Interim Core Map Documentation for the Gentner's Fritillary

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Interim Core Map Developer: U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs

Species Summary

The Gentner's fritillary (*Fritillaria gentneri,* Entity ID 551) is an endangered terrestrial plant (dicot). The U.S. Fish and Wildlife Service (FWS) has not designated a critical habitat for the Gentner's fritillary. The plant is endemic to Jackson and Josephine counties, Oregon and Siskiyou County, California, in the Rogue and Klamath River watersheds at elevations ranging from 284 to 1,527 m, and mainly on the southern aspect. The plant occurs in a variety of upland habitat types ranging from hardwood to conifer dominated habitat. The Gentner's fritillary flowers April through June and may be pollinated by insects and other pollinators. Additional information is provided in **Appendix 1**.
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Description of Core Map

The core map for the Gentner's fritillary is based on biological information. The outer extent of this core map is defined by the species range. The species occurs in the Rogue and Klamath watersheds at elevations ranging from 284 to 1,527 m. The interim core map for the species consists of these two watersheds within the species range and is further refined to include only the elevation range where the species occurs. **Figure 1** depicts the resulting interim core map for the Gentner's fritillary. The size of this core map is approximately 417,668 acres. Landcover categories within the core map are included in **Table 1**. Landcover is predominantly evergreen forest and scrub/shrub. The Gentner's fritillary is not expected on cultivated lands.

The core map developed for the Gentner's fritillary is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Gentner's fritillary. This core map incorporates information developed by 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 species expert feedback from FWS. This interim core map has an "average" best professional judgment classification to describe major uncertainties/limitations. The map is based on known locations described by FWS, and EPA removed some additional areas based on biological needs of the species. This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

