5-YEAR STATUS REVIEW

White Bladderpod *(Physaria pallida)*

1.0 GENERAL INFORMATION

1.1 Listing History

Species: White bladderpod
Date listed: March 11, 1987
FR citation(s): 52 Federal Register (FR) 7424-7426
Classification: Endangered species without critical habitat

Critical habitat/4(d) rule/Experimental population designation/Similarity of appearance listing: not applicable.

1.2 Methodology used to complete the review:

The U.S. Fish and Wildlife Service (Service) last evaluated the biology and status of the white bladderpod as part of a status review conducted on August 26, 2014 (USFWS 2014, entire). As part of this review, 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 (USFWS 2023, entire). We also contacted Texas Parks and Wildlife Department (TPWD) botanists Anna Strong and Jason Singhurst; Matt Buckingham, Texas Department of Transportation (TxDOT); Jeff Reid, Partner's for Fish and Wildlife Program (PFW) with the Service; and, Suzanne Walker, Azimuth Forestry Services, Inc. Other private land stewards were contacted, as needed, to provide site-specific updates. Additionally, we conducted a literature search and a review of information in our files.

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

U.S. Fish and Wildlife Service. 2023. Notice of 5-Year Status Reviews of 31 Species in the Southwest. 88 FR 7, 1602-1604.

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):

Not applicable; this species is a plant.

2.2 Updated Information and Current Species Status

2.2.1 Biology and Habitat:

Technical Name Correction:

In 2021, the Service published a final rule, revising the scientifically accepted taxonomy and nomenclature for 18 species that included the white bladderpod (USFWS 2021, entire). The Service's finding states that the approved name for the white bladderpod is now *Physaria pallida*, and not *Lesquerella pallida*. This revision is based on findings from Al-Shehbaz and O'Kane (*in* USFWS 2021, p. 67357) from 2002, whereby they transferred 91 taxa of *Lesquerella* to the genus *Physaria,* including the species *pallida* based on molecular, morphological, cytological, biogeographic, and ecological data. These taxonomic revisions are supported by the Flora of North America, the Integrated Taxonomic Information System (ITIS), and the Tropicos database (O'Kane 2010, IT IS 2015, and Tropicos 2015 *in* USFWS 2021).

Population Monitoring:

The following information briefly describes updated species and location accounts for each recorded element of occurrence ID (EO ID) record as document by TPWD's Texas Natural Diversity Database (TXNDD), where applicable. These records include both wild and reintroduced site information current as of 2022 (TXNDD 2022, entire). Researchers including Dr. Paula Williamson, Dr. Jason Martina, and Brianna Fogel

(student), from Texas State University (TSU), along with Suzanne Walker, contacted land stewards and conducted site assessments of the EO ID's below as part of an ongoing Traditional Section 6 project that includes the white bladderpod but also the Texas golden gladecress (*Leavenworthia texana*). Their observation data related to these EO IDs from 2022 and 2023 are pending and more information will be available upon publication of the final report. Therefore, the most up-to-date information is provided below:

EO ID 1671 – extant: The Service visited this EO ID on April 26 and again on May 6, 2019. During the May 2019 survey, an exact plant count was not conducted, however four sub-locations of plants were observed within suitable habitat. At one of the sub-locations, a high plant count of at least a few hundred plants was noted (Ardizzone 2019a, p. 3). Fogel and Walker visited this EO ID in March 2022 and noted a potential rosette of *P. pallida*, they planned to return in late April 2022 during peak-bloom to conduct a full count. Results of the 2023 site visit are pending.

EO IDs 943 and 8130 – extant: These EO IDs are owned by the same land steward in San Augustine County, Texas. The Service visited EO ID 943 on May 6, 2019, from a public road as a precaution since ownership boundaries were unclear. At EO ID 8130, plants were observed in more dappled areas of suitable habitat where obvious geology was exposed to the surface. An exact plant count was not conducted on EO 8130 in 2019 although an estimate of at least of few hundred plants were noted at one of the sites (Ardizzone 2019b, p. 3). Fogel and Walker visited these EO IDs in March 2022 and no plants were observed. They planned to return in late April during peak-bloom to conduct a full count. Results of the 2023 site visit are pending.

EO ID 12396 – extant: Plants are located along the TxDOT right-of-way (ROW) along County Road 21. The Service visited the site on April 18, 2018, and observed about 300 plants in flower. Plants appeared robust, some with multiple stems from the root (A. Bearb, pers. comm. 2018). Even with significant rainfall in the spring of 2019, the Service counted 90-100 flowering plants on a May 6, 2019, visit (A. Miller, pers. comm. 2019). Fogel and Walker visited this EO ID in March 2022 and no plants were observed. Results of the 2023 site visit are pending.

