

Interim Core Map Documentation for the Large-Flowered Woolly Meadowfoam

Version 1

Review Completed: April 2026

Core Map Developer: EPA's Office of Pesticide Programs (OPP)

Species Summary

The large-flowered woolly meadowfoam (*Limnanthes pumila* spp. *Grandiflora*; Entity ID # 1262) is an endangered terrestrial plant (dicot). This species is restricted to Agate-Winslo complex soils and vernal pool habitats in Jackson County, Oregon. This species blooms from March through May and is both self-pollinated and insect-pollinated. There is a designated critical habitat for this species. Additional information is provided in **Appendix 1**.

Description of Core Map

The core map for the large-flowered woolly meadowfoam is based on biological information. Many known occurrences of this species fall within the critical habitat. However, four extant populations occurred outside of the critical habitat. These occurrences, as well as the critical habitat, completely overlap with the vernal pools and Agate-Winslo complex soils in Jackson County, Oregon. A long-term recovery action for this species is to re-establish any extirpated occurrences and to protect the vernal pool acreage within the Rogue Valley of Jackson County, Oregon. **Figure 1** depicts the interim core map for the large-flowered woolly meadowfoam (green areas on map). The core map represents approximately 25,000 acres.

The large-flowered woolly meadowfoam inhabits Agate-Winslo complex soils in vernal pool habitats within Jackson County Oregon's Rogue Valley. Landcover categories within the core map area are included in **Table 1**. Landcover within the core map is predominantly pasture/hay, evergreen forest, and shrub/scrub, which is consistent with the habitat of this species.

The core map developed for the large-flowered woolly meadowfoam is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the large-flowered woolly meadowfoam. This core map incorporates information developed by the U.S. Fish and Wildlife Service (FWS) and made available to the public; however, the core map has not been formally reviewed by FWS. This interim core map may be revised in the future to incorporate expert feedback from FWS. This interim core map has a "limited" (2) best professional judgment classification because it consists of the species' critical habitat with the addition of a few known locations outside of the critical habitat. However, EPA did limit the extent of the core map based on interpretation of FWS documentation.

