulatory oversight, especially where wetlands are dry for much of the year and thus indistinguishable from uplands to the untrained eye (Boix et al. 2016, 158; TSSC 2012, 9).

Accordingly, agricultural practices, livestock grazing, irrigation, and water extraction directly threaten the hydrologic conditions that are essential for vernal pool function (Fickas et al. 2016, 73; Euliss & Mushet 2004, 78-81). Sedimentation, pollution from fertilizers and pesticides, and accumulation of toxic substances further compromise habitat quality and biodiversity in temporary wetlands (Zelder & Kercher 2004, 446). These threats are compounded by the fact that many of these wetlands fall outside the scope of current federal or state wetland protections due to their small size, intermittent visibility, lack of continuous surface connection, or misclassification.

Historical land use changes have already resulted in the destruction of a vast majority of suitable habitat. The Willamette Valley has lost over 98 percent of its original wet prairie habitat and 72 percent of its floodplain riparian forests (Fickas et al. 2016, 74), due largely to agricultural conversion, urbanization, logging, and river channelization. Today, 96 percent of the valley's land is privately owned, and over 70 percent of Oregon's population resides in the Willamette Valley (Fickas et al., 74), exerting constant development pressure on remaining habitat fragments.

Future threats are likely to intensify. The Willamette Valley's human population is projected to reach 4 million by 2050 (USFWS 2017, 1). Moreover, as climate change renders regions of the American West increasingly uninhabitable due to extreme heat and drought, the Willamette Valley may serve as a climate refuge. This scenario could lead to population growth that exceeds current projections (USFWS 2017, 7), bringing with it increased demand for housing, infrastructure, and agricultural land. These pressures will almost certainly lead to further loss, degradation, and fragmentation of Willamette Phlox habitat through road expansion, urban sprawl, and intensified land use.

Given the species' narrow ecological niche and the accelerating threats to its habitat, the Willamette Phlox faces a high risk of extinction. Listing the species under the Endangered Species Act is warranted and necessary to prevent further decline and to ensure its survival.

Other Natural or Manmade Factors Affecting the Continued Existence of the Species:

Invasive Species

The threat from invasive plants is particularly urgent given the Willamette Phlox's limited range and dependence on high-quality, disturbance-sensitive habitat. Invasive plant species have already been documented at multiple sites where the Willamette Phlox occurs. Without targeted and ongoing control efforts, exotic invasives—particularly aggressive wetland invaders such as *Mentha pulegium* (pennyroyal) and non-native perennial grasses—can rapidly outcompete native vegetation, including rare and endemic species like the Willamette Phlox. Thus, invasive plants pose a significant and growing threat to the Willamette Phlox's viability.

Temporary wetlands are particularly vulnerable to non-native plant invasions. Invasive plants not only compete for light, space, and nutrients, but may also alter critical ecosystem functions, including soil moisture retention, fire regimes, and hydrologic patterns (Zedler & Kercher 2004, 442–445, 447–448). Sedimentation is both a cause and effect of wetland plant invasions—where sediments accumulate and fill-in wetlands and vernal pools, noxious weeds can rapidly colonize, and where hardy roots of invasive plants take hold, sediments can accumulate and erode wetland function (Zedler & Kercher 2004, 445).

Almost all of the remaining wetland prairies in the Willamette Valley are colonized to some extent by non-native plants, many of which are highly invasive (Krueger et al. 2014, 8). Among the most dominant and persistent of these non-native species are tall fescue (*Festuca arundinacea*), non-native bentgrasses *(Agrostis capillaris* and *A. stolonifera*), velvet grass (*Holcus lanatus*), sweet vernal grass (*Anthoxanthum odoratum*), rattail fescue (*Vulpia myuros*), hairy cat's ear (*Hypochaeris radicata*), pennyroyal (*Mentha pulegium*), meadow foxtail (*Alopecurus pratensis*), and reed canarygrass (*Phalaris arundinacea*) (Krueger et al. 2014, 8). Many of these species can dominate a wetland prairie, excluding almost all native species and, in some cases, forming large patches of monocultures (Krueger et al. 2014, 8). *Mentha pulegium*, in particular, is known to spread densely in seasonally wet habitats, reducing native plant richness and biomass, and forming persistent seed banks that make long-term eradication difficult (DiTomaso & Healy 2007, 876). Perennial invasive grasses such as *Agrostis capillaris* and *Arrhenatherum elatius*, both common in the Willamette Valley (Dunwiddie & Alverson 2020, 498), can transform open wet prairie habitat by forming dense monocultures that suppress native species germination and growth (USFWS 2010).

