

Interim Core Map Documentation for Wyoming Toad

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Developed by US Environmental Protection Agency, Office of Pesticide Programs

Species Summary

The Wyoming toad (*Anaxyrus baxteri*; Entity ID #202) is an endangered amphibian. The U.S. Fish and Wildlife Service (FWS) has not designated a critical habitat for the Wyoming toad. This species occurs in floodplain ponds and small seepage lakes associated with the Laramie River. This species may also use terrestrial areas near water. Additional information is provided in **Appendix 1**. This species is currently included in the Vulnerable Species Action Plan.

Description of Core Map

The core map for the Wyoming toad is based on its range (last updated 06/01/2021). **Figure 1** depicts the core map for the Wyoming toad. The core map covers an area that is approximately 192,000 acres. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly shrub, grassland/herbaceous, pasture/hay, and herbaceous wetland. All of these areas represent potential habitat of the species. In addition, this range is consistent with the known locations of the species, which includes the Laramie Plains, specifically at the Mortenson Lake National Wildlife Refuge (Mortenson Lake), the Wyoming Toad Conservation Area National Wildlife Refuge, and release sites not found on the refuge created under a Safe Harbor Agreement.¹ During the malathion consultation with FWS (concluded in 2022²), FWS identified the range as the PULA for this species.

The core map developed for Wyoming Toad is considered interim. This core map will be used to develop a pesticide use limitation area (PULA) for the Wyoming Toad. 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 for purposes outside of the 2022 malathion consultation. This Interim Core map may be revised in the future to incorporate expert feedback from FWS. This interim core map has a “none” best professional judgment classification because it consists of the species’ range without additions or subtractions. There is confidence in the core map because it contains all of the species’ known occurrences and suitable habitat for proposed reintroductions. Also, this core map is consistent with a PULA FWS has used previously. This core map is intended to be used for PULAs and does not replace or revise the range developed by FWS for Wyoming Toad.

¹ https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/16413.pdf

² <https://www.epa.gov/system/files/other-files/2022-03/finalmalathionbiop.zip>

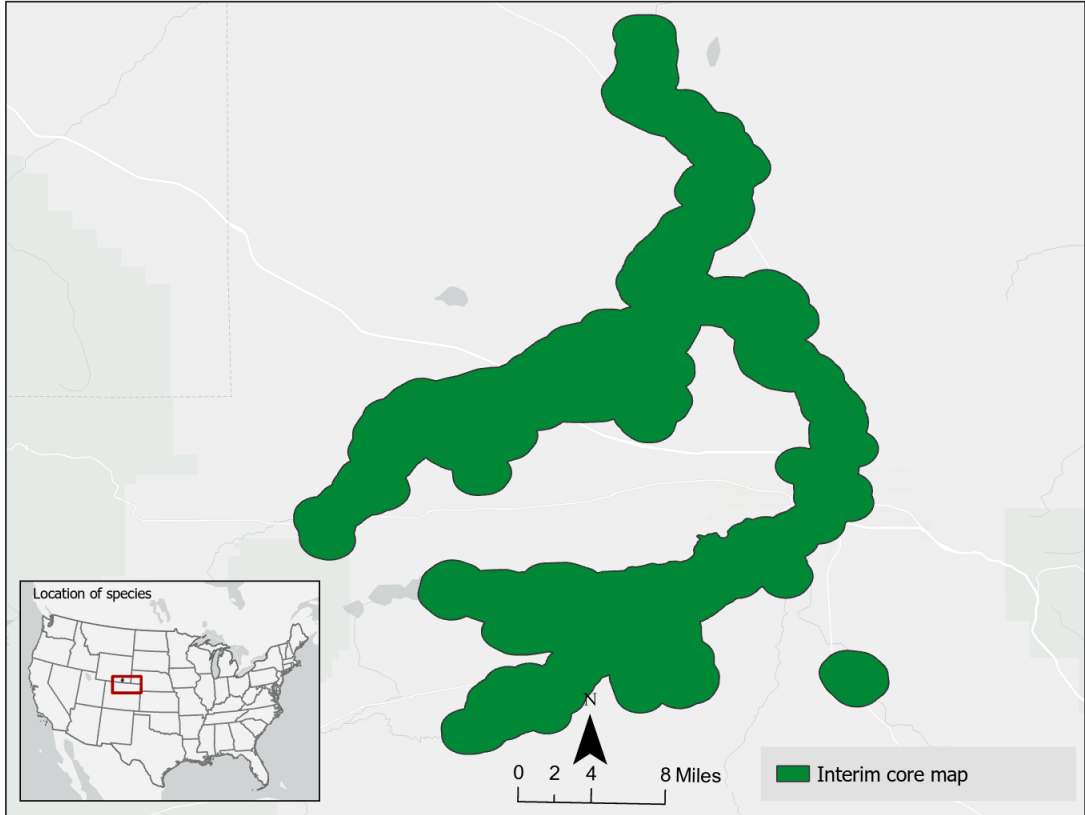


Figure 1. Interim core map for Wyoming toad.

