Interim Core Map Documentation for the Clara Hunt's Milkvetch (*Astragalus clarianus*)

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

Species Summary

The Clara Hunt's milkvetch (also known as Napa milkvetch) is a low-growing annual herb in the pea family (Fabaceae). It is a slender, sparsely leafed plant on which small flowers appear from March through April. The flowers are pea-like; petals are bicolored with white wings (petals that cover the reproductive parts of the flower) and purple tipped banner (petals that curve back from the rest of the flower) and keel (petals that wrap around the reproductive parts from below). The species occurs on thin, rocky clay soils derived from volcanic or serpentine substrates in grasslands and openings in whiteleaf manzanita *(Arctostaphylos manzanita glaucescens*) – blue oak (*Quercus douglasii*) woodlands across an elevation range of 95–360 meters (320–1,175 feet) (Liston 1990, p. 9; Ruygt 1994, pp. 26, 34; Department 2019, p. 5). The species is restricted to six localities in northwestern Napa County and eastern Sonoma County. Habitat destruction and modification due to urbanization and competition from invasive plant species pose the most significant threats to this species

Description of Core Map

The interim core map for the Clare Hunt milkvetch is based on biological information. The core map is defined by 5 locations that the U.S. Fish and Wildlife Service (FWS) identified as occupied (**Table 1**). **Figure 1** depicts the resulting interim core map for the Clare Hunt milkvetch. The size of this core map is approximately 4,975 acres. Landcover categories within the core map area are included in **Table 2**. Landcover is predominantly forest.

The core map developed for the Clare Hunt milkvetch is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Clare Hunt milkvetch. 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.

[1]Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, https://epa.maps.arcgis.com/home/item.html?id=3ccf118ed80748909eb85c6d262b426f
California Natural Diversity Database, 2025. California Department of Fish and Wildlife, https://wildlife.ca.gov/Data/CNDDB

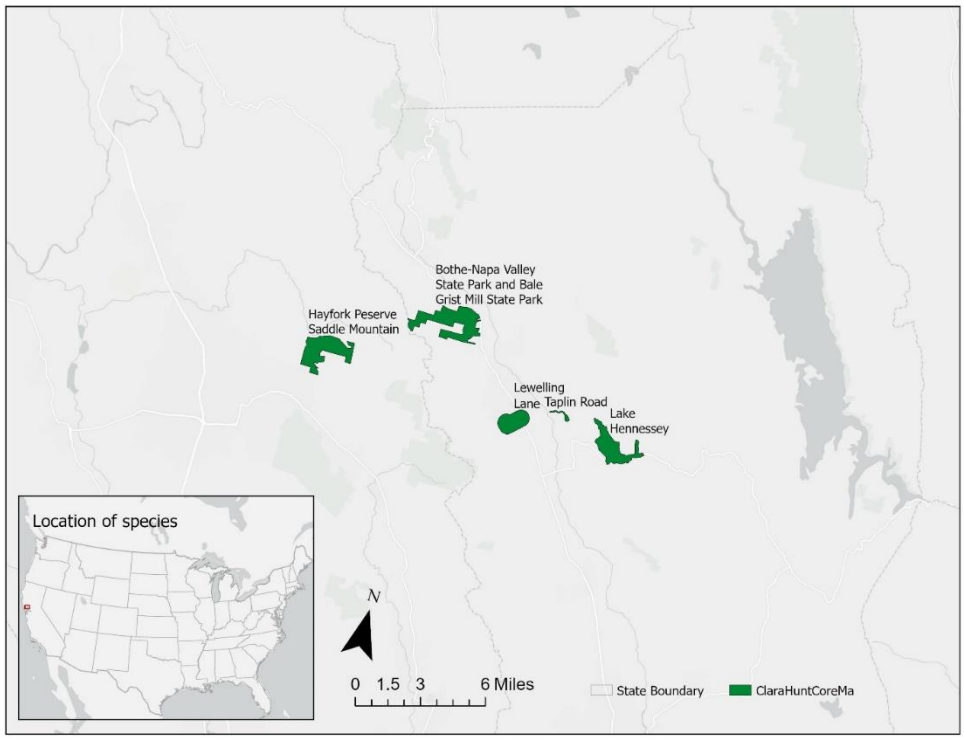

Figure 1: **Core map for the Clare Hunt's milkvetch.**

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 table that gave detail about the current known locations. Occurrences in iNaturalist and GBIF do have some data points outside of the core map, but these areas were not discussed by FWS and were not included in the core map. **Appendix 1** includes more information on the available known location information.