This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

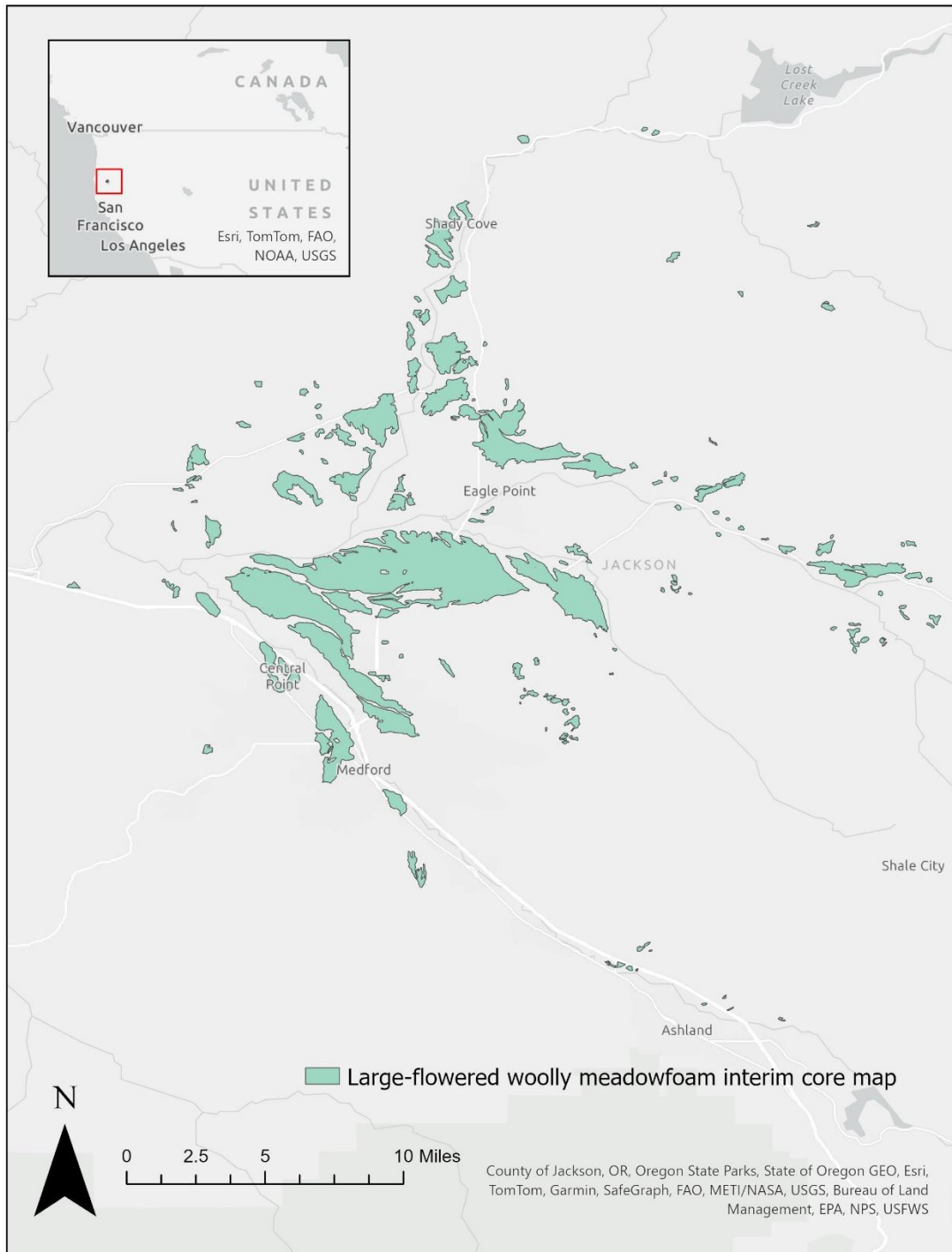


Figure 1. Interim core map for the large-flowered woolly meadowfoam. The total acreage of the core map is approximately 25,000 acres.

Table 1. Percentage of Interim Core Map Represented by NLCD¹ Land Covers and Associated Example Pesticide Use Sites/Types.

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover
Forestry	Deciduous Forest (41)	<1%
Forestry	Evergreen Forest (42)	26%
Forestry	Mixed Forest (43)	<1%
Agriculture	Pasture/Hay (81)	34%
Agriculture	Cultivated Crops (82)	0%
Mosquito adulticide, residential	Open space, developed (21)	5%
Mosquito adulticide, residential	Developed, Low intensity (22)	7%
Mosquito adulticide, residential	Developed, Medium intensity (23)	6%
Mosquito adulticide, residential	Developed, High intensity (24)	4%
Invasive species control	Woody Wetlands (90)	<1%
Invasive species control	Emergent Herbaceous Wetlands (95)	<1%
Invasive species control	Open water (11)	1%
Invasive species control	Grassland/herbaceous (71)	2%
Invasive species control	Scrub/shrub (52)	13%
Invasive species control	Barren land (rock/sand/clay; 31)	0%
Total Acres	Interim Core Map Acres	~25,000 acres

Evaluation of Known Location Information

There are four datasets with known location information for this species:

- Descriptions of locations provided by FWS
- Occurrence locations in iNaturalist
- Occurrence locations in the Global Biodiversity Information Facility (GBIF)
- Occurrence locations in NatureServe

EPA evaluated these sets of data before selecting the type of and developing the core map. FWS' most recent 5-year review (2024) detailed known locations of this species. FWS described 25 documented occurrences that are extant, status unknown, and extirpated. Currently, there are 19 extant populations, most of which have locations that are consistent with the critical habitat. iNaturalist had 13 research grade observations. NatureServe provided four documented locations. GBIF contained no additional data that were not already included in iNaturalist or NatureServe. Public occurrence data had a coarse resolution, and EPA could not determine conclusively if these data fell within the critical habitat; however, they generally appear to be consistent with the locations of the range and critical habitat. **Appendix 1** includes more information on the available known location information.

Approach Used to Create Core Map

The core map was developed using the "Process EPA Uses to Develop Core Maps for Draft Pesticide Use Limitation Areas for Species Listed by the U.S. Fish & Wildlife Service (FWS) and their Designated Critical

Habitats” (referred to as “the process”). This core map was developed by EPA and was developed using the 4 steps described in the process document:

1. Compile available information for a species
2. Identify core map type
3. Develop the core map for the species
4. Document the core map

For step 1, EPA compiled available information for the large-flowered woolly meadowfoam from FWS as well as observational information available from various publicly available sources (discussed in previous section). The information compiled for the large-flowered woolly meadowfoam is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- This species is endemic to vernal pool habitats and is known to occur in areas mapped with Agate-Winslo complex soils.
- The species’ critical habitat is highly refined.

