

# Interim Core Map Documentation for Keck's Checker-mallow

## Version 1

**Review Completed:** April 2026

**Core Map Developer:** EPA's Office of Pesticide Programs

## Species Summary

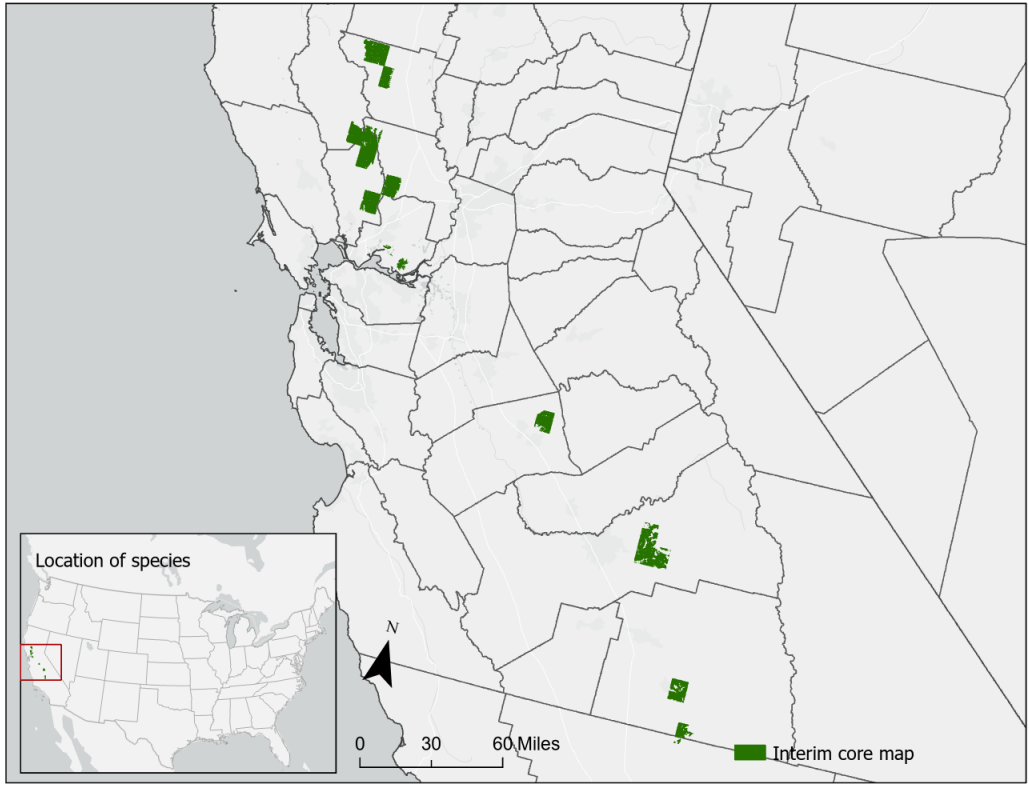
The Keck's checker-mallow (*Sidalcea keckii*, Entity ID 610) is an endangered terrestrial plant (dicot). *Sidalcea keckii* is endemic to California and grows in relatively open areas on grassy slopes of the Sierra foothills. The Keck's checker-mallow is threatened by urban development, competition from non-native grasses, agricultural land conversion, and random events. The primary pollinators of the Keck's checker-mallow are unknown, but two related California species of *Sidalcea* (*S. oregana* ssp. *spicata* and *S. malviflora* ssp. *malviflora*) are pollinated primarily by various species and families of solitary bees, bumble bees, and bee flies. Additional information on the species is provided in **Appendix 1**.

## Description of Core Map

The core map for the Keck's checker-mallow is biological information type. U.S. Fish and Wildlife Service (FWS) critical habitat is available for this species, but critical habitat was not selected for the core map because of the species' limited genetic diversity identification, narrow ecological range, and restricted geographic distribution related uncertainties. Moreover, both extant and extirpated occurrences have not been visited in the past few years to determine the status of occurrences and there are many public occurrences outside of critical habitat. As a result, the outer extent of this core map is defined by FWS species range. EPA further refined this area using habitat information (including clay soil, slopes 2-40 percent and elevations ranging from 240 to 1,950 feet) and combined this with the area of the designated critical habitat to develop the core map.

**Figure 1** depicts the resulting interim core map for the Keck's checker-mallow. The size of this core map is approximately 293,315 acres. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly grassland/Herbaceous and shrub/scrub areas.