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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 Clara Hunt milkvetch from FWS, as well as observation information available from various publicly available sources (including iNaturalist, NatureServe, and GBIF). The information compiled for the Clara Hunt milkvetch is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Occurrences and known locations of the Clara Hunt milkvetch mentioned in FWS survey.

For step 2, EPA used the compiled information to identify the core map type including species range and known location information. EPA relied on known locations found in FWS that are within the species range. 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. **Appendix 2** provides more details on the GIS analysis and data used to generate the core map.

[1]Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, https://epa.maps.arcgis.com/home/item.html?id=3ccf118ed80748909eb85c6d262b426f
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Table 1: **FWS known locations (Clara Hunt's milkvetch 5-Year Review 2024); California Natural Diversity Database.**

Occurrence number	Occurrence/ population name	County	Ownership	Range of results from previous surveys	Survey results since 2019 status review
3	Saint Helena Road/ Alpine School	Sonoma	Private; Hayfork Ranch Conservation Easement	0-4,500	25-75 plants in 2019; ~230 plants in 2021; Present in 2022; Present in 2023
7	Bothe-Napa Valley State Park/Bale Grist Mill State Park	Napa	California State Park	0-200	0 plants in 2019; 0 plants in 2020; 2 plants in 2021
11	Lake Hennessey	Napa	City of Napa	1-~700	27 plants in 2019; 49 plants in 2020; 58 plants in 2021; 26 plants in 2023
12	Lewelling Lane	Napa	Private	15-6,192	Last surveyed in 2009
13	Spring Valley/ Taplin Road	Napa	Private	10-290	Last surveyed in 2016
14	Saddle Mountain/ Hayfork Ranch	Sonoma	Private; Hayfork Ranch Conservation Easement and Saddle Mountain Open Space Preserve	0-300	40 plants in 2019; ~2,300 plants in 2021; Present in 2022; Present in 2013

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Table 2: **Core map percent NLCD Landcover category.**

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	~51
Forestry	Evergreen Forest (42)	44	~51
Forestry	Mixed Forest (43)	7	~51
Agriculture	Pasture/Hay (81)	0	~6
Agriculture	Cultivated Crops (82)	6	~6
Mosquito adulticide, residential	Open space, developed (21)	4	~8
Mosquito adulticide, residential	Developed, Low intensity (22)	2	~8
Mosquito adulticide, residential	Developed, Medium intensity (23)	1	~8
Mosquito adulticide, residential	Developed, High intensity (24)	1	~8
Invasive species control	Woody Wetlands (90)	0	~35
Invasive species control	Emergent Herbaceous Wetlands (95)	2	~35
Invasive species control	Open water (11)	14	~35
Invasive species control	Grassland/herbaceous (71)	5	~35
Invasive species control	Scrub/shrub (52)	14	~35
Invasive species control	Barren land (rock/sand/clay; 31)	0	~35
Total Acres	**Interim Core Map Acres**	**~4,975**	

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

EPA evaluated the four sets of data to inform or support the core map. FWS provided the most refined descriptions of the occurrence information with the support of the California Natural Diversity Database and confirmed that all known locations of extant populations are located within the range. The FWS dataset in support from the California Natural Diversity Database was used to inform the core map. Additional data compiled but not used to create core map are: iNaturalist, GBIF, and NatureServe. The iNaturalist dataset had 12 research grade observations, which are consistent with the species range. GBIF's occurrence data also are consisted with the species' range and were larger the same set of data

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points found on iNaturalist. NatureServe included four documented areas, all of which were consistent with the location of the species range. **Appendix 1** includes more information on the available known location information.

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Appendix 1. Information Compiled for the Clara Hunt's milkvetch During Step 1

1. **Recent FWS documents/links and other data sources**
    - Clara Hunt's milk-vetch 5-Year Review 2024
    - Clara Hunt's milk-vetch 5-Year Review 2019
    - Clara Hunt's milk-vetch 5-Year Review 2009
2. **Background information**
    - **Status**: Federally listed as endangered in 1997
    - **Resiliency, redundancy, and representation** (the 3Rs)

        Resiliency: FWS did not discuss resiliency.

