Zapata Bladderpod

(Lesquerella thamnophila)

5-Year Status Review:

Summary and Evaluation

U.S. Fish and Wildlife Service

Texas Coastal and Central Plains Ecological Service Field Office

Corpus Christi, TX

August 2024

5-YEAR REVIEW

*Z*apata Bladderpod *(Lesquerella thamnophila)*

1.0 GENERAL INFORMATION

1.1 Listing History

Species: Species: *Lesquerella thamnophila* (Zapata bladderpod)
Date listed: November 22, 1999
FR citation(s): 64 FR 63745 Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the Plant *Lesquerella thamnophila* (Zapata Bladderpod)
Classification: Endangered

Critical habitat/4(d) rule/Experimental population designation/Similarity of appearance listing: 65 FR 81182, Endangered and Threatened Wildlife and Plants; Final Designation of Critical Habitat for the Plant *Lesquerella thamnophila* (Zapata Bladderpod), December 22, 2000

1.2 Methodology used to complete the review:

In accordance with section 4(c) (2) of the Endangered Species Act of 1973, as amended (Act), the purpose of a 5-year review is to assess each threatened species and endangered species to determine whether its status has changed, and it should be classified differently or removed from the Lists of Threatened and Endangered Wildlife and Plants.

The U.S. Fish and Wildlife Service (Service) most recently evaluated the biology and status of the Zapata bladderpod *(Lesquerella thamnophila)* as part of a status review conducted on August 28, 2015. We examined whether new information was available and whether that new information would alter or affect analyses and conclusions made in the previous status review. Data for this current review were solicited from interested parties through a Federal Register notice announcing the review on January 11, 2023 (88 FR 1602-1604). We also contacted Texas Parks and Wildlife Department (TPWD), U.S. Geological Survey, U.S. Fish & Wildlife Service Refuges, academia and other species experts to request any data or information we should consider in our review. Additionally, we conducted a literature search of peer-reviewed publications.

1.3 FR Notice citation announcing the species is under active review:

Name of plan or outline: Recovery Plan for *Lesquerella thamnophila* (Zapata bladderpod) Amendment 1
Date issued: August 28, 2019

Dates of previous revisions, if applicable: Zapata bladderpod (*Lesquerella thamnophila*) Recovery Plan. July 14, 2004

2.0 REVIEW ANALYSIS

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations (50 CFR part 424) set forth the procedures for determining whether a species meets the definition of "endangered species" or "threatened species." The Act defines an "endangered species" as a species that is "in danger of extinction throughout all or a significant portion of its range," and a "threatened species" as a species that is "likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The Act requires that we determine whether a species meets the definition of "endangered species" or "threatened species" due to any of the five factors described below.

Section 4(a) of the Act describes five factors that may lead to endangered or threatened status for a species. These include: A) the present or threatened destruction, modification, or curtailment of its habitat or range; B) overutilization for commercial, recreational, scientific, or educational purposes; C) disease or predation; D) the inadequacy of existing regulatory mechanisms; or E) other natural or manmade factors affecting its continued existence.

The identification of any threat(s) does not necessarily mean that the species meets the statutory definition of an "endangered species" or a "threatened species." In assessing whether a species meets either definition, we must evaluate all identified threats by considering the expected response of the species, and the effects of the threats—in light of those actions and conditions that will ameliorate the threats—on an individual, population, and species level. We evaluate each threat and its expected effects on the species, then analyze the cumulative effect of all of the threats on the species as a whole. We also consider the cumulative effect of the threats in light of those actions and conditions that will have positive effects on the species—such as any existing regulatory mechanisms or conservation efforts. The Service recommends whether the species meets the definition of an "endangered species" or a "threatened species" only after conducting this cumulative analysis and describing the expected effect on the species now and in the foreseeable future.

2.1 Distinct Population Segment (DPS) policy (1996):

The Distinct Population Segment policy applies only to vertebrate animals.