The core map developed for the Keck's checker-mallow is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Keck's checker-mallow. 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" (3) 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 Keck's checker-mallow.**

**Table 1. Percentage of Interim Core Map Represented by NLCD<sup>1</sup> Land Covers and Associated Example Pesticide Use Sites/Types.**

Example pesticide use sites/types	NLCD Class/Value	% Area	Total area for landcover type
Forestry	Deciduous Forest (41)	0%	7%
Forestry	Evergreen Forest (42)	4%	7%
Forestry	Mixed Forest (43)	2%	7%
Agriculture	Pasture/Hay (81)	0%	4%
Agriculture	Cultivated Crops (82)	4%	4%
Mosquito adulticide, residential	Developed Open Space (21)	1%	2%
Mosquito adulticide, residential	Developed Low Intensity (22)	0%	2%
Mosquito adulticide, residential	Developed Medium Intensity (23)	0%	2%
Mosquito adulticide, residential	Developed High Intensity (24)	0%	2%
Invasive species control	Woody Wetlands (90)	0%	88%
Invasive species control	Emergent Herbaceous Wetlands (95)	0%	88%
Invasive species control	Open Water (11)	0%	88%
Invasive species control	Grassland/Herbaceous (71)	52%	88%
Invasive species control	Shrub/Scrub (52)	36%	88%
	Barren Land (31)	0%	88%
Total Acres	Interim Core Map Acres	~ 293,315	

## 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
- 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 has county level location information. Occurrences in iNaturalist, GBIF, and NatureServe did not support expanding the core map outside of range. **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

<sup>1</sup> Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, <https://doi.org/10.5066/P9JZ7AO3>

Habitats”<sup>2</sup> (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
4. Document the core map

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

- Occurrences have been reported in Yolo, Napa, Lake, Colusa, Glenn, Solano, Fresno, Tulare and Merced counties;
- *Sidalcea keckii* is endemic to California and grows in relatively open areas on grassy slopes (2-40 percent) at elevations ranging from 240 to 1,950 feet; and
- Found in clay area.

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 within the species’ range. Therefore, EPA based the outer extent of the core map on the range. EPA refined this area by including only clay soils, elevations ranging from 240 to 1,950 feet, and slopes ranging from 2-40 percent. EPA also merged all the critical habitat locations to make sure critical habitat is included.

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 CA SSURGO soil and elevation data. **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

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

---

<sup>2</sup> Dated 2024, available online at: <https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas>

## Appendix 1. Information Compiled for the Keck's Checker-mallow

### 1. Recent FWS documents/links and other data sources

- Five Year Review (2020) ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/2996.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2996.pdf) )
- Five Year Review (2012) ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/1925.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1925.pdf))
- Five Year Review (2008) ([https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public\\_docs/species\\_nonpublish/1207.pdf](https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1207.pdf) )
- [Final Rule for Designation of Critical Habitat for Keck's Checkermallow \(\*Sidalcea keckii\*\)](#) (68 FR 12863 12880)
- Nature Serve (2025)  
[https://explorer.natureserve.org/Taxon/ELEMENT\\_GLOBAL.2.161316/Sidalcea\\_keckii](https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.161316/Sidalcea_keckii)