Wetland prairies are particularly susceptible to invasion by non-native species due to the dynamic nature of the habitat, which historically was maintained in an open state through periodic fires, which created space for plant reemergence and colonization (Krueger et al. 2014, 8, 11–12). Many non-native species are well adapted for colonizing recently disturbed areas and are often present within the soil seedbank of a wetland prairie or have colonized adjacent sites (Krueger et al. 2014, 11–12). Seed from non-native invasive plant species can be carried onto a site by the wind, birds, grazing animals, humans and their equipment, or surface water flowing across a site, which is common in wetland prairies (Krueger et al. 2014, 11–12).

The integration of non-native species into wetland prairie plant communities can significantly impact the structure and function of these communities with alterations to wildlife such as pollinators, alterations to the three dimensional structure by tall, dense growing species such as *Festuca arundinacea* and *Phalaris arundinacea*, alterations to the forb/grass ratios by aggressive invasive non-native grass species, and other likely alterations including possibly soil nutrient/microbial conditions (Krueger et al. 2014, 11–12).

In the absence of fire or other disturbance such as mowing that mimics some of its effects, woody vegetation will successfully colonize most wetland prairies in the Willamette Valley over time through the natural process of succession. Typical colonizing woody vegetation includes native species such as Menzies' spiraea (*Spiraea douglasii*), Nootka rose (*Rosa nutkana*), Suksdorf's hawthorn (*Crataegus suksdorfii*), *Fraxinus latifolia*, and non-native species such *Rubus spp.*, *Cytisus scoparius*, sweetbriar rose (*Rosa eglanteria*), and pear (*Pyrus spp.*). There are many remnant areas in the valley where the prairie structure has been completely converted to a shrub/scrub, savanna or even woodland structure, with dramatic impacts to biotic and abiotic attributes of the former prairie (Krueger et al. 2014, 12).

Without active management—including manual removal, prescribed fire, and in some cases selective herbicide application—these and other invasives are likely to spread, further fragment habitat, and reduce the Willamette Phlox's reproductive success.

Climate Change

Climate change presents a significant and increasing threat to the Willamette Phlox due to its highly specialized habitat requirements and narrow ecological range. The ephemeral wetlands and seasonally wet prairies that the Willamette Phlox depends on are ecosystems that are exceptionally sensitive to climatic shifts in temperature, precipitation, and hydrology.

Projected climate change impacts in the Pacific Northwest include increased temperatures, more frequent and severe droughts, altered precipitation patterns, and heightened wildfire risk (Halofsky et al. 2020, 11; Field et al. 2007). These shifts are expected to reduce winter snowpack, accelerate snowmelt, and change the timing and magnitude of streamflows—producing higher peak flows earlier in the year and reduced summer base flows (Halofsky et al., 2022, pp. iii, v–viii, xi, 43–84). Such hydrologic changes will significantly alter the seasonal wetland regimes and hydroperiods upon which the Willamette Phlox depends for germination and flowering (Donnelly et al. 2025, 2, 11–12).

Additionally, due to their small size and shallow water depth, the temporary wetlands inhabited by the Willamette Phlox are particularly vulnerable to climatic variability. These ecosystems have high watershed-to-surface-area ratios and short hydroperiods, making them extremely sensitive to both drought and changes in precipitation timing and intensity (Junk et al. 2013). Even modest shifts in climate can affect soil saturation levels and drying rates, disrupting the precise seasonal drying window (typically mid-June to mid-July) needed for the Willamette Phlox to flower.

More broadly, climate-induced changes to wetland function—such as increased nutrient loading, sedimentation, and changed vegetation composition—could reduce suitable habitat. Research shows that temporary aquatic ecosystems are likely to experience dramatic changes in plant community structure and function as a result of increasing climate variability (*see, e.g.*, Calhoun et al. 2016, at 5; Bagella et al. 2013). As seasonal patterns become less predictable, wetland-dependent species with narrow hydrologic tolerances, like the Willamette Phlox, face disproportionately high risks.

The increasing frequency and intensity of wildfire will also increase the likelihood of direct and indirect habitat damage (ISAB 2007, p. 33).

The Oregon Biodiversity Information Center ("ORBIC") has classified the Willamette Phlox as "highly vulnerable" to climate change. This designation indicates that the species' abundance and/or range within Oregon is "likely to decrease significantly by 2050" under projected climate scenarios (ORBIC, Climate Change Vulnerability Assessment).

In summary, climate change is a significant direct and compounding threat to the Willamette Phlox and its sensitive wetland habitat. Given the species' already limited range, fragmented distribution, and dependence on specific hydrologic conditions, the continued and increasing climate-driven changes—especially in the timing and availability of seasonal wetlands within the foreseeable future—pose a serious risk to the Willamette Phlox's long-term survival.

Inadequacy of Existing Regulatory Mechanisms:

Existing regulatory mechanisms are entirely inadequate to protect the Willamette Phlox or the delicate seasonal wetland habitat upon which it depends (Calhoun et al. 2016, at 4). Regulations are not sufficiently protective of the species' habitat, which receives no substantial protection from

human disturbance or drought, which will only become more frequent and intense with climate change.

