Interim Core Map Documentation for Spring Creek Bladderpod

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Developed by US Environmental Protection Agency, Office of Pesticide Programs

Species Summary

The Spring Creek bladderpod (*Lesquerella perforate or Paysonia perforata*, Entity ID 568) is an endangered terrestrial plant (dicot). The U.S. Fish and Wildlife Service (FWS) has not designated a critical habitat for the Spring Creek bladderpod. This species is typically found growing on flood plains, with full sun, in well drained soils and occasionally in limestone outcrops. Spring Creek bladderpod appears to need some sort of regular disturbance for survival and is known to occur on agriculture fields. Pollination for this species is unknown. Currently, Spring Creek bladderpod is found in only three floodplains in Tennessee (Spring Creek, Barton's Creek, and Cedar Creek). Additional information on the species 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 Spring Creek bladderpod is based on biological information. The outer extent of this core map is defined by 3 watersheds that FWS identified as occupied (Spring Creek, Barton's Creek, and Cedar Creek). During a consultation concluded in 2023¹, FWS provided EPA with a PULA for this species that is based on the 12-digit Hydrologic Unit Code (HUC 12s) for these three watersheds. EPA further refined this area to create the core map by removing forested areas within the 3 watersheds that contain 25% or more canopy cover because this species requires areas with full sun.

Figure 1 depicts the resulting interim core map for Spring Creek bladderpod. The size of this core map is approximately 65,700 acres. Landcover categories within the core map area are included in **Table 1**. Landcover is predominantly pasture/hay, forest, and developed areas. Since this species occurs in disturbed areas, many of these areas potentially represent habitat.

The core map developed for the Spring Creek bladderpod is considered interim. This core map will be used to develop pesticide use limitation areas (PULAs) that include the Spring Creek bladderpod. 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" 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.

¹ https://www.regulations.gov/document/EPA-HQ-OPP-2021-0957-0047



Figure 1. Interim core map for Spring Creek bladderpod.

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)	2	5
	Evergreen Forest (42)	1	
	Mixed Forest (43)	2	
Agriculture	Pasture/Hay (81)	67	- 69
	Cultivated Crops (82)	2	
Mosquito adulticide, residential	Open space, developed (21)	8	- 25
	Developed, Low intensity (22)	9	
	Developed, Medium intensity (23)	6	
	Developed, High intensity (24)	2	
Invasive species control	Woody Wetlands (90)	0	1
	Emergent Herbaceous Wetlands (95)	0	
	Open water (11)	1	
	Grassland/herbaceous (71)	0	
	Scrub/shrub (52)	0	
	Barren land (rock/sand/clay; 31)	0	
Total Acres	Interim Core Map Acres	~ 65, 700	

 Table 1. Percentage of Interim Core Map Represented by NLCD² Land Covers and Associated Example

 Pesticide Use Sites/Types.

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 these four sets of data before selecting the type of and developing the core map. FWS appeared to have the finest resolution of the location information, providing a map that depicted the current known locations all within the Spring Creek, Barton's Creek, and Cedar Creek watersheds (**Figure A1-2 in Appendix 1**). Occurrences in iNaturalist, GBIF, and NatureServe did not support expanding the core map outside of these three watersheds. **Appendix 1** includes more information on the available known location information.

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

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"³ (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; and
- 4. Document the core map.

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

- Occurrences and known locations of the Spring Creek bladderpod are in three floodplains in Tennessee (Spring Creek, Barton's Creek, and Cedar Creek);
- FWS provided a PULA for this species that represents the HUC12 watersheds of these three creeks for use in a pesticide-specific consultation; and
- This species requires full sunlight.

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 in watersheds identified by FWS (Spring Creek, Barton's Creek, and Cedar Creek) within the species' range. Therefore, EPA based the core map on the HUC12 watersheds from the known locations identified by FWS. EPA further refined this area by removing areas with 25% or more canopy cover because this species requires full sunlight. 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 HUC12 watersheds for Spring Creek bladderpod's known occupied waterbodies identified by FWS (Barton's Creek, Spring Creek, and Cedar Creek watersheds). EPA used the 2021 NLCD Tree Canopy Cover data to remove forested areas that do not provide full sunlight (*i.e.*, 25% or more canopy cover) as required by the species. **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 explored using GIS datasets that describe the species' habitat to further refine the core map (in addition to removing areas with >25% canopy cover). However, this approach was not used because the Spring Creek bladderpod is a habitat generalist and the removal of unsuitable habitat did not

³ Dated 2024, available online at: <u>https://www.epa.gov/endangered-species/process-epa-uses-develop-core-maps-pesticide-use-limitation-areas</u>

meaningfully decrease the acreage of the core map and would have increased uncertainty in the results.