For step 2, EPA used the compiled information to identify the core map type, including the species range, critical habitat, and known location information. EPA compared known location data to the range and critical habitat and found that the FWS known locations of currently existing (extant) populations are consistent with the location of the designated critical habitat, vernal pools, and Agate-Winslo soils. The species range is not likely limited to the areas containing habitat of the species. The range is also much larger than the areas where known locations occur. Based on this information, EPA used biological information, including designated critical habitat, as the core map.

For step 3, EPA based the core map on designated critical habitat, vernal pool habitats, and relevant soils (see Appendix 2).

Discussion of Approaches and Data that were Considered but not Included in Core Map

EPA did not explore approaches other than those described in this documentation.

Appendix 1. Information Compiled for Species

1. Recent FWS Documents/Links

- 2012 Recovery Plan: https://ecos.fws.gov/docs/recovery_plan/Rogue&Illinois%20Valley%20Final%20Recovery%20Plan%20031913.pdf
- 2024: 5-Year Review: https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/19944.pdf
- 2010 Designation of Critical Habitat: <https://www.govinfo.gov/content/pkg/FR-2010-07-21/pdf/2010-17324.pdf#page=1>

2. Background information

- Status: federally listed as endangered in 2002
- Resiliency, redundancy, and representation (the 3 Rs) from 2024 5-Year Review:
 - Extant populations are in the Rogue Valley in Jackson County, OR.
 - “A total of 23 large-flowered woolly meadowfoam populations across the range of the species are documented as extant (ORBIC 2023, entire; USFWS 2024, entire). Of the 23 documented populations, 18 occur on property that can be accessed and monitored but 5 occur on private land that is inaccessible. Because of the inaccessibility of 5 populations, we cannot determine their status; however, based on recent aerial photography, the landscape appears intact, so we have no reason to believe the populations are extirpated. The 18 meadowfoam populations with consistent monitoring show that 13 populations are stable or increasing and 5 populations appear to be declining.”
- **Habitat, Life History, and Ecology (Source: 2012 Recovery Plan)**
 - “*Limnanthes pumila* ssp. *grandiflora* occupies a limited portion of the Rogue Valley. The plant typically occurs in areas mapped with Agate-Winlo soils.”
 - “*Limnanthes pumila* ssp. *grandiflora* is typically associated with vernal pools. According to Arroyo (1973), the plant occurs generally near the wetter, inner edges of pools, as opposed to the drier outer fringes, which harbor the slightly more common *L. floccosa* ssp. *floccosa*. However, on many occasions, *L. pumila* ssp. *grandiflora* has been observed on the outside edges of vernal pools, sympatric with *L. floccosa* ssp. *floccosa*, and has even been observed in some areas on low upland mounds (S. Meyers, pers. comm. 2007). The deeper basins are dominated by *Plagiobothrys stipitatus*, *Eryngium petiolatum*, *Navarretia leucocephala* ssp. *leucocephala*, and *Myosurus minimus*. *Alopecurus saccatus* (Pacific foxtail), and *Deschampsia danthonioides* are also common plant associates. The inner vernal pool edges occupied by *L. pumila* ssp. *grandiflora* often have up to 10 to 15 percent exposed soil, due partly to gopher or vole foraging activity.”
 - Annual plant that is capable of self-fertilization and self-pollination.
 - Presence of larger flower sizes and nectar guides suggest evidence of insect pollinators as well.
 - Blooms from March-May

- **Taxonomy**
 - Flowering dicot plant

- **Essential Physical Biological Features (PBFs) for Designated Critical Habitat:**
 - Vernal pool-mounded prairie or other ephemeral wetland habitats with elevation ranging from 372 to 411m.
 - Plant species commonly associated with LFWM are: *Alopecurus saccatus*, *Deschampsia danthonioides*, *Eryngium petiolatum*, *Lasthenia californica*, *Myosurus minimus*, *Navarretia leucocephala* ssp. *leucocephala*, *Phlox gracilis*, *Plagiobothrys bracteatus*, *Trifolium depauperatum*, and *Triteleia hyacinthina*.
 - Agate-Winlo complex soils.

