

# Interim Core Map Documentation for the Blowout Penstemon (*Penstemon haydenii*)

Version 1

Review Completed: April 2026

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

## Species Summary

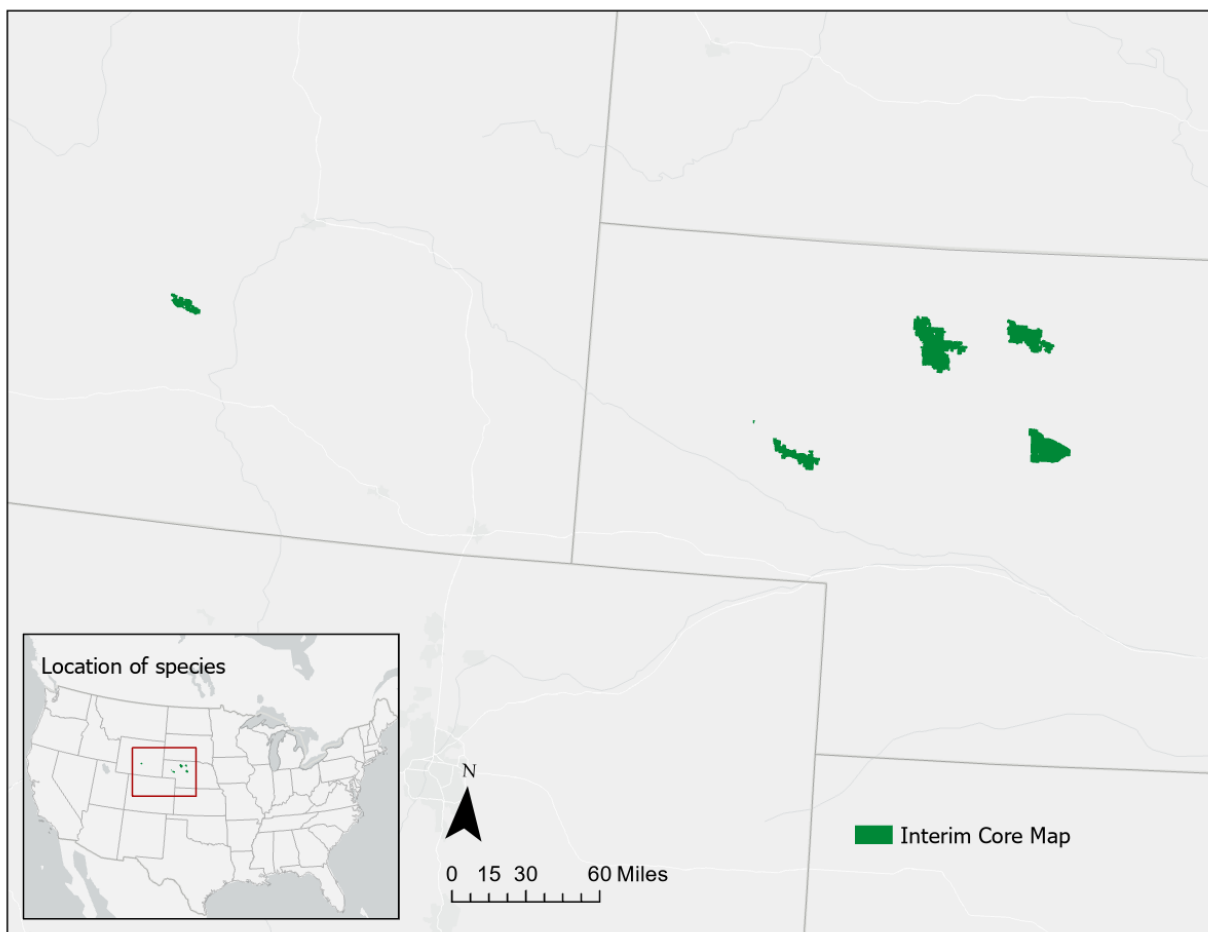
The blowout penstemon (*Penstemon haydenii*; Entity ID #978) is an endangered terrestrial plant. There is no designated critical habitat for this species. This species inhabits the northwestern Ferris Dunes in Carbon County, Nebraska, and the blowout habitats within the Sandhills Prairie in Nebraska. The blowout penstemon has a relatively short lifespan of six to eight years due to the species' adaptation to constantly moving habitat and because the plant is an early successional species. The blowout penstemon is cross-pollinated by insects and the seeds are mostly dispersed by wind. Additional information is provided in **Appendix 1**.