2.2 Updated Information and Current Species Status

2.2.1 Biology and Habitat:

Zapata bladderpod has been observed as a trailing perennial, with a silvery-green, zigzag-growing stem, 40–80 cm tall. Except for the fruit, the entire green portion of the plant is coated in a layer of hairs. Each of the four to six radiating side branches that the microscopic hairs split into frequently further splits into two additional branches. The 4–12 cm long, elongated oval rosette leaves have edges that are smooth, shallowly serrated, or wavy in different ways. The stem's leaves have a similar shape, but they are smaller (3–4 cm long) and thinner, and they may have whole, unevenly wavy margins or a few scatted teeth along the margin. Although they

emerge on only one side of the stem, flower clusters are dispersed along a stem that is ≤30 cm long. Figure 1 shows photos of Zapata bladderpod silicles and trichomes, key identification features of this species.

Figure 1. Zapata bladderpod silicles (left) and branched stellate trichomes (right; 40x magnified). Photos by Chris Best, U.S. Fish and Wildlife Service.

Zapata bladderpod thrives in the unique ecological setting of the Tamaulipan thornscrub, primarily above the Rio Grande floodplain. This species is typically found in open thorn shrublands with shallow, gravelly, or sandy soils and sandstone outcrops. It is adapted to calcareous clay and sandstone substrates, often in areas rich with fossil oyster shell layers. These soils are prone to erosion, making the species particularly sensitive to habitat disturbances. The plant community in these areas includes other species which sometimes act as nurse plants providing shade and reducing soil erosion (Fowler et al. 2011). Zapata bladderpod is often associated with blackbrush (*Acacia rigidula*), parralena (*Thymophylla pentachaeta*), purple three-awn (*Aristida purpurea*), and cenizo (*Leucophyllum frutescens*) (Service 2015, Table 1). A thorough review of plant associations and a list of locally common species that were absent from Zapata bladderpod populations can be found in the 2015 Five Year Review (Service 2015, p. 8).

Zapata bladderpod can rapidly increase in population size following significant rainfall events. Surveys of known populations following extended periods of hot, dry weather have detected few or no Zapata bladderpod plants. We believe that leafless caudices are able to remain in a dormant state for extended periods, during which they are very difficult to detect. Leaf emergence from the dormant caudices probably occurs in the fall to early winter after rain (Service 2015, p. 6), but individuals can emerge at other times of year (e.g., January, June, July; Middleton et al. 2024, p. 250). Rainfall in this hot, semi-arid region occurs most reliably from September through November. Seed germination and the emergence of basal rosettes from dormant caudices probably occur in the fall and early winter in response to rain, cooler weather, and shorter day lengths (Service 2015, p. 6). Flowering occurs mainly from February to April, with a peak in March; flowering has occasionally been observed as late as October and as early as January (Middleton et al. 2024, p. 250). Most fruiting has been observed in March and April (Service 2015, p. 5). Usually, there are four seeds in each of the two chambers (8 seeds per capsule) but there are sometimes as many as 10–11 seeds per capsule (Middleton et al. 2024, pp. 248-250).

Preliminary results of experimental propagation methods show promise. Seeds collected from the wild were viable and germination percentage was high, and plants grown in the laboratory and nursery have matured, readily flowered, and even developed fruits (Molano-Flores and Coons 2023, p. 9; Gabler 2024a, pp. 12-13). In fact, survival from wild-collected seeds that are grown in the lab and nursery have so far shown better survival than mature plants that were excavated from the wild. However, excavation and storage techniques are currently being evaluated which may result in improved methods and survival with future translocations. Best management practices to increase germination and reduce post-transplant mortality of seedlings in the lab are also being developed (Gabler 2024a, pp. 12-13; Gabler 2024b, personal communication).

Fruits with developing or mature seeds are spherical, brown, flattened and 2.5 – 5 millimeters in diameter (Molano-Flores and Coons 2023, p. 5; Middleton et al. 2024, p. 248). Preliminary results from Molano-Flores and Coons (2023, p. 5) indicate that fruits had either green seeds that were plump and appeared to be developing, and/or brown seeds that were fully mature. More fruits and seeds developed from open flowers than those that were bagged to exclude flying insects, suggesting that insects are important for cross pollination (Molano-Flores and Coons 2023, pp. 8-9). The Zapata bladderpod receives a range of pollinator visitors and likely is not limited by pollinator visitation. Beetles, various flies, bees, and wasps were observed visiting flowers (Molano-Flores and Coons 2023, p. 6).