San Augustine County, reintroduction (no EO ID record) – extant: This site includes two planted areas within suitable habitat, with one located within the utility ROW of the Deep East Texas Electric Cooperative. The Service visited the site on April 17, 2018; April 22, 2019, and May 6, 2019. Plants were not in bloom in April 2019 but when revisited in May, the Service counted at least 40 plants in flower. There were likely more plants at the site however the area known to be occupied by the white bladderpod was heavily overgrown with invasive grasses (Ardizzone 2019c, entire). The property owner mowed the area in fall of 2021 (A. Bearb, pers. comm. 2023). In spring 2022, plants occupied the two known planted areas. Within the utility ROW, annual mowing normally occurs, however the site had not been mowed recently. Within the other planted area, the Service observed plants in flower in 2022 but an eastern red cedar

(*Juniperus virginiana*) and roughleaf dogwood (*Cornus drummondii*) were beginning to shade out the glade (A. Bearb, pers. comm. 2023).

EO ID 7637 – unknown: The Service, Walker, and a private land steward visited this record on May 6, 2019, from a public road, no plants were observed.

EO ID 3668 – unknown: The white bladderpod co-occurs with Texas golden gladecress at this site (TXNDD 2022, p. 7) (EO ID 2930 for the *L. texana*). The site is entirely on private land and does not extend into the road ROW (USFWS 2013, p. 56035). As of 2013, land steward was mowing and/or bush-hogging the site at least once a year to try and halt encroachment of woody species into this small tract (USFWS 2013, p. 56049). Neither the *L. texana* nor white bladderpod were observed during the site visits in 2021 or 2022 (two visits).

There are no updates for EO ID records: 2667, 5419, and 3637.

Traditional Section 6 Grant:

In 2020, the Service provided funds to TPWD through the Traditional Section 6 program to investigate the "Habitat assessment, monitoring and landowner outreach for the *Leavenworthia texana* and *Physaria pallida*." Funds were provided to the sub-grantees, Dr. Martina and Dr. Williamson at Texas State University (TSU) in 2021 for a three-year study. Objectives of the project included: mapping areas of potential habitat for both species; identifying landowners, contacting and gaining access, and surveying for populations; establishing permanent demographic monitoring sites/plots at known populations and additional populations; and, developing a landowner outreach program with a goal of establishing voluntary conservation agreements with landowners (Martina and Williamson 2020, p. 3). As of spring 2023, contact with all landowners has been initiated and monitoring of several of the white bladderpod sites has been completed. Survey findings and results are pending as well as the establishment of permanent monitoring sites/methods.

Delisting Criteria:

In 2019, the Service published several batched revisions updating existing recovery plans to contain quantifiable recovery goals, where applicable. The 1992 White Bladderpod recovery plan includes only downlisting criteria. As stated in the finding, "The species will be considered for downlisting when 12 distinct self-sustaining populations are maintained. The Service did not define delisting criteria for the white bladderpod because of the restricted geographic distribution; a limited understanding of its life history and habitat requirements; and the unknown magnitude and degree of threats (USFWS 2019, p. 2)." Based on this information, the Service published a not practicable Supplemental Finding on July 25, 2019 (USFWS 2019, entire) and therefore, the plan does not contain delisting criteria to date.

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

Threats

The best available information indicates that the primary threats to the white bladderpod stem from destruction, modification, and curtailment of habitat and its range. Historically, farming and grazing were the dominate land use practices in San Augustine County and were considered the predominate threat to white bladderpod and its habitat (USFWS 1992; The Nature Conservancy (TNC) 2003, p. 9; USFWS 2014, p. 13). These land use practices remain as the primary threat, confirmed through recent survey efforts by the Service in April 2019. More recent survey efforts in 2023 were conducted but data on threats is not yet available. Researchers from TSU continue to assess populations as part of the ongoing Traditional Section 6 project, and we anticipate their results will provide further insight into the conservation needs and threats for sites and the species. As of August 2023, the following continue to threaten the conservation and recovery of the white bladderpod across its range:

Habitat Destruction, Modification or Curtailment of Habitat or Range

When the Service visited the six EO ID records in 2019, most exhibited some degree of habitat modification due to the encroachment of nonnative grasses and other species however the effects of any encroachment have not been well documented.