Appendix 1. Information Compiled for the Spring Creek Bladderpod During Step 1

1. Recent FWS documents/links and other data sources

- Five Year Review (2024) (<u>https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/13773.pdf</u>)
- Five Year Review (2011) (<u>https://ecosphere-documents-production-public.s3.amazonaws.com/sams/public_docs/species_nonpublish/1839.pdf</u>)
- Recovery Plan (2006) (<u>https://ecos.fws.gov/docs/recovery_plan/spring%20creek%20bladderpod%20rp.pdf</u>)
- Enlist biological opinion (2021) (<u>https://www.regulations.gov/document/EPA-HQ-OPP-2021-0957-0047</u>)
- Nature Serve (1996) (<u>https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.137674/Paysonia_perforata</u>)

2. Background information

- Status: Federally listed as <u>endangered</u> in <u>1996</u>
- Resiliency, redundancy, and representation (the 3Rs)

<u>Resiliency</u>: There are 23 extant element occurrences for this species and 5 are at risk of extirpation. Species' recovery priority number is 5 (high degree of threat, low recovery potential). "Consistently low abundance and/or large decreases in abundance could lower resiliency and may make populations more prone to extirpation. Further investigation would be needed to evaluate if low abundance or decreases are due to natural fluctuations or are due to habitat degradation or incompatible management...and/or if abundance could be improved with compatible management." (Five Year Review 2024)

<u>Redundancy</u>: Five of 23 element occurrences (EOs) are considered at risk of extirpation. "Although the species has not been observed recently at the [five at risk] EOs..., it is possible a seed bank still exists. Additional investigation would be needed to evaluate that both suitable habitat and/or the species persist at these EOs. If habitat and a seedbank persist, appropriate management would likely be needed to promote growth. If loss of these EOs is confirmed, this would confer lower redundancy of the species." (Five Year Review 2024)

<u>Representation</u>: Species relies on seed bank, which may remain dormant for extended periods of time (>5 years) under conditions are suitable. "...the species' limited range and small number of populations may exacerbate the species' vulnerability to other threats due to the limited geographic range, limited variation in environmental conditions among sites and, presumably, reducing adaptive variation among populations of the species." (Five Year Review 2024)

- Habitat
 - Herbaceous wetlands. Floodplains, full sun, well-drained soils, and occasionally limestone outcrops. Nature Serve (1996)
 - Full sunlight is required for optimum growth.
 - Occasional flooding, and other land disturbances, eliminate competing species. (Recovery Plan 2006)
 - Occurs in agricultural fields (Enlist Biological Opinion)
- Pollinator/reproduction
 - flowering occurs in March and April
 - not capable of self fertilization
 - Pollinator is not identified or described in FWS documentation

• Taxonomy

- o Terrestrial Plant
- FWS Category: Flowering dicot plants with biotic pollination vectors with other reproductive mechanisms unknown (group 11)
- Relevant Pesticide Use Sites
 - Cultivation of corn and soybean in Wilson County, TN.
 - No information specific to pesticides. However, agriculture is a mechanism for maintaining the species' habitat. (Recovery Plan, 2006)

• Recovery Criteria/Objectives (2006 recovery plan)

- 15 protected occurrences: five each in the Spring Creek, Barton's Creek, and Cedar Creek floodplains.
- Each must be protected by a permanent conservation easement with a management agreement.
- Each must be consistent of an average of 500 plants over a five year period and no less than 100 plants in a given year.

• Recovery Actions (from 2006 recovery plan)

- Protect and manage existing occurrences and habitats.
- Develop and implement management strategies for species.
- Develop communication with local officials to coordinate county planning.
- Utilize existing environmental laws to protect species and floodplain habitat.
- Conduct monitoring at all sites.
- Conduct seed ecology studies.
- Search for new populations.
- Establish new occurrences within the historic range.
- Maintain seed source ex situ.
- Develop and implement public education plans.
- Annually assess the success of recovery efforts for the species.