- **Relevant Pesticide Use Sites in FWS Documents**
 - “Certain pesticides are registered by the Environmental Protection Agency for use on rangelands and these may be sprayed directly on vernal pools. Mosquito abatement activities in the Rogue Valley mainly occur during the summer months, but do not include application of pesticides to vernal pools.” (2012 Recovery Plan).

- **Relevant Recovery Criteria and Actions (Source: 2012 Recovery Plan)**
 - De-listing criteria include:
 - At least 17 of 18 occurrences for *Limnanthes pumila* ssp. *grandiflora*; or 33 of 36 occurrences for *Lomatium cookii* (approximately 95 percent of documented/extant occurrences) should be protected in conservation-oriented ownership (i.e., land that is formally secured from habitat loss and degradation by way of conservation easements, formal agreements, conservation banks, or public or conservation group ownership). For occurrences that have become extirpated, reintroduced or introduced xi populations may be substituted. Introduced or newly discovered populations outside of currently known core areas may be substituted if the Service deems them equivalent in their contribution to recovery.
 - At least 95 percent of suitable vernal pool habitat acreage within each Priority 1 core area for the species and at least 90 percent of suitable vernal pool habitat acreage within each Priority 2 core area for the species has been protected from development. All suitable habitat must include soils and hydrology that support the plant species.
 - Conservation oriented management plans for each protected core area are developed to guide protection and conservation following establishment of protected status such as a conservation easement or transfer of ownership to land trusts or government entities. Each management plan should be operational as soon as possible, as funding and staff time allow.
 - Additional species occurrences identified through future site assessments, GIS, other analyses, or status surveys, and that are determined essential to recovery, are protected.
 - Status surveys, 5-year status reviews, and population monitoring show achievement of self-sustaining species populations as confirmed

through species monitoring and status surveys in each protected occurrence.

- Seeds from each core area of the two species are in storage as insurance against the risk of extirpations and to ensure that genetic lines are preserved. Seed banking is also necessary to complete the reintroductions or introductions that can contribute to meeting recovery criteria.
- Down-listing criteria include:
 - At least 90 percent of documented occurrences have been protected from development. If extant occurrences become extirpated, protection of reintroduced or introduced occurrences may be substituted. Introduced or newly discovered populations outside of currently known core areas may be substituted if deemed equivalent in their contribution to recovery. Currently 15 of 23 documented occurrences are protected from development, including 2 new occurrences, for a total of 65 percent protection (Table 1).
 - At least 90 percent of suitable vernal pool habitat acreage within the four Rogue Valley Priority 1 core areas has been protected, and at least 85 percent of suitable vernal pool habitat acreage within the five Rogue Valley Priority 2 core areas has been protected. All suitable vernal pool habitat must include soils and hydrology that support *Limnanthes pumila* ssp. *grandiflora*. This habitat includes both occupied and suitable habitat. Suitable habitat that is not currently known to be occupied must be protected to provide for corridors and dispersal habitat, restoration dynamics, provide for reintroduction/ introduction sites, and to protect currently undiscovered populations. This criterion has been partially met for the Agate Lake Priority 1 core area and Agate Desert, North Eagle Point, Rogue Plains, and Whetstone Creek of the Priority 2 core areas. In total, 26 percent of the core areas receive protection, currently (Table B-2).
 - Management plans for each protected area are developed for species protection and conservation and implemented as soon as feasible. The management plans should address vegetation control, include a set of methods to reduce thatch buildup and noxious weed control, set a monitoring schedule to assess population levels to quantitatively determine trends, include a set of methods to maintain hydrological functions, outline an outreach plan for neighboring landowners, and set a plan to deter garbage dumping. Management plans should take an ecosystem approach to management, conserving associated wetland and upland species. This criterion has been partially met at SOLC Whetstone Savannah Preserve, SOLC Agate Desert Preserve, SOLC Rogue Plains Preserve, SOLC Rogue River Preserve, ODOT Vernal Pool Mitigation and Conservation Bank, Medford Water Commission's Vernal Pool Mitigation Bank, and RES Rogue Valley Mitigation and Conservation Bank.

3. Description of the species range

- Rogue Valley Plains of Jackson County, Oregon.
- Figure A1-1 depicts the current FWS species range and critical habitat (last updated 11/20/2024).
- The species range is approximately 72,000 acres.