        Redundancy: FWS did not discuss redundancy.

        Representation: FWS did not discuss representation.

    - **Habitat**
        - The species occurs on thin, rocky clay soils derived from volcanic or serpentine substrates in grasslands and openings in whiteleaf manzanita (*Arctostaphylos manzanita glaucescens*) – blue oak (*Quercus douglasii*) woodlands across an elevation range of 95–360 meters (320–1,175 feet)

    - **Pollination/Reproduction**
        - Small flowers appear from March through April
        - The Clara Hunt's milkvetch is poorly understood; however, bee pollination is common for the milkvetch genus (*Astragalus*), and bees have been observed interacting with the Clara Hunt's milkvetch.

    - **Taxonomy**
        - Terrestrial dicot

    - **Relevant Pesticide Use Sites**
        - Development, urbanization, and agriculture conversion are all identified as threats. The 2024 five-year review mentions that EPA's biological evaluations on three neonicotinoid pesticides and the potential impact on pollinators; however, the importance of pollinators for the Clara Hunt's milkvetch is not fully known.

    - **Recovery Criteria/Objectives (2024 Five Year Review)**
        - There currently is not a published recovery plan for the Clara Hunt's milkvetch.

    - **Recovery Actions (from 2024 Five Year Review)**
        - There currently is not a published recovery plan for the Clara Hunt's milkvetch.
        - RECOMMENDATIONS FOR FUTURE ACTIONS
            - "Here we propose several habitat conservation and management recommendations which will aid in the recovery and conservation of the Clara Hunt's milkvetch. Some of these recommendations have already

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been discussed in previous Service recovery documents (Service 2009, p. 13; Service 2019, p. 2) or were identified during the Department's 5-Year Status Review of the species (Department 2019, p. 25) and remain valid.

- 1. Secure landowner agreements with property owners for the Lake Hennessey, Spring Valley, and Lewelling Lane occurrences to protect the occurrences from development and facilitate the management of Clara Hunt's milkvetch habitat to reduce or eliminate competition with introduced plant species and uprooting by feral pigs, if still an issue at Lewelling Lane.
- 2. Conduct annual demographic monitoring at all six localities. Monitoring surveys should also include an assessment of current threats facing the Clara Hunt's milkvetch at each locality.
- 3. Collect seeds from the Bothe-Napa Valley State Park and Saddle Mountain/Hayfork Ranch occurrences and request that the California Botanic Garden conduct seed viability tests on previously collected seeds. Seeds were collected from the other four occurrences of Clara Hunt's milkvetch in 2009 and are stored at the California Botanic Garden.
- 4. Work with California Department of Parks and Recreation at Bothe-Napa Valley State Park to manage habitat (e.g., vegetation removal, introduced species control, prescribed burns) occupied by Clara Hunt's milkvetch. If habitat management efforts do not result in growth and reproduction of the species, discuss the possibility of implementing population augmentation with the California Department of Parks and Recreation and the California Department of Fish and Wildlife.
- 5. Conduct coordinated research or adaptive management to identify effective habitat management techniques for maintaining Clara Hunt's milkvetch habitat (preventing community succession) and controlling invasive plant species.
- 6. In collaboration with the City of Napa, investigate ways to reduce impacts from recreational use, invasive species, and remnant topsoil piles at the Lake Hennessey population."

3. Description of Species Range

- The species range was last updated in 2015.

