Interim Core Map Documentation for the New Mexico Ridgenosed Rattlesnake

Version 1
Review Completed: April 2026
Core Map Developer: U.S. Environmental Protection Agency (EPA), Office of Pesticide Programs

Species Summary

The New Mexico ridgenosed rattlesnakes (*Crotalus willardi obscurus*, Entity ID #166) are small, montane species whose historical range includes Arizona and New Mexico. They are one of the five recognized subspecies of the ridgenosed rattlesnakes (*Crotalus willardi*) belonging to the viper family. This species is known to occur in the Animas Mountains, New Mexico, the Peloncillo Mountains of New Mexico and Arizona, and in the Sierra San Luis Mountains in Mexico.

The New Mexico ridgenosed rattlesnake was listed as threatened under the Endangered Species Act on August 21, 1978. Additional information is provided in **Appendix 1**.

Description of Core Map

The interim core map for the New Mexico ridgenosed rattlesnake is biological information type based on the species range identified by the U.S. Fish and Wildlife Service (FWS) refined by elevation and with the addition of the species' population in the Sierra San Luis mountains.

Figure 1 depicts the resulting interim core map for the New Mexico ridgenosed rattlesnake. The size of this core map is approximately 158,000 acres. Landcover categories within the core map area are included in **Table 1**. Landcover within the core map is predominantly shrub/scrub, with some grassland/herbaceous and evergreen forest, which is consistent with the habitat of this species.

The core map developed for the New Mexico ridgenosed rattlesnake is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the New Mexico ridgenosed rattlesnake. 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 a "limited" (2) best professional judgment classification to describe major uncertainties/limitations. The map is based on the range described by FWS, with limited additions and subtractions based on FWS documentation; all supporting data sources consistently support the core map. This core map does not replace or revise any range or designated critical habitat developed by FWS for this species.

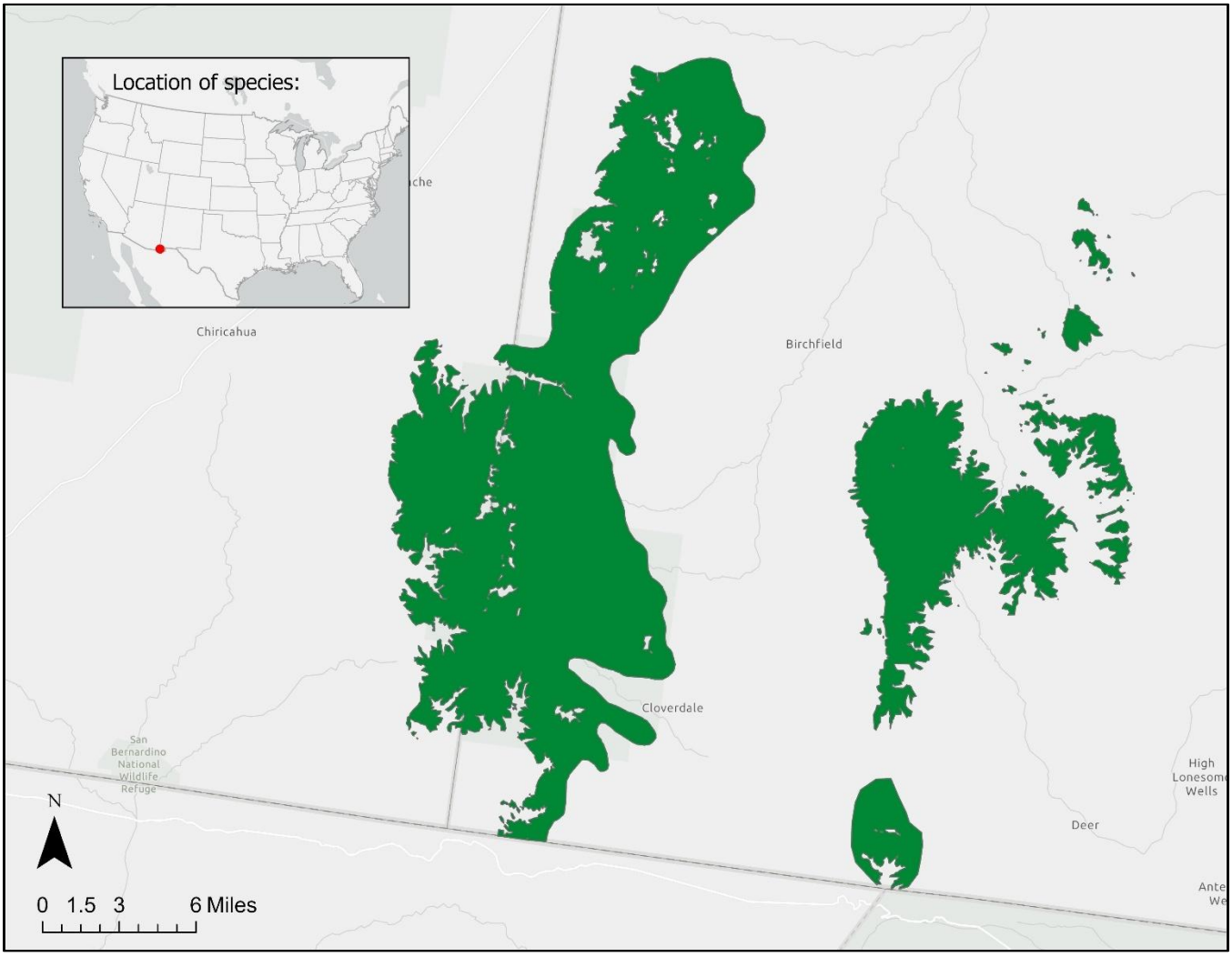

Figure 1. Interim core map for the New Mexico ridgenosed rattlesnake. The total acreage of the core map is approximately 158,000 acres

Table 1. Percentage of Interim Core Map Represented by National Land Cover Database (NLCD) Land Covers and Associated Example Pesticide Use Sites/Types.

Example pesticide use sites/types	NLCD Class/Value	% Area
Forestry	Deciduous Forest (41)	0%
Forestry	Evergreen Forest (42)	18%
Forestry	Mixed Forest (43)	2%
Agriculture	Pasture/Hay (81)	0%
Agriculture	Cultivated Crops (82)	0%
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)	0%
Invasive species control	Open water (11)	0%
Invasive species control	Grassland/herbaceous (71)	13%
Invasive species control	Scrub/shrub (52)	67%
Invasive species control	Barren land (rock/sand/clay; 31)	0%
Total Interim Core Map Acres		**158,000 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. Occurrences in iNaturalist, GBIF, and NatureServe were consistent with the general locations discussed in FWS documentation. **Appendix 1** includes more information on the available known location information.

Approach Used to Create Core Map

EPA compiled available information for the New Mexico ridgenosed rattlesnake from FWS, as well as observation information available from various publicly available sources (including iNaturalist, NatureServe, and GBIF). The information compiled for the New Mexico ridgenosed rattlesnake is included in **Appendix 1**.

EPA used this information to identify the core map type, which is biological information. The core map includes areas within the species range with suitable elevation restrictions for this species and includes the population in the Sierra San Luis mountains.

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

EPA considered using the designated critical habitat as the interim core map; however, the FWS documentation reviewed made clear that there are occupied areas outside of the critical habitat. See **Appendix 1** for additional information.