Table 1. Percentage of Interim Core Map Represented by NLCD³ 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)	12	12
	Cultivated Crops (82)	0	
Mosquito adulticide, residential	Open space, developed (21)	1	3
	Developed, Low intensity (22)	1	
	Developed, Medium intensity (23)	1	
	Developed, High intensity (24)	0	
Invasive species control	Woody Wetlands (90)	1	85
	Emergent Herbaceous Wetlands (95)	21	
	Open water (11)	2	
	Grassland/herbaceous (71)	20	
	Scrub/shrub (52)	41	
	Barren land (rock/sand/clay; 31)	0	
Total Acres	Interim Core Map Acres	~ 192,000	

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 GBIF.

EPA evaluated occurrence data from these sources before selecting the core map type and developing the core map. Occurrences from iNaturalist, GBIF, and NatureServe were either in or near the species range. Resolution of the occurrence data was such that occurrences outside of the Wyoming Toad’s range were still consistent with its range (occurrences were not clearly inside or outside of the range given the resolution of the data). The Wyoming Toad’s 2024 Five Year Review (referenced in Appendix 1) details the known locations and extant populations of this species, which also supports using the species range to form the basis of this core map. **Appendix 1** includes more information on the available known location information.

³ Dewitz, J., 2023, National Land Cover Database (NLCD) 2021 Products: U.S. Geological Survey data release, <https://doi.org/10.5066/P9JZ7AO3>

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 Habitats⁴ (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; and
4. Document the core map (represented by this document).

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

- This species’ current distribution is limited to the following sites within its range: the Laramie Plains, specifically at the Mortenson Lake National Wildlife Refuge (Mortenson Lake), the Wyoming Toad Conservation Area National Wildlife Refuge, and release sites created under a Safe Harbor Agreement;
- Future reintroductions of the Wyoming toad are planned in areas beyond the current distribution within its range;
- Known location data from iNaturalist, NatureServe, and GBIF were consistent with the range and did not support reducing or expanding the core map.

For step 2, EPA used the compiled information to identify the core map type, including the species range and known location information. Areas with extant members of the species identified by FWS (Mortenson Lake National Wildlife Refuge and the Wyoming Toad Conservation Area National Wildlife Refuge) are contained within the current species range. FWS documents reported that future reintroductions are planned within the range. To capture current populations and planned re-introduced populations, EPA selected the range core map type which will consist of the ECOS range for the Wyoming Toad.

To generate the core map (Step 3), EPA used the ECOS range for the Wyoming Toad without any additions or subtractions.

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

EPA explored an option to refine the core map by removing developed areas and cultivated lands from the species range. Hay and pasture were excepted from this potential removal because those areas represent potential habitat for the Wyoming Toad. However, this refinement only decreased the total

⁴ Dated 2024, available online at: <https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas>

area of the core map by 3% and would have introduced additional uncertainty. Therefore, EPA decided that the refinement was not substantive enough to justify removing the developed areas.

Appendix 1. Information compiled for the Wyoming Toad During Step 1

1. Recent FWS documents

- 5-Year Review (2024): https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/16413.pdf
- 5-Year Review (2019): https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/2762.pdf
- 5-Year Review (2012): https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1948.pdf
- Recovery Plan (2015): https://ecos.fws.gov/docs/recovery_plan/First%20Revised%20Recovery%20Plan%20for%20Wyoming%20Toad_07.16.2015.pdf
- Safe Harbor Agreement (2004): https://ecos.fws.gov/docs/plan_documents/tsha/tsha_645.pdf

2. Background information

- **Status:** Federally listed as **endangered** in **1984**
- **Resiliency, redundancy, and representation (the 3Rs)**
 - Resiliency/Redundancy/Representation: There was no Species Status Assessment (SSA) but **assumed to be low** based on information below in the 5-year review (2019).
 - “The Wyoming toad is considered one of the four most endangered amphibian species in North America (IUCN 2011). The last ten toads believed to exist in the wild were taken into captivity in 1989 for breeding.”
 - “...releases of captive bred tadpoles and toadlets have resulted in tenuous wild populations and very little wild breeding to date. Recovery of this species will require both sustained, long-term conservation actions and repeated experimentation to determine the optimal means to reestablish wild populations.”
- **Habitat** (5-Year Review, 2024): Floodplain ponds and small seepage lakes associated with the Laramie River.
- **Diet** (5-Year Review, 2012)

