

# Zapata Bladderpod (*Lesquerella thamnophila*)

## *Recovery Plan*



*July 2004*

**ZAPATA BLADDERPOD**  
(*Lesquerella thamnophila*) Rollins and Shaw

**RECOVERY PLAN**

Prepared by

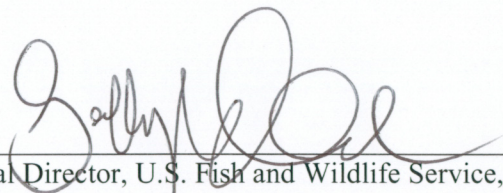
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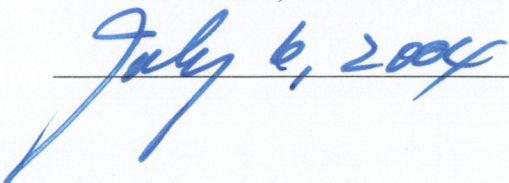
Date:

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Concurrence:

  
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Date:



## DISCLAIMER

Recovery plans delineate reasonable actions which are believed to be required to recover and/or protect listed species. Plans are published by the U.S. Fish and Wildlife Service, sometimes prepared with the assistance of recovery teams, contractors, state agencies, and others. Objectives will be attained and any necessary funds made available subject to budgetary and other constraints affecting the parties involved as well as the need to address other priorities. Recovery plans do not necessarily represent the views nor the official positions or approval of any individuals or agencies involved in the plan formulation, other than the U.S. Fish and Wildlife Service **only** after they have been signed by the Regional Director or Director as **approved**. Approved recovery plans are subject to modification as dictated by new findings, changes in species status, and the completion of recovery tasks.

### **The Recovery Plan should be cited as follows:**

U.S. Fish and Wildlife Service. 2004. Zapata Bladderpod (*Lesquerella thamnophila*) Recovery Plan. U.S. Fish and Wildlife Service, Albuquerque, New Mexico. i-vii + 30 pp., Appendices A-B.

Copies of the Recovery Plan are available from:

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The Recovery Plan is also available in electronic format for the U.S. Fish and Wildlife Service at [www.fws.gov](http://www.fws.gov).

## **ACKNOWLEDGMENTS**

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This Recovery Plan was prepared by Loretta Schanen Pressly, U.S. Fish and Wildlife Service, Corpus Christi, Texas.



## EXECUTIVE SUMMARY

**Current Status:** Zapata bladderpod (*Lesquerella thamnophila*) was listed as endangered on November 22, 1999 (U.S. Fish and Wildlife Service 1999) with critical habitat designated on December 22, 2000 (U.S. Fish and Wildlife Service 2000). Eleven Zapata bladderpod populations have been located and described in the U.S., including the type locality (first documented) discovered in Zapata County in 1959. Of the eleven sites, seven are known from Starr County, Texas, and four from Zapata County, Texas. In Starr County, four of the seven populations are extant; the status of the remaining three sites is unknown, as the sites have not been visited due to inaccessibility on private land. In Zapata County, bladderpod plants remain extant at three of the sites in reduced numbers; the fourth site is believed to be extirpated. In Mexico, one population has been documented in the State of Tamaulipas. A specimen of Zapata bladderpod from this location has been submitted to the University of Texas Herbarium at Austin. Additional populations in Mexico may exist but have not yet been located.

**Habitat Requirements and Threats:** Zapata bladderpod is known to occur on graveled to sandy-loam upland terraces above the Rio Grande flood plain. The known populations of Zapata bladderpod are associated with highly calcareous sandstones and clays, and occur within a community of shrub species. Threats to the species include habitat modification and destruction from increased road and highway construction and associated urban development, increased oil and gas exploration and development, alteration and conversion of native plant communities to improved pastures, overgrazing, and vulnerability from low population numbers (U.S. Fish and Wildlife Service 1999).

**Recovery Goal:** Current recovery goals of the Zapata Bladderpod Recovery Plan (Recovery Plan) are to: (1) Identify and achieve the conservation measures necessary to reclassify the species from endangered to threatened status; and, (2) Identify and obtain the information needed to develop objective and measurable delisting criteria for future revisions of the Recovery Plan. Major objectives of the recovery strategy include protection of existing populations and habitat, surveys for undocumented populations and habitat, and reintroduction of populations as necessary to meet preliminary recovery goals and criteria.

**Recovery Criteria:** In order to reclassify the species to threatened status, 12 self-sustaining populations of 2,000 reproductive individuals must be maintained or established in the United States. Management plans and agreements with private and public landowners must be developed to ensure the protection of these populations.

### **Major Actions Needed:**

1. Protect and manage existing Zapata bladderpod populations and habitat.
2. Survey for new populations in the United States and Mexico.
3. Gather biological information necessary for management and develop a population-monitoring program.
4. Establish and maintain a botanical garden population.
5. Establish new populations as necessary to meet downlisting criteria, through voluntary public or private partnerships with Federal and State agencies, local communities, and landowners.
6. Develop a public education and awareness program.
7. Develop delisting criteria and revise the Recovery Plan.

**Total Estimated Cost of Recovery (\$1,000's<sup>1</sup>):**

<u>Year</u>	<u>Action 1</u>	<u>Action 2</u>	<u>Action 3</u>	<u>Action 4</u>	<u>Action 5</u>	<u>Action 6</u>	<u>Action 7<sup>2</sup></u>	<u>Total</u>
<b>2004</b>	40.0	25.0	75.0	12.0	19.0	5.0	0.0	<b>266.0</b>
<b>2005</b>	31.0	25.0	75.0	12.0	19.0	5.0	0.0	<b>257.0</b>
<b>2006</b>	31.0	25.0	70.0	12.0	19.0	5.0	0.0	<b>252.0</b>
<b>2007</b>	5.0	6.0	18.0	2.0	5.0	5.0	0.0	<b>41.0</b>
<b>2008</b>	5.0	6.0	5.0	2.0	5.0	5.0	0.0	<b>28.0</b>
<b>2009</b>	5.0	3.0	5.0	2.0	1.0	5.0	0.0	<b>21.0</b>
<b>2010</b>	1.0	3.0	5.0	2.0	1.0	5.0	0.0	<b>17.0</b>
<b>2011</b>	1.0	3.0	0.0	2.0	1.0	5.0	0.0	<b>12.0</b>
<b>2012</b>	1.0	3.0	0.0	2.0	1.0	5.0	0.0	<b>12.0</b>
<b>2013</b>	1.0	3.0	0.0	2.0	1.0	5.0	0.0	<b>12.0</b>
<b>2014</b>	1.0	0.0	0.0	2.0	1.0	0.0	0.0	<b>4.0</b>
<b>2015</b>	1.0	0.0	0.0	2.0	1.0	0.0	0.0	<b>4.0</b>
<b>Total</b>	<b>123.0</b>	<b>102.0</b>	<b>283.0</b>	<b>54.0</b>	<b>74.0</b>	<b>50.0</b>	<b>0.0</b>	<b>686.0</b>

<sup>1</sup> Costs to recover the species to threatened status are provided; complete cost of recovery cannot be determined at this time. <sup>2</sup> Action may incur costs when a recovery team is formed.

**Date of Recovery:** Time required to reclassify the species as threatened is estimated at 12 years (2016), to allow adequate time to survey habitat for existing populations, collect biological data, develop management plans to protect known populations, locate appropriate areas for reintroductions if applicable, and monitor populations.

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## I. INTRODUCTION

### STATUS

Zapata bladderpod was listed as endangered on November 22, 1999 (U.S. Fish and Wildlife Service 1999) with 4 populations being located and described in Starr and Zapata Counties in South Texas. Since the listing, additional populations have been documented, and the species is now known from eleven occurrences. The species' range may be more extensive than what is currently known, but this is difficult to determine due to limited survey access on private land. Little evidence has been found of extensive populations in Mexico. One specimen from Tamaulipas, Mexico, has been identified but the site has not been revisited (Patterson 2000 in litt.).