Information from the 2019 EO ID visits is presented below:

At EO ID 1671, notable canopy shading was occurring at one of the occupied glades. Cattle tracks were also noted at this same site, but it is unclear if this activity is causing any issues to the white bladderpod. At EO ID 8130, a mix of glades with white bladderpod plants were found in full sun but others in dappled canopy where encroachment from other species was noted. At the reintroduction site (EO ID 12396) in 2019, plants at the site were being outcompeted by ryegrass (*Lolium perenne*) and yellow clover (*Medicago* species) (S. Walker, pers. comm. 2019) that were aggressively growing in the Weches glade. In addition, it was noted that EO ID 7637 was overgrown with species of morning glory, verbena, and McCartney rose but since this site was only accessible via a public road, the threat at this site needs further investigation.

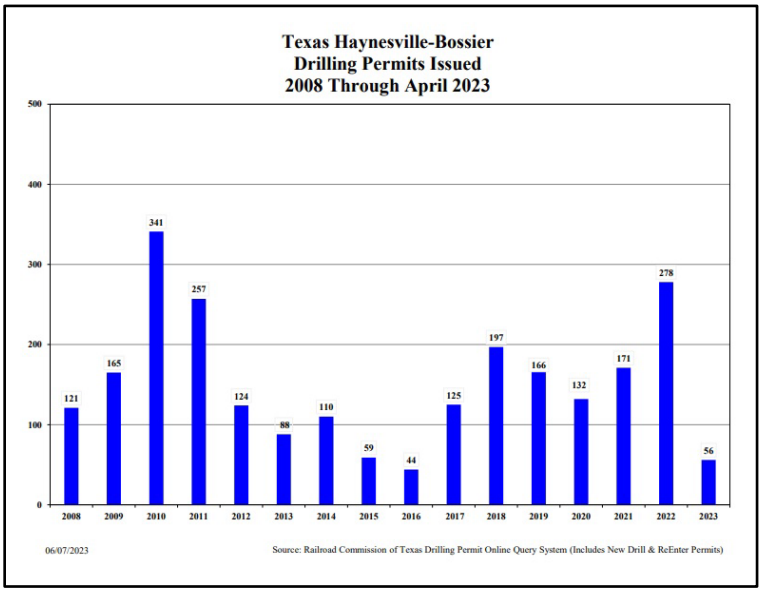
Threats from encroaching species were present at several of the EO IDs during the 2022 visits by Fogel and Walker. In 2022, at EO ID's 943 and 8130, Fogel noted lots of encroachment with eastern red cedars "growing directly over the rocky outcrops, shading them out." (B. Fogel, pers. comm. 2022, attachment).

Oil and Gas

Oil and gas development diminishes habitat quality and quantity through direct loss of habitat, introduction of nonnative species into modified areas of habitat, and an altered

site hydrology. The white bladderpod is found atop glade habitats of East Texas's Hayensville Shale; since the white bladderpod can co-occur with the *L. texana*, (see the Texas golden gladecress SSA (Service 2022, pp. 41-44) for more detail). In San Augustine County in general, the majority of existing pipelines are located in the area north of State Highway (SH) 21 and west of the town of San Augustine. To the east of San Augustine, there are fewer pipelines, but of those that are located in this area, several are large gas transmission lines. The Railroad Commission of Texas (RRC) regulates the oil and natural gas industry in the state of Texas. The RRC has detailed information on all existing pipelines, but the agency has no way to predict future routes for new pipelines or wells. New pipelines and their routes are not displayed on the RRC website and although impacts from pipelines excavations could have an effect on the white bladderpod, specific locations of any future pipeline and any effects on the species and its suitable habitat are unknown. In addition to pipelines, associated oil and gas activities such as drilling and/or maintenance could also affect the white bladderpod and its habitat. Pipeline and well pad construction will continue to be a threat to the species as the demands for oil and gas production within San Augustine County continue. Since 2017, drilling permits issued by the RRC have generally increased over time and permits for 2023 are increasing (Figure 1; RRC 2023). In addition, projects that do not require consultation under Section 7 of the Act including maintenance and expansion associated with oil and gas wells, pads, roadways, etc. are occurring within existing known occupied sites of the white bladderpod. Since a federal nexus is often lacking in these cases, any coordination with the Service is not required.

Figure 1. Drilling permits issued by RRC from 2008 through April 2023.



Surface Mining

Mining of glauconite minerals may continue to threaten the white bladderpod within its range. As described in the species 2014 5-year status review, "two EO IDs are located

adjacent to a glauconite mine. There has not been an opportunity to survey the sites and therefore it is unknown whether or not these two populations have been impacted by the mining activities." New glauconite mines in the area have not been developed, however glauconite mining is unregulated and therefore forecasting when and/or where these activities will appear on the landscape is extremely difficult. Mining of glauconite in the vicinity of occupied and suitable moist, alkaline habitat remains a potential threat to the white bladderpod.