Appendix 1. Information Compiled for Species

1. **Recent FWS Documents/Links**
   2019 5 Year Review
   2019 Supplement to Recovery Plan

2. **Background Information**
   - **Status:**
     Listed as threatened on August 21, 1978

   - **Taxonomy**

Kingdom:	Animalia – Animal, animaux, animals
Subkingdom:	Bilateria – triploblasts
Infrakingdom:	Deuterostomia
Phylum:	Chordata – cordés, cordado, chordates
Subphylum:	Vertebrata – vertebrado, vertébrés, vertebrates
Infraphylum:	Gnathostomata
Superclass:	Tetrapoda
Class:	Reptilia Laurenti, 1768 – répteis, reptiles, Reptiles
Order:	Squamata Oppel, 1811 – Amphisbaenians, Lizards, Snakes, amphisbènes, lézards, serpents
Suborder:	Serpentes Linnaeus, 1758 – Snakes, cobra, serpente, serpents
Infraorder:	Alethinophidia Nopcsa, 1923
Family:	Viperidae Oppel, 1811 – Pit Vipers, Vipers
Subfamily:	Crotalinae Oppel, 1811
Genus:	Crotalus Linnaeus, 1758 – Rattlesnakes
Species:	Crotalus willardi Meek, 1905 – Ridge-nosed Rattlesnake, Víbora-cascabel bigotuda
Subspecies:	Crotalus willardi obscurus Harris and Simmons, 1974 – Animas Ridge-nosed Rattlesnake, New Mexico Ridgenose Rattlesnake, New Mexico Ridge-Nosed Rattlesnake

   - **Resiliency, Redundancy, and Representation**
     Not discussed explicitly in FWS documentation reviewed but can be inferred to be low.

   - **Life History**
     - **Habitat & Biology**
       FWS (2019a) states the New Mexico ridgenosed rattlesnake is a montane subspecies that can be found in pine oak woodlands, on steep, rocky hillsides, in canyon bottoms, and on talus slopes. There are currently three known isolated populations of the New Mexico ridge-nosed rattlesnake subspecies: Animas Mountains (NM), Peloncillo Mountains (NM and AZ), and the Sierra San Luis Mountains (Mexico). These three isolated populations are restricted to three of the approximately 57 sky-islands in the region. The Madrean Sky Islands (also known as the Madrean Archipelago) is a world diversity hotspot in northwestern Mexico and the southwestern United States (Arizona and New Mexico), characterized by pine and oak forested mountains surrounded by low elevation desert and grassland “seas”. Principles of island biogeography are often applicable to Sky Islands. The New Mexico rattlesnake is found

at elevations ranging from approximately 6,000 – 8,500 ft in the Animas Mountains and 5,000 – 6,200 ft in the Peloncillo Mountains.

At the time of listing in 1978 and when the Recovery Plan for the New Mexico ridge-nosed rattlesnake was completed in 1985, little was known about the natural history of the subspecies, and detection of the subspecies in the Peloncillo Mountains in New Mexico and Arizona had not yet occurred. The New Mexico ridge-nosed rattlesnake was first observed in the Peloncillo Mountains in 1987, in Cochise County, Arizona.

FWS (2019a) states that:

> *Since the time of listing and the Final Recovery Plan, numerous studies have resulted in a variety of reports, theses, dissertations, and peer-reviewed publications contributing to our understanding of the life history and biology of the subspecies. While these documents provide information regarding our understanding of some key attributes of the subspecies, we still lack specific locality or capture data for most of these studies, and our understanding relies upon analyses and information as presented in available literature. Designated critical habitat for the subspecies occurs only in the Animas Mountains (NM) because that was its known distribution in the United States at the time of listing in 1978.*

FWS (2019a) states that the maps within this document represent the best available information regarding the distribution of this subspecies at this time; however, that there is published literature and reports that provide significantly more information about the locality, distribution, and detections. The maps provided in FWS (2019a) visually appear to be what is proposed as the species range in Environmental Conservation Online System (ECOS).

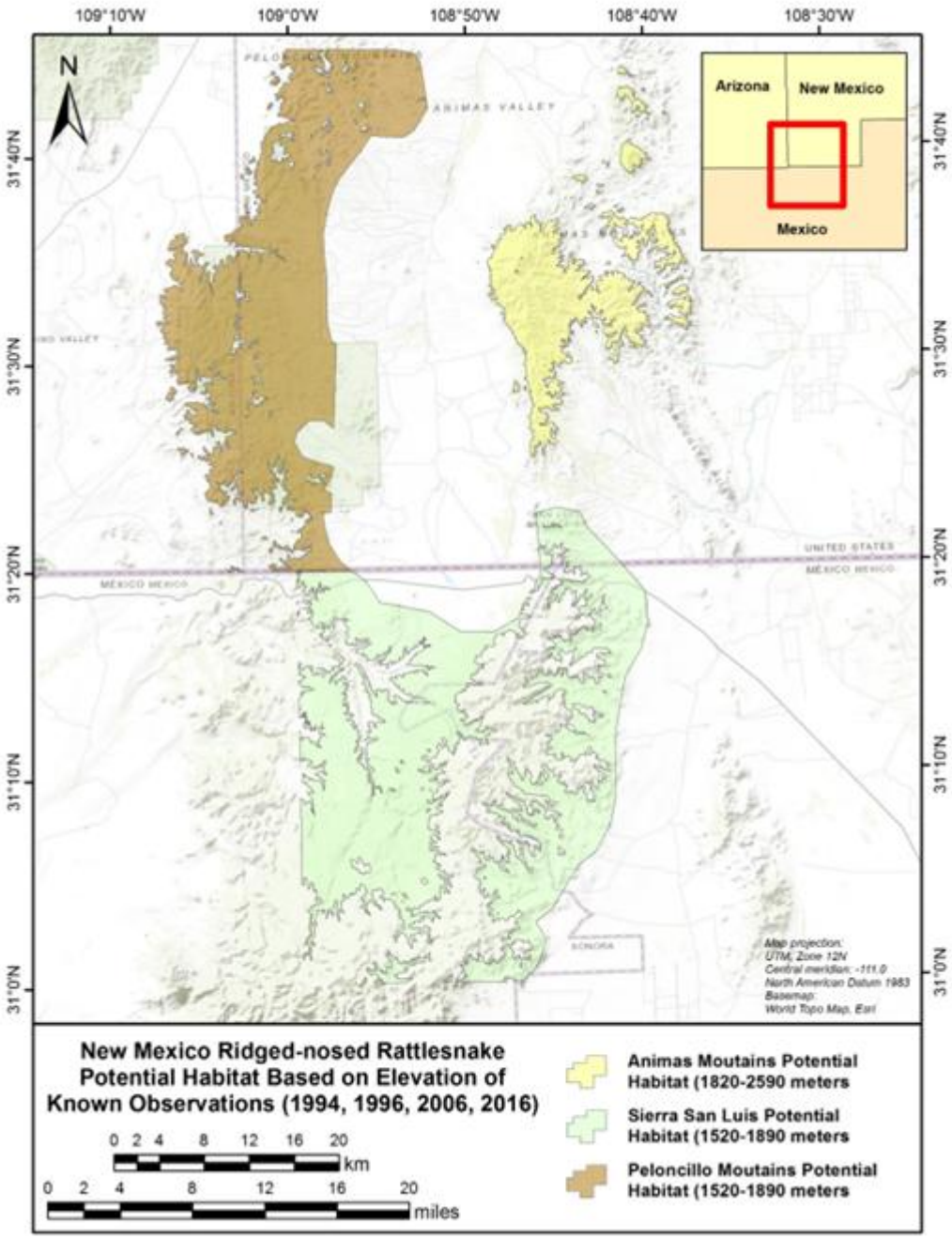

Figure 2. Screenshot of Figure 3 in FWS (2019a). FWS (2019a) describes this map as possible habitat for the New Mexico ridge-nosed rattlesnake based on the known elevational range of the subspecies in each mountain area where the subspecies occurs.