Seven sites are known to still support the plant in South Texas. Populations in Starr County occur at two sites on Lower Rio Grande Valley National Wildlife Refuge (LRGV) property, and two sites occur on private land in close proximity to each other. (The two sites on private land may be one or two disjunct populations; until genetic analysis is performed, the site will remain listed as two populations). In Zapata County, three sites are known to support the plant. Two sites are located on highway rights-of-way between the towns of Zapata and Falcon, and another is in a small subdivision near Falcon Lake. Other populations of Zapata bladderpod have been found in Starr and Zapata Counties in southern Texas but have not been documented or re-verified.

Critical habitat was designated on December 22, 2000 (U.S. Fish and Wildlife Service 2000). Eight critical habitat units were designated in Starr County, Texas. Of the eight units, seven occur on 2,088 hectares (ha) (5,158 acres (ac)) of LRGV property, and one occurs on private property (0.55 ha (1.36 ac)). Since critical habitat designation in 2000, a new population of Zapata bladderpod has been located on one of the designated refuge tracts, for a total of eleven documented occurrences. Thus, of the seven designated units on refuge property, Zapata bladderpod occurs on two. The

remaining five refuge units possess the same vegetation and soil qualities as the known population sites and are considered essential for the conservation of the species. Critical habitat was not designated at the two occupied sites in Zapata County due to the low numbers of plants present and an unknown potential for long-term survival or sustainability of the populations.

This species is threatened by habitat modification and destruction from increased road and highway construction and associated urban development, increased oil and gas exploration and development, alteration and conversion of native plant communities to improved pastures, overgrazing, and vulnerability from low population numbers (U.S. Fish and Wildlife Service 1999).

### TAXONOMY

Zapata bladderpod is a member of the Brassicaceae family. The species was first collected by Neally in Starr County between 1882 and 1894 (Rollins and Shaw 1973). The type specimen was collected in Zapata County, Texas, by R. C. Rollins in 1959 and named *Lesquerella thamnophila* by R. C. Rollins and E. A. Shaw (Rollins and Shaw 1973).



**Figure 1.** Zapata bladderpod (*Lesquerella thamnophila*). Photo courtesy of Loretta Schanen Pressly, U.S. Fish and Wildlife Service.

### MORPHOLOGY

Zapata bladderpod is a pubescent, silvery-green, herbaceous perennial plant, with sprawling stems 43 to 85 centimeters (cm) (17 to 34 inches (in)) long (Figure 1; Figure 2). Basal leaves are narrowly elliptical to oblanceolate and acute, 4 to 12 cm (1.5 to 4.8 in) long, and 7 to 15 millimeters (mm) (0.3 to 0.6 in) wide, with entire or slightly toothed margins.



**Figure 2.** Zapata bladderpod (*Lesquerella thamnophila*). Photo courtesy of Loretta Schanen Pressly, U.S. Fish and Wildlife Service.

Cauline or stem leaves are linear to narrowly elliptical and acute, 3 to 4 cm (1 to 1.5 in) long and 2 to 8 mm (0.1 to 0.3 in) wide, with margins similar to basal leaves. The presence of stellate trichomes (small hair-like structures) on the leaves produces the plant's appearance of a whitish or silvery-green color. The inflorescence is a loose raceme of bright, yellow-petaled flowers. The flowers appear throughout the year depending upon temperature and rainfall, and are arranged

along an axis with the lower flowers maturing first. Fruits are round and 4.5 to 6.5 mm (0.2 to 0.8 in) in diameter on short, downward curving pedicels (Poole 1989) (Figure 3).



**Figure 3.** Zapata bladderpod (*Lesquerella thamnophila*). Photo courtesy of Loretta Schanen Pressly, U.S. Fish and Wildlife Service.

### HABITAT

Zapata bladderpod can occur on graveled to sandy-loam upland terraces above the Rio Grande flood plain. The known populations are associated with three Eocene-age geologic formations, Jackson, Laredo, and Yegua, which yield fossiliferous (containing fossils) and highly calcareous (composed of calcium carbonate) sandstones and clays. Historically, populations of Zapata bladderpod were found within the Jimenez-Quemado soil association in Starr County, and the Zapata-Maverick association in Zapata County. Based on soil composition and vegetation characteristics of this region of Texas, the Zapata bladderpod may also occur within Copita-Zapata soils in Zapata County (Wu and Smeins 1999).

Presently, documented Zapata bladderpod populations in Starr County occur within the Jimenez-Quemado soil association and on Catarina series soils. Jimenez-Quemado soils are well

drained, shallow, graveled to sandy loam underlain by caliche (a hard soil layer cemented by calcium carbonate). This soil association is broad, dissected, irregularly shaped, and occurs on huge terraces 6 to 15 m (20 to 50 feet (ft)) above the flood plains of the Rio Grande. In most areas, Jimenez soils occupy the slope breaks extending from the tops of ridges to the bottoms of their slopes, and in the narrow valleys between them. Quemado soils occur as narrow areas on ridge tops that have slopes ranging from 3 to 20 percent. Steep escarpments can be present with rocky outcrops adjacent to the flood plain. Catarina series soils consist of clay, saline upland soils developed from calcareous, gypsiferous, or saline clays. Areas dominated by Catarina series soils usually contain many erosional features. The underlying material contains calcareous concretions, gypsum crystals, and marine shell fragments (Thompson *et al.* 1972).

Known populations of Zapata bladderpod in Zapata County occur within the Zapata-Maverick soil association. Zapata soils are shallow, loamy or mixed, hyperthermic, well drained, and nearly level with undulating slopes ranging from 0 to 18 percent primarily on uplands occurring over caliche. The upper portion of the soil horizon ranges from 5 to 10 cm (2 to 4 in) thick, with chert gravel and coarse fragments consisting of up to 25 percent of angular caliche 2.5 to 20 cm (1 to 8 in) long. Maverick soils consist of eroding upland clayey soils occurring over caliche, with underlying calcareous material containing shale and gypsum crystals (Thompson *et al.* 1972). The upper zone consists of well-drained, moderately deep soft shale bedrock, sloping 1 to 10 percent and forming clayey sediments.

### POPULATION BIOLOGY

The population biology of Zapata bladderpod has not been fully described, but the plant is known to grow opportunistically as evidenced by fluctuations in the density of plants and the size of populations in response to rainfall and temperature (U.S. Fish and Wildlife Service 1999). Zapata bladderpod can respond dramatically to rainfall

events, increasing in numbers from a barely detectable population to a substantial assemblage including thousands of individuals. The Zapata bladderpod is a perennial plant that sprouts aboveground leaves and stems more readily during periods of favorable weather.

Zapata bladderpod occurs as an herbaceous component of an open *Leucophyllum frutescens* (cenizo) - *Acacia Berlanderi* (guajillo) shrubland alliance (Nature Serve 2002) (Figure 4). Both plant communities dominate upland habitats on shallow soils near the Rio Grande (Diamond *et al.* 1987). These shrub lands are sparsely vegetated due to the shallow, fast-draining, highly erosional soils and semi-arid climate. Other related plant species include *Acacia ridigula*, (blackbrush), *Prosopis* sp. (mesquite), *Celtis pallida* (granjeno), *Yucca treculeana* (Spanish dagger), *Zizyphus obtusifolia* (lotebush), and *Guaiacum angustifolium* (guayacan).

The Zapata bladderpod may occur within areas of sparse vegetation, or under canopy of associated shrub species. These brush species may serve as nurse plants for the Zapata bladderpod, potentially reducing the amount of sunlight on the soil surface or maintaining moisture in the root area. In July of 1999, U.S. Fish and Wildlife Service (Service) personnel took readings of the filtered sunlight through the canopy where bladderpod plants were present. These readings showed average percentages of canopy shade as 28 percent (with a range of 4 to 72 percent). Adjacent shrubs may also provide protection from soil erosion around the bladderpod's roots. During a site visit in Starr County, after approximately 6 cm (4 in) of rain, Service personnel observed the top portion of root material exposed on many bladderpod plants that did not occur under the canopy of adjacent brush. Those plants under the brush canopy maintained root systems covered by soils. The brush species may counteract the buffeting of rain on the soil, reducing erosion under the protection of the canopy cover, and/or may serve as a deterrent to browsing native wildlife, and domestic or exotic animals.





**Figure 4.** Typical Zapata bladderpod habitat. Photo courtesy of Loretta Schanen Pressly, U.S. Fish and Wildlife Service.