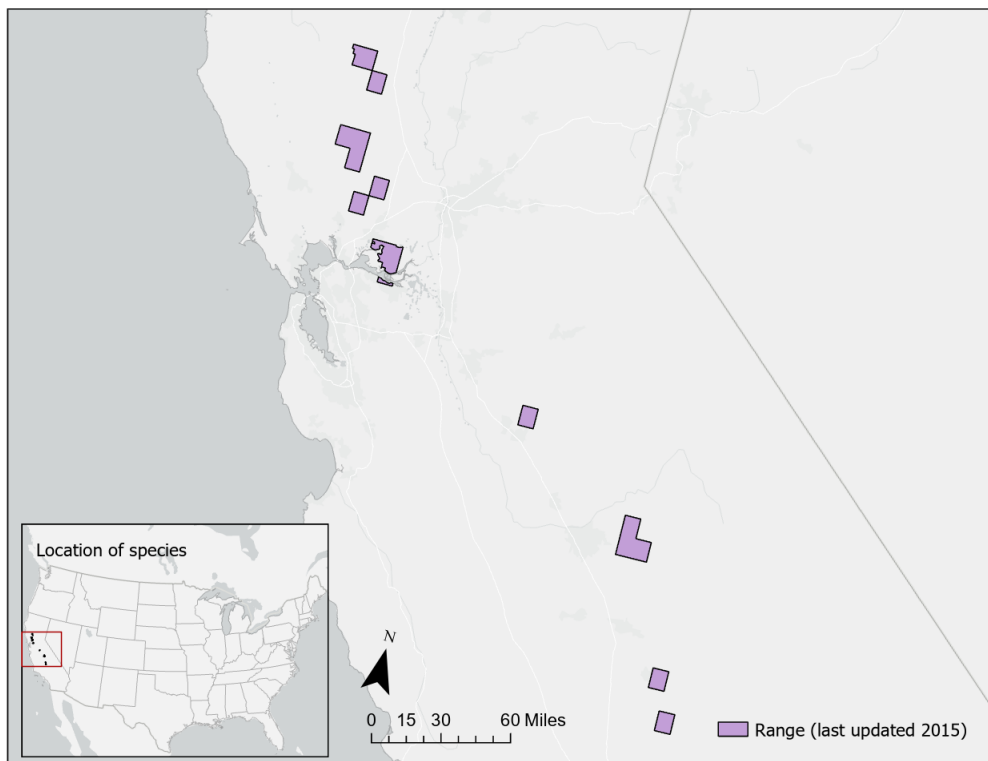
### 2. Background information

- **Status:** Federally listed as endangered in 2000
- **Resiliency, redundancy, and representation** (the 3Rs)
  - Resiliency: Species' recovery priority number is 5. 5C, which indicates a high degree of threat, including threats from development and agricultural activities, and a low potential for recovery. *Sidalcea keckii* has low resiliency due to its small population size, habitat destruction, competition, genetic isolation, and vulnerability to random events. Conservation actions, such as habitat protection, reintroduction, and genetic studies, are critical to improving its resiliency. (Five Year Review 2012)
  - Redundancy: *Sidalcea keckii* has extremely low redundancy, as it relies on a single population for survival, with no confirmed backup populations or widespread distribution to mitigate localized threats. Conservation efforts, such as reintroduction and habitat acquisition, are essential to increase redundancy and reduce extinction risk. (Five Year Review 2012)
  - Representation: *Sidalcea keckii* has low representation due to its limited genetic diversity, narrow ecological range, and restricted geographic distribution. Conservation actions, including genetic studies and habitat protection, are critical to preserving the species' representation and adaptive potential." (Five Year Review 2012)
- **Habitat**
  - *Sidalcea keckii* is endemic to California and occurrences have been reported in Yolo, Napa, Lake, Colusa, Glenn, Solano, Fresno, Tulare and Merced counties.
  - Grows at elevations ranging from 240 to 1,950 feet
  - The extant population is in a sparsely vegetated annual grassland on red or white-colored clay soils with 2-40 percent slopes.
  - Found in clay soil and the clay substrates are thought to be derived from serpentine. (Nature Serve, 2025)
- **Pollinator/reproduction**

- “The primary pollinators of *Sidalcea keckii* are unknown, but two related California species of *Sidalcea* (*S. oregana* ssp. *spicata* and *S. malviflora* ssp. *malviflora*) are pollinated primarily by various species and families of solitary bees, bumble bees, and bee flies. Many bees of the solitary bee genus *Diadasia* specialize in collecting pollen solely from members of the Malvaceae family.
- The plant flowers in April and early May, producing five petalled flowers that are either solid pink or pink with a maroon center
- **Taxonomy**
  - Terrestrial Plant
  - FWS Category: Flowering dicot plants
- **Relevant Pesticide Use Sites**
  - No information specific to pesticides. However, one of the primary threats to the species is agricultural land conversion.
- **Recovery Criteria/Objectives**
  - There is no approved final or draft recovery plan for the species. Draft Recovery Plan for Fifteen Plants from Southern Sierra Foothills, California (in development)
- **Recovery Actions**
  - Not available.