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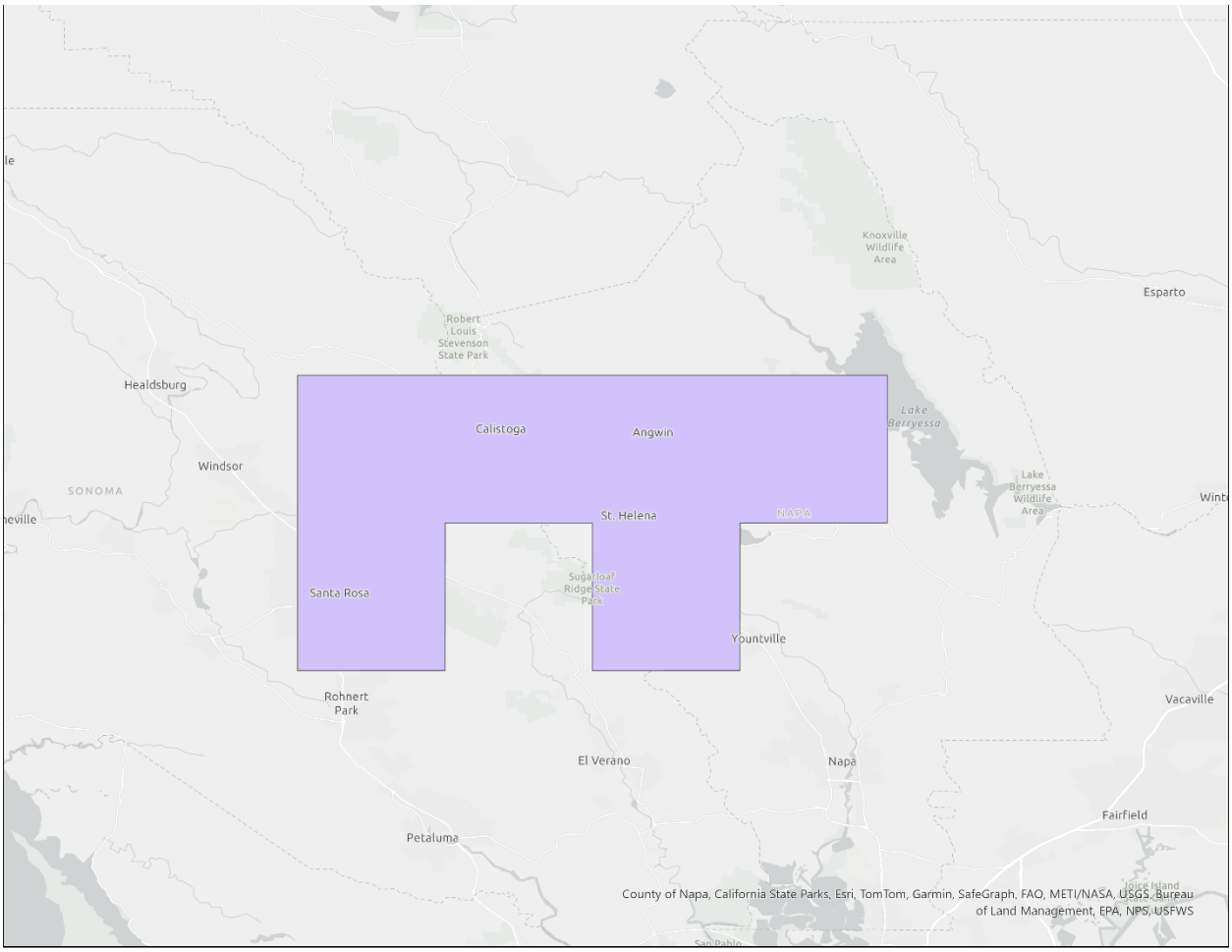

Figure A1-1. Clara Hunt's Milk-Vetch Species Range.

4. **Critical Habitat**
    - FWS has not designated a critical habitat for this species.

5. **Known Locations**

- **Occurrences Included in Public Databases** (see Appendix 2 for further details)

The core map was developed using the species range and refining with known location information provided in FWS documentation (Clara Hunt's milk-vetch 5-Year Review 2024) and California Natural Biodiversity Database[2].

- **Occurrences Described in FWS Documents**

"Historically, Clara Hunt's milkvetch was known from six occurrences in Sonoma and Napa counties (Service 1997, p. 55792). It is possible that this plant has always been rare, but more common in the hills surrounding the Napa Valley and possibly on the valley floor itself, before the planting of vineyards (Service 2019, p. 3). By the time of listing in 1997, two of the known occurrences had been extirpated due to urbanization and viticulture, leaving only one occurrence in eastern Sonoma County (Diversity Database #3 - Saint Helena Road) and three occurrences in northwestern Napa County (Diversity