Adults: “Little information is available about the diet and nutritional needs of the Wyoming toad, which hinders development of an optimal captive diet and complicates identification of potential reintroduction sites. Thirteen scat samples from Wyoming toads were collected at Mortenson Lake during 1998 and 1999. The most common insects Wyoming toads eat are **ants**. Two species were identified: *Myrmica incompleta* and *Formica fusca*. Two types of **beetles** in the Carabidae family were identified: *Elaphrus sp.* and *Anara sp.* Dungbeetles (*Canthos sp.*) were also identified. *Myrmica incompleta* was the dominant food source found in the samples submitted. Although this information is valuable, more samples should be collected, as these may not be indicative of the food source of the population as a whole.”

Tadpoles: “Tadpoles of the Wyoming toad have mouthparts suited for scraping surfaces, and have been observed feeding on unidentified algae in Mortenson Lake. Nutritional value of these algae has not been determined. Initially, captive Wyoming toad tadpoles were fed algae, dried Daphnia and shrimp (*Hyalella axteca*, *Gammarus sp.*, and *Artemia salina* because these were found in abundance at Mortenson Lake. However, most captive breeding facilities do not have access to food items available at Mortenson Lake. Therefore, captive breeding facilities are now feeding tadpoles a varied diet, including; tropical fish flakes, frozen kale, frozen romaine lettuce, algae cultured in tanks, spirulina, fish flakes, and tetra min tablets.”

- **Taxonomy:** Amphibian (aquatic and terrestrial life stages)

- **Relevant Pesticide Use Sites**

5-Year Review (2012): “The 1984 listing and 1991 Plan states that pesticides/herbicides use in the area continue to threaten the Wyoming toad. However, the widespread aerial spraying of Fenthion (Baytex) for mosquito control in Albany County, which coincided with population declines of Wyoming toads is no longer used in the Laramie Basin. Albany County is now using Bti (*Bacillus thuringiensis ssp. israelensis*), a bacteria which infects and kills mosquito larvae, but does not harm any other plant or animal life. However, Malathion and Atrazine are still used in the basin. In Mortenson Lake during 2004, Atrazine was not detected, but the metabolites desisopropyl and desethyldeisopropyl were detected. A follow-up study in 2008/2009 indicated no Atrazine or metabolites were detected in extracts at Mortenson Lake or the reference site. No Atrazine or metabolites were detected in chorus frog or Wyoming toad tadpolets at Mortenson Lake or in reference animals. The Safe Harbor Agreement (SHA) introduction site has not been tested for Atrazine.”

- **Relevant Recovery Criteria and Actions (5-Year Review, 2024)**
 - **Objectives:** “reduce threats to the Wyoming toad, allowing for the establishment of self-sustaining wild populations. For this to occur, captive populations with maximized genetic variability will need to be maintained at a sufficient level, suitable habitat will need to be restored and/or identified, and disease will need to be suppressed to a level to which it is not a threat to the viability of the wild populations.”
 - **Recovery Criteria:** Reclassification to Threatened Criteria:

(1) “Three self-sustaining and viable populations of the Wyoming toad (as evidenced by a Population Viability Analysis (PVA)) are established within or nearby the toad’s historic range and remain viable for a minimum of seven consecutive years. Benchmark criteria for viability, including time horizon, quasi-extinction threshold, and exact probability of persistence, will be developed by the WTRT using the abundance-based PVA approach (Dennis et al. 1991, Morris and Doak 2002) when the data are available (e.g. reproduction and overwinter survival are occurring).”

(2) “The captive assurance population is targeted to a minimum of 500 toads (excluding tadpoles and toadlets) for seven consecutive years during establishment of self-sustaining wild populations. This targeted minimum may fluctuate (by approximately 50 individuals) along with natural fluctuations within a given year or during a naturally unsuccessful year.”

(3) “A peer-reviewed, long-term adaptive management plan is in place to guide conservation efforts of captive and wild populations for 25 years after downlisting. This management plan will provide a framework to maximize the health of and minimize genetic loss in the captive population and maintain the viability of wild populations. It will address the threats identified in the factors section of this plan (Section 2) and any potential threats that may arise that have not been identified to allow for continued recovery of this species.”

○ **Delisting Criteria:**

(1) “Two additional self-sustaining populations of the Wyoming toad are established within and nearby the toad’s historic range (for a total of five populations) and are viable as evidenced by a current PVA. Benchmark criteria for viability are the same for delisting as for downlisting and include time horizon, quasi-extinction threshold, and exact probability of persistence (Dennis et al. 1991, Morris and Doak 2002).”