### 3. Description of Species Range

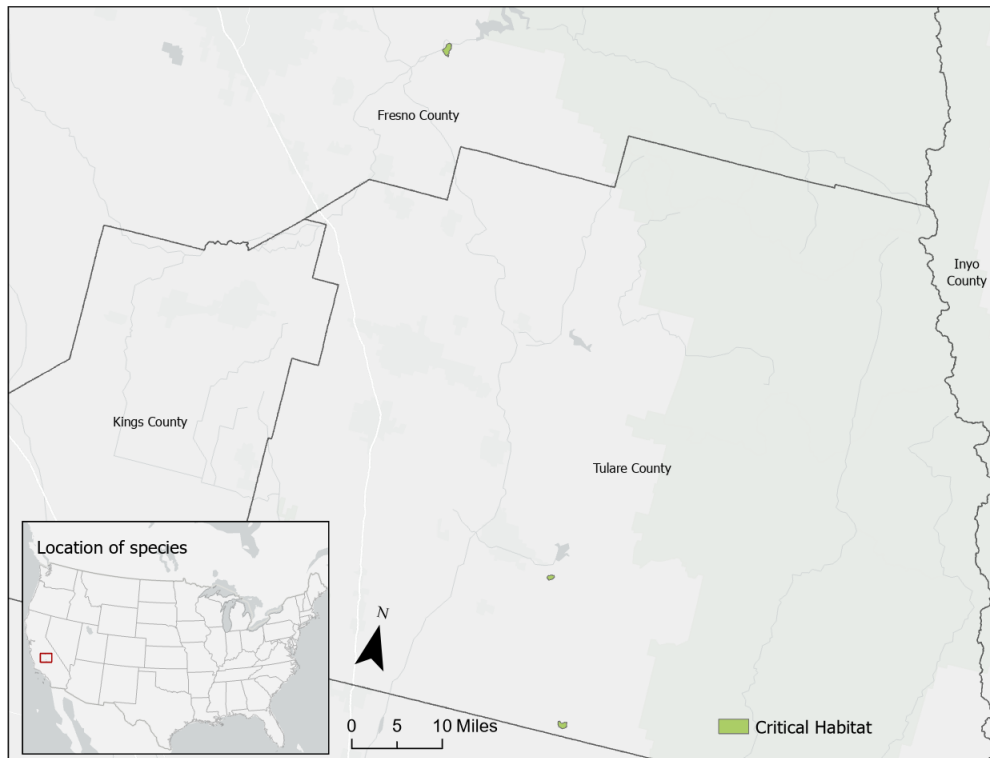
- Figure A1-1 depicts the FWS range. The range was last updated on 1/27/2018. Total acreage of range is around 584, 583 acres.



**Figure A1-1. FWS range for the Keck's checker-mallow. The total acreage of the range is around 584,583 acres.**

#### 4. Critical Habitat

- Figure A1-1 depicts the FWS critical habitat.
- Final critical habitat designation on 2003 ([68 FR 12863 12880](#)).
- Approximately 438 hectares (ha) (1,085 acres (ac)) are designated in California, consisting of three separate units: one unit in Fresno County, 206 ha (510 ac), and two units in Tulare County, one of 86 ha (213 ac) and one of 146 ha (362 ac) ([68 FR 12863 12880](#)).