- **Threats**

FWS (2019b) states that the New Mexico ridgenosed rattlesnake was primarily listed due to its narrowly restricted range, couple with over collections and habitat modification. The threats currently affecting the subspecies include those that were at present at the time of listing, as well as additional threats not addressed at the time of listing (lack of connectivity among populations, small population sizes, hybridization, changing climate). Current habitat alteration and loss primarily stems from forest type conversions resulting from forest management practices over the last century (including fire suppression) that have caused shifts in the natural fire regime resulting in large-scale, unplanned forest

fires or unnatural prescribed fire regimes, and ultimately vegetation type conversion from suitable woodland habitat to unsuitable chaparral and grassland habitat

- **Recovery Criteria**

FWS (2019b) states:

Even though the very restricted range of *Crotalus willardi obscurus* as it is presently known may preclude eventual delisting, reclassification to non-threatened status, nonetheless, could be considered when:

1. All important areas of *C. w. obscurus* habitat in Mexico and New Mexico are identified;
2. *C. w. obscurus* habitat in New Mexico is protected from adverse modification; and
3. The continued existence of the taxon in its habitat is assured. Steps to reach recovery include identification and protection of important habitat and gaining additional information, through research, concerning unknown aspects of the taxon's life history. To keep the subspecies recovered, it will be necessary to provide adequate protection and management of important habitat. This must include entering into land management agreements with private landowners and monitoring C. w. obscurus populations to assure continued survival of viable populations.

In August 2018, the Service completed a supplemental finding to the 1985 Recovery Plan finding that it remains not practicable to develop delisting objectives and criteria at this time. FWS determined that the development of delisting objectives and criteria was not practicable for the following reasons:

1. Some of the major threats affecting the subspecies now and in the foreseeable future cannot be measured, monitored, or abated (illegal collection, continuous habitat alteration and loss);
2. FWS lack the necessary information regarding impacts to the subspecies for some potential threats (prey availability, hybridization, disease); and
3. FWS lack population-level information and cannot develop population-level criteria.

3. Species Range

The species range was last updated on December 27, 2023 and is approximately 247,000 acres. See Figure 1 for the species range.

4. Critical Habitat

FWS designated a critical habitat for the New Mexico ridgenosed rattlesnake in 1978. Designated critical habitat for the subspecies occurs only in the Animas Mountains (NM) because that was its known distribution in the United States at the time of listing in 1978. The understanding of the species distribution has increased greatly since the designation of the critical habitat, with known occurrence occurring outside of the critical habitat.

Figure 3. Comparison of critical habitat and species range, downloaded from ECOS.

5. Additional Known Locations

- iNaturalist
  - Searched on 10/23/2025
  - 17 research grade and verifiable observations made between July 2024 – September 2018
  - Five occurrences had public location information, all of which are within the species known range.

- GBIF
  - Searched on 10/23/2025
  - 13 observations made between 2008 –2024 whose basis of record was either a human observation or occurrence
  - Two observations included coordinates, both of which were from the iNaturalist dataset

- NatureServe
  - Searched on 10/23/2025
  - Four hexagons include observations, all within the species expected range

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

EPA developed the interim core map by adding a national forest district to the species critical habitat to account for known occurrence information.

1. **Datasets and Software**
   Datasets used:
   1.1. USFWS species range
   1.2. New Mexico mountain ranges
   1.3. USGS 3DEP Elevation – 30m

   Software used: ArcGIS Pro, version 3.5.2

2. **Creating the core map**
   2.1. Refining the range by elevation
   Use the *Clip Raster* tool to clip USGS 3DEP Elevation – 30 m raster to the shape of the species range.

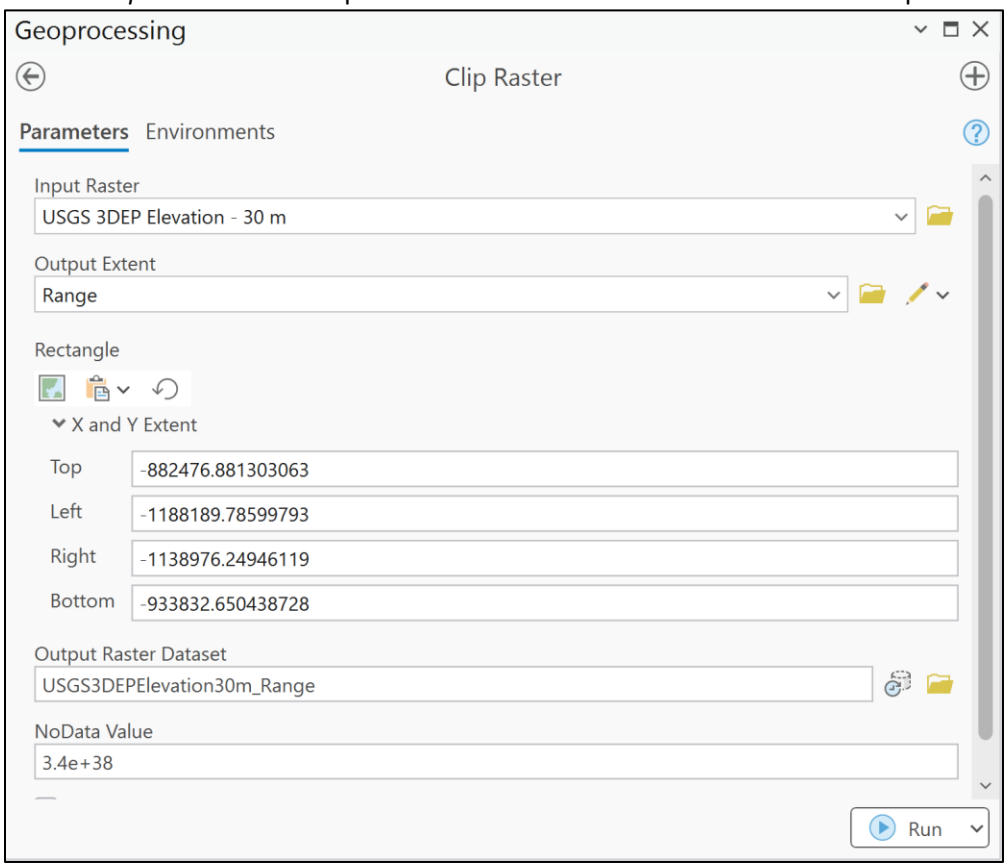

Figure 4. Setup of the *Clip Raster* tool.

Multipart to Singlepart tool to divide the USGS 3DEP Elevation – 30 m raster clipped to the species range into the segments in the Peloncillo and Animas mountain ranges.