(2) “The long-term adaptive management plan created for downlisting will be updated and peer-reviewed to guide conservation efforts for 25 years after delisting. This comprehensive plan will include detailed monitoring protocols to ensure the continued viability of the five populations established to warrant delisting of the species. It will also address the threats identified in the factors section of this plan (Section 2) and any potential threats that may arise that have not been identified to allow for continued persistence of this species.”

○ **Recovery Actions** (5-Year Review, 2024)

Captive Population Management and Research

Wild Population Management, Monitoring, and Research

Identify New Release Sites

Planning and Adaptive Management, and

Outreach and Cooperation

3. Description of Species Range

- The current range is pictured in **Figure A1-1**. The range is approximately 192,000 acres and includes areas of the Mortenson Lake National Wildlife Refuge (Mortenson Lake), the Wyoming Toad Conservation Area National Wildlife Refuge and several release sites.

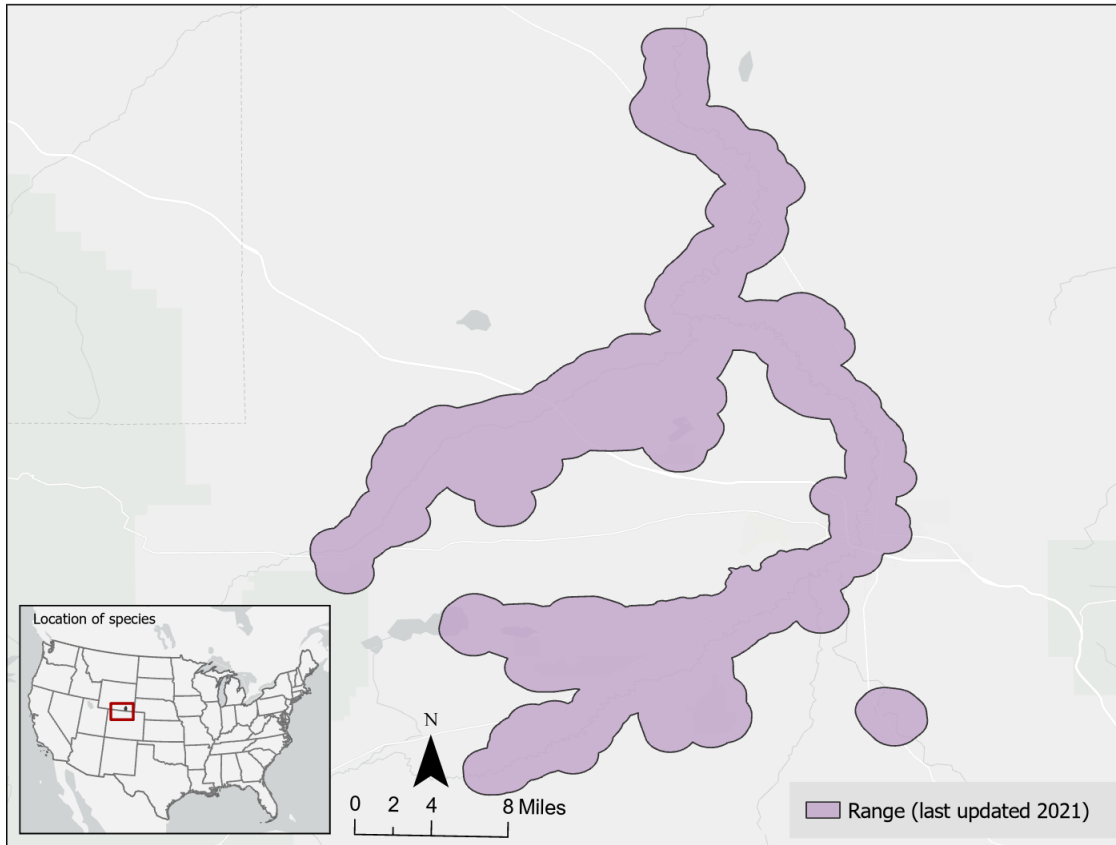


Figure A1-1. Current Range of the Wyoming Toad (ECOS; last updated 06/01/2021)

4. Critical Habitat:

- No critical habitat has been designated for this species.

5. Known Locations:

- 5-Year Review, 2024: "Current distribution is limited to the Laramie Plains, specifically at the Mortenson Lake National Wildlife Refuge (Mortenson Lake), the Wyoming Toad Conservation Area National Wildlife Refuge, and several release sites created under a Safe Harbor Agreement."
- **Public Databases**
EPA queried iNaturalist, GBIF, and NatureServe. iNaturalist included [26 research grade observations](#) (linked [here](#)). GBIF included 39 georeferenced observations (linked [here](#)). Occurrences in NatureServe were also consistent with other occurrence data (linked [here](#)). Collectively, the occurrence data are consistent with the species range.