The 2015 5-Year Review documented 10 populations of Zapata bladderpod in Starr and Zapata counties. Molano-Flores and Coons (2022 and 2023) identified a previously unknown population in Zapata County, Loma Linda (M) population. This population has not yet been assigned an EO (Element Occurrence) identification number in the Texas Natural Diversity Database (TXNDD). Molano-Flores and Coons also identified another grouping of individuals called OK Corral located less than 1 kilometer (km) from the historic Arroyo Tigre Chiquito Right of Way (ROW) population. Numbers of individuals in the OK Corral group were included with the Arroyo Tigre Chiquito ROW population estimate in Table 1 below. Combining estimates of these two nearby locations is consistent with TXNDD and Nature Serve methodology which uses a default EO separation distance of at least 1 km (Nature Serve 2020, p. 4).

On April 17, 2024, the Service conducted a rare plant survey on the Lower Rio Grande Valley National Wildlife Refuge's (LRGV NWR) Guerra Tract. The Guerra tract is adjacent to, and on the east side of, the LRGV NWR's Arroyo Ramirez tract. The Service observed a total of 17 individuals of Zapata bladderpod and collected a sample of silicles from 15 individuals, and 364 mature seeds. This newly discovered population has not yet been assigned an EO identification number in the TXNDD.

A single, highly disjunct, occurrence of Zapata bladderpod located in Tamaulipas, Mexico, was found to have a high level of genetic divergence and is believed to represent a new subspecies of *Physaria thamnophila* (Sedio et al. 2023, p. 413). This sub-species could provide a critical source of germplasm, if needed, for genetic augmentation and/or translocation (Sedio et al. 2023, p. 422). Genetics population comparisons are underway for leaf samples taken from ten U.S.

populations and will expand on the Sedio et al. (2023) study (Molano-Flores and Coons 2023, p. 8).

Table 1. Known populations and estimated number of individuals of Zapata bladderpod. Note: a letter following a number in the 2022-2024 population size column is a reference to a data source and survey. An "a" indicates a survey conducted by Molano-Flores and Coons (2022). A "b" indicates a survey conducted by Molano-Flores and Coons (2022, at a location less than 1 kilometer from EO3. A "c" indicates a survey conducted by Gabler (2024a), and a "d" indicates a survey conducted by Best (2024 personal communication).

EO No.	EO_ID	Place Name	County	Year Documented	Year Last Documented (pre 2022)	Largest Population	2022-2024 Population Size
1	7751	Siesta Shores	Zapata	1959	2007	1,033	1,033 a
2	5996	4 mi N Roma	Starr	1889	1986	n/a	n/a
3	2477	Arroyo Tigre Chiquito	Zapata	1941	2006	5,000	71b
6	7965	Santa Margarita Ranch	Starr	1975	2007	6,649	751 a
7	2223	Cuellar Tract	Starr	1994	2007	8,351	242 c
12	7381	Arroyo Ramirez Tract	Starr	2002	2007	1,706	607 c
13	8926	San Julian Rd-Martinez Ranch	Starr	2007	2007	370	257 a
14	8927	Arroyo Morteros Tract	Starr	2004	2007	181,838	14,377 c
15	8929	E Zapata	Zapata	2007	2007	260	260 a
17	8930	4 mi N Roma	Starr	1994	1994	n/a	n/a
Not assigned	N/A	Guerra Tract	Starr	2024	2024	17	17 d
Not assigned	N/A	Loma Linda (M)	Zapata	2023	2023	2,155	2,155 a
Totals:	12 Populations	N/A	N/A	N/A	N/A	207,379	19,770

2.2.2 Threats Analysis (threats, conservation measures, and regulatory mechanisms):

The Zapata bladderpod faces multiple threats. The best available information indicates that primary threats to Zapata bladderpod stem from destruction, modification and curtailment of the species habitat and range (Factor A). These threats include habitat loss and fragmentation caused by urban development, agricultural expansion, and infrastructure projects, including road and border wall construction (Factors A & D) (Service 2015). Invasive grasses, particularly buffelgrass (*Cencrhus ciliaris*), guineagrass (*Megathrysus maximus*), and Kleberg bluestem

(*Dichanthium annulatum*), further threaten the species by competing for resources. Although buffelgrass appears less competitive in bladderpod habitats, it readily colonizes disturbed areas, exacerbating habitat degradation. The specific soils where the Zapata bladderpod thrives are highly prone to erosion, especially when disturbed by activities like root-plowing or heavy foot and vehicle traffic. This erosion is compounded by poor rangeland management practices, such as overgrazing and lack of fire management, which reduce the vegetation cover and increase soil vulnerability (Service 2015).

