# Interim Core Map Documentation for Roswell Springsnail

Posted on EPA's GeoPlatform June 2025 Interim Core map developed by Center for Biological Diversity<sup>1</sup> Documentation and analysis supplemented by EPA's Office of Pesticide Programs

### **Species Summary**

Roswell springsnail (*Pyrgulopsis roswellensis*; Entity ID #1246) is a threatened aquatic snail associated with grassland spring systems within southeastern New Mexico. The snail is a narrow endemic that survive only in isolated locations in Chaves County, New Mexico, on Bitter Lake National Wildlife Refuge (BLNWR, Refuge). This species does not thrive in pool-like environments and requires flowing water in all life stages. Herbicide use is documented within its habitat to remove invasive vegetation, and there are agricultural areas bordering the habitat. There is a designated critical habitat for this species. Additional information is provided in **Appendix 1**.

## **Description of Core Map**

EPA determined that the critical habitat core map type is most appropriate for this species. The core map for Roswell springsnail is based on critical habitat with no alterations.

The critical habitat is primarily contained within BLNWR (67.4 acres of land within BLNWR and 2.8 acres of land directly neighboring the Refuge). All of the populations with known statuses at the time of the 2019 FWS Recovery Plan fall within the critical habitat and are within or directly adjacent to BLNWR (see **Figure A1-4**). Because the species is fully aquatic, the critical habitat only covers the narrow streams/ water bodies within which the species is known to occur.

**Figure 1** depicts the interim core map for Roswell springsnail (green areas on map). The core map represents approximately 70 acres. The core map developed for Roswell springsnail is considered interim and depicts where the species is located and not necessarily the entire spatial area that may be included in a pesticide use limitation area (PULA) for the Roswell springsnail. This core map will be used as the basis for developing PULAs that include Roswell springsnail.

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" best professional

<sup>&</sup>lt;sup>1</sup> CBD sent EPA the core map for this species before EPA released its mapping process document and example documentation. EPA modified the core map as described in this document and supplemented the documentation and supporting analysis for consistency with EPA's most recent documentation examples made available after CBD developed this core map.

judgment classification because although it consists of the species' critical habitat with no changes, EPA modified the core map originally developed by CBD based on its own interpretation of the FWS documentation and literature cited by FWS. See **Discussion of Approaches and Data that were Considered but not Included in Core Map** for additional description and justification for these modifications. 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 Roswell springsnail (approximately 70 acres).

Table 1. Percentage of Interim Core Map Represented by 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	% of core map represented by example pesticide use
Forestry	Deciduous Forest (41)	0%	0%
	Evergreen Forest (42)	0%	
	Mixed Forest (43)	0%	
Agriculture	Pasture/Hay (81)	0.5%	-0.5%
	Cultivated Crops (82)	0%	

<sup>&</sup>lt;sup>2</sup> Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, <u>https://doi.org/10.5066/P9JZ7AO3.</u> N

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	Open space, developed (21)	0%	-0%
	Developed, Low intensity (22)	0%	
	Developed, Medium intensity (23)	0%	
	Developed, High intensity (24)	0%	
Invasive species control	Woody Wetlands (90)	1.5%	-70%
	Emergent Herbaceous Wetlands (95)	41%	
	Open water (11)	11%	
	Grassland/herbaceous (71)	0%	
	Scrub/shrub (52)	17%	
	Barren land (rock/sand/clay; 31)	0%	
Total Acres	Interim Core Map Acres	~ 70	

## **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 GBIF; and
- Occurrence locations in NatureServe.

EPA considered these four sets of data when developing the core map. FWS' 2019 Recovery Plan detailed known locations of this species. FWS described 9 documented occurrences that are either extant or extirpated. Currently, there are 5 extant populations, which have locations that are consistent with the critical habitat. There is a 6<sup>th</sup> population with unknown status that is also within the critical habitat. The remaining three occurrences are no longer extant. iNaturalist had one research grade observation. Given the resolution of the data, it was consistent with the location of the critical habitat and the Refuge. GBIF contained 10 documented occurrences that contained geospatial coordinates, which included one observation from iNaturalist, and nine samples collected by museums from named locations within the species' habitat also identified by FWS. The nine occurrences collected by museums in the GBIF dataset (both specimen records and material sample) have specific location names included in their description that are consistent with the FWS occurrence locations names ("Roswell Country Club," "Sado Springs," and "Bitter Lake") and were all collected prior to 2000. There were no occurrences in the NatureServe public database. **Appendix 1** includes more information on the available known location information.