## Description of Core Map

The core map for the blowout penstemon is biological information type based on known locations. The species occurs in five known locations identified by FWS. Those locations are the Valentine and Crescent Lake National Wildlife Refuges (NWR), the National Forest Service's Bessey Ranger District, Spikebox Ranch in Nebraska, and the northwestern Ferris Dunes in Carbon County, Wyoming. These five known locations make up the species' core map. There is no designated critical habitat for this species.

**Figure 1** depicts the interim core map for the blowout penstemon. The size of the core map is approximately 370,611 acres. Landcover categories within the core map area are included in Table 1. Landcover is predominately grassland/herbaceous. Since the species occurs in the rim and steep faces of sandy slough slopes, many of these areas potentially represent that habitat. The remaining small amount of cultivated area (3% of core map) in the core map was left to preserve potential habitat around those areas.

The core map developed for the blowout penstemon is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the blowout penstemon. 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 expert feedback from FWS. This interim core map has an "average" (3) best professional classification to describe major uncertainties/limitations. The map is based on biological information for 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 t blowout penstemon.**

**Table 1. Percentage of Interim Core Map Represented by National Land Cover Database (NLCD)<sup>2</sup> 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)	0%
Forestry	Evergreen Forest (42)	5%
Forestry	Mixed Forest (43)	1%
Agriculture	Pasture/Hay (81)	0%
Agriculture	Cultivated Crops (82)	3%
Mosquito adulticide, residential	Developed Open Space (21)	0%
Mosquito adulticide, residential	Developed Low Intensity (22)	0%
Mosquito adulticide, residential	Developed Medium Intensity (23)	0%
Mosquito adulticide, residential	Developed High Intensity (24)	0%
Invasive species control	Woody Wetlands (90)	0%
Invasive species control	Emergent Herbaceous Wetlands (95)	3%

Example pesticide use sites/types	NLCD Landcover (Value)	% of core map represented by landcover
Invasive species control	Open Water (11)	2%
Invasive species control	Grassland/Herbaceous (71)	74%
Invasive species control	Shrub/Scrub (52)	9%
Invasive species control	Barren Land (31)	0%
<b>Total Acres</b>	<b>Interim Core Map Acres</b>	370,611

## Evaluation of Known Location Information

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

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

EPA evaluated these sets of data to inform or support the core map. FWS provided the most refined descriptions of the occurrence information and confirmed that all known locations of extant populations are located within the range. iNaturalist has 26 research grade observations, which are consistent with the species range. GBIF's occurrence data consisted of 67 occurrences that had also been accounted for in iNaturalist and NatureServe. NatureServe included 30 documented areas that were consistent with the location of the species 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 Habitats<sup>3</sup>" (referred to as "the process"). This core map was developed by EPA 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 blowout penstemon from FWS, as well as observation information available from various publicly available sources noted above. The information compiled for the blowout penstemon is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Known locations described in the FWS documentation.

For Step 2, EPA used the compiled information to identify the core map type including species range, species habitat, and known location information. The extant populations are in the Valentine and Crescent Lake National Wildlife Refuges (NWR), the National Forest Service's Bessey Ranger District, and

Spikebox Ranch in Nebraska and the northwestern Ferris Dunes in Carbon County, Wyoming. Therefore, EPA based the core map on the known locations identified by FWS, which reflect the habitat type occupied by the species. 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 U.S. Protected Areas Database to identify and map Valentine and Crescent Lake NWR, and the National Forest Service's Bessey Ranger District. EPA used US parcel data to identify and map parcels owned by Spikebox Ranch. Finally, EPA used a topographic basemap to identify and map the Ferris Mountain range, where the northwestern Ferris Dunes are located. **Appendix 2** provides more details on the Geographic Information System (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.