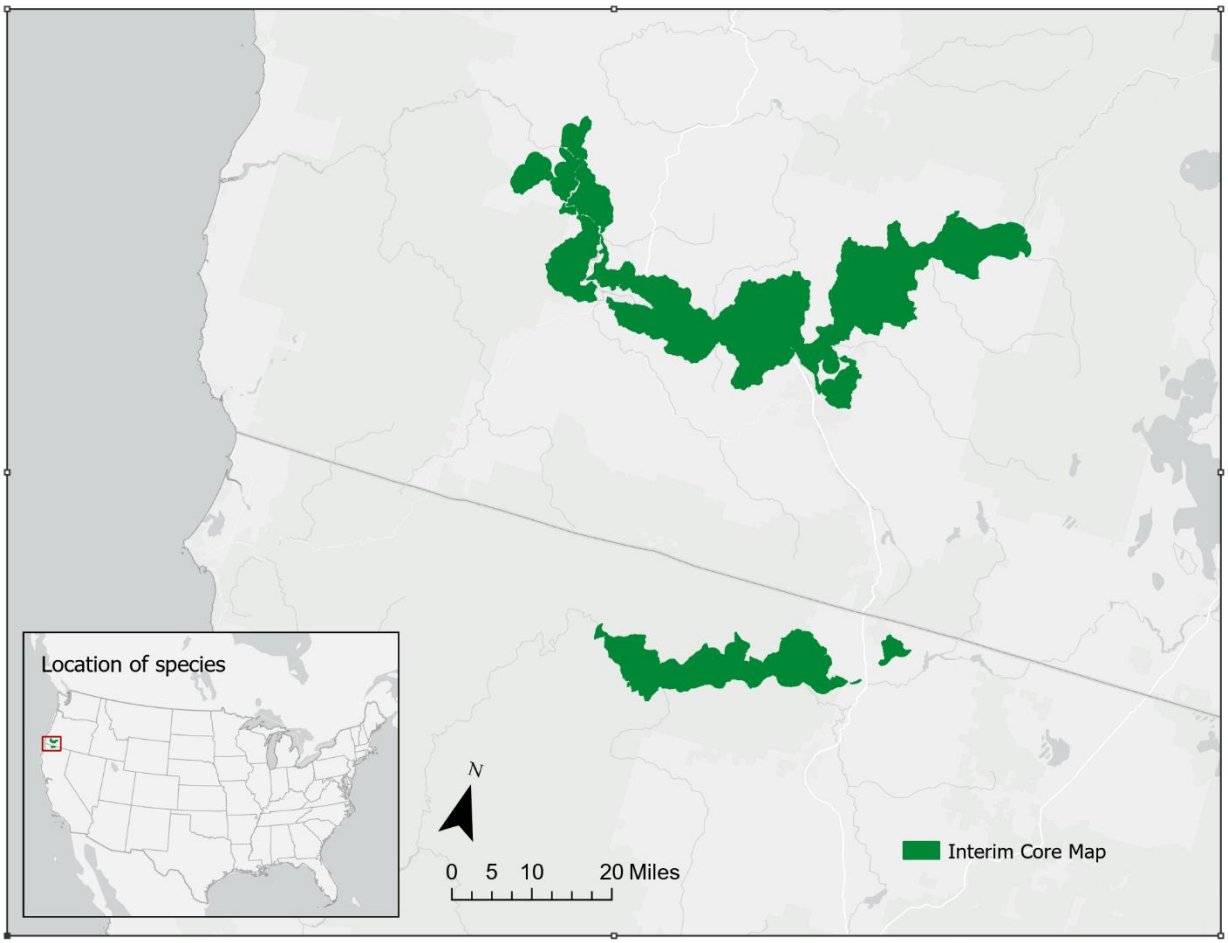

Figure 1. Interim core map for the Gentner's fritillary. Total acreage of the interim core map is approximately 417,668 acres.

Table 1. Percentage of Interim Core Map Represented by NLCD[2] Land Covers and Associated Example Pesticide Use Sites/Types.

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover	% of core map represented by example pesticide use
Forestry	Deciduous Forest (41)	0%	50%
Forestry	Evergreen Forest (42)	47%	50%
Forestry	Mixed Forest (43)	3%	50%
Agriculture	Pasture/Hay (81)	8%	9%
Agriculture	Cultivated Crops (82)	1%	9%
Mosquito adulticide, residential	Open space, developed (21)	5%	8%
Mosquito adulticide, residential	Developed, Low intensity (22)	2%	8%
Mosquito adulticide, residential	Developed, Medium intensity (23)	1%	8%

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover	% of core map represented by example pesticide use
Mosquito adulticide, residential	Developed, High intensity (24)	0%	8%
Invasive species control	Woody Wetlands (90)	0%	33%
Invasive species control	Emergent Herbaceous Wetlands (95)	0%	33%
Invasive species control	Open water (11)	1%	33%
Invasive species control	Grassland/herbaceous (71)	6%	33%
Invasive species control	Scrub/shrub (52)	25%	33%
Invasive species control	Barren land (rock/sand/clay; 31)	0%	33%
Total Acres	**Interim Core Map Acres**	**417,668**	

Evaluation of Known Location Information

There are four datasets with known location information:

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

EPA evaluated these four sets of data before selecting the type of and developing the core map. FWS appeared to have the finest resolution of the location information, providing a map that depicted the current known locations all within the Rogue and Klamath watersheds (**Figure A1-2 in Appendix 1**). Occurrences in iNaturalist, GBIF, and NatureServe did not support expanding the core map outside of these two watersheds. **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"[3] (referred to as "the process"). EPA developed the core map 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; and
4. Document the core map.

For step 1, EPA compiled available information for the Gentner's fritillary from FWS, as well as observation information available from various publicly available sources (including iNaturalist, NatureServe, and GBIF). The information compiled for the Gentner's fritillary is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Occurrences and known locations of the Gentner's fritillary are in two watersheds in Oregon

and California (Rogue River and Klamath River); and

- This species is found at elevations ranging from 284 to 1,527 m.