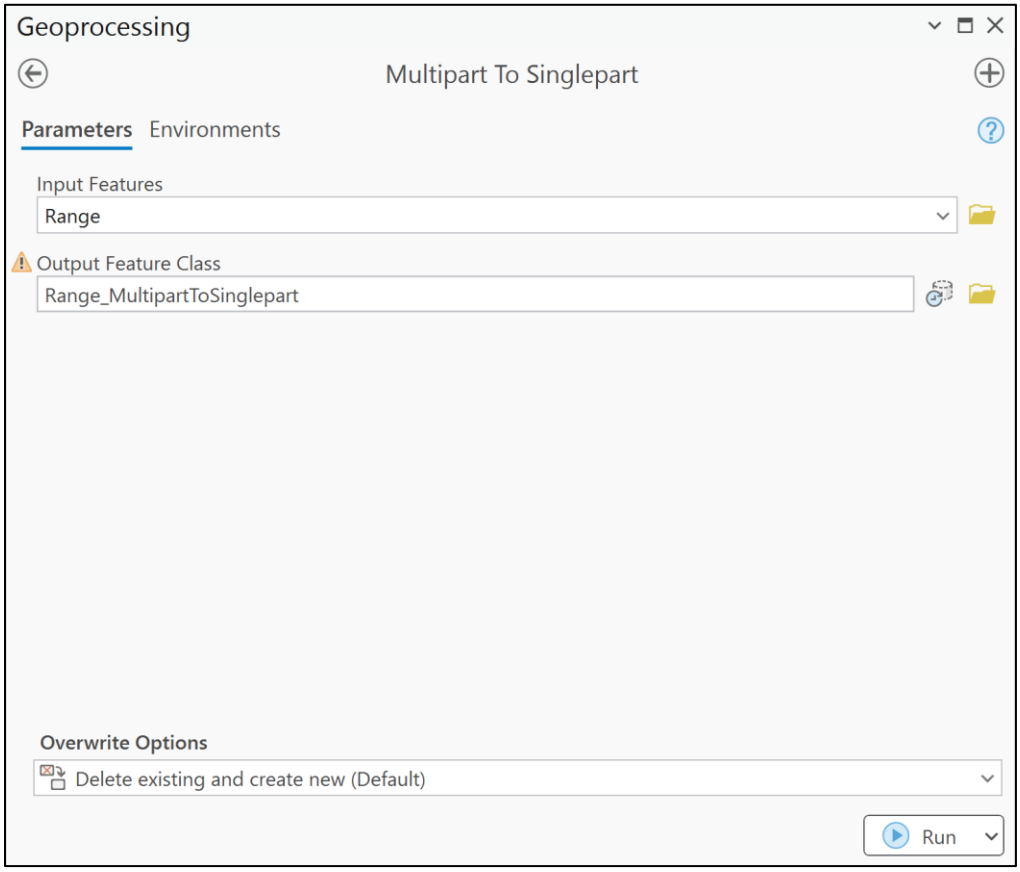

Figure 5. Setup of the *Multipart to Singlepart* tool.

Use the *Select Layer by Attribute* tool to select each mountain range and create a new layer. The *Multipart to Singlepart* tool resulted in two feature classes. As such, each mountain range was identified and selected visually.

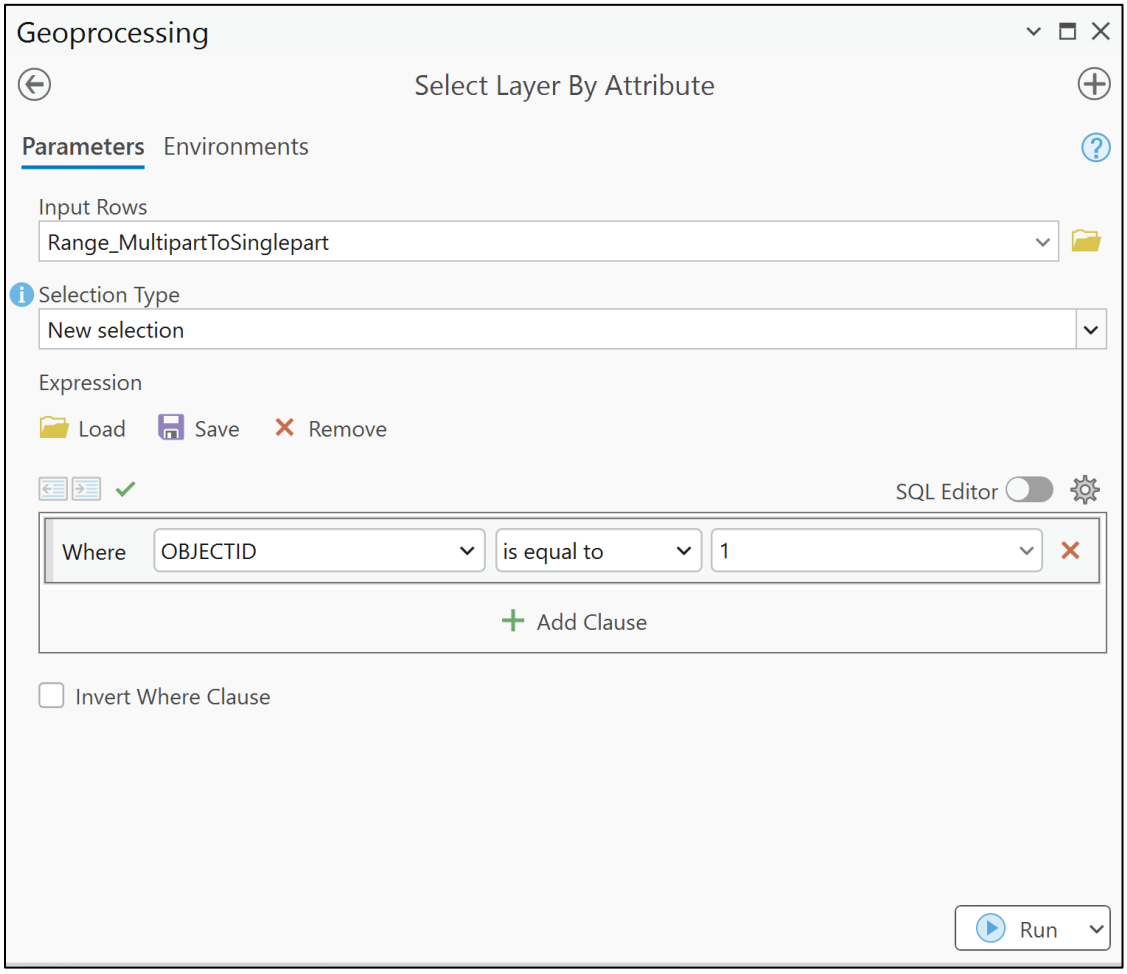

Figure 6. Example of the setup for the *Select Layer by Attribute* tool.

Use the *Con* tool to refine each mountain range layer to the respective elevations the species is known to occur at, based on FWS documentation.