# Approach Used to Create Core Map

After reviewing the core map developed by CBD and reviewing relevant FWS documentation, EPA used the critical habitat as the interim core map for Roswell springsnail and did not include known locations outside of the critical habitat. EPA reviewed available information for the Roswell springsnail from FWS as well as observational information available from various publicly available sources (discussed in previous section) and modified the core map submitted by CBD accordingly. The information compiled for the Roswell springsnail is included in **Appendix 1**. Influential information that impacted the development of the core map included:

- Current existing populations occur in locations consistent with the critical habitat;
- The species' critical habitat is highly refined.
- The known occurrences documented outside of the critical habitat have likely been extirpated.

EPA did not use the species range as the interim core map. The species range covers a large spatial area (likely the entire watershed surrounding the species habitat) and is not limited to the areas containing habitat of the species. The range is much larger than the areas where known locations occur.

For step 3, EPA used the designated critical habitat provided by FWS for Roswell springsnail. EPA downloaded the critical habitat from FWS's ECOS (https://ecos.fws.gov/ecp/).

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

Roswell springsnail formerly occurred in several locations outside BLNWR in the Roswell area ("Roswell Country Club," "Berrendo River," and "Landers Springbrook", see **Appendix 1**, for more information). When CBD developed this core map, they included the critical habitat, three historic known occurrences, a one-mile upstream area from two of the historic occurrences, and the geographic extent of BLNWR. CBD also included a 1000-foot buffer around each of these geographic units.

Upon review of the core map developed by CBD and the publicly available documentation from FWS, EPA used the critical habitat as the basis for this interim core map. EPA removed the three occurrences outside of the critical habitat<sup>3</sup> because FWS documentation indicate that these habitats have dried up and no longer contain the species (2005 Listing of Roswell springsnail as Endangered, 2011 Designation of Critical Habitat). All other occurrences described in the 2019 Recovery Plan are within the extent of the designated critical habitat. EPA adds buffers to core maps when creating PULAs to account for pesticide movement or biological needs of a species. Therefore, the interim core map for this species does not include buffers around the critical habitat. Any necessary buffers will be added when EPA develops PULAs.

<sup>&</sup>lt;sup>3</sup> The three occurrences were: "Roswell Country Club," "Berrendo River," and "Landers Springbrook" occurrences, and upstream areas.

Additionally, when designating the critical habitat in 2011, the Service noted that "because these formerly occupied sites have been so severely impacted in the past (particularly due to the decline of groundwater and subsequent loss of spring flows), it is not likely that they could be rehabilitated in the future or be restored to contain the physical and biological features necessary to support habitat for the [Roswell springsnail]." Therefore, while these historic occurrences are included in the species map in the 2019 Recovery Plan as "unknown" status (see **Figure A1-4**), species documentation by the Services (including the 2019 Recovery Plan) and Taylor (1987) suggests that these populations of Roswell springsnail have both been extirpated and are not likely to be rehabilitated. For these reasons, these areas were not included in the Roswell springsnail core map.