The Clean Water Act no longer provides adequate protection for seasonal wetlands critical to the survival of the Willamette Phlox, particularly in the wake of the U.S. Supreme Court's decision in *Sackett v. EPA* (2023). This decision significantly curtailed federal protections of wetlands, dramatically narrowing the scope of federal jurisdiction under the Clean Water Act by excluding wetlands that lack a "continuous surface connection" to traditionally navigable waters. As a result, isolated and seasonal wetlands—despite their ecological importance—are now left unprotected at the federal level, making them vulnerable to degradation and destruction from development, pollution, and drainage. This excludes from protection the Willamette Valley's hydrologically dynamic seasonal wetlands, including the few remaining isolated wetlands where the Willamette Phlox lives. Without the protections formerly extended under the Clean Water Act, these habitats are increasingly susceptible to conversion, degradation, and fragmentation. Given this regulatory void, listing the Willamette Phlox under the ESA is essential to ensure the conservation of its habitat and the continued existence of the species.

Vegetation management actions can involve use of herbicides and pesticides to maintain and inhibit growth of vegetation, as well as mechanical removal of larger trees and shrubs, all of which are likely to cause or contribute to the harm to the Willamette Phlox's narrow and sensitive habitat.

An endangered listing under the ESA would provide the Willamette Phlox with a recovery plan, as well as long-term funding for conservation efforts called for by scientists as being necessary for the Willamette Phlox to have any chance of persistence.

Land trusts and conservation easements can play an important role in safeguarding remnant habitats for sensitive native species like the Willamette Phlox. For example, the McKenzie River Trust's work at Lomatium Prairie has been instrumental in preserving a rare fragment of native wetland prairie, offering a crucial refuge for native flora, including a population of the Willamette Phlox. These types of voluntary, often community-driven conservation efforts can help reduce habitat loss, support ecological stewardship, and serve as critical models for landscape-scale conservation.

However, while laudable, such efforts are inherently limited in scope, scale, and enforceability. Conservation easements typically apply only to specific parcels of land and depend on the long-term capacity and funding of the managing organization. They provide no binding legal protection across the broader landscape and cannot address threats like hydrological alterations, invasive species, or adjacent land use changes that affect the viability of wetland-dependent species across their range. Moreover, land trusts cannot prevent extinction when species exist outside protected parcels or when remaining populations are too small or fragmented to be viable in the long term.

Without the comprehensive, legally binding protections afforded by listing under the Endangered Species Act, the Willamette Phlox remains at significant risk of habitat degradation and extirpation. Federal listing is essential to ensure coordinated recovery planning, habitat protection, and regulatory oversight across the species' full range—functions that private conservation, however valuable, cannot fulfill alone.

Designate Critical Habitat for the Willamette Phlox Concurrent with Listing

The Center requests and strongly recommends that the vernal pools and seasonal wetlands of the southern Willamette Valley that are necessary for the survival and recovery of the Willamette Phlox be designated as critical habitat for the Willamette Phlox concurrent with listing.

As required by the ESA, the Secretary "shall" designate critical habitat concurrent with determining that a species is endangered or threatened (16 U.S.C. §1533(a)(3A)). Critical habitat is defined by Section 3 of the ESA as:

> (i) the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and
>
> (ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species.

16 U.S.C. §1532(5).

Protecting what remains of the Willamette Phlox's seasonal wetland habitat, which is particularly vulnerable to any human or natural disturbance, may assist in preventing the extinction of this species, as it is preferable to constructing new wetland habitat (Drayer & Richter 2016, 169–170).

Conclusion

The Willamette Phlox is an extremely rare plant that is gravely in need of protection. With highly specific habitat needs and sensitivities, and with only 11 natural occurrences within an extremely narrow range, the Willamette Phlox is extremely vulnerable to any habitat destruction or loss. The best available science indicates that development, particularly agricultural development and habitat loss and degradation, poses a significant threat to the Willamette Phlox and its unique, sensitive ephemeral wetland habitat. Accordingly, climate change also threatens the Willamette Phlox, as demonstrated by the projections for changes in precipitation, temperature, and growing seasons, as well as increased occurrence of drought in the region.

In the context of the five listing factors, the Willamette Phlox warrants federal protection as an endangered species because it faces imminent extinction due to myriad threats to its highly sensitive wet-prairie habitat—including agricultural development, urbanization, invasive species, and climate change—and it is particularly vulnerable to these threats due to its extremely small population and highly restricted range. There are no existing regulatory mechanisms that ameliorate these threats.

Thus, the Center urges the Service to promptly propose the Willamette Phlox for listing as an endangered plant species and to designate critical habitat concurrently with listing to ensure that the rare wetland-dependent plant survives for future generations.

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