4. Critical Habitat (Source: 2024 Five Year Review)

- LFWM critical habitat designation was issued in 2010, protecting 1,470 ac (594.9 ha) across 5 units.
- As of the 2024 Five-Year Review, protected core areas have increased to 1,970 ac (777 ha) to include Agate Desert, Agate Lake, North Eagle Point, Rogue Airfield, Rogue Plains, and Whetstone.
- **Figure A1-1** depicts the 2010 critical habitat.

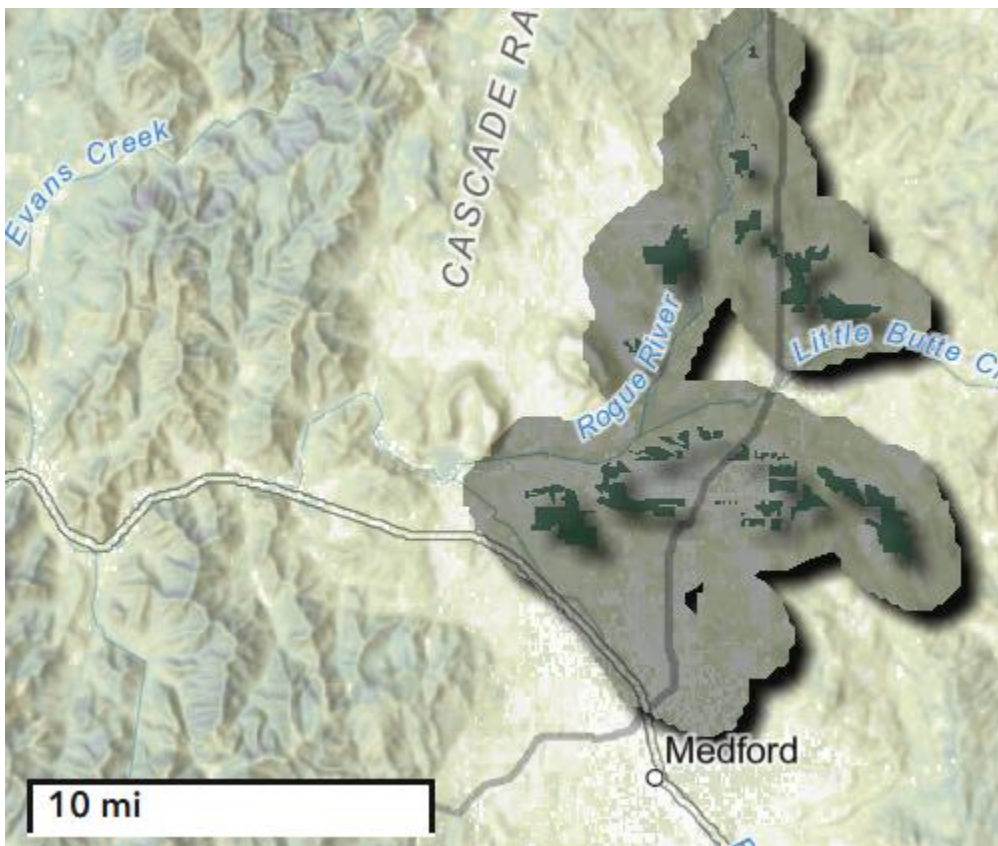


Figure A1-1. FWS critical habitat of the large-flowered woolly meadowfoam. Range is also included for reference.

5. Known Locations

- **Known Locations Described in FWS Recovery Documents**
 - There are currently 23 known occurrences of the large-flowered woolly meadowfoam, 19 of which are extant and 4 are unknown.
 - Two historically known occurrences are likely extirpated.

- **Figure A1-2** depicts the known location data and updated protected core areas in FWS' most recent 5 year review.
- When considering the locations of the current extant populations (**Figure A1-2**), they are mostly consistent with the location of the critical habitat (**Figure A1-1**), although some occur outside of it.