The inadequacy of existing regulatory mechanisms (Factor D) poses a threat to the Zapata bladderpod. The Act does provide some legal protection for federally listed plants on land under federal jurisdiction; however, these provisions can be waived by the Department of Homeland Security (DHS) to ensure expeditious construction of border barriers and roads. All known Zapata bladderpod populations are located less than 50 miles from the U.S./Mexico border, putting them at risk from border wall construction and border security activities (Greenwald et al. 2017, p. 11; Fowler et al. 2018, p. 137). The construction of border security infrastructure has been particularly impactful to this species, with new roads and increased foot and vehicle traffic resulting in physical damage to the plants and further erosion of the soil (see Figure 2). The Service and Department of Homeland Security identified Zapata bladderpod and prostrate milkweed (*Asclepias prostrata*) as the endangered species most likely to be adversely affected by border wall activities (Gabler 2024a, p. 3). Because of the ongoing border-related threats to Zapata bladderpod, research is underway to develop successful propagation techniques and best practices for repopulation (Gabler 2024a and 2024b). The lack of regulatory mechanisms (Factor D) on private lands will continue to be a significant stressor to the species as border-related construction and enforcement activities continue (Service 2015).

The State prohibits taking and/or possession for commercial sale of all or any part of an endangered, threatened, or protected plant from public land. Texas Parks and Wildlife Department requires permits for the commercial use of listed plants collected from private land. Scientific permits are required for collection of endangered plants or plant parts from public lands for scientific or educational purposes. In addition to State endangered species regulations, other State laws may apply. For example, State law prohibits the destruction or removal of any plant species from State lands without a Texas Parks and Wildlife Department permit.

Because Zapata bladderpod receives a range of pollinator visitors such as beetles, various flies, bees, and wasps, climate change may impact environmental conditions for these pollinators (Factor A & E) (Molano-Flores and Coons 2023, p. 6). Environmental conditions related to climate change, including precipitation and temperature may impact genetic drift induced by low population sizes during drought years. (Factor E) (Service 2015). Highway maintenance activities along highways and utility ROW may adversely affect Zapata Bladderpod populations within these ROW's. (Factor E) Molano-Flores and Coons also identified another grouping of individuals called OK Corral located less than 1 kilometer (km) from the historic Arroyo Tigre Chiquito ROW population. The existence in a highway ROW increases a species' vulnerability to accidental and deliberate action including mowing, road traffic, chemical road runoff, accidental herbicidal treatments, vehicular accidents and plant collection (Factor E).