# Appendix 1. Information Compiled for Species During Step 1

### 1. Recent FWS Documents/Links

- Endangered and Threatened Wildlife and Plants: Draft Recovery Plan for Four Invertebrate Species of the Pecos River Valley – (04/02/2018)
- <u>5-Year Status Reviews of 36 Species in Arizona, New Mexico, Texas, Utah, and Mexico; Notice of initiation of reviews; request for information</u> (7/26/2019)
- Designation of Critical Habitat for Roswell Springsnail, Koster's Springsnail, Noel's Amphipod, and Pecos Assiminea; Final Rule – (06/07/2011)
- Listing Roswell springsnail, Koster's springsnail, Noel's amphipod, and Pecos assiminea as Endangered With Critical Habitat; Final Rule – (08/09/2005)

### 2. Background information

- Status: Federally listed as endangered in 2005
- Resiliency, redundancy, and representation (the 3Rs)
  - No species assessment for this species with specific information on the 3Rs.
  - exceedingly limited distribution, low mobility, and fragmented habitat
  - Having a small, localized range means that any perturbation, either natural (e.g., drought) or anthropogenic (e.g., water contamination) can eliminate many or all of the existing populations. Having a high number of individuals at a site provides no protection against extinction

### • Habitat, Life History, and Ecology

- Habitat: The snail is aquatic species constrained to karst water features including sinkholes and springs, and are reliant on suitable groundwater sources, in localized areas of New Mexico. The snail is a narrow endemic that survive only in isolated locations in Chaves County, New Mexico, on BLNWR (2019 Recovery Plan).
- Life History: Lifespans is 9 to 15 months and breed in the spring (2005 Listing of Roswell springsnail as Endangered).
- Ecology: feed on algae, bacteria, and decaying organic material or may incidentally ingest small invertebrates while grazing on algae and detritus (2005 Listing of Roswell springsnail as Endangered).
- Reproduction/pollinators: (2005 Listing of Roswell springsnail as Endangered)
  - Sexually dimorphic
  - Reproduce several times during the spring through fall breeding season
  - Females being characteristically larger and longer-lived than males
- Taxonomy
  - Invertebrate
  - FWS Category: gastropod/ snails of the family Hydrobiidae
- Essential Physical Biological Features (PBFs) for Designated Critical Habitat:
  - Have permanent, flowing water with no or no more than low levels of pollutants;
  - Have slow to moderate water velocities;
  - Have substrates ranging from deep organic silts to limestone cobble and gypsum;
  - Have stable water levels with natural diurnal (daily) and seasonal variations;

- Consist of fresh to moderately saline water;
- Vary in temperature between 10-20 °C (50-68 °F) with natural seasonal and diurnal variations slightly above and below that range; and
- Provide abundant food, consisting of: algae, bacteria, and decaying organic material; and submergent vegetation that contributes the necessary nutrients, detritus, and bacteria on which these species forage (2011 Designation of Critical Habitat).
- Relevant Pesticide Use Sites in FWS Documents
  - There is documented use of herbicide to control several different invasive terrestrial plants on the Refuge (2019 Recovery Plan).
  - There is documented agriculture in the area surrounding the refuge (2019 Recovery Plan).
- Relevant Recovery Criteria and Actions (Source: 2019 Recovery Plan)
  - FWS chose persistence as stable to increasing abundance within management units over 10- and 20-year time frames as surrogates for measures of the resiliency. Persistence over a 10-year period demonstrates that the species is resilient enough to withstand typical drought conditions, and persistence over a 20-year period demonstrates that the species is resilient enough to withstand major drought conditions.
  - Downlisting criteria include: Maintain presence of species in the occupied management units with stable or increasing density for 10 years, develop and implement water management plan that ensures adequate surface and groundwater levels for 10 years, implement long-term commitments that with ensure water quality protections for 10 years, and implement habitat management plan that ensures environment remains suitable for 10 years.
  - De-listing criteria include: Maintaining the downlisting criteria for 20 years

### 3. Description of the species range

- Figure A1-1 depicts the current FWS species range (last updated 12-28-2023).
- The species range is approximately 101,091 acres.



Figure A1-1. FWS Range of Roswell springsnail (approximately 101,000 acres).

#### 4. Critical Habitat (2011 Designation of Critical Habitat)

- Roswell springsnail has designated critical habitat in New Mexico that is primarily within BLNWR.
- The critical habitat contains 67.4 acres of land within BLNWR and 2.8 acres of land directly outside the Refuge.
- Figure A1-2 depicts the current critical habitat.
- Figure A1-3. FWS critical habitat of Roswell springsnail with range included for context.