**Figure A1-2. FWS critical habitat for Keck's Checker-mallow.**

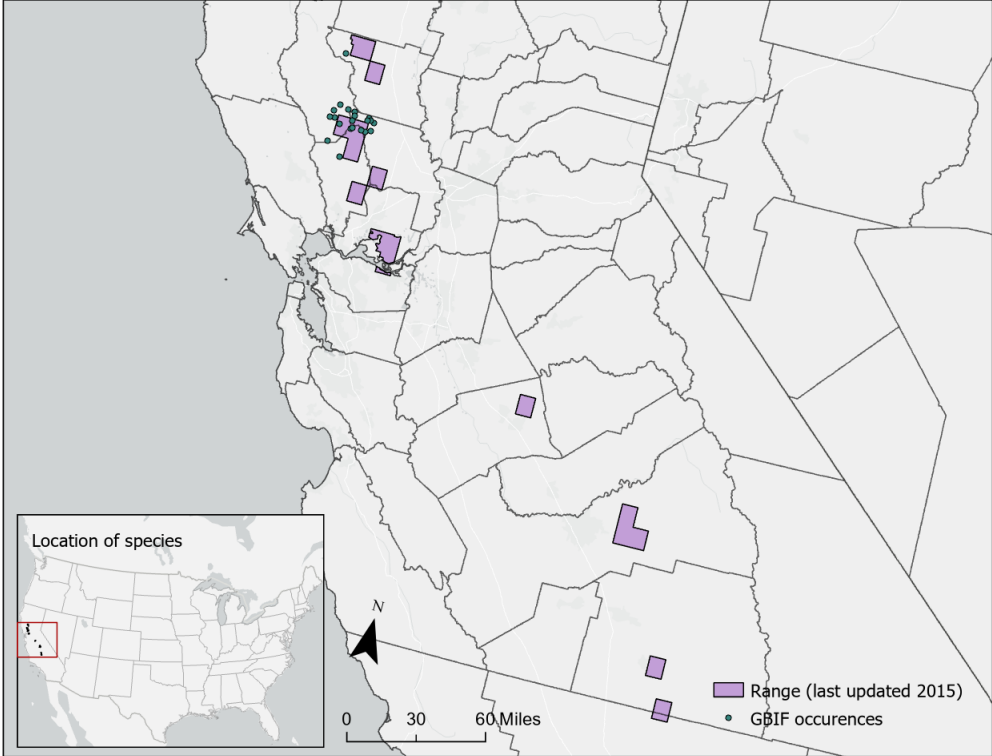
#### 5. Known Locations

- **Known Locations Described in FWS Recovery Documents**
  - *Sidalcea keckii* is endemic to California and occurrences have been reported in Yolo, Napa, Lake, Colusa, Glenn, Solano, Fresno, Tulare and Merced counties.
  - Grows at elevations ranging from 240 to 1,950 feet.
  - The extant population is in a sparsely vegetated annual grassland on red or white-colored clay soils with 2-40 percent slopes.
  - Found in clay soil and the clay substrates are thought to be derived from serpentine.
- **Occurrences Included in Public Databases**

EPA queried iNaturalist, GBIF, and NatureServe. Occurrences in NatureServe were also consistent with other occurrence data (linked [here](#)).

32 research grade observations were reported on iNaturalist (available [here](#)). All these observations aligned with the selected core map for the species when accounting for positional obscuration by iNaturalist to preserve geological privacy. No additional areas were added to the core map.

GBIF (available [here](#)) included 137 occurrences. Among those only 29 of them are human observations. Eight of them don't have latitude and longitude information. Twenty-one (21) of them are with iNaturalist institution code and have most recent data (from 2010-2025). Fifteen of these observations fall outside of the range and they are likely to be found on the range when considering the point accuracy. Given this, no additional areas were added to the core map for this species, see **Figure A1-3** for occurrences.



NatureServe's occurrence area is consistent with species range  
[https://explorer.natureserve.org/Taxon/ELEMENT\\_GLOBAL.2.161316/Sidalcea keckii](https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.161316/Sidalcea_keckii)

## 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 habitat. EPA used the species range as the starting point (outer extent) for developing this core map.

### 1. Dataset References and Software

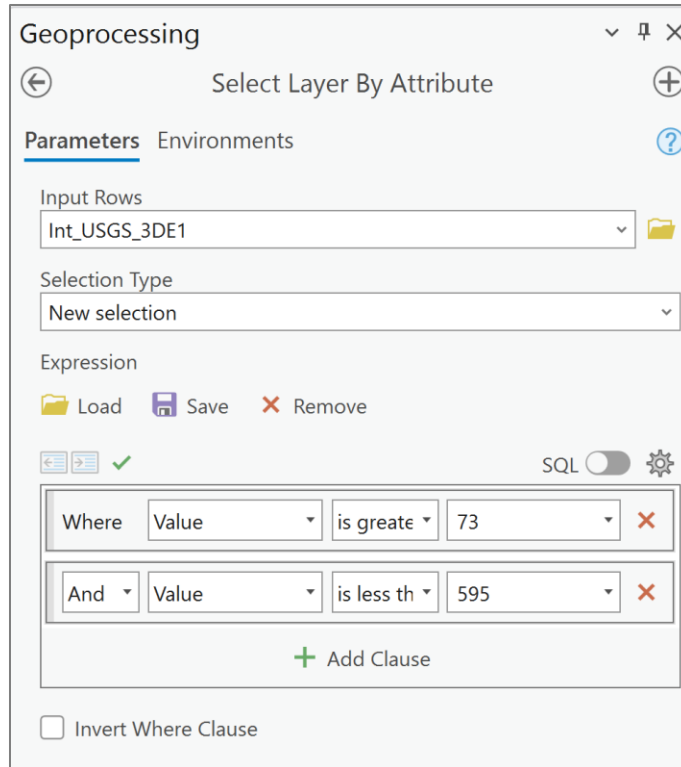
- Software used: ArcGIS Pro 3.2
- FWS Species Range –  
[https://ecos.fws.gov/docs/species/shapefiles/usfws\\_Q1OS\\_P01\\_Sidalcea\\_keckii\\_current\\_range.zip](https://ecos.fws.gov/docs/species/shapefiles/usfws_Q1OS_P01_Sidalcea_keckii_current_range.zip) last updated on 10/30/2015
- Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, <https://doi.org/10.5066/P9JZ7A03>
- Gridded Soil Survey Geographic (gSSURGO) Database for CA. United States Department of Agriculture, Natural Resources Conservation Service. Available online at <https://nrcs.app.box.com/v/soils/file/1680614967801> . 16 August 2025
- FWS Critical Habitat 2003  
[https://ecos.fws.gov/docs/crithab/zip/FCH\\_Sidalcea\\_keckii\\_20030318.zip](https://ecos.fws.gov/docs/crithab/zip/FCH_Sidalcea_keckii_20030318.zip)
- USGS 3DEP Elevation data <https://elevation.arcgis.com/arcgis/services/NED30m/ImageServer>