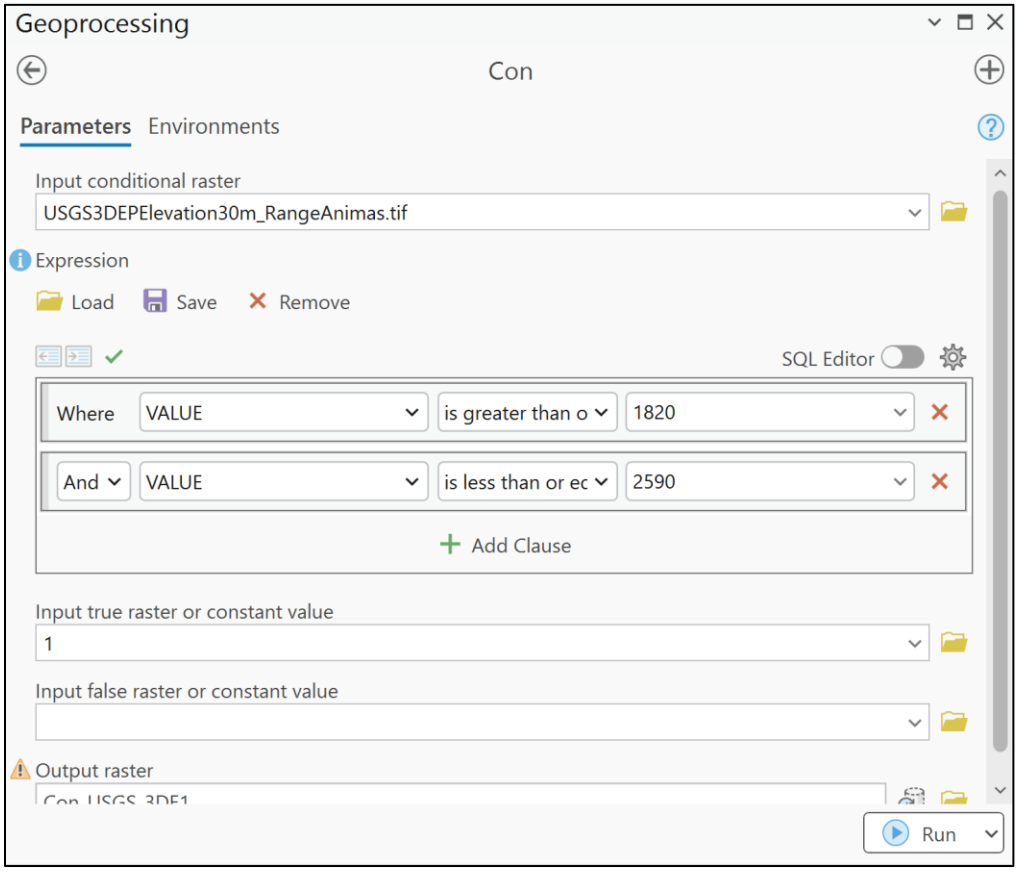

Figure 7. Setup of the *Con* tool for the Animas mountain range elevation refinement.

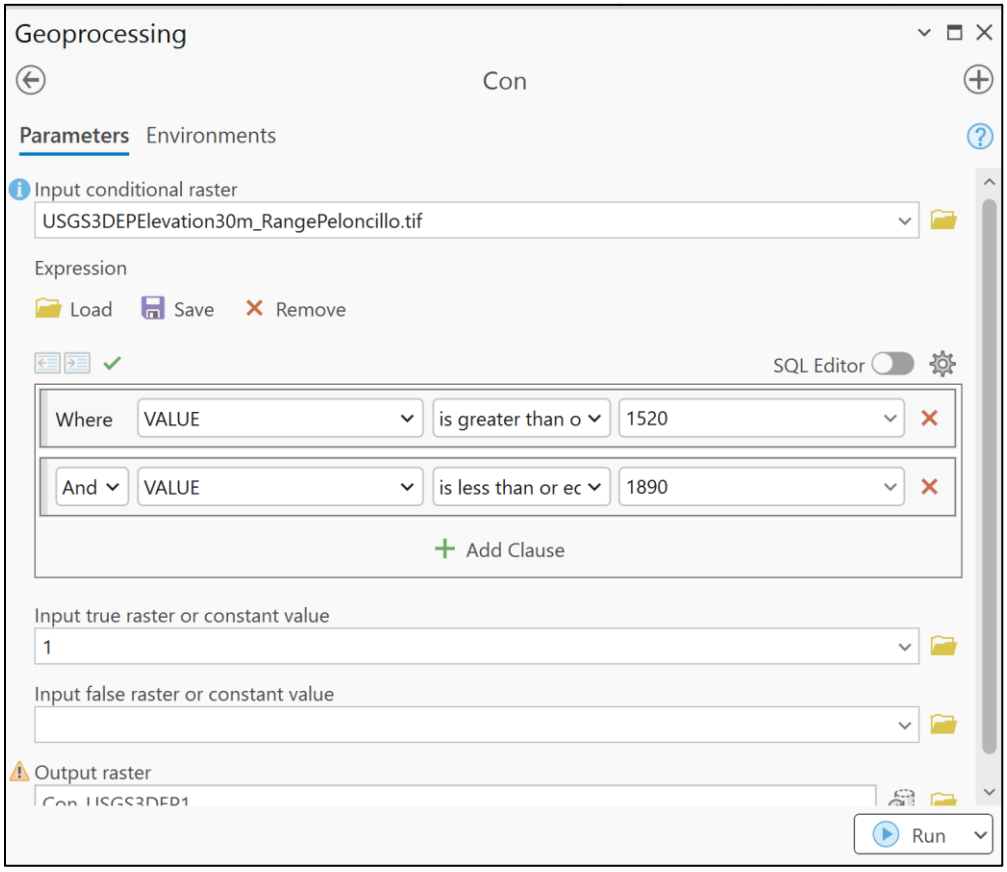

Figure 8. Setup of the *Con* tool for the Peloncillo mountain range elevation refinement.

Use the *Raster to Polygon* tool to create polygons of the resulting refined mountain ranges.

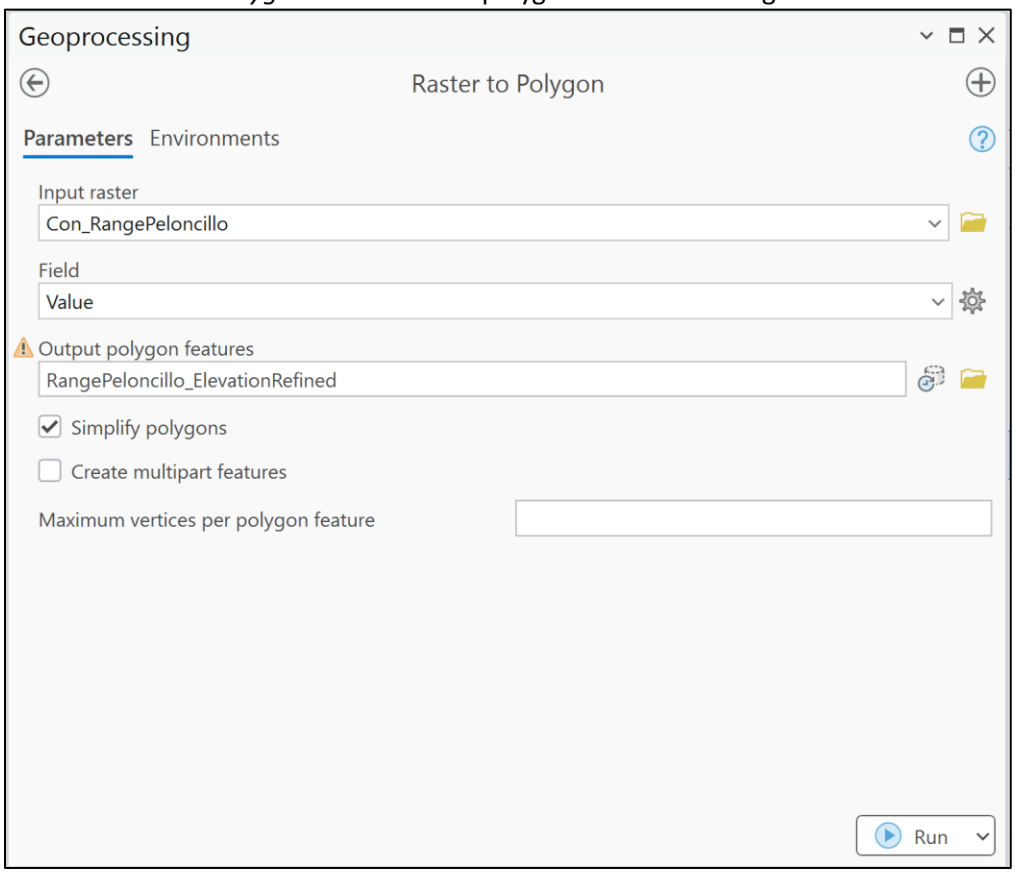

Figure 9. Example of the setup of the *Raster to Polygon* tool.