## Appendix 1. Information Compiled for Species

### 1. Recent FWS Documents

- [Recovery Plan for Blowout Penstemon \(1992\)](#)
- [Blowout penstemon \(Penstemon haydenii\) 5-Year Review \(2012\)](#)
- [Blowout penstemon \(Penstemon haydenii\) 5-Year Status Review \(2022\)](#)
- [Bureau of Land Management: Penstemon haydenii \(Blowout penstemon, Blowout beardtongue\) Monitoring Synthesis and Species Report, Carbon County, Wyoming \(2022\)](#)

### 2. Background Information on Species

- **Status:** Federally listed as endangered in 1987 (Recovery Plan 1992)
- **Taxonomy:** FWS identifies the blowout penstemon as a short-lived perennial plant belonging to the Penstemon genus (<https://ecos.fws.gov/ecp/species/6172>). It is classified as a CONUS-11 species having biotic pollination vectors with other reproductive mechanisms unknown.
- **Resiliency, Redundancy, and Representation (the 3Rs)**  
FWS documents do not explicitly address the 3Rs. Relevant information from FWS documents is listed below.
  - **Resiliency:**
    - “In 2016, the NGPC conducted a survey effort for blowout penstemon at 16 ranch sites that contained 72 blowouts. The survey results indicated that most blowouts had declined since 2007 and population declines of both native and re-introduced sites were attributed to the healing of blowouts, the invasion of native grasses and forbs. Based in these survey results, if current trends continue, many of the blowouts where blowout penstemon currently occur in Nebraska may not remain suitable habitat in the future (5-Year Review 2022).”
    - “Dispersal to new habitat in the Nebraska sandhills is hampered by isolation of relatively small, individual blowouts surrounded by grasslands managed for cattle forage or breeding grassland birds. There is little chance of the species migrating to new habitat (5-Year Review 2012).”
  - **Redundancy:** The blowout penstemon has been reintroduced on the Valentine NWR, the Crescent Lake NWR, and on the Bessey Ranger District. “Overall results from this effort indicate that most blowouts where the blowout penstemon has been introduced are healing within a few decades (5-Year Review 2022).”
  - **Representation:** “For more of the last 20 years, blowout penstemon subpopulations in Nebraska have been enhanced by transplanting greenhouse seedlings into previously unoccupied blowouts. This practice has increased both the overall number of plants and the number of blowout penstemon subpopulations. In Wyoming, estimates place the total Wyoming population between 5,000 and 8,000 individual plants. This represents a decline from the 19,343 plants estimated in 2005 (5-Year Review 2012).”
- **Habitat Description:**
  - “Blowouts, the habitat of blowout penstemon, are depressions in the topography caused by wind erosion (Recovery Plan 1992).”
  - “Blowouts are round or conical eroded areas, depressions formed in the sand when prevailing northwesterly winds scoop of the sides of the hills. The eroded areas form

on the sides of dunes where vegetative cover is removed or disturbed, and wind action further exposes the slopes (5-Year Review 2012).”

- “In Wyoming, blowout penstemon is found primarily on the rim and steep faces of sandy slough slopes. These deposits are found at the base of mountains or ridges. The dunes may be 60 to 120 feet high at elevations between 5860-7440 feet (5-Year Review 2012).”
- “The Wyoming sites differ from Nebraska sandhills in that the populations occur at higher elevations, the mean annual precipitation is lower, and Wyoming has cooler minimum and maximum summer temperatures (5-Year Review 2012).”
- “The blowout penstemon is a pioneer species in blowouts and will not persist when prairie grasses and forbs begin to invade, as the blowout then begins to heal (5-Year Review 2022).”