For step 2, EPA used the compiled information to identify the core map type including species range and known location information. The extant populations are located in watersheds identified by FWS (Rogue River and Klamath River) within the species' range. Therefore, EPA based the core map on the HUC12 watersheds from the known locations identified by FWS. EPA further refined this area by removing areas where elevation criteria is not met, as this species is only found at elevations ranging from 284 m to 1527 m. The entire range of the species was not used as the core map because the range contains areas where the species does not occur.

For step 3, EPA used the best available data sources to generate the core map. Data sources are discussed in the process document. For this core map, EPA used the HUC12 watersheds for Gentner's fritillary known occupied waterbodies identified by FWS (Rogue River and Klamath River watersheds). EPA used USGS elevation data to remove areas that are outside of the species known elevation range. **Appendix 2** provides more details on the GIS analysis and data used to generate the core map.

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

Approaches or data not described in this documentation were not explored.

Appendix 1. Information Compiled for the Spring Creek Bladderpod During Step 1

1. **Recent FWS documents/links and other data sources**
   - Recovery Plan (2003): https://ecos.fws.gov/docs/recovery_plan/030828.pdf
   - Five Year Review (2022): https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/3757.pdf
   - Species Status Assessment (2022): https://ecos.fws.gov/ServCat/DownloadFile/249004
   - Habitat Conservation Plan (2017): https://ecos.fws.gov/docs/plan_documents/fdoc/fdoc_1532.pdf
   - INaturalist: https://www.inaturalist.org/observations?quality_grade=research&subview=map&taxon_id=77173
   - GBIF: https://www.gbif.org/occurrence/search?offset=100&basis_of_record=OBSERVATION&basis_of_record=HUMAN_OBSERVATION&basis_of_record=OCCURRENCE&taxon_key=5300355&year=2010,2025
   - NatureServe: https://explorer.natureserve.org/pro/Map/?taxonUniqueId=ELEMENT_GLOBAL.2.158328

2. **Background information**
   - **Status**: Federally listed as endangered in 1999
   - **Resiliency, redundancy, and representation** (the 3Rs)
     - Resiliency: High. There are multiple populations with moderate or high resiliency in each of the Recovery Units. (Species Status Assessment 2022)
     - Redundancy: "The species redundancy is adequate." (Species Status Assessment 2022
     - Representation: Moderate. "Gentner's fritillary has a moderate degree of representation." (Species Status Assessment 2022)
   - **Habitat**
     - This red-flowered lily is endemic to Jackson and Josephine counties, Oregon and Siskiyou County, California, in the Rogue and Klamath River watersheds at elevations ranging from 284 to 1,527 m (931 to 5,009 feet), and mainly on the southern aspect (203° [South to Southwest]). The plant occurs in a variety of upland habitat types ranging from hardwood to conifer dominated habitat. Gentner's fritillary seems to prefer openings but can tolerate partly shaded habitats as well (Species Status Assessment 2022).
     - Despite being common in Oregon, "most of the potential habitat is unoccupied" (Species Status Assessment 2022).
   - **Pollinator/reproduction**
     - The Gentner's fritillary flowers April through June and may be pollinated by insects and other pollinators. (Species Status Assessment 2022)
   - **Taxonomy**
     - Terrestrial Plant
     - FWS Category: Flowering monocot plants with biotic pollination, asexual reproduction or self-fertilization
   - **Relevant Pesticide Use Sites**
     - Herbicide applications in Forestry (Recovery Plan 2003)
   - **Recovery Criteria/Objectives** (Recovery Plan 2003)

- To consider reclassification to threatened status: Each recovery unit shall maintain at least 750 flowering plants. To consider delisting, each recovery unit shall maintain at least 1,000 flowering plants. For delisting purposes, these 1,000 flowering plants should occur in protected Fritillaria management areas and should have exhibited net demographic stability or growth for a minimum of 15 years, as determined through at least biennial demographic monitoring.
- Fritillaria management areas within the recovery units should be located on public land, or private land subject to permanent conservation easement or other permanently binding agreements.
- Two of the Fritillaria management areas within each recovery unit must consist of populations of at least 100 flowering individuals each within an 0.8- kilometer (0.5-mile) radius of each other.
- Flowering individuals should be distributed over a minimum of 50,000 square meters (5 hectares or 12.4 acres) of occupied habitat within each recovery unit.