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Database #7 - Bothe-Napa Valley State Park, Diversity Database #11 - Lake Hennessey, and Diversity Database #12 - Lewelling Lane) (Service 1997, p. 55792). As noted in the 2009 status review, one additional occurrence of Clara Hunt's milkvetch was discovered in 1998 within Spring Valley (Diversity Database #13) in Napa County, approximately 3.2 kilometers (2 miles) east of Lake Hennessey (Service 2009, p. 3). At the time of the 2019 status review, the species was still known from these five occurrences; however, the status of the Bothe-Napa Valley State Park occurrence was uncertain as no plants had been observed at the site since 2009 despite multiple survey attempts (Service 2019, p. 1). Overall, the current distribution of the species is similar to as described in the 2019 status review. However, the Diversity Database occurrence records for Clara Hunt's milkvetch were updated in 2019 following publication of our last status review and two changes were made to the occurrence records (See Table 1 for a summary of the occurrences, 2024 Five Year Review). The historical, type locality of Clara Hunt's milkvetch (former Diversity Database occurrence #1), which had previously been mapped to an unspecific location in the vicinity of the City of Saint Helena, was combined with the presumed extant Lewelling Lane occurrence (Diversity Database #12) (Diversity Database 2024, p. 7). Additionally, one new occurrence record (#14) was added to the Diversity Database for Clara Hunt's milkvetch occurring on the Saddle Mountain Open Space Preserve and adjacent lands on the eastern portion of the Hayfork Ranch Conservation Easement. Clara Hunt's milkvetch was first discovered at the locality in April 2009 during botanical surveys of the Saddle Mountain Open Space Preserve (Ag + Open Space 2019, p. 31). These plants were originally considered as part of the Saint Helena Road occurrence (Diversity Database #3; Bjerke 2019a, p. 1). However, the plants found in 2009 were located approximately 0.6 kilometers (0.4 miles) from the previously known individuals at the Saint Helena Road occurrence, and individuals located more than 0.40 kilometers (0.25 miles) apart are generally considered as separate occurrences in the Diversity Database (Bittman 2001, p. 58). In 2019, occurrence record #14 was added to the Diversity Database for the Saddle Mountain/Hayfork Ranch locality and was mapped as two separate polygons or subpopulations, which are separated by approximately 152 meters (500 feet), based on surveys completed in 2019 (Department 2019, p. 10; Bjerke 2021, p. 3; Diversity Database 2024, p. 11). Clara Hunt's milkvetch has also been observed in the area surrounding the two mapped polygons (Department 2019, p. 10; J. Bjerke, Department, in litt. 2024). There are currently six occurrences of Clara Hunt's milkvetch recorded in Diversity Database all of which are presumed extant (Diversity Database 2024, entire)." 2024 Five Year Review

  - See Table 1: FWS known locations (Clara Hunt's milk-vetch 5-Year Review 2024)

- **Occurrences Described in public databases**
  - **iNaturalist** https://www.inaturalist.org/observations?taxon_id=75635
  - Occurrences Described in GBIF: https://www.gbif.org/
  - Occurrences Described in NatureServe: https://explorer.natureserve.org/pro/Welcome

Collectively, occurrences in the public databases are consistent with the indigenous range.

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

This core map was created based on biological information, including occupied location designated by FWS.

Dataset References and Software

- NLCD Landcover 2021[1]
  - 30 m raster dataset that contains percent landcover, as a continuous variable, for each pixel across all land covers and types for the conterminous US
- Software used: ArcGIS Pro 3.2
- FWS Species Range – last updated on 05/26/2015

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 FWS species range. The core map was refined using FWS known locations for the species from FWS and California Natural Diversity Database. All developed polygons encompass California Natural Diversity Database data points.
  - Hayfork Ranch/Saddle Mountain preserve: polygon was defined based on boundaries laid out in the 2019 Saddle Mountain Open Space Preserve Management Plan.
  - Bothe Napa Valley State Park: polygon was defined by state park property lines.
  - Lake Hennessey: polygon was defined by lake boundaries plus a 200-foot buffer.
  - Taplin Road: polygon was defined by road with a 100-foot buffer.
  - Lewelling Road: polygon was defined by road with a 2000-foot buffer.
- Each known location site was converted to a polygon
- All 5 polygons were then merged to form a single polygon
- Export NLCD landcover to raster for merged polygon
- Raster to polygon by classname
- Dissolve by classname to get sum of each landcover category
- Calculate acres for each landcover category

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