Development – Transportation Projects

One extant white bladderpod population (EO ID 12396) occurs along state-owned ROW that is managed by TxDOT. Observations from past site visits and TxDOT's online Project Tracker application as of April 2023, show resurfacing projects "underway or beginning soon" along SH 21 both east and west of the towns of San Augustine. On the west side of this town in the stretch of SH 21 where EO ID 12396 is located, the project is marked as ongoing. TxDOT is aware of the plants' presence and is avoiding the EO ID. Additional areas of exposed Weches glades occur within the ROWs within San Augustine County, but as of August 2023 none have been occupied by the white bladderpod.

Climate Change

It is anticipated that effects from climate change could impact white bladderpod. The species is known from a single county known for its climatic extremes of temperature and precipitation (TNC 2003, ii; Diggs *et al.* 2006, p. 80) and native flora are well adapted to the region. White bladderpod is an edaphic (soil) specialist, restricted to soils with alkaline sediments with unique mineral and water retention properties described as seepy and saturated during the cool moist winter and spring months and dry during the summer (USFWS 1992, p. 4). These features may restrict the plant's capacity to spatially shift into surrounding habitat in response to a changing climate (USFWS 2014, p. 15). Warnock (1992) documented the effects of its restricted nature with a high variability in population counts, attributing fluctuations to early year frosts and dry springs. The localized effects of climate change on white bladderpod are unknown, however The Intergovernmental Panel on Climate Change (2014, p. 26) projects that temperatures and the intensity and duration of heat waves will increase, which could make these populations less stable and persistent into the future.

Conservation Measures

Measures to help conserve and protect the white bladderpod include seed banking and a landowner outreach and mapping project through a Traditional Section 6 grant. Mercer Botanic Gardens currently maintains accessions of white bladderpod seeds, two groups with a total of 26 accessions, ranging from collection dates between 1991 and 2002 (A. Tiller, pers. comm. 2023). Mercer continues to house white bladderpod plants used for educational purposes. Additional seed collections of white bladderpod are maintained

at the Pineywoods Native Plant Center and at the U.S. Department of Agriculture in Fort Collins, Colorado (see USFWS 2014, p. 13).

2.3 Synthesis:

The white bladderpod faces multiple threats, and its range is limited to small areas mostly on private property only in San Augustine County, Texas. Recent survey efforts through a Traditional Section 6 grant with TPWD are focused on mapping areas of potential habitat for the white bladderpod; identifying landowners, contacting and gaining access, and surveying for populations; establishing permanent demographic monitoring sites/plots at known populations and additional populations; and, developing a landowner outreach program with a goal of establishing voluntary conservation agreements with landowners (Martina and Williamson 2020, p. 3). A final report is pending however, researchers have been able to survey EO IDs as recent as 2022 and 2023. Habitat loss and destruction remain the primary threat to the species survival and are not sufficiently mitigated. Such measures will rely on cooperation with land stewards and land managers.

3.0 RESULTS

3.1 Recommended Classification:

No change is needed.

3.2 New Recovery Priority Number:

No change recommended.

3.3 Listing and Reclassification Priority Number: not applicable.

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

4.0 RECOMMENDATIONS FOR FUTURE ACTIONS

Future actions to aid in the recovery of the white bladderpod should focus on the implementation of the following actions:

- Contact the land stewards and managers of all white bladderpod sites.
- Work with land stewards to develop and implement management beneficial for the bladderpod.
- Continue monitoring and surveys of known populations.
- Implement projects and agreements through the Traditional Section 6 program with TPWD, the Service's PFW Program, as well as cooperative agreements with state and federal agencies.
- Continue to search for additional populations.

- Continue reintroduction efforts. Implement a reintroduction program, adhering to the Service's Controlled Propagation and Reintroduction Policy.
- Acquire new conservation agreements with interested parties.
- Continue conservation and recovery awareness through public and land steward outreach.

5.0 REFERENCES

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U.S. FISH AND WILDLIFE SERVICE

5-YEAR STATUS REVIEW of White Bladderpod (*Physaria pallida*)

Current Classification: Endangered

Recommendation resulting from the 5-Year Status Review:

No change needed.

Appropriate Listing/Reclassification Priority Number, if applicable:

FIELD OFFICE APPROVAL:

Lead Field Supervisor, Fish and Wildlife Service, Texas Coastal Ecological Services Field Office, Clear Lake, Texas

Approve CHARLES ARDIZZONE Digitally signed by CHARLES ARDIZZONE Date: 2023.08.31 13:26:06 -05'00'

REGIONAL OFFICE APPROVAL:

Assistant Regional Director, Ecological Services, U.S. Fish and Wildlife Service, Region 2

Approve _____