- **Pollinator/Reproduction:**

- “The blowout penstemon is primarily cross-pollinated by insects. The most important insect pollinators of the blowout penstemon appear to be four species of megachilid bees. Several other species of insects, including wasps, flies, beetles, and butterflies, have been observed visiting flowers of the blowout penstemon, and it is likely that some of these insects are also pollinators (Recovery Plan 1992).”
- “The seeds are adapted to dispersal by wind, which often distributes seed downward across the edge of the blowout into the area of sand accumulation. Wind and animals aid in the seed dispersal (5-Year Review 2012).”
- “Observations of seedlings in natural populations are rare. The sand must remain damp for a period of two weeks at the appropriate time in the spring for the seeds to germinate and for the roots of seedlings to reach a depth where moisture is available constantly. These limiting conditions are only met in one out of eight or ten years (Stubbendieck et al. 1997). The blowout penstemon has a relatively short lifespan of six to eight years due to the species’ adaptation to constantly moving habitat and because the plant is an early successional species (5-Year Review 2012).”

- **Relevant Pesticide Use Sites:**

- It was reported that treating plants with insecticides or fungicides did not significantly affect total seed output, weight or viability (5-Year Review 2012).
- The Bureau of Land Management has established a buffer around known blowout penstemon subpopulations to regulate herbicide and pesticide application (5-Year Review 2012).
- This species relies on pollination. Therefore, impacts to pollinator bees could also affect this species (5-Year Review 2012).