2.2. Creating a polygon for the population in the San Luis mountain range

Use the *Select by Layer* feature to select the San Luis mountain range from the New Mexico Mountain Range layer.

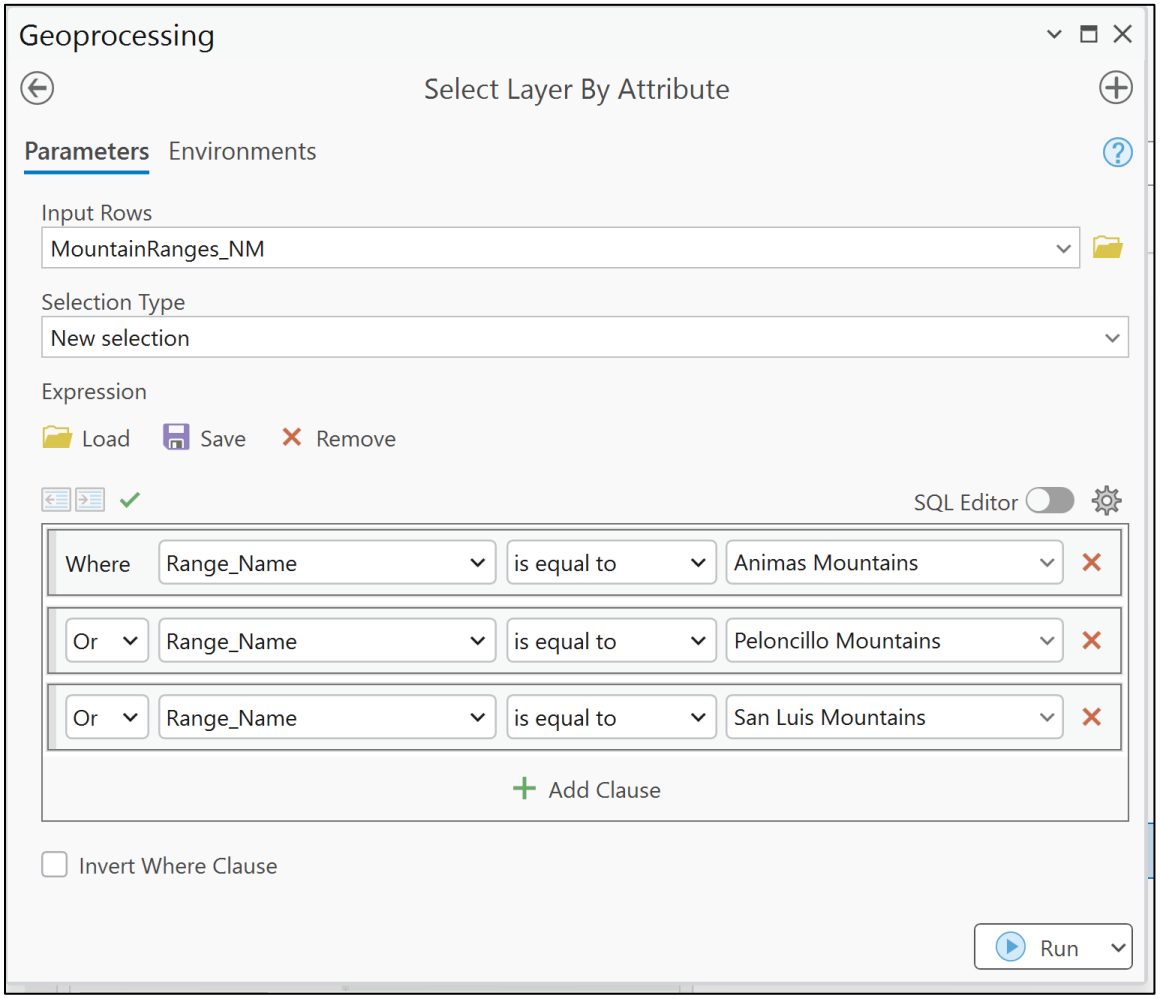

Figure 10. Set up of the *Select Layer by Attribute* tool used to select the mountain ranges within the species range.

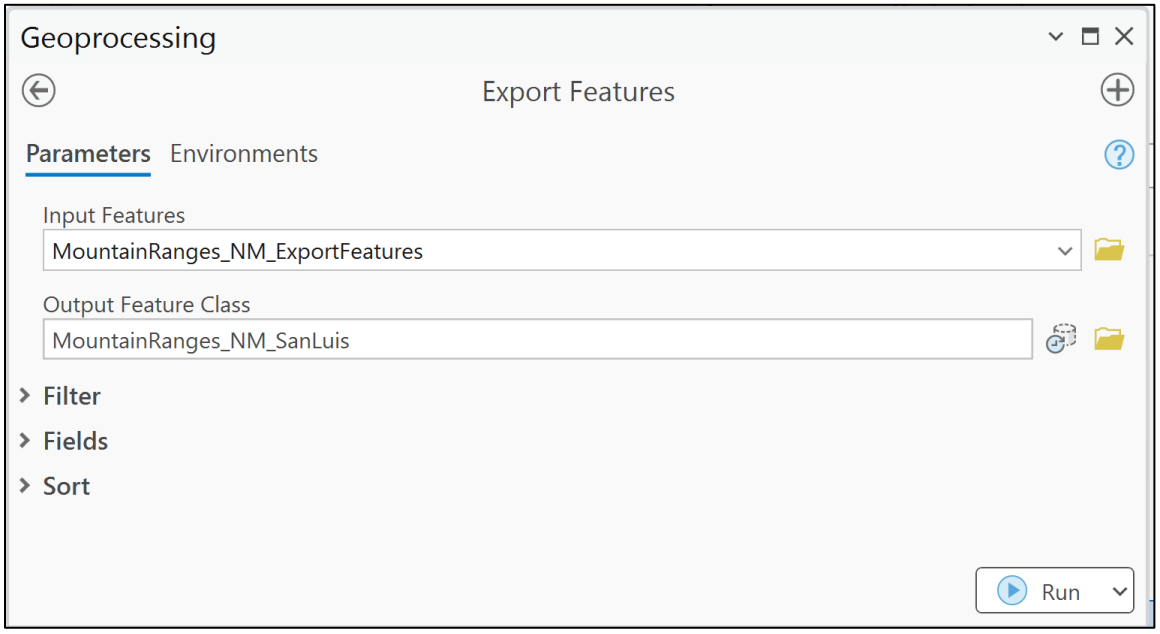

Figure 11. Set up of the *Export Features* tool used to create a layer of the San Luis mountain range.

Use the *Clip Raster* tool to clip the USGS 3DEP Elevation – 30m layer to the shape of the San Luis mountain range.

Figure 12. Setup of the *Clip Raster* tool used to clip the USGS 3DEP Elevation – 30m layer to the extent of the San Luis mountains.

Use the *Con* tool to select the portion of the clipped USGS 3DEP Elevation – 30m layer to the appropriate elevation.