#### **DISTRIBUTION AND ABUNDANCE**

Zapata bladderpod is currently known to exist at seven accessible sites in Starr and Zapata Counties, within 3.2 kilometers (km) (2 miles (mi)) of the Rio Grande (Figure 5). Biologists have located and described a total of 11 populations of Zapata bladderpod, including the type locality discovered by R. C. Rollins in Zapata County in 1959 (U.S. Fish and Wildlife Service 1999). Four of these populations had been described when the species was listed in 1999; one of the eleven is a newly documented population. Seven of the eleven populations were found in Starr County and four in Zapata County. One population has been documented within the State of Tamaulipas, Mexico, and a verified specimen from this population is housed in the herbarium at the University of Texas in Austin, Texas.

Of the seven historically reported populations in Starr County, four are still known to support Zapata bladderpod plants in varying numbers. Following substantial rainfall in October 2000, biologists verified previous documentation of Zapata bladderpod plants at the LRGV refuge tract. The site was surveyed again in 2001 and 2002, and continues to maintain the largest number of plants of the known populations (U.S. Fish and Wildlife Service 1999). The second and third populations, which are separated by 0.96 - 1.28 km (0.6-0.8 mi),

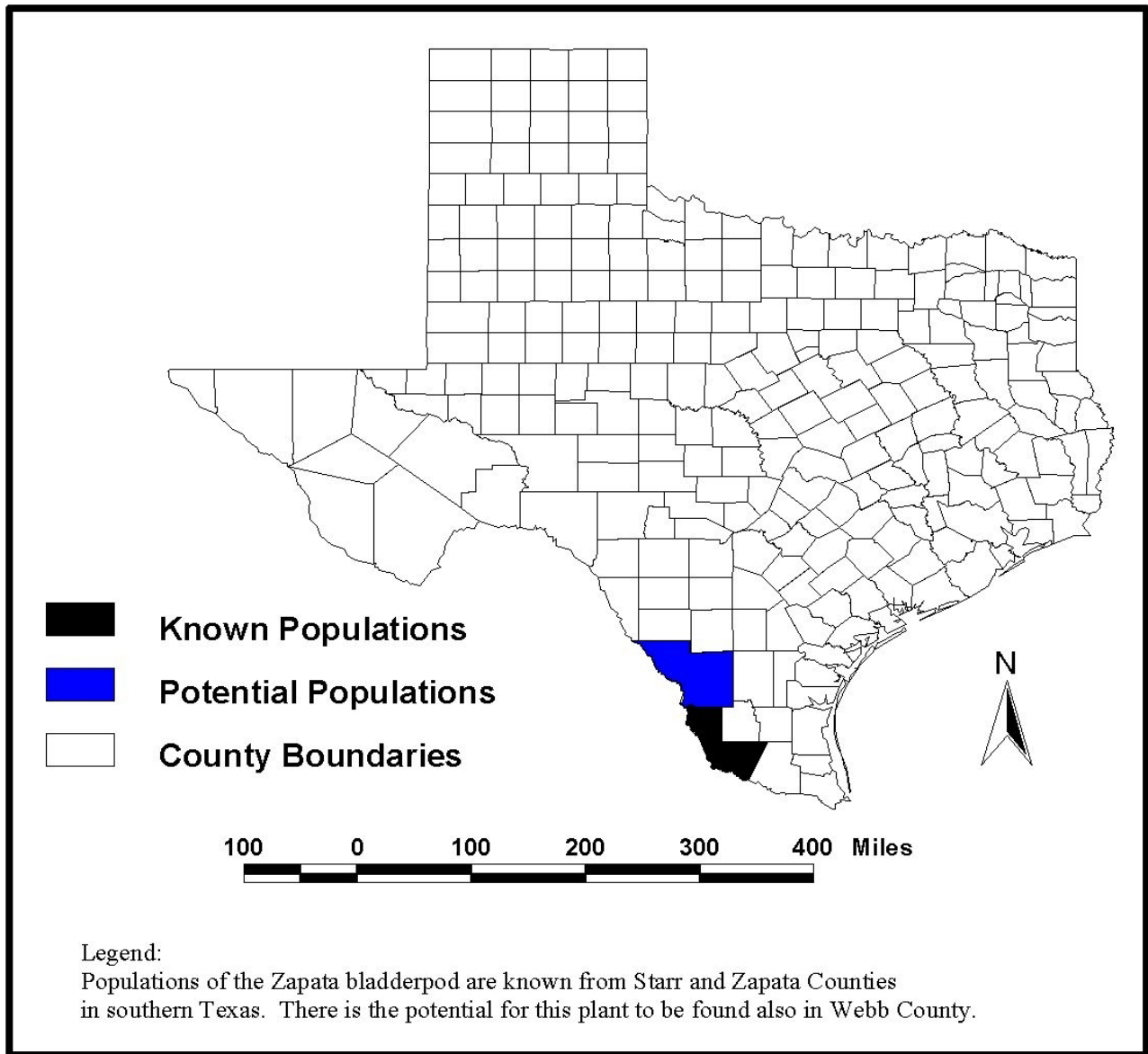
occur on a private ranch and support the species in small numbers (Poole 2002 pers. comm.) In 2002, a new population was discovered on a LRGV refuge tract. This population is located on a tract of land designated as critical habitat for Zapata bladderpod. Two populations are now protected on refuge land. The remaining three sites of Zapata bladderpod populations that existed in Starr County have not been surveyed recently due to inaccessibility of the property and/or insufficient information as to the exact location of the historic population.

In Zapata County three of the four historically documented sites still support Zapata bladderpod. During survey work in October 2000, biologists recorded a small number of plants on a highway right-of-way near a small subdivision adjacent to Falcon Reservoir. Several bladderpod plants were also present within the subdivision site adjacent to the highway. The third site was relocated on another portion of the highway. In 2001, plants were observed again at these three sites, although a reduction in individuals was noted. The site in the vicinity of the type locality at the area known as Falcon Lake West is believed to be extirpated; plants were last observed at this site in 1985 (U.S. Fish and Wildlife Service 1996).

The number of plants at each of the seven existing population sites fluctuates from a few individuals to thousands depending on temperature and rainfall conditions (Poole 1989, Sternberg and Best in prep.). This perennial plant is an ephemeral, cryptic species that produces above ground vegetative growth and reproductive organs primarily following significant rainfall and optimal temperatures. This characteristic dormancy can be misleading to a surveyor who may overlook a site and report absence of the plant.

Although Zapata bladderpod has been found primarily in Starr and Zapata Counties, additional populations may exist in Webb County, Texas. Wu and Smeins (1999) developed multiple scale habitat models of rare plants in the region that included physical and chemical properties of soils collected at four Zapata bladderpod sites in Starr





**Figure 5.** Known and potential Counties of occurrence of Zapata bladderpod in North America (Texas). Populations of Zapata bladderpod are documented in Starr and Zapata Counties, and there is potential for the species to occur in Webb County.

County. Their results suggest that there is potential Zapata bladderpod habitat north and northwest of Starr County, extending into Webb County. Surveys have not been conducted to determine whether populations exist in Webb

County. Historical references of Zapata bladderpod suggest that there may be undocumented populations in Mexico (Garcia in litt.).

### IMPACTS AND THREATS

The Service (1999) analyzed the five listing factors in section 4(a)(1) of the Endangered Species Act (Act) and determined that the Zapata bladderpod warranted listing as endangered. To provide continuity between the listing process, recovery, and the reclassification (or delisting) processes of the Act, specific threats to the bladderpod that led to its endangerment are organized in the Recovery Plan according to the five listing factors, below. Due to lack of adequate information, quantification of the following threats to the bladderpod is not possible. However, these threats impact the vegetative communities in which Zapata bladderpod is found, and are conducted at large scales across the landscape. The threats discussed below have been observed at or near documented Zapata bladderpod sites, and therefore warrant further analysis as to the degree of threat they may or may not pose to the species.

To achieve recovery, it is necessary to stop or reverse the decline of a species and neutralize the threats to its existence. Measures to alleviate the threats discussed below are given in the form of stepped-down recovery actions in the Narrative Outline of Recovery Actions. These actions recommend information gathering (research) to increase our understanding of the magnitude of specific threats, which will then be used to inform management actions to reduce impacts.