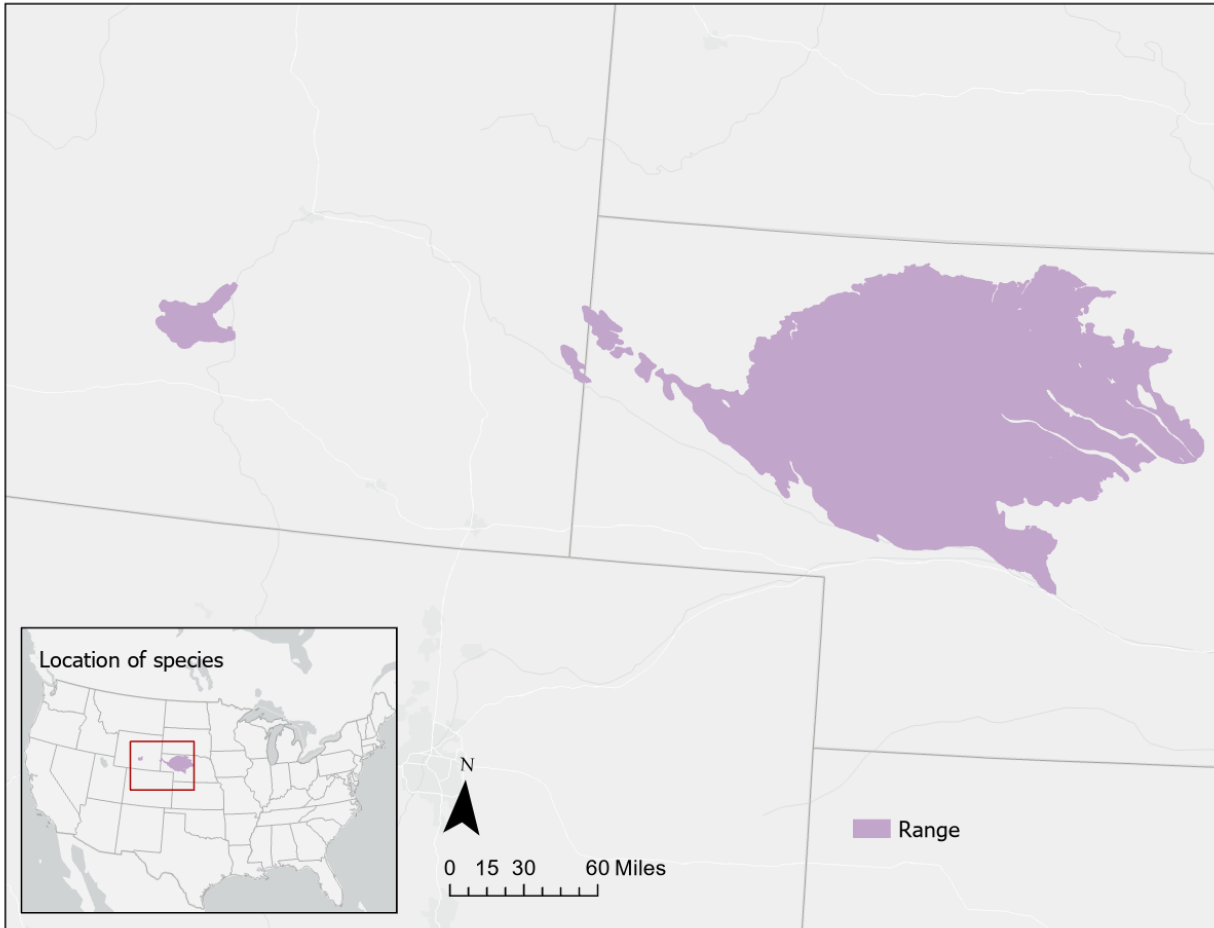
- **Threats:**

- Nebraska
  - “Loss of blowout habitat due to stabilization of dunes accompanies with the lack of effective habitat management remain major threats to the recovery of the blowout penstemon (5-Year Review 2012).”

- Wyoming
  - “Threats associated with extensive interest in developing potential areas for wind farms will likely pose threats to the habitat occupied by the blowout penstemon through placement of wind turbines in and adjacent to occupied habitat and by construction of roads and other infrastructure associated with such development (5-Year Review 2012).”
  
- **Recovery Criteria/Objectives (1992 Recovery Plan):**
  - **Objective** – “The primary objective of this recovery plan is to delist *Penstemon haydenii* as an endangered or threatened species. The basic population goals for delisting are to protect a minimum of 15,000 individuals in at least 10 population groups and their habitats. *Penstemon haydenii* will be considered for delisting when the following recovery and protection criteria are achieved:
    - **Criteria #1** – “A total population of at least 15,000 established individuals with documented stability.”
    - **Criteria #2** – “A minimum of 10 population groups, each with a minimum of 300 plants at the low point of population fluctuations, that are documented to be naturally-reproducing and self-sustaining. These groups will be comprised of naturally occurring, extant population groups, population groups introduced to new locations within the species historic range in order to ensure demographic stability.”
    - **Criteria #3** – “A minimum level of protection that will ensure the continued viability of each population group. The highest level of protection should be afforded the above 10 population groups to prevent their destruction, habitat degradation or exploitation, and guarantee their status as a viable population.”
    - **Criteria #4** – “A management plan is established and implemented for each population group that will maintain it as a naturally reproducing, self-sustaining population. The plan should enable the group to evolve and withstand natural disturbances and environmental variations in its habitat.”
  
- **Recovery Actions (1992 Recovery Plan):**
  - “Protect naturally occurring, reintroduced and introduced populations and their habitat.”
  - “Locate additional naturally occurring populations and suitable habitat for establishing new populations.”
  - “Monitor populations and conduct research to determine species life history minimum viable population parameters, habitat requirements, and management criteria.”
  - “Reintroduce populations in areas of historic occurrence and introduce new populations in a suitable habitat within the species range.”
  - “Develop and implement management plans for naturally occurring and new populations.”
  - “Maintain seed source and genetic variability in an artificial seed bank.”
  - “Carry out public education to develop awareness and support for the conservation of *Penstemon haydenii*.”

### 3. Description of Species Range

- “The blowout penstemon continues to occur in the Sandhills region of north-central Nebraska and the northwestern Ferris Dunes in Carbon County, Wyoming. The Sandhills is an area of stabilized sand dunes covering 5 million hectares (12.4 million acres). The Ferris Dunes cover an area less than 124,000 hectares (50,000 acres). The Ferris Dunes are separated from the Nebraska Sandhills by about 175 miles (282 kilometers; 5-Year Review 2022).”



**Table A1-1. FWS range for the blowout penstemon. The range is approximately 10,292,488 acres.**

### 4. Critical Habitat

- The blowout penstemon does not have a designated critical habitat.

### 5. Known Locations

- **Known Locations Described in FWS Documents**
  - In Nebraska, blowout penstemon grow in blowout habitats within Sandhills prairie. In 2016, there was a survey conducted for blowout penstemon at 16 ranch sites that contained 72 blowouts. The counts also included Valentine and Crescent Lake

National Wildlife Refuges (NWR) and the National Forest Service’s Bessey Ranger District (5-Year Review 2022).