### 2. Datasets Used in Core Map Development

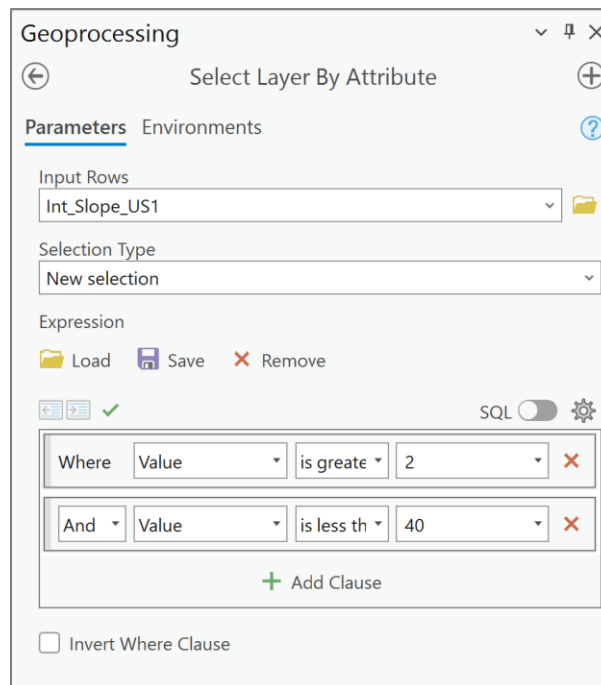
All datasets used in core map development are described in EPA's process document.

### 3. Core Map Development

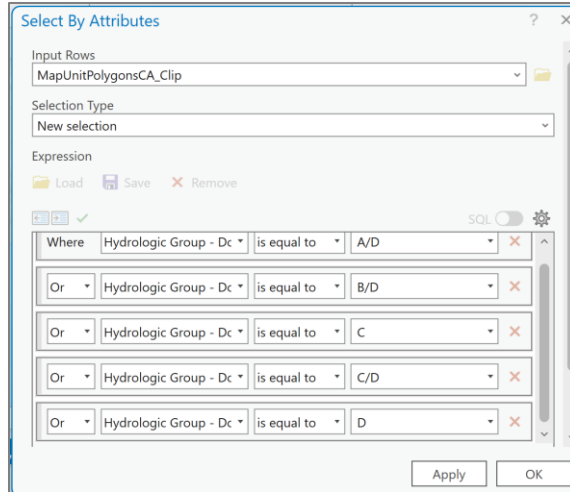
- EPA started with the FWS species range and critical habitat.
- Further refine the range by selecting elevation, slope and soil criteria.
- Elevation was selected from 240 to 1,950 feet (73 m to 595 m).