(A) *The present or threatened destruction, modification, or curtailment of its habitat or range* Habitat destruction and modification are the primary threats to the species. Specific types of destruction and modification include: habitat loss from the introduction of non-native pasture grasses during the conversion of native rangeland to improved pasture, overgrazing, and ground disturbance activities associated with urban development, construction or improvement of highways and utility transmission systems necessary to support urban infrastructures, and oil and gas exploration and production. It has been estimated that more than 95% of the native vegetation in South Texas has been altered or

destroyed by anthropogenic impacts to the landscape (Jahrsdoerfer and Leslie 1988).

Agricultural modifications to the landscape have impacted Zapata bladderpod habitat. During rangeland improvement, native shrubs are typically eliminated through root plowing (Figure 6) or other means, and areas are subsequently replanted with nonnative pasture grasses such as buffelgrass (Figure 7). *Pennisetum ciliare* (buffelgrass) is an aggressive, exotic grass that is extensive at several of the known Zapata bladderpod population sites. *Dichanthium annulatum* (Kleberg bluestem grass), used for erosion control on roadway rights-of-way, also invades natural areas and is present at all Zapata bladderpod sites, although not as extensively as buffelgrass.



**Figure 6.** Root plow. Photo courtesy of Loretta Schanen Pressly, U.S. Fish and Wildlife Service.

Highly invasive species such as these exhibit the ability to create quick monotypic stands. Results from various invasive grass studies indicate that there is shade and root competition between native plants and invasive grasses (Pressly 2002), as well as possible allelopathic effects (suppression of growth of one plant species by another due to release of toxic substances) on native forbs and grasses (Nurdin and Fulbright 1990). When native plants compete for light, moisture, and/or nutrients, energy is expended to produce vegetative growth for photosynthesis and survival, with consequential decreases in seed production.



**Figure 7.** Buffelgrass along a roadway (*Pennisetum ciliare*). Photo courtesy of Loretta Schanen Pressly, U.S. Fish and Wildlife Service.

survival, with consequential decreases in seed production. This may decrease seedling recruitment and hinder range expansion of the out-competed species. As natural habitats become increasingly rare, costs to re-vegetate denuded areas are amplified due to the expense of securing regional native plant species.

Construction activities such as roadway and utility service expansion, and oil and natural gas exploration and production have increased in the South Texas region during the last decade. Seismic operations associated with oil and gas exploration, including the clearing of large areas to facilitate equipment transport and placement, well pad placement and drilling, and pipeline placement for transport of oil and gas, may directly eliminate current bladderpod habitat if areas are not properly surveyed and projects are not sensitive to the presence of the species. In addition, planting of nonnative grasses to fill-in pipeline rights-of-way or to decrease roadside erosion is sometimes associated with these construction activities, furthering the spread of aggressive exotic species and hindering the opportunities for Zapata bladderpod recovery.

*(B) Over-utilization for commercial, recreational, scientific, or educational purposes*

There are no known threats to the Zapata bladderpod from commercial, recreational,

scientific, or educational activities or purposes. Historically, the plant was used medicinally to treat wounds, but there is no evidence to support the ongoing use of the plant for medicinal benefits.

*(C) Disease or predation*

Disease is not considered a threat to the species at the present time, as populations have shown no evidence of disease.

Poole (1989) reports that cattle likely graze the plant, as numbers of plants in populations subject to grazing are significantly reduced compared to those in adjacent, un-grazed land. Impacts to the bladderpod from grazing may be direct (e.g., trampling), or indirect (e.g., a result of changes to the soil). Cattle grazing and wildlife browsing impacts may increase during drought conditions when range quality is reduced and forage species have been reduced or removed. Cattle production in the region has generally decreased due to drought, and the extent of this threat is unknown.

During a site visit to one of the LRGV refuge sites, there was evidence of predation on seed material (by an unknown predator), which could impact recruitment onto other sites.

*(D) The inadequacy of existing regulatory mechanisms*

Zapata bladderpod is now protected by Federal and State endangered species laws. Since the Federal listing of the Zapata bladderpod, mitigation imposed through section 7(a)(1) under the Act has included re-evaluation of known sites and surveying for additional populations.

*(E) Other natural or man-made factors affecting its continued existence*

Other factors affecting the continued existence of the Zapata bladderpod include drought conditions and decreased genetic variability and viability associated with the reduction of plant populations and population size. Low numbers of flowering plants during drought years could cause genetic drift (Pavlik 1996). This has the effect of lowering genetic variability and reducing the species' ability to cope with a wide range of environmental

stressors. Decreased reproduction during drought years - with populations in some areas including zero aboveground vegetative individuals - makes the species particularly vulnerable to extinction during a prolonged drought.

### **CONSERVATION MEASURES**

Conservation measures have included mitigation measures imposed through section 7(a)(1) under the Act, re-evaluation of known sites, and surveying for additional populations. The populations that occur on LRGV refuge land are under the jurisdiction of the Service. The Texas Parks and Wildlife Department (TPWD) Wildlife Diversity Program conducts multiple surveys for the bladderpod and other rare plant species following measurable rainfall events. Service, (Ecological Services), LRGV, TPWD, and Texas Department of Transportation (TXDOT) personnel monitor the known sites periodically to make qualitative observations. One population on a highway right-of-way is protected under an informal agreement between TPWD and TXDOT; the agreement includes mowing on the right-of-way during appropriate times of the year to reduce potential loss or impact to Zapata bladderpod reproductive organs.

Studies are currently being conducted to determine population status and associated species at the largest known population site in Starr County (Sternberg and Best in prep.). Research on community disturbance and effects on the Zapata bladderpod are underway. Preliminary results indicate that bladderpod may increase in density after removal of associated brush species (Price 2003 pers. comm., Best 2003 pers. comm.). TPWD personnel collect seed for long-term storage by the San Antonio Botanical Gardens in (Texas) and the National Seed Storage Lab (Colorado), under the auspices of the Center for Plant Conservation.

Wildlife management for hunting and recreational use (e.g., bird watching) is becoming increasingly important as an economic value to the area. Zapata bladderpod may benefit if land converted from livestock pasture to wildlife management includes improvements such as restoration of native vegetation. Revegetation of native species could also benefit major game species such as *Odocoileus virginianus* (white-tailed deer), *Callipepla squamata* (scaled quail), *Zenaidura macroura* (mourning dove), *Meleagris gallopavo* (turkey), *Pecari tajacu* (collared peccary), and *Sus scrofa* (feral pig).



## II. RECOVERY PROGRAM

### RECOVERY GOALS, OBJECTIVES, AND STRATEGY

The first recovery goal for Zapata bladderpod is to identify and achieve the conservation measures necessary to reclassify the species from endangered to threatened status. The restricted distribution of the species and our currently limited understanding of its life history and habitat requirements make it difficult to develop objective and measurable criteria, which when met, will result in the delisting of the species. The second recovery goal is therefore to identify and obtain the information needed to determine delisting criteria for future revisions of the Recovery Plan. Major recovery objectives include protection of existing populations and habitat, surveys for undocumented populations and habitat, information gathering, and reintroduction of populations as necessary to meet reclassification recovery criteria.

A multi-pronged recovery strategy may allow the species to be downlisted to threatened status while acquiring the information needed to determine delisting objectives and criteria. Conservation efforts for the Zapata bladderpod should focus initially on maintaining current populations within the species' range to ensure that the species is safe from extinction; protective measures (e.g., stewardship or management agreements) should then be implemented to ensure the species is moving toward recovery. Surveys to locate undocumented populations should be increased immediately. As a better understanding of the species status is gained, the need for reintroduction as a tool to increase the number or distribution of populations can be better examined. Simultaneously, information gathering to inform management and monitoring strategies should occur. Binational collaboration between the United States and Mexico should also be pursued.

### RECLASSIFICATION CRITERIA

*1) Maintain or establish 12 fully protected, geographically distinct, self-sustaining populations*

*of the Zapata bladderpod within the historical and geographical range of the species in the United States:*

Each population should consist of at least 2,000 reproductive individuals at a size class structure reflecting that plants are reproducing and becoming naturally established within the population. These populations can be composed of smaller subpopulations so that the units function as one large meta-population if habitat availability is limited or fragmented and life history information support a meta-population structure. Distance between (meta) populations should be determined as information on genetics, seed dispersal and pollination is gathered throughout the recovery process. For populations to count toward the reclassification criteria, the number of plants, number of reproductive individuals, and age class structure must be verified through monitoring, including an assessment of the general habitat condition. Reintroductions, if necessary, can occur on Federal or State land, and/or private land that have been voluntarily entered into a stewardship agreement for the Zapata bladderpod by its owners. Threats to the species must be managed and controlled at each site.