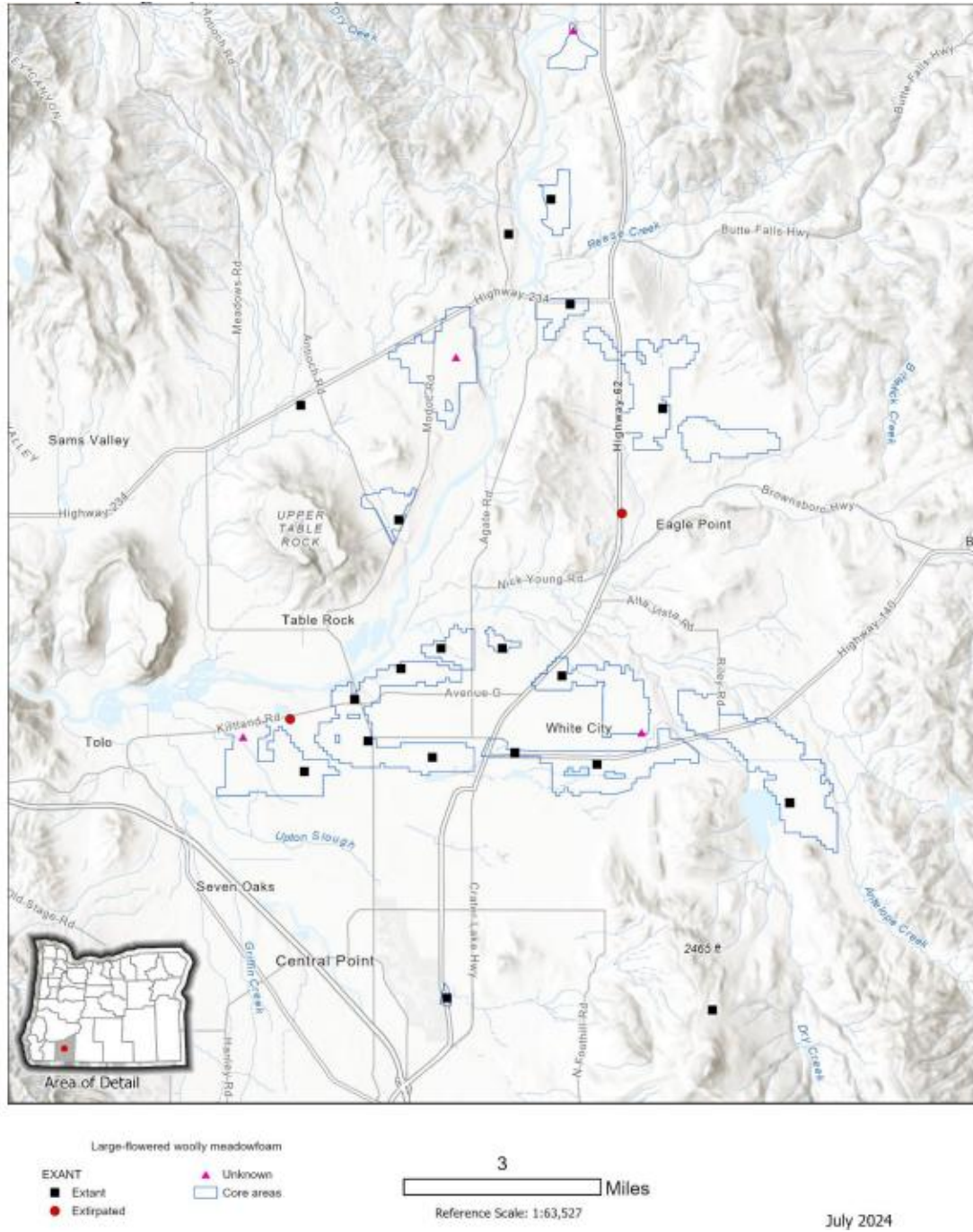


Figure A1-2. Known locations of the large-flowered woolly meadowfoam. Reproduced from FWS 5-year review (2024).

- **Occurrences in iNaturalist**
 - Searched on 8/19/2025
 - https://www.inaturalist.org/observations?quality_grade=research&subview=map&axon_id=1152875
 - There are 13 research grade observations available from 2021 to 2025.
 - **Figure A1-3** depicts the locations of these observations.