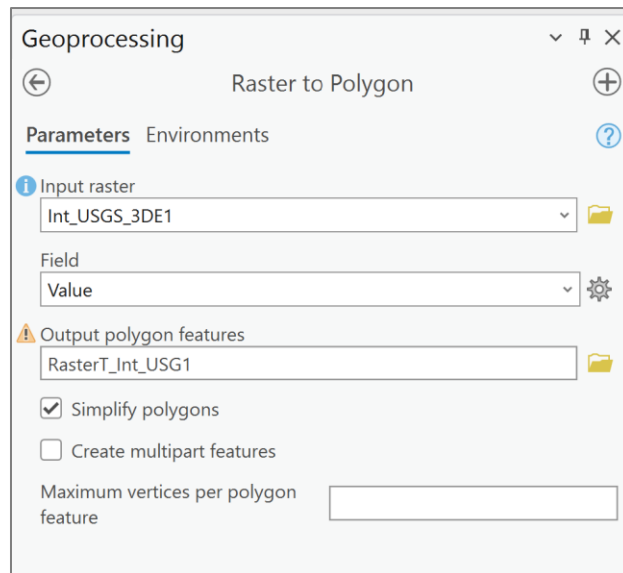
- Slope was selected from 2-40 percent.

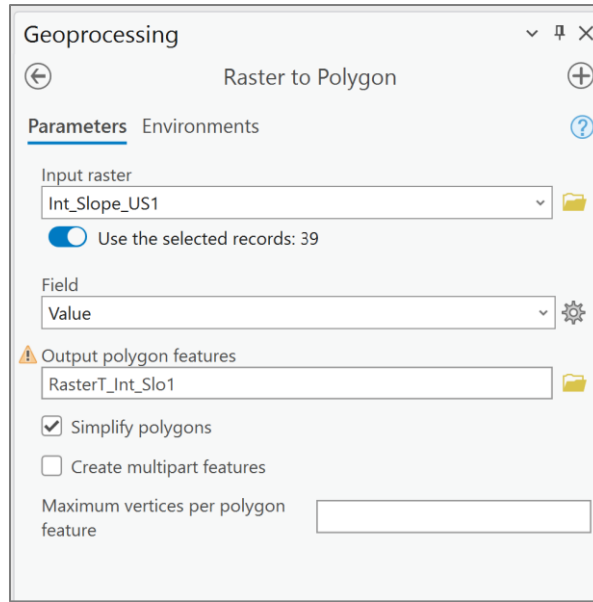


- Soil hydrologic group C and D were selected to denote clay soil.

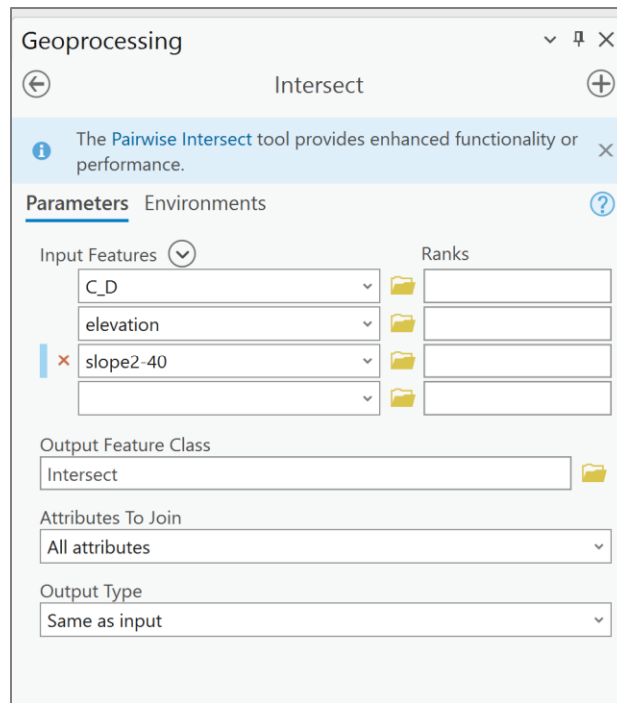


- After identifying elevation, slope and clay soils, all the layers were converted to polygons.





- After that overlapping area with all conditions met was developed using intersect.



- Since there is some non-overlapping critical habitat area, critical habitat area was merged with intersecting area to develop the final core map area.

Geoprocessing Merge

Parameters Environments

Input Datasets

- Intersect\_Dissolve
- FCH\_Sidalcea\_keckii\_20030318
- 

Output Dataset

Intersect\_Dissolve\_Merge

Field Map

- ABC text
- 0.01 Shape\_Length
- 0.01 Shape\_Area
- ABC CNAME
- ABC SNAME
- ABC UNIT\_NUM
- ABC UNIT\_NAME
- ABC SUBUNIT
- ABC SSP\_CODE
- ABC ORG\_CODE
- ABC STATUS
- 0.01 AREA

Add source information to output