*(2) Establish agreements for the protection and management of the 12 self-sustaining populations:*

Although binding agreements such as an approved management plan (e.g., National Wildlife Refuge Comprehensive Conservation Plan), or formal stewardship agreement with private landowners are preferable due to the commitment of long-term management continuity, non-binding verbal agreements can contribute in the interim to the objectives of this Recovery Plan. Protection and management measures for any populations on public land should be fully incorporated into Federal and State management plans.

The justification for twelve Zapata bladderpod populations is based upon the following: (a) the understanding that this number reflects sufficient

population repetition such that extinction is not likely in the foreseeable future; (b) it represents a significant increase in the number of known populations from the time of listing (4 known sites) to reclassification; and (c) it is a feasible target considering the amount of unsurveyed range and the opportunity for reintroduction on Federal, State, and participating private land sites.

The recommendation for population size of 2,000 individuals of Zapata bladderpod is based on the concept that a minimum viable population (MVP) should maintain enough individuals that there is a 95 percent probability that the population will remain viable over a period of one-hundred years (Mace and Lande 1991). MVP size for the Zapata bladderpod should take into account the life characteristics of the plant, the extent of appropriate habitat, and threats to the species. Characteristics of the plant that should be examined include the life habit, breeding system, growth form, fecundity, ramet production (if any), survivorship, seed duration, environmental variation, and successional status (Pavlik 1996). According to these population characterizations, and available information on Zapata bladderpod, MVP for the plant requires a population size of approximately 2,000 reproductive individuals.

“Maintain or establish” in criteria (1) should be interpreted to mean that the populations necessary for reclassifying the species to threatened can include currently existing, newly discovered, or reintroduced populations. Populations discovered on Federal, State, or private land that fit the definition of a MVP that can be protected with adequate management and monitoring programs (i.e., “maintain”), may count towards reclassification criteria. Efforts to reintroduce (i.e., “establish”) Zapata bladderpod should be pursued as a method to reach reclassification as well as to provide sites available for research activities. It is recommended that survey efforts for the species be intensified before large-scale reintroduction efforts take place. Protection (and augmentation, if necessary) of currently existing and newly discovered populations may be the most cost efficient method to recover the species. The

recovery program will greatly benefit from continued and increased collaboration and cooperation between all partners, including private landowners.

Reintroductions, if necessary, can take place on Federal, State, and private land with consent of landowner. For example, reintroductions could take place on LRGV refuge tracts (Cuellar, Chapeno, Arroyo Morteros, Las Ruinas, Los Negros, Arroyo Ramirez, and La Puerta). Partnership and stewardship agreements to manage and protect or reintroduce the species should be pursued with interested parties. It is recommended that populations be geographically distinct from one another (depending on relevant life history information such as on pollinator range or genetic variability) to decrease the likelihood that localized events will impact more than one population.

Full protection is defined as management of populations on Federal or State lands as part of an approved management plan (e.g., National Wildlife Refuge Comprehensive Conservation Plan), or a formal stewardship agreement for private landowners that includes management and monitoring of the populations, habitat, and threats. Management should include measures to identify and subsequently lessen or alleviate relevant threats (e.g., habitat modification or loss) to Zapata bladderpod.

A full strategy for recovery needs to be developed based on the species’ life history, population and community ecology, as well as an understanding of how to alleviate threats. To make progress toward development of delisting criteria, currently existing, newly discovered, and/or reintroduction sites should also be considered for compatible research activities. The research actions listed in the following step-down and narrative outlines will be used to determine the number of populations needed for full recovery and to develop management options for alleviating threats to the species, and other relevant objectives.

Information needs for Zapata bladderpod recovery could be further assessed and resolved by a

recovery team and/or scientific workshops. Research priorities, genetic data analysis, survey and monitoring protocols, and reintroduction protocols are all topics integral to the development of recommendations for survival and long-term viability of the species. Workshops concerning these topics should include Federal, State, academic and conservation personnel, and other experts as necessary, including bi-national collaborators from Mexico.

Historically, populations of Zapata bladderpod were known from Mexico. Based on the soil type and general habitat requirements currently documented for the Zapata bladderpod, it is possible that extant populations occur in Mexico. As appropriate, formal and informal conservation measures for the species (e.g., a formal Memorandum of Understanding between the United States and Mexico to manage and protect populations, and encourage voluntary private lands conservation) should be pursued as part of the long-term conservation strategy for the Zapata bladderpod.

The estimated time to accomplish the criteria for downlisting is twelve years. The Recovery Plan, however, should be reevaluated in five years to assess progress on survey projects, research, and reintroductions. The overall management strategy for the species, including the Recovery Plan, should be revised, based on new information, as needed. Objective, measurable delisting criteria should be developed concurrently with revisions to the Recovery Plan. This Recovery Plan is an important step in identifying, organizing, and prioritizing recovery needs for the species. Although Federal and State (including Mexico) conservation has taken place since the Federal listing of the bladderpod in 1999, the Recovery Plan will hopefully act as a catalyst to improve our understanding of and conservation of the species.

**STEP-DOWN OUTLINE OF RECOVERY ACTIONS**

Completion of these actions will satisfy the recovery objectives, including achievement of downlisting criteria. Fulfillment of these actions will also enable development of delisting criteria. Although several of the actions are needed to ensure the species survival (i.e., Priority 1 tasks in the Implementation Schedule), it is recommended that a coordinated approach to recovery be taken such that surveys, research, partnership building, and educational efforts occur simultaneously, or as needed, to maximize progress toward recovery.

1. Protect known Zapata bladderpod populations in the United States.
  - 1.1 Familiarize landowners with information on the rarity, significance, and threats regarding the Zapata bladderpod population on their property; encourage stewardship agreements.
  - 1.2 Work with landowners to develop and implement management for the species.
    - 1.2.1 Identify landowner short-term and long-term land use goals and compatibility for Zapata bladderpod conservation.
    - 1.2.2 Develop partnerships with landowners and implement management plans that are beneficial to Zapata bladderpod.
    - 1.2.3 Develop a monitoring program to be implemented with voluntary landowner assistance.
  - 1.3 Encourage enforcement of applicable laws and regulations.
2. Search for new populations.
3. Conduct studies to gather biological information about Zapata bladderpod needed for management and recovery in the wild.
  - 3.1 Determine specific habitat requirements.
    - 3.1.1 Study soils and underlying geology.
    - 3.1.2 Determine community structure.
    - 3.1.3 Study ecology and dynamic processes of associated community.
      - 3.1.3.1 Study direct and indirect effects of land use practices on Zapata bladderpod and its associated habitat.
      - 3.1.3.2 Study the responses to periodic or cyclic processes such as flooding, fire, and freezing temperatures.
      - 3.1.3.3 Study interactions with other species (beneficial and negative).

- 3.2 Study population biology.
  - 3.2.1 Conduct demographic analyses of the populations.
  - 3.2.2 Characterize phenological aspects.
  - 3.2.3 Study pollination biology.
  - 3.2.4 Study seed production and dispersal in the wild.
  - 3.2.5 Study seedling recruitment.
  - 3.2.6 Study population genetics to determine genetic diversity within and among populations.
4. Establish a botanical garden population and seed bank.
5. Establish new populations as necessary to meet downlisting criteria.
  - 5.1 Incorporate reintroduction program plans into applicable agency land management plans.
  - 5.2 Develop a monitoring program to assess reintroduction success.
6. Develop a public information and awareness program.
7. Develop delisting criteria and a post-delisting monitoring plan.

**NARRATIVE OUTLINE OF RECOVERY ACTIONS**

1. Protect known bladderpod populations in the United States. The known populations of Zapata bladderpod must be protected from habitat destruction or degradation and other relevant threats. Relationships with private landowners, soil conservation district agencies, roadway construction agencies, oil and gas exploration/production agencies, and rural development agencies should be developed to raise awareness of and conserve the habitat where bladderpod populations are located.