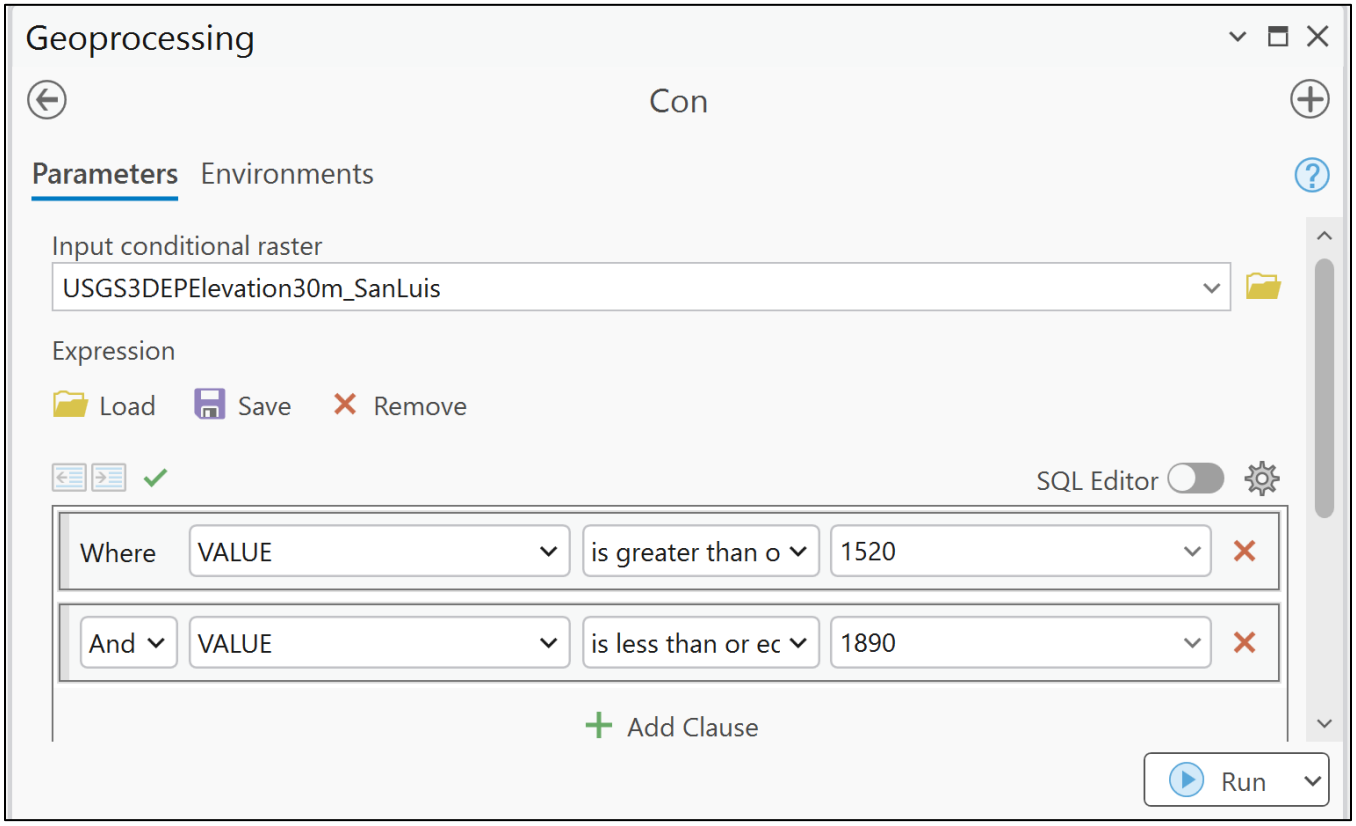

Figure 13. Set up of the *Con* tool used to select the appropriate elevations for this species in the San Luis mountains.

Use the *Raster to Polygon* tool to create a polygon from the resultant layer.

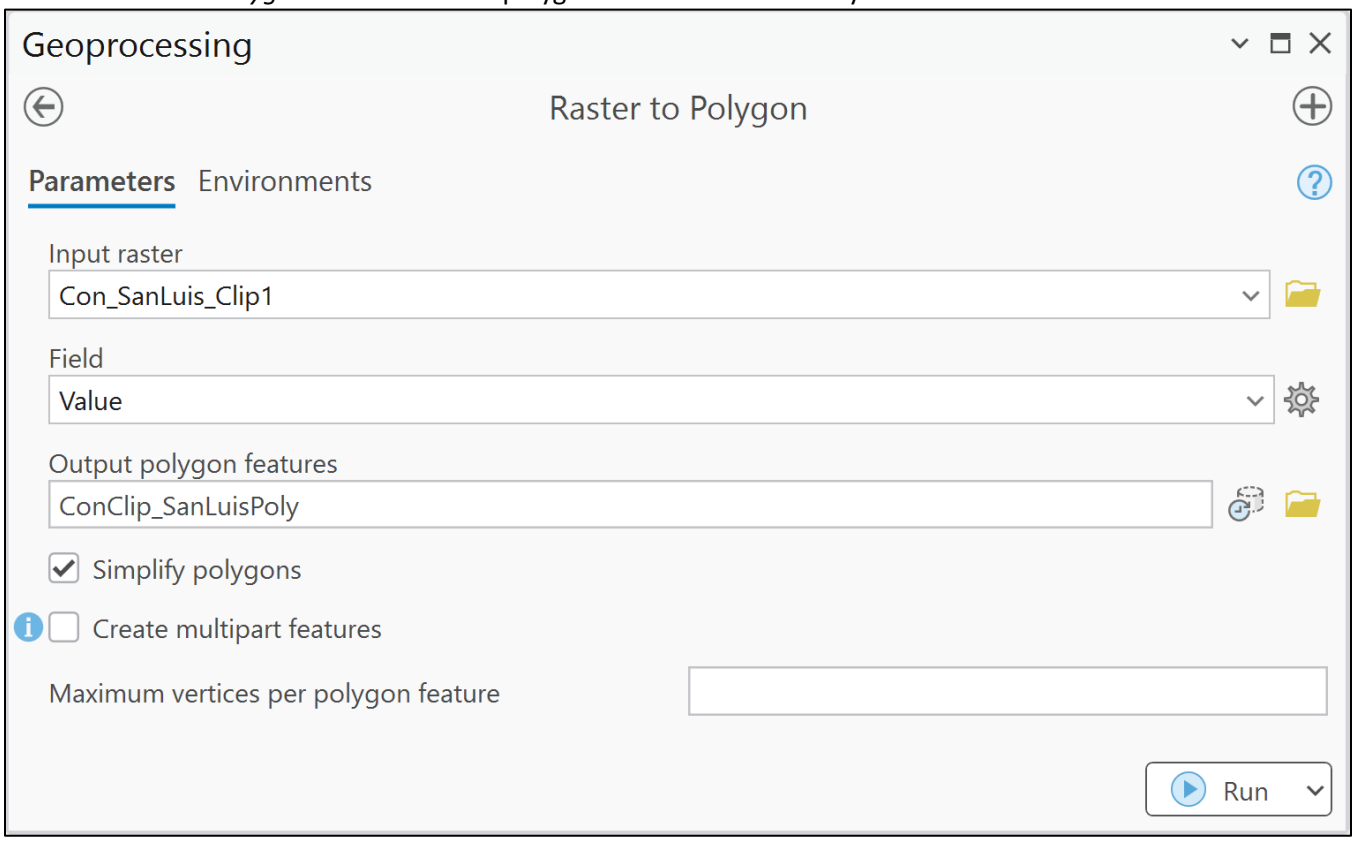

Figure 14. Set up of the *Raster to Polygon* tool used to create a polygon for the elevation refined San Luis mountain range.

2.3. Finalizing the interim core map

Use the *Merge* tool to combine the respective refined elevation ranges into one layer.