Figure A1-2. FWS critical habitat of Roswell springsnail.



Figure A1-3. FWS critical habitat of Roswell springsnail with range included for context.

#### 5. Known Locations

#### • Known Locations Described in FWS Recovery Documents

- At the time of the 2019 FWS Recovery Plan for the Roswell springsnail, there were five known occurrences with known status and four occurrences with unknown status.
- One of the four occurrences with unknown status (named "Unit 3 Spring Ditch") is within the Roswell springsnails designated critical habitat and the BLNWR (see Figure A1-4).
- Three of the four occurrences with unknown status are outside the critical habitat and were identified when the species was first described by Taylor in 1987 (named "Roswell Country Club," "Berrendo River," and "Landers Springbrook"). <sup>4</sup> These three occurrences were excluded from the core map and are discussed in detail in the Discussion of Approaches and Data that were Considered but not Included in Core Map.
  - In 1987 Taylor noted that "the future of the population is doubtful" at the Roswell Country Club and that the species "could not be traced, but it is doubtful that the habitat and population survive" at the Landers Springbrook location.<sup>Error!</sup> Reference source not found.

<sup>&</sup>lt;sup>4</sup> Taylor, D.W. 1987. Fresh-water mollusks from New Mexico and vicinity. New Mexico Bureau of Mines and Mineral Resources Bulletin 116.

- Based on the 2019 Recovery Plan, the Roswell springsnail was last found at the Roswell Country Club in 1995 and was not identified in the 2004 survey.
- None of these three occurrences were included in the 2011 designated critical habitat, which "include(d) all populations necessary for conserving the species and maintaining all of the known remaining genetic diversity within each species."
- Additional, when the Roswell spring snail was listed, FWS noted that "Roswell springsnail formerly occurred in several other springs in the Roswell area, but these habitats have dried up apparently due to groundwater pumping and no longer contain the species." (2005 Listing of Roswell springsnail as Endangered).
- Therefore, these occurrences are likely extirpated.
- Figure A1-4 depicts the known occurrences identified FWS' 2019 Recovery Plan.
- **Figure A1-5** depicts the BLNWR boundaries, water bodies, and estimated location of endangered invertebrate species from FWS's 2019 Recovery Plan.
- When considering the locations of the current extant populations (Figure A1-4), they are consistent with the location of the Critical habitat (Figure A1-2).



Figure 4. Roswell springsnail current and historical locations.

Figure A1-4. Known occurrences of Roswell springsnail. Reproduced from FWS Recovery Plan (2019).



Figure 11. Bitter Lake National Wildlife Refuge Rio Hondo area (Management Unit 5).

Figure A1-5. BLNWR area and habitat of Roswell springsnail. Reproduced from FWS Recovery Plan (2019).

#### • Occurrences Included in Public Databases

EPA queried iNaturalist, GBIF, and NatureServe. Collectively, the occurrence data are consistent with the critical habitat used to identify the core map.

iNaturalist (available <u>here</u>) had 1 research grade observation for this species. However, the positional accuracy of the point does not allow EPA to determine if this occurrence were in or out of the critical habitat. There is also some discussion whether the identified species is a Roswell springsnail or a Koster's springsnail.

There were no occurrences in NatureServe (linked here).

There were 10 occurrences documented in GBIF contained 10 documented occurrences that contained geospatial coordinates. The only one of these occurrences that was documented after 2000 was the research grade observation from iNaturalist. The remaining nine observations consisted of material sample collected between 1971 and 1999 by museums from locations specifically named by FWS. All nine of these samples were collected from documented FWS known occurrence locations and have the specific occurrence location names included in their description ("Roswell Country Club," "Sado Springs," and "Bitter Lake"). Therefore, all the GBIF occurrence information is consistent with the FWS known occurrence information and the established core map.