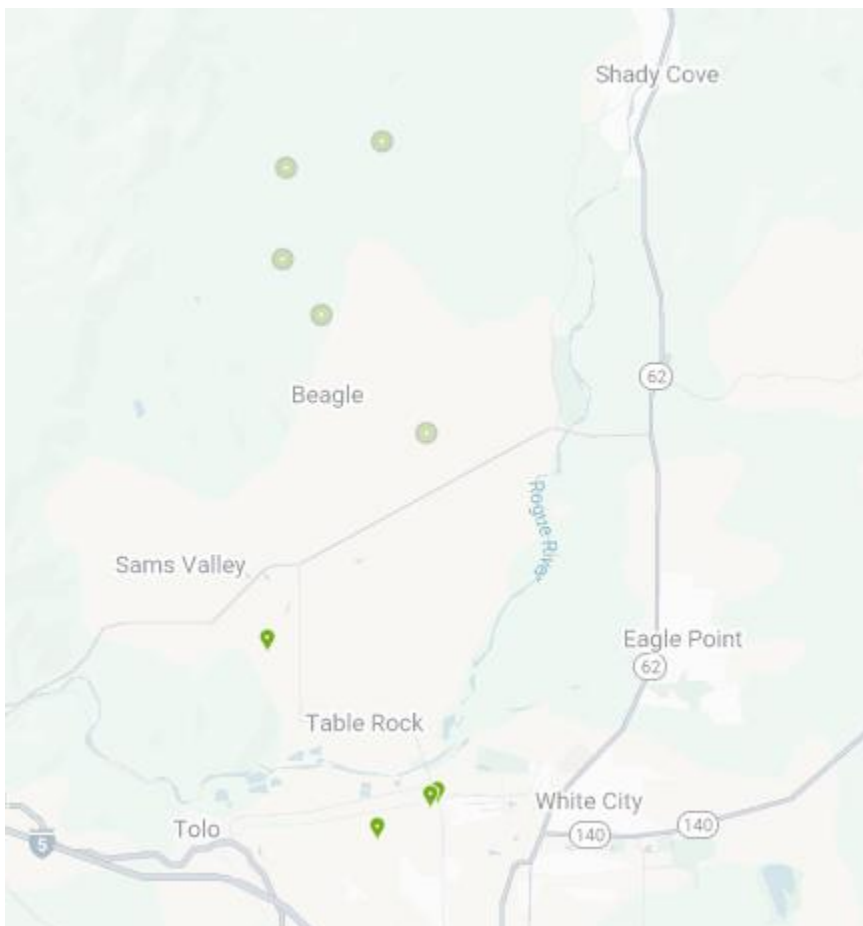


Figure A1-3. Screenshot from iNaturalist observations for the large-flowered woolly meadowfoam. Area depicted is on similar scale and location as species range depicted in Figure A1-1.

Occurrences in NatureServe

- NatureServe was searched on 8/19/25
- https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.158519/Limnanthes_pumila_ssp_grandiflora
- NatureServe has 4 documented locations in Jackson County, Oregon.
- These locations are generally consistent with the location of the range and critical habitat

Occurrences in GBIF

- GBIF was searched on 8/19/25
- There were 10 “human observations” available for this species between 2010 and 2025.

- https://www.gbif.org/occurrence/search?basis_of_record=HUMAN_OBSERVATION&taxon_key=9216821&year=2010,2025&occurrence_status=present
- All observations were included in either iNaturalist or NatureServe.

Collectively, the occurrence data from iNaturalist, GBIF, and NatureServe do not support expanding the core map beyond the designated critical habitat. However, some FWS known locations occur outside the critical habitat, which supports expanding the core map to include these areas.

Appendix 2. GIS Data Review and Method to Develop Core Map

This core map was created based on biological information, including occupied location and species critical habitat. EPA used the large-flowered woolly meadowfoam critical habitat, as well as the approximate known locations of extant populations occurring outside of the critical habitat, according to the 2024 Five-Year Review.

1. Dataset References and Software

- Software used: ArcGIS Pro 3.3
- FWS Critical Habitat Shapefile –last updated 7/21/2010
- FWS Known Occurrences (2024 Five-Year Review)
- Jackson County, OR Agate-Winslo soils layer:
<https://jcportal.jacksoncountyor.gov/server/rest/services/Environmental/SoilsAgateWinslo/FeatureServer>
- FWS R1 ES Mounded Vernal Pool Habitat in the Rogue River Valley of Southwest Oregon

2. Datasets Used in Core Map Development

All datasets used in core map development are described in EPA’s process document.

3. Core Map Development

- EPA started with the critical habitat established by FWS in 2010. Upon review of the 2024 FWS Five-Year Plan, it was noted that there were four extant occurrences outside of the critical habitat, but still within the species range.
- This PULA contains the area of the established critical habitat merged with the FWS RW ES Mounded Vernal Pool Habitat layer (Rogue River Valley) and the Agate-Winslo soils layer. The known occurrences outside of the critical habitat identified in the 2024 Five-Year Plan appear to occur within the vernal pool and/or soil layers.
- EPA merged all three layers using the “Merge” and “Dissolve” tools to create a biological information core map.