- **Recovery Actions (from 2006 recovery plan)**
  - Establish a minimum of eight Fritillaria management areas (allocated among recovery units as detailed in Objectives and Criteria)

3. **Description of Species Range**
   - "*Fritillaria gentneri* occurs predominantly in southwestern Oregon, where it is known from scattered localities in the Rogue and Illinois River drainages in Jackson and Josephine Counties. A small population has just been found in northern California, close to the Oregon border. The species is highly localized within about a 48-kilometer radius of the Jacksonville Cemetery in Jacksonville, Oregon...The majority of known individuals…occur within an 11-kilometer radius of the Jacksonville Cemetery." (Recovery Plan 2003)
   - **Figure A1-1** depicts the FWS range. The range was last updated on April 25, 2022. Total acreage of range is approximately 2,125,672 acres.

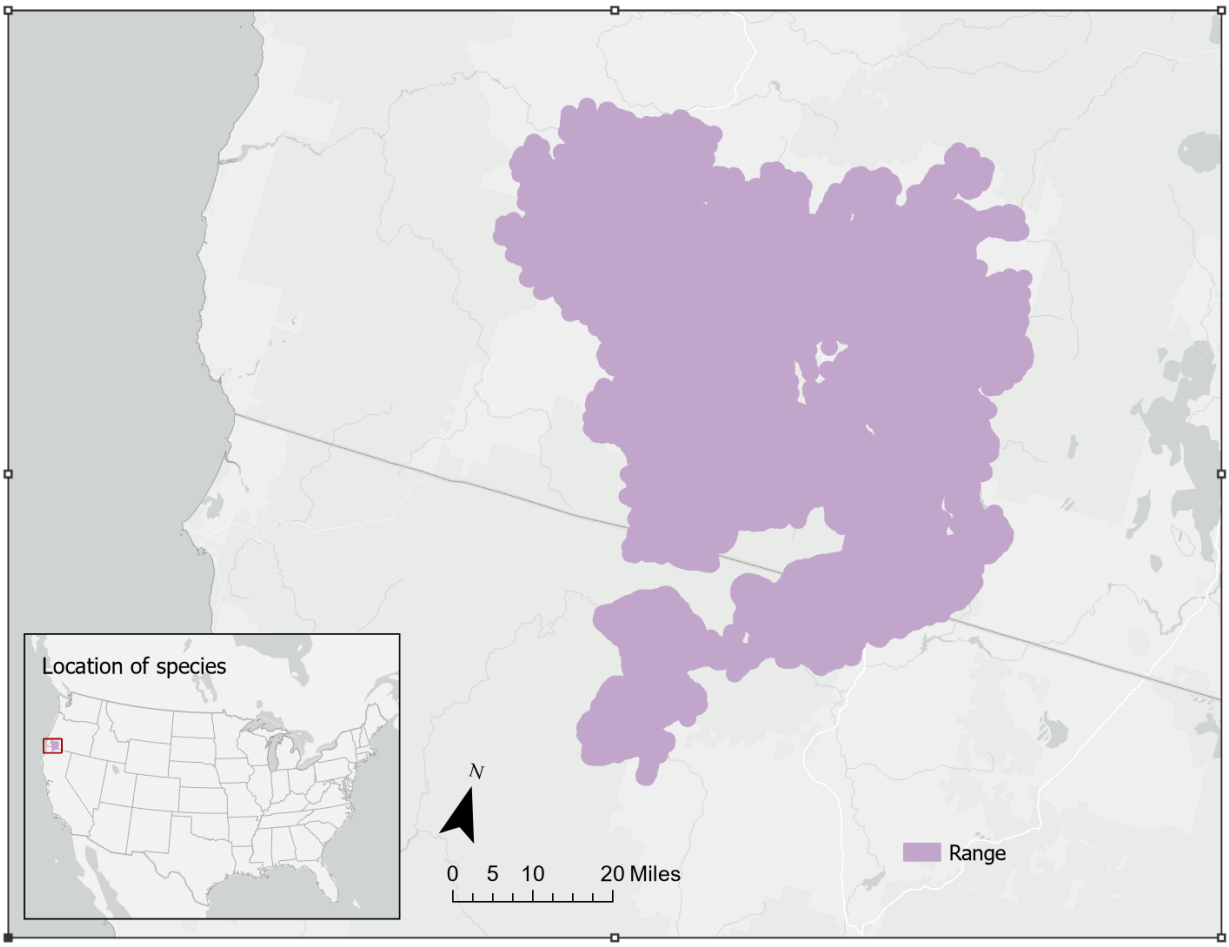

Figure A1-1. Range map for the Gentner's fritillary. Total acreage of the range map is approximately 2,125,672 acres.

4. **Critical Habitat**
   - FWS has not designated a critical habitat for this species (Species Profile for Gentner's Fritillary(Fritillaria gentneri))

5. **Known Locations**
   - Known Locations Described in FWS Recovery Documents
     - "Gentner's fritillary is known from 166 Oregon Biodiversity Information Center occurrence clusters, or element occurrences (EOs) (Oregon Biodiversity Information Center 2020). However, 18 EO's are believed to be extirpated. California Natural Diversity Database records indicate two EOs occur in California (California Natural Diversity Database 2020). The 151 EO's are made up of approximately 274 sites of Gentner's fritillary of which occur on 98 percent of federal, state, county or municipal ownership. Gentner's fritillary are distributed discontinuously from Wolf Creek, Oregon, southeast to Brushy Gulch, in northern Siskiyou County, California, near the Klamath River and from Pickett Creek in Josephine County to Dog Creek and easterly to the Cascade-Siskiyou National Monument in Jackson County (Figure 8). Agency partners have surveyed thousands of acres as part of population monitoring and project clearance survey efforts." (Species Status Assessment 2022)

- Figure A1-2 depicts the currently known locations from FWS.