1.1 Familiarize landowners with information on the rarity, significance, and threats regarding the Zapata bladderpod population on their property; encourage stewardship agreements. Information on plant protection under the ESA and other Federal policies concerning recovery of listed plants should be provided to landowners. The Service and other interested parties should work with the government of Mexico (as populations are located) to provide information on the significance of the preservation and natural heritage of the plant so both countries can work collectively with landowners. Landowner cooperation is an essential requirement for the preservation of currently known and newly discovered populations. Agreements for rare plant protection on private lands may be entered into to protect the species as well as offer financial or technical assistance for land management strategies. Conservation organizations such as the Nature Conservancy offer non-binding agreements that recognize landowners who voluntarily protect sensitive species or ecosystems. TPWD's Landowner Incentive Program provides financial incentives that encourage landowners to help conserve rare species and is open to all private landowners who wish to voluntarily manage for rare species on their land.

Other long-term, binding agreements could include conservation easements or the sale or donation of land to a conservation organization. Programs through which these agreements could be funded include the Service's Partners for Wildlife, Cooperative Endangered Species Fund, or private lands programs with TPWD, TNC, and other conservation organizations or agencies.

1.2 Work with landowners to develop and implement management for the species. Landowner cooperation and involvement is critical to the survival of Zapata bladderpod and its habitat. Landowners who are interested in surveying for the species on their property and/or implementing management for the species may and should be encouraged to contact the Service for information: U.S. Fish and Wildlife Service, Corpus Christi Ecological Services, c/o TAMUCC, 6300 Ocean Dr., Box 338, Corpus Christi, Texas 78412. Tel. (361) 994-9005.

1.2.1 Determine voluntary landowner short-term and long-term land use goals. Where Zapata bladderpod occurs on private land, current management should be assessed to determine compatibility with bladderpod. Grazing regimes, pasture improvements such as the introduction of non-native forage grasses, mechanical or chemical brush removal, or an increased animal stocking rate may impact bladderpod habitat.

- 1.2.2 Develop partnerships with landowners and implement management plans that are beneficial. Landowners may indirectly protect and maintain the species through land management that supports hunting and other recreational uses; such management plans may provide optimum conditions for the Zapata bladderpod. Management plans should include best practices to reduce soil disturbance, manage grazing, manage invasive plant species, and monitoring. New information on the life history, ecology, and population biology of this species should be incorporated as it becomes available.
    - 1.2.3 Develop a monitoring program to be implemented with voluntary landowner assistance. The Service should work with landowners to develop monitoring programs for the Zapata bladderpod. Monitoring techniques should be standardized so that results between different populations/sites will be comparable. The results from the monitoring program should facilitate an evaluation of management practices for different populations of Zapata bladderpod. Factors to be assessed during monitoring should include the general condition of the habitat, reproductive success, and responses to specific management practices. Monitoring should be conducted qualitatively and quantitatively during and following flowering and fruiting of the plant, and especially after significant rainfall events. Any decline noted in the species' condition during monitoring should be brought to the attention of all parties involved in the species' recovery so that an effective response can be initiated.
  - 1.3 Encourage enforcement of applicable laws and regulations. Federal and State agents should exercise their full authority to protect populations on public and private land. The legal responsibilities of landowners for protecting endangered plants that occur on their land are limited. If a project on private land receives Federal funds or is Federally authorized, the Federal action agency providing the funds or authorization must ensure that the project will not jeopardize the continued existence of the species. Federal agencies must conduct formal section 7 consultations under the Act if an action authorized, funded, or carried out by a Federal agency may adversely affect a threatened or endangered species. Informal consultations with the Service are often undertaken by Federal agencies to assist them with their determination of a project's potential impact.
2. Search for new populations. Surveys should be conducted to locate Zapata bladderpod populations in the United States and Mexico. Many areas of native habitat have not been surveyed for this species due to lack of access. This species is difficult to detect without an intensive search due to its ephemeral tendencies during drought conditions. Information on the Zapata bladderpod's appearance, rarity, and vulnerability should be provided to Federal, State, and private landowners. To ensure accuracy, surveys should be conducted at favorable times to locate the plants, (e.g., after rainfall) focusing on associated soil types. Federal (i.e. USFWS, USDA, etc.) and State (TPWD, TDA, etc.) agencies as well as non-governmental organizations (TNC) should increase efforts to form relationships with private landowners to search for and protect populations.
3. Conduct studies to gather information about Zapata bladderpod for management and recovery in the wild. Information on the ecology, life history, population biology, and pollination for the Zapata bladderpod in its native habitat is lacking. Efforts to understand and manage the species



are therefore hindered. Studies conducted to gather basic biological information on the species should focus on factors that will enable a better understanding of habitat and provide insight into effective management for the species. Information obtained from the studies should be incorporated into management plans as appropriate to assist recovery of the species. New information should be incorporated into future recovery plan revisions.

- 3.1 Determine specific habitat requirements. Detailed habitat information will enable survey efforts to be focused and more efficient. This information would also enable the Service to identify specific locations on Service lands suitable for reintroduction efforts.
  - 3.1.1 Study soils and underlying geology. Soil analysis has been performed (Wu and Smeins 1999) at four Zapata bladderpod population sites in Starr and Zapata Counties. Further analyses and sampling efforts may facilitate the discovery of other populations within the species' historic range.
  - 3.1.2 Determine community structure. Research regarding the community structure at the largest known site of Zapata bladderpod is ongoing (Sternberg and Best in prep.). Detailed, quantitative measurements have not been conducted for all existing populations; data gathering should include calculations of dominance, density, frequency, constancy, species diversity, age class structure, and spatial patterning of associated thornshrub and Zapata bladderpod.
  - 3.1.3 Study ecology and dynamic processes of associated community. Little is known about the basic community ecology and dynamic processes that may be critical to the preservation of Zapata bladderpod. Studies are needed to determine the response of the species to seasonal and cyclical processes such as rainfall, flooding, freezing, fire suppression, disturbance (grazing and trampling), and interactions with associated species. Successful management and recovery of the species will depend on an understanding of Zapata bladderpod habitat and the species' role in the ecosystem.
    - 3.1.3.1 Study direct and indirect effects of land use practices on the Zapata bladderpod and its associated habitat. One of the populations of Zapata bladderpod is subject to grazing, providing an opportunity to study the response of the species and the habitat to this land use.
    - 3.1.3.2 Study the responses to periodic or cyclic processes such as flooding or freezing. The effect of periodic freezes on Zapata bladderpod is unknown, although based on the perennial lifestyle and deep taproot the species exhibits, it is probably capable of withstanding freezing temperatures. Surveys after strong rain events indicate that the upper portion of the soils in this area are prone to erosion, which in turn may affect the survival of the plant by exposing the root structures. This type of information may help identify specific potential reintroduction sites or appropriate timing of reintroductions.

## 3.1.3.3

Study interactions (beneficial and negative) with other species. Interaction between Zapata bladderpod and associated species need to be studied. Although Zapata bladderpod individuals are sometimes found in the open, most individuals are located within the protection and semi-shade of scattered thornshrub. Other plants may act as "nurse plants" for Zapata bladderpod by providing shelter from predation, shading (with the resultant tempered microclimate), more favorable microclimate for seedling germination, and higher nutrient levels or other favorable edaphic factors (Barbour *et al.* 1998, Nabhan 1987). The degree of fidelity of Zapata bladderpod with other species is not known, and the role of nurse plants warrants further investigation.

The Zapata bladderpod is vulnerable to competition from invasive, non-native forage grasses such as buffelgrass. Buffelgrass can displace native vegetation, possibly creating changes in the habitat through allelopathic or direct soil and nutrient competition that prevent re-establishment of native species including the Zapata bladderpod. Controlled studies are needed to determine the degree of threat and options for effective management.

Cattle grazing and trampling may cause direct and indirect impacts to the species through damage from trampling on individuals, alteration of vegetation composition and structure, change in soil and water resource distribution as a result of long-term grazing in an arid environment, introduction of non-native species, disruption of nutrient cycling through damage to the thin microbiotic crust over the soil, and edaphic macrohabitat changes such as soil compaction/erosion, decreased water infiltration ability, and the reduction of soil litter (Fleischner 1994). These impacts could be evaluated using small enclosure studies.