- Blowout penstemon were also introduced on Spikebox Ranch in Nebraska, where a herd of several hundred bison grazed until little grass remained and then seeds were sown in the blowouts (5-Year Review 2022).
- In Wyoming, the blowout penstemon occurs in the northwestern Ferris Dunes in Carbon County (5-Year Review 2022).
  - “Blowout penstemon populations are present in three areas: at the flank of the Bradely Peak (western Seminoe Mountains, on the south side of Bear Mountain and adjacent to Junk Hill (eastern end of the Ferris Mountains and immediately adjoining Seminoe Mountains), and at the area beside Pathfinder Reservoir with isolated outcrops (BLM 2022).”
- **Occurrences Included in Public Databases**
  - EPA queried iNaturalist, GBIF, and NatureServe. The occurrence data from iNaturalist, GBIF, and NatureServe are consistent with the range identified by FWS (<https://ecos.fws.gov/ecp/species/6172>), with all the occurrences falling within the FWS range.
  - iNaturalist (available [here](#)) had 27 research grade observations for this species under the common name “Blowout beardtongue” within the past 15 years. All 27 observations are within the range identified by FWS.
  - GBIF (available [here](#)) included 23 human observations with coordinates (from 2018-2025). The GBIF points are within the range identified by FWS.
  - Occurrences in NatureServe were consistent with other occurrence data (linked [here](#)) for 30 documented distributions that are within the FWS range.

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

This core map was created based on biological information, including known locations provided by FWS. The interim core map includes the five named locations found in FWS documents, including Valentine and Crescent Lake NWR, the National Forest Service's Bessey Ranger District, Spikebox Ranch in Nebraska and the northwestern Ferris Dunes in Carbon County, Wyoming.

### Dataset References and Software

- [PAD-US Protection Status by GAP Status Code - Overview](#)
- [Regrid Parcels Feature Service - Overview](#)
- Software used: ArcGIS Pro 3.2
- FWS Species Range – last updated on 1/05/2023

### Datasets Used in Core Map Development

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

### Core Map Development

EPA used PAD-US to create layers for Valentine and Crescent Lake NWR. PAD-US was also used to identify and create a layer for the Nebraska National Forest, where the Bessey Ranger District is located. Regrid Parcels Feature Service was used to identify and create a layer of parcels owned by Spikebox ranch in Nebraska. Finally, the World Topographic Basemap was used to identify and create a layer the Ferris Mountain Range where the Northwestern Ferris Dunes are located. This location could be refined further if a layer becomes available that maps the extent of the Northwestern Ferris Dunes in the Ferris Mountain Range.

- Add Valentine National Wildlife Refuge and Crescent Lake Wildlife Refuge to map
  - PAD-US Protection Status by GAP Status Code
  - Select by attributes where Unit Name equals Valentine National Wildlife Refuge, Crescent Lake Wildlife Refuge. Create New Layer from selection.
- Add National Forest Service's Bessey Ranger District
  - The Nebraska National Forest is broken into two distinct areas, half in Chadron, NE, and the other half in Halsey, NE. The Bessey Ranger District manages the section located near Halsey in central Nebraska.
  - PAD-US Protection Status by GAP Status Code
  - Select by attributes where Unit Name equals Nebraska National Forest. Create new layer from selection.
  - Pairwise clip tool where the input feature is the Nebraska Wildlife Refuge Layer and the Clip Features is the Species range. This tool can be used because the area of interest (Bessey Ranger District) is within the species range, and the area that should be removed is outside of the species range.
- Add Spikebox Ranch
  - Regrid Parcels Feature Service
  - Select by attributes to select the parcels for Spikebox Ranch. Create new layer from selection.
- Add Northwestern Ferris Dunes
  - Identify the Ferris Mountain range using World Topographic Map Basemap
  - Create new shapefile in the Catalog.

- In the contents pane, select the created shapefile and select Edit in the ribbon. Select Create and select the Polygon tool.
  - Trace the boundaries of the mountain and save it to the layer.
- Use the Merge tool to combine the 5 named location layers into one single layer that is titled Interim Core Map.
- All core map files are in “Blowout Penstemon Interim Core Map.gbd”.