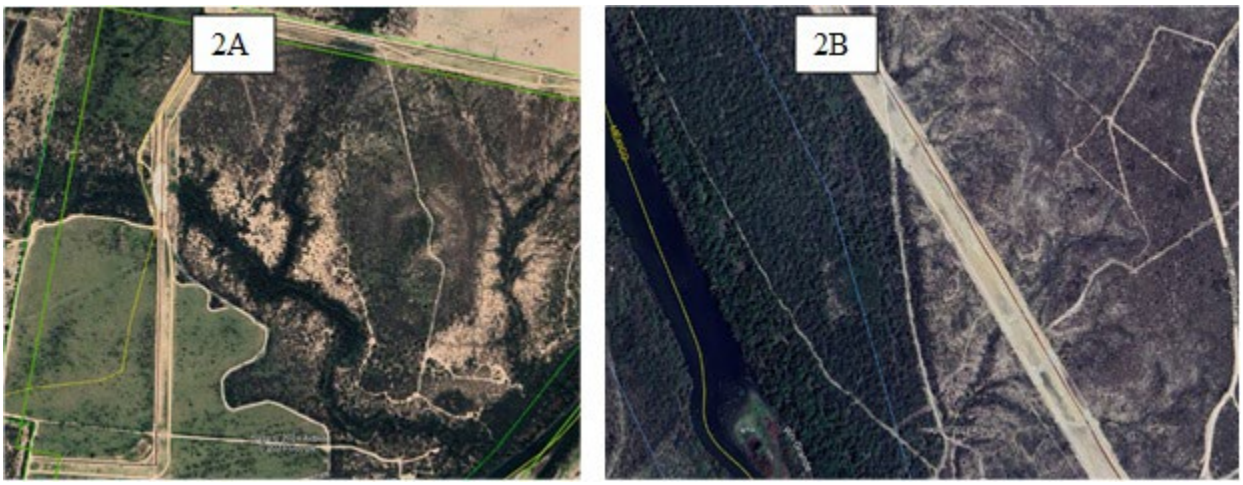

Figure 2. Google Earth imagery showing two representative portions of the 200-foot-wide border wall right-of-way in Starr County, Texas. 2A. The Arroyo Ramirez tract of the Lower Rio Grande National Wildlife Refuge. 2B. Private land where the wall was constructed through occupied Zapata bladderpod habitat.

2.3 Synthesis:

Information on the species in the 2015 5-year review remains accurate today. Since the 2015 5-year review, new information has been made available on the species' distribution and threats: two new populations have been discovered and the threat from border security and barrier construction has accelerated or increased. Recovery work and research is currently ongoing and is expected to be completed 2025-2027. Although two additional populations have been documented, for a total of 12 known populations monitored within Starr and Zapata counties, estimated population sizes collected from 2022-2024-indicate that most populations have experienced declines (see Table 1). Of the six populations with confirmed population declines, five have experienced substantial reductions (31 to 99%) in the number of individuals documented compared to the high ever documented, and only two populations currently meet the MVP of at least 2,000 individuals. Therefore, given the increasing threats documented in the analysis of the factors in 4(a)(1) of the Act and the status of species, the Zapata bladderpod meets the definition of an endangered species, and no changed in its status is recommended.

3.0 RESULTS

3.1 Recommended Classification:

No change is needed

3.2 New Recovery Priority Number:

Current recovery priority number 8C still applies.

Brief Rationale:

The Zapata Bladderpod is a species, has a moderate degree of threat, a high recovery potential, and is in conflict with construction or other development projects.

3.3 Listing and Reclassification Priority Number:

Reclassification (from Threatened to Endangered) Priority Number: N/A
Reclassification (from Endangered to Threatened) Priority Number: N/A
Delisting (Removal from list regardless of current classification) Priority Number: N/A

Brief Rationale:

N/A

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

Continue public outreach in Starr and Zapata counties to raise local awareness of Zapata bladderpod and other listed plants, such as prostrate milkweed. Support conservation of wild populations on private lands with willing landowners through the Service's Partners for Fish and Wildlife Program, section 6 grants, cooperative efforts with Natural Resources Conservation Service, or non-governmental partners.

Complete in-progress scientific investigations of the reproductive biology, seed ecology, and pollination of Zapata bladderpod. Implement findings from propagation experiments to repopulate priority areas using results from best management practices currently in development to increase germination and reduce seedling transplant mortality.

Prohibit vehicle traffic, including ATVs, from Zapata bladderpod occupied habitats at National Wildlife Refuge tracts, and limit foot traffic to the greatest extent possible. Continue to work with U.S. Customs and Border Protection and Texas Department of Transportation to avoid, minimize, and mitigate impacts.

When possible, prioritize habitat protection and avoidance of impacts, rather than translocation of individuals from established populations. Relocation efforts and plant survival have so far had minimal success; therefore, until better methods are developed for translocation of plants, this practice should be used with caution and only as a last resort.

5.0 REFERENCES

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U.S. FISH AND WILDLIFE SERVICE

5-YEAR REVIEW of Zapata bladderpod

Current Classification: Endangered

Recommendation resulting from the 5-Year Review:

No change needed

Appropriate Listing/Reclassification Priority Number, if applicable: N/A

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service, Texas Coastal and Central Plains Ecological Service Field Office

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