Specific predators or pests have not been identified for Zapata bladderpod; however, entrance and exit cavities have been observed in the pods, which may indicate insect predation that may potentially affect seed production. Observation to identify predators or pests is needed, as well as evaluation of potential management control actions.

- 3.2 Study population biology. The status of Zapata bladderpod population stability over time, demographic trends, genetic viability and variation within and between populations (intra- and inter-population), phenology (relationship of climate and seasonality to plant life cycle stages), and reproductive biology of the species in the wild is not well documented. This information is critical for effective management of Zapata bladderpod populations.

- 3.2.1 Conduct a demographic analysis of the populations. Little is known of the demographics of Zapata bladderpod populations. The largest population occurs on a LRGV tract where numbers of individuals found during different surveying efforts ranged from few to thousands (U.S. Fish and Wildlife Service 1999). Studies on the natural population variation, age class distribution, survivorship, resource allocation patterns, and the spatial relationships of the Zapata bladderpod to associated species are necessary to evaluate critical life stages and vulnerability to threats.
- 3.2.2 Characterize phenology. The relationship of climate and seasonality on the Zapata bladderpod life cycle in the wild should be further investigated. Phenological observations during growing and dormant seasons are needed to assess the species' responses to varied climatic conditions. Observations at each visit should note present and recent climatic conditions so that climatic data can be correlated with life cycle stages. This information is necessary to determine management strategies that address vulnerable life stages and favorable times for establishment of individuals.
- 3.2.3 Study pollination biology. It is speculated that Zapata bladderpod reproduces strictly sexually through outcrossing (U.S. Fish and Wildlife Service 1999); therefore, understanding the pollination biology of this species is critical to the establishment and maintenance of populations. The bright yellow flower is likely to attract pollinators; however, pollinators have not been observed in any of the Zapata bladderpod locations. Identification of pollinators would be of value for management of the species as well as the evaluation of pesticide threats to pollinators.
- 3.2.4 Study seed production and dispersal in the wild. Seed production and dispersal mechanisms of Zapata bladderpod in the wild are poorly understood. Mature fruits may dehisce while still attached to the plant, or may drop to the soil. Rain may carry the seed to establishment sites away from the original plant. Further observation of plants in the wild would provide information on recruitment potential for the species and may also guide decisions related to the appropriate distance between (protected and/or reintroduced) populations.
- 3.2.5 Study seedling recruitment. Seedlings have been observed in the wild although physical and biological conditions necessary for seedling growth are virtually unknown (U.S. Fish and Wildlife Service 1999). Studies are needed to determine optimum conditions for seedling establishment and growth, effects of disease and predation on seed production, and habitat factors that may be limiting seed production and seedling establishment. This information is vital for understanding long-term viability of populations, potential for range expansion of a population, and in selecting sites for reintroduction or augmentation.
- 3.2.6 Study population genetics to determine genetic diversity within and among populations. As populations are located or reintroduction projects materialize, the need for genetic information becomes invaluable. This information would be

useful in measuring the amount of genetic diversity of individuals within and among populations, total genetic diversity among all populations, and the genetic distance between two populations. In addition, information on the rate of gene flow between populations, as well as quantitative information on reproduction modes (self-fertilization vs. outcrossing vs. vegetative cloning) will help guide long-term conservation strategies for the species.

4. Establish a botanical garden population and seed bank. Specimens from the known population(s) should be maintained at different institutions. A seed bank should be established for the species and maintained at the National Seed Storage Laboratory in Fort Collins, Colorado. The San Antonio Botanical Garden has indicated an interest in conducting research on propagation techniques and seedling production for the Zapata bladderpod, and to establish an educational botanical garden population (Cox 2002 pers. comm.). At least two refugia collections and seed bank reserves should be established and maintained to provide assurance against extinction if a loss of natural populations should occur. Cultivated plants could provide individual plants for research and provide a plant source for possible reintroductions.
5. Establish new populations as necessary to meet downlisting criteria. Due to the apparent rarity of the Zapata bladderpod within its range, reintroductions of the species may be necessary to aid recovery. The Service defines reintroduction as placing species in its historic range. As some of the collection data for this species is ambiguous, any reintroduction will need to be undertaken in areas of appropriate habitat within the historic range of the species. Reintroduction efforts could be implemented on Federal lands such as those within the LRGV Refuge Complex or on State or private lands volunteered for use. Any reintroduction efforts will follow Service policy on controlled propagation of endangered and threatened species, and incorporate the most recent reintroduction guidelines available (Falk *et al.* 1996).
  - 5.1 Incorporate reintroduction program plans into applicable agency land management plans. Federal lands occurring within the historic range of the Zapata bladderpod primarily consist of sites under the management of the LRGV; reintroduction programs for the Zapata bladderpod could be incorporated into ongoing habitat restoration projects and land protection plans of the Wildlife Refuge Comprehensive Conservation Plan. State or private lands volunteered for use should also be considered for reintroduction programs for the Zapata bladderpod within the known range.
  - 5.2 Develop a monitoring program to assess reintroduction success. Reintroduction success can only be assessed through the development and implementation of a long-term monitoring program. A monitoring program may reveal information needs, management strategies, or a need for adaptive approaches to reintroduction. Monitoring procedures for assessing reintroduction success should be the same as those implemented for the natural populations so that comparisons between populations can be verifiable and valid. The monitoring program should be incorporated into management plans as procedures are developed.
6. Develop a public information and awareness program. Public awareness and cooperation are essential for the success of the Zapata bladderpod recovery program. An informative program about the Zapata bladderpod, threats to the species, the Recovery Plan, and the Endangered Species Act in general, should be developed for presentation to private landowners, agency

personnel, and other interested groups. The program should include the identification of recovery tasks that the individuals or groups being addressed can accomplish to participate in recovery of the species. Additionally, information on the Zapata bladderpod should be included within any Lower Rio Grande or Mexico/United States Bi-national Ecosystem program so that a coordinated approach to recovery can be implemented.

7. Develop delisting criteria and a post-recovery monitoring plan. Once the needed information on distribution, life history, ecology, and genetics are obtained, delisting criteria and a post-delisting monitoring plan can be developed. Future criteria should be developed that incorporate measures to alleviate threats identified under the five listing factors and identify when the species will no longer be threatened with endangerment. All information needs for Zapata bladderpod that have been determined as critical during the course of recovery-oriented research must be evaluated prior to delisting. If the downlisting criteria are no longer being met, the species should be returned to the status of endangered. Post-delisting monitoring for a minimum of five years is required by the ESA.



**MINIMIZATION OR ALLEVIATION OF THREATS TO THE ZAPATA BLADDERPOD THROUGH IMPLEMENTATION OF RECOVERY ACTIONS**

The final rule listing the Zapata bladderpod as endangered under the Endangered Species Act evaluated threats to the species in terms of the five ESA listing factors. Implementation of the Recovery Plan would result in an improvement in the status of the species by recommending actions that directly address the five listing factors. By alleviating these threats to the species, recovery objectives and criteria can be achieved, and the goal of the Recovery Plan will be accomplished.

Listing Factor A: The present or threatened destruction, modification, or curtailment of its habitat or range. These threats include the introduction of non-native pasture grasses, such as buffelgrass, and conversion of native rangeland to improved pasture, overgrazing, construction or improvement of highways and utility transmission systems necessary to support urban infrastructures, and oil and gas exploration and production. Implementation of recovery actions 1.1, 1.2, 1.3, 2, 3.1, 3.2, 4, 5 and 6, will help protect the Zapata bladderpod's habitat by: (a) providing landowners and land managers information on the significance, rarity and threats facing the Zapata bladderpod; (b) encouraging establishment of Stewardship Agreements in accordance with landowner short-term and long-term land use goals; (d) developing management and monitoring plans with willing landowners and land managers; (e) studying effects of land use patterns on the bladderpod's associated habitat; (f) searching for additional populations on private, State and Federal lands, as well as in Mexico; (g) establishing a protected, intensively managed botanic population and seed bank; (h) establishing new populations on private, State, and Federal lands; (i) promoting conservation of the species in Mexico; (j) developing public awareness through outreach efforts to protect both the Zapata bladderpod populations and its associated habitat.