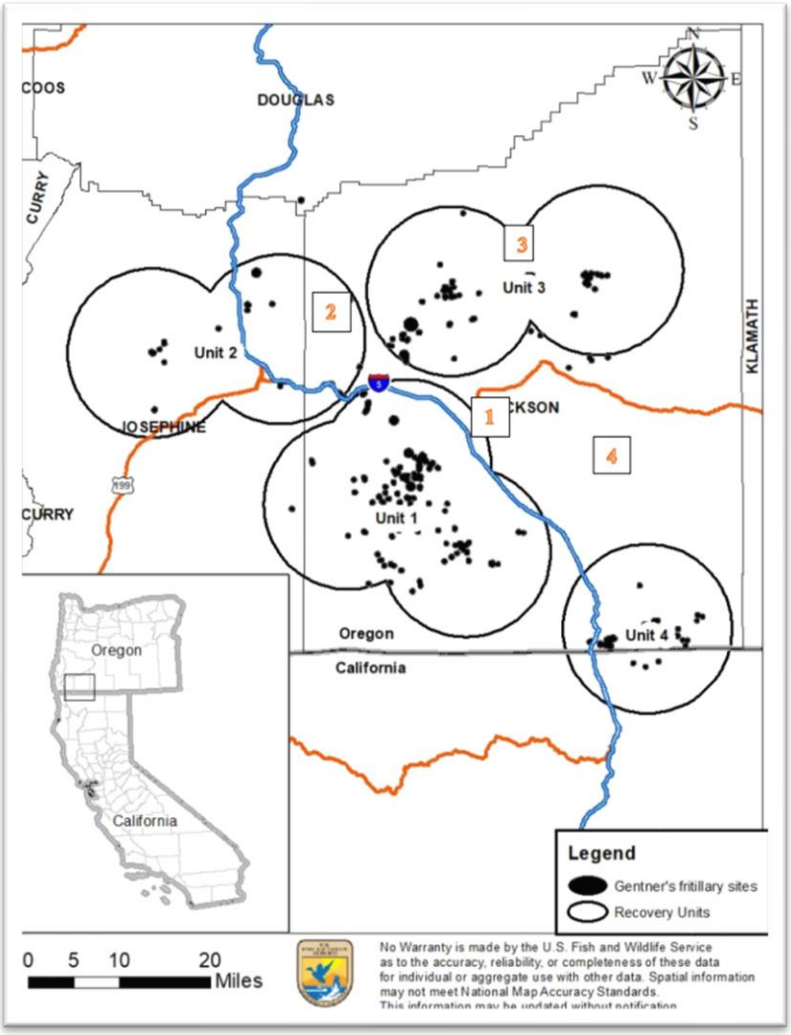

Figure A1-2. Known location information from FWS. Map reproduced from the FWS Species Status Assessment (2022).

- **Occurrences Included in Public Databases**
  - EPA queried iNaturalist, GBIF, and NatureServe.
  - iNaturalist (available here) had 124 research grade observations for this species, many of which appear to fall outside of the two watersheds (but within the species range; however, the positional accuracy of the points do not allow EPA to determine if these occurrences were in or out of the occupied watersheds.
  - GBIF (available here) included 182 occurrences and human observations (from 2010-2025). GBIF points largely coincide with the two occupied watersheds but those that fall outside of the core map can also be accounted for by the resolution of the location data.
  - Occurrences in NatureServe were consistent with other occurrence data (linked here).

- Collectively, the occurrence data are consistent with the interim core map

Appendix 2. GIS Data Review and Method to Develop Core Map (Step 3)

The interim core map was created based on biological information, including occupied location and species habitat. EPA used the FWS range as the starting point (outer extent) for developing this core map. This core map was refined to only include the two watersheds and the elevation range where the species occurs.

Dataset References and Software

- FWS Species Range – last updated on 04/25/2022
- 12 Digit HUC Subwatersheds
- USGS The National Map
- Software used: ArcGIS Pro 3.2

Datasets Used in Core Map Development
All datasets used in core map development are described in EPA's process document.

Core Map Development

- EPA started with the Gentner's fritillary range map provided by FWS to set the outer extent of the core map.
- This species is endemic to Jackson and Josephine counties, Oregon and Siskiyou County, California, in the Rogue and Klamath River watersheds. The HUC 12 Subwatersheds layer was used to identify areas where the species range overlaps with the Rogue and Klamath River watersheds. Areas outside of the two watersheds were removed from the core map.
    - Added HUC 12 Subwatersheds layer to core map.
    - Created new layer from selection where attribute table name includes the text Rogue OR Klamath.
    - Used the Clip tool to create new layer that includes only the two watersheds within the species range.
- This species is found at elevations ranging from 284 to 1,527 m, and mainly on the southern aspect. The National Map by National Geospatial Program (U.S. Geological Survey ((USGS)) was used to identify elevation where the species occurs within the core map.
    - Downloaded digital elevation model (DEM) tiles that overlapped with the core map from USGS website: n42w123, n42w124, n43w123, and n43w124.
    - Used Mosaic tool to combine DEMs into one layer.
    - Created new layer where attribute table Value is greater than or equal to 284 AND less than or equal to 1,527.
    - Selected Export Features to create a new layer titled Interim Core Map.
    - The resulting core map includes the HUC 12 watershed areas and appropriate elevation range identified by FWS for the species. This area is also representative of other occurrence data sources including iNaturalist, GBIF and NatureServe.