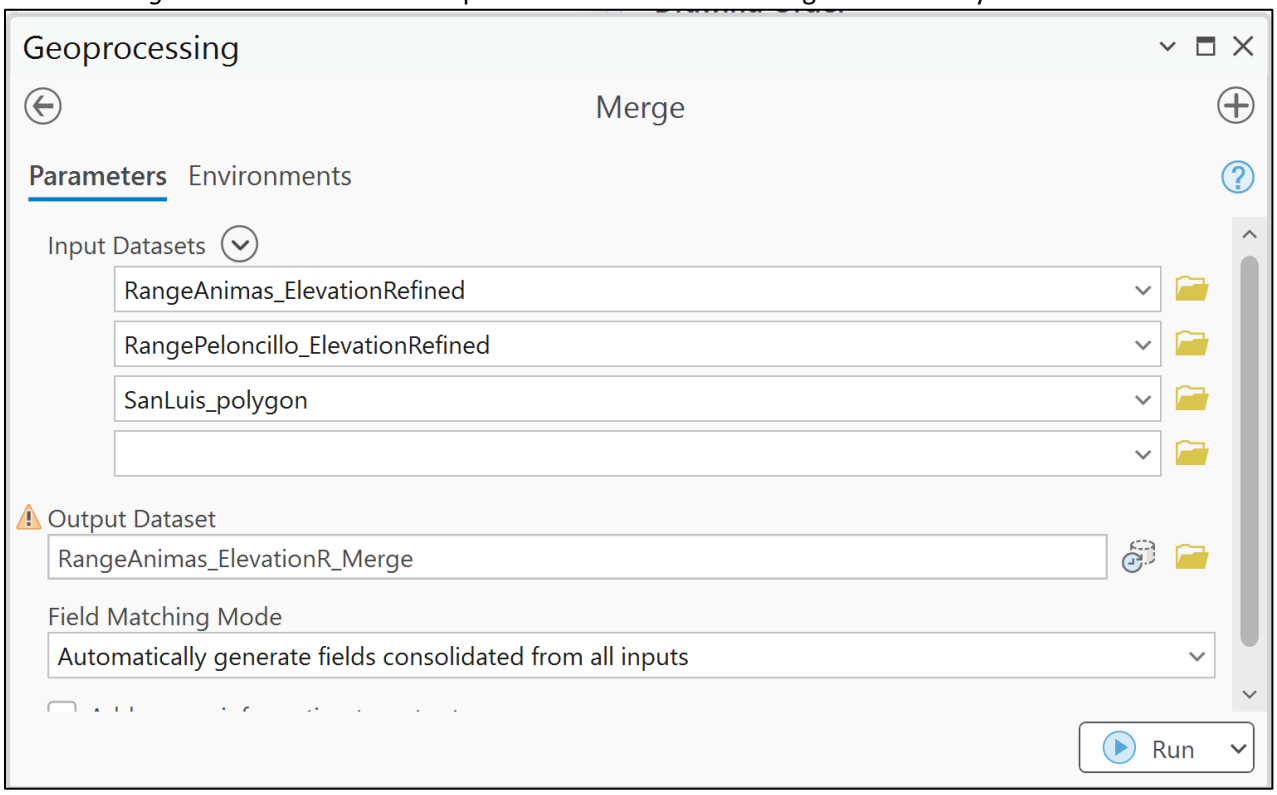

Figure 15. Set up of the *Merge* tool used to combine the three elevation refined mountain range layers.

Use the *Dissolve* tool to dissolve the interior boundaries.

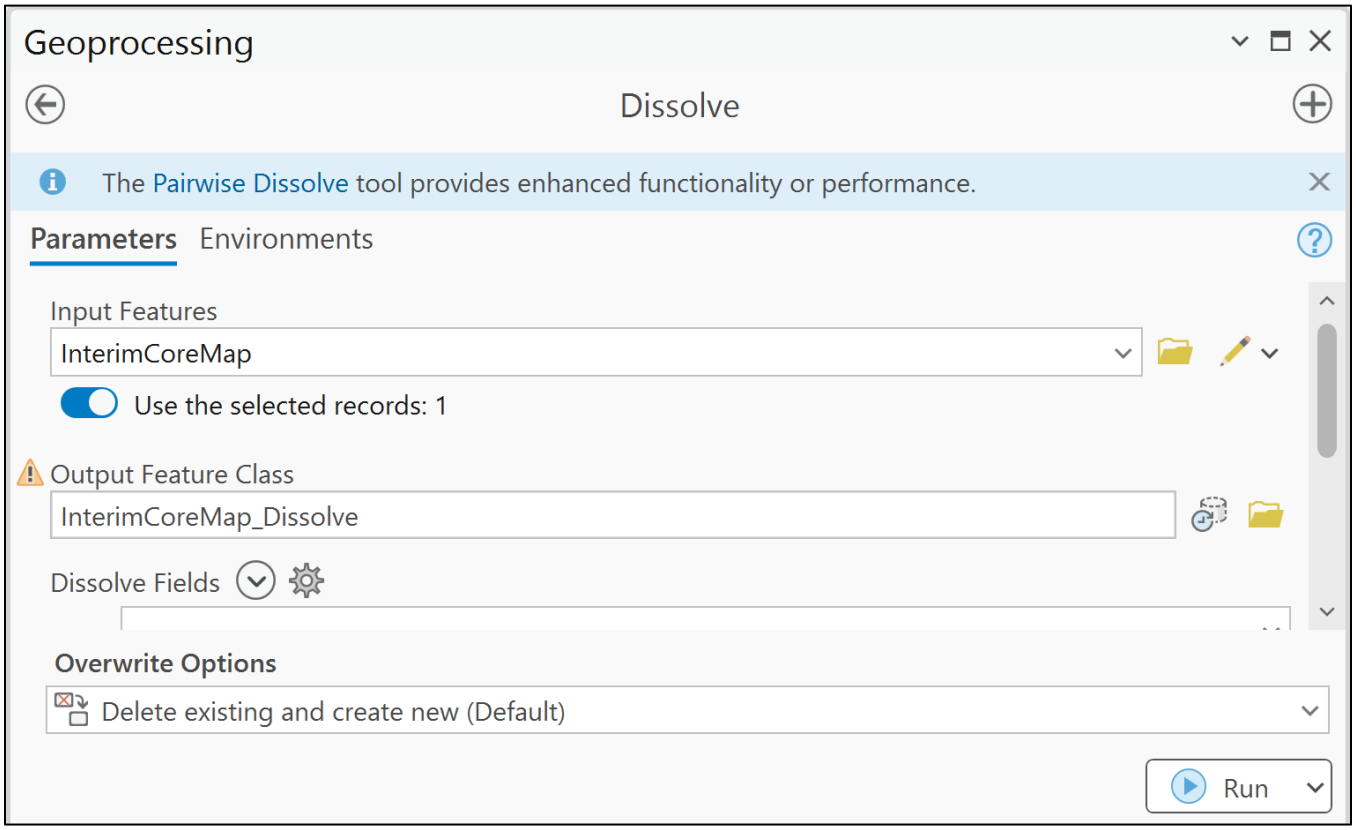

Figure 16. Set up of the *Dissolve* tool used to remove internal boundaries within the interim core map ("NewMexicoRidgenosedRattlesnake.gdb").

References

FWS, 2019a. *New Mexico Ridge-nosed Rattlesnake (Crotalus willardi obscurus) 5-Year Review: Summary and Evaluation*. September 19, 2019. New Mexico Ecological Services Field Office, U.S. Fish and Wildlife Service.

FWS, 2019b. *Supplemental Finding for New Mexico Ridgenose Rattlesnake Recovery Plan*. June 2019. Southwest Region 2, U.S. Fish and Wildlife Serivce.