Listing Factor B: Over-utilization for commercial, recreational, scientific, or educational purposes. Although reported to have medicinal values, the species is not known to be a product in commercial trade. Implementation of recovery action 6 will help inform scientific agencies or any interested party of the importance of protecting this rare species.

Listing Factor C: Disease and/or predation. Current populations of Zapata bladderpod have shown no evidence of disease. Biologists surveying the sites owned and protected by the LRGV found evidence of browsing by native animal species on the plants. Although consumption by herbivores is a natural event, browsing can be a greater threat during drought conditions when range quality is reduced and other forage species have been reduced or removed. Due to the small number of Zapata bladderpod populations that currently exist, the overall sensitivity of the species to browsing (or any threat) may be increasing over time. Biologists have also discovered evidence of predation on seed material of Zapata bladderpod during surveys. Implementation of recovery actions 1.1, 1.2.1, 1.2.3, 2, and 3.1.3.3 will provide landowners information on protection and stewardship for populations that may be under stress by natural or man-made causes.

Listing Factor D: Inadequacy of existing regulatory mechanisms by Federal and State laws. Protection of the Zapata bladderpod under the Endangered Species Act provides opportunities to protect the species. Recovery action 1.3 will encourage the ongoing efforts of section 7 consultation, whereby Federal agencies are required to consult with the Service on projects that they fund, authorize, or permit that may impact listed species. Recovery implementation actions 1.2, 2, 5, 7 will contribute to the species' recovery by increasing the interests of non-governmental organizations, Federal and State agencies, and academics, in protecting known populations, establishing seed banking projects, undertaking

reintroduction projects, continuing to refine recovery objectives and criteria, and developing post-delisting monitoring plans.

Listing Factor E. Other Natural or Man-made Factors Affecting its Continued Existence. In the final listing of the Zapata bladderpod, only two sites were known to occur that had viable populations. Loss of individuals within a population can result in genetic drift, which can restrict genetic variability, thereby reducing the species' ability to overcome environmental stresses, especially in drought years (Pavlik 1996). The extreme rarity of the species makes populations vulnerable to extirpation and extinction from the variety of random environmental events, as well as human exploitation of its habitat. Implementation of recovery actions 1.2, 1.3, 4, and 7 will help to achieve recovery by promoting conservation practices at existing and newly discovered bladderpod sites. Development of delisting criteria and implementation of the actions needed to achieve recovered status will ensure that all threats, including vulnerability due to small population size, are sufficiently lessened or alleviated such that the species is no longer in danger of extinction or endangerment within a significant portion of its range.

**IMPLEMENTATION SCHEDULE**

The following Implementation Schedule outlines actions and costs for the Zapata bladderpod recovery program. It is a guide for meeting the objectives elaborated in Part II of the Recovery Plan. This schedule specifies task priorities, task numbers, task descriptions, duration of tasks, responsible agencies or potential partners, and estimated costs. It should be noted that the estimated costs for all parties involved in recovery are identified for the first three years only, and therefore do not reflect total recovery costs. An estimate of total costs to reach the goal of the Recovery Plan is shown in the Executive Summary. The costs estimated are intended to assist in planning. The Recovery Plan does not obligate any involved agency or party to expend the estimated funds. Although collaboration with private landowners is recommended in the Recovery Plan, private landowners are also not obligated to expend any funds.

*Action Priority*

**Priority 1** - An action that must be taken to prevent extinction or to prevent the species from declining irreversibly in the foreseeable future. **Priority 2** - An action that must be taken to prevent a significant decline in species population/habitat quality, or some other significant negative impact short of extinction. **Priority 3** - All other actions necessary to meet the recovery objectives.

*Acronyms Used*

CPC - Center for Plant Conservation

EPA - Environmental Protection Agency

ES - Ecological Services, U. S. Fish and Wildlife Service

LE - Law Enforcement, U.S. Fish and Wildlife Service

LRGVNWR - Lower Rio Grande Valley National Wildlife Refuge

NRCS - Natural Resources Conservation Association

SABG - San Antonio Botanical Gardens

STCC - South Texas Community College

TAMU - Texas A & M University

TDA - Texas Department of Agriculture

TNC - The Nature Conservancy

TPWD - Texas Parks and Wildlife

TX DOT - Texas Department of Transportation

UAT - Universidad Autónoma de Tamaulipas

UNAM- Universidad Nacional Autónoma de Mexico

USDA - U.S. Department of Agriculture

US DOT - U. S. Department of Transportation

UT - PanAM - University of Texas Pan-American

## ZAPATA BLADDERPOD RECOVERY PLAN IMPLEMENTATION SCHEDULE

PRIORITY #	TASK #	TASK DESCRIPTION	TASK TERM (YEARS)	POTENTIAL PARTNERS FWS/REGION 2 PROGRAM / OTHER	COST ESTIMATES (\$1000s)			COMMENTS
					YEAR 1	YEAR 2	YEAR 3	
1	1.1	Familiarize landowners with information on the rarity, significance, and threats; encourage stewardship agreements	1-10+	ES / TNC / TPWD LRGVNWR	11.0	8.0	8.0	Continued protection of existing populations is crucial to the species' survival.
2	1.2.1	Determine landowner short-term and long-term land use goals	3	ES / TNC / TPWD LRGVNWR	5.0	5.0	5.0	Necessary for outreach and conservation
1	1.2.2	Develop and implement management plans for known sites	5	ES / TNC / TPWD LRGVNWR	10.0	5.0	5.0	Years 4 and 5 \$5,000 See comment 1.1.

PRIORITY #	TASK #	TASK DESCRIPTION	TASK TERM (YEARS)	POTENTIAL PARTNERS FWS/REGION 2 PROGRAM / OTHER	COST ESTIMATES (\$1000s)			COMMENTS
					YEAR 1	YEAR 2	YEAR 3	
1	1.2.3	Develop monitoring program with voluntary landowner assistance	5	ES / TPWD/LRGV NWR US DOT/TXDOT TAMU/UT/PanAm/ STCC/TNC	6.0	6.0	6.0	Years 4 and 5 \$3,000 See comment 1.1.
1	1.3	Implement applicable laws and regulations	Ongoing	ES/TPWD / LRGV NWR/US DOT TXDOT/LE	2.0	2.0	2.0	See comment 1.1.
1	2	Search for new populations	Ongoing	ES/TPWD/LRGV NWR US DOT/TXDOT TAMU/UT/PanAm/ STCC/UNAM/UAT	25.0	25.0	25.0	Surveys should be conducted as needed until recovery is achieved
2	3.1.1	Study soils and underlying geology	2	ES/TPWD/LRGV NWR US DOT/TXDOT TAMU/UT/PanAm/ STCC/UNAM/UAT	2.0	2.0	2.0	Necessary for surveying and reintroduction efforts
2	3.1.2	Determine community structure	3	ES / LRGV NWR/TPWD UAT/UNAM/TAMU UTPanAm/STCC	5.0	5.0	5.0	Necessary for surveying and reintroduction efforts



PRIORITY #	TASK #	TASK DESCRIPTION	TASK TERM (YEARS)	POTENTIAL PARTNERS FWS/REGION 2 PROGRAM / OTHER	COST ESTIMATES (\$1000s)			COMMENTS
					YEAR 1	YEAR 2	YEAR 3	
1	3.1.3.1	Study effects of land use practices on Zapata bladderpod and its associated habitat	5	ES/LRGVNR UAT/UNAM/STCC/TA MUTPWD/UTPanAm	5.0	5.0	5.0	Years 4 and 5 \$2,000 See comment 1.1.
3	3.1.3.2	Study response to periodic or cyclic processes such as flooding, fire, and freezing temperatures	3	ES/LRGVNR UAT/UNAM/STCC/TA MUTPWD/UTPanAm	2.0	2.0	2.0	Years 4 and 5 \$2,000
2	3.1.3.3	Study interactions with associated species	5	ES/LRGVNR UAT/UNAM/STCC/TA MUTPWD/UTPanAm	3.0	3.0	3.0	Years 4 and 5 \$2,000
1	3.2.1	Conduct a demographic analysis of the populations	3	ES/LRGVNR UAT/UNAM/STCC/TA MUTPWD/UTPanAm	10.0	10.0	10