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 373,000 acres.



Figure A1-1. FWS range for spring creek bladderpod. Total acreage of range is around 373,000 acres.

4. Critical Habitat

• FWS has not designated a critical habitat for this species (<u>https://ecos.fws.gov/ecp/species/2012</u>)

5. Known Locations

- Known Locations Described in FWS Recovery Documents
 - Currently found in only three floodplains in Tennessee (Spring Creek, Barton's Creek, and Cedar Creek) (Five Year Review 2024)
 - Figure A1-2 depicts the currently known locations from FWS.



Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USPWS, Esri, NASA, NGA, USGS, Esri, TomTom, Garmin, SafeGraph, METT/NASA, USGS, EPA, NPS, USDA, USPWS

Current and historical Spring Creek Bladderpod element occurrences across three occupied HUC 12 watersheds: Barton's Creek, Spring Creek, and Cedar Creek

Figure A1-2. Known location information from FWS. Map reproduced from most recent FWS 5-year review (2024).

• Occurrences Included in Public Databases

EPA queried iNaturalist, GBIF, and NatureServe. Occurrences in NatureServe were also consistent with other occurrence data (linked <u>here</u>). Collectively, the occurrence data are consistent with the three watersheds used to identify the core map.

iNaturalist (available <u>here</u>) had 18 research grade observations for this species, 10 of which appear to fall outside of the 3 watersheds (but within the species range); however, the positional accuracy of the points do not allow EPA to determine if these occurrences were in or out of the occupied watersheds.

GBIF (available here) included 41 occurrences and human observations (from 2004-2024). All but 2 of these observations are also included in iNaturalist or NatureServe. GBIF points largely coincide with the 3 occupied watersheds but those that fall outside of the core map can also be accounted for by the resolution of the location data.

Occurrences in NatureServe were consistent with other occurrence data (linked here).

Collectively, the occurrence data are consistent with the three occupied watersheds included in the core map.

Appendix 2. GIS Data Review and Method to Develop Core Map (Step 3)

This core map was created based on biological information, including occupied location and species habitat. EPA used the PULA provided by FWS during the Enlist consultation as the starting point (outer extent) for developing this core map. The initial PULA consists of three adjacent HUC12s containing Barton's Creek, Spring Creek, and Cedar Creek. These HUC12 sub-watersheds were further refined to remove areas with dense canopy cover.

1. Dataset References and Software

- NLCD Tree Canopy Cover 2021⁴
 - 30 m raster dataset that contains percent tree canopy estimates, as a continuous variable, for each pixel across all land covers and types for the conterminous US
- Software used: ArcGIS Pro 3.2
- FWS Species Range last updated on 1/27/2018

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 PULA provided by FWS during the Enlist consultation to set the outer extent of the core map. This PULA contains three adjacent HUC12s containing Barton's Creek, Spring Creek, and Cedar Creek, which contain the FWS known locations for the species. Note that there are two Spring Creek HUC12 watershed, the one included for the Spring Creek Bladderpod is HUC-12 051302010305.
- This species requires full sunlight; therefore, areas representing dense canopy is considered nonhabitat and was removed. Areas with dense canopy cover were removed using 2021 NLCD Tree Canopy Cover layer (TCC).
 - cover was defined as anything greater than 25% tree canopy estimates and was removed using a conditional raster to mask areas of the HUC12s.
 - Raster calculator and Conditional statement: i.e CON(TCC Raster >25, 0,1)
 - Raster to polygon
 - Create new layer from selection where attribute table VALUE = 1
 The resulting core map includes the HUC12 watershed areas that contain the FWS known locations for the Spring Creek Bladderpod with greater than 25% canopy cover. This area is

⁴ Housman, I.W.; Schleeweis, K.; Heyer, J.P.; Ruefenacht, B.; Bender, S.; Megown, K.; Goetz, W.; Bogle, S. 2023. National Land Cover Database Tree Canopy Cover Methods v2021.4. GTAC-10268-RPT1. Salt Lake City, UT: U.S. Department of Agriculture, Forest Service, Geospatial Technology and Applications Center. 26 p

also representative of other occurrence data sources including iNaturalist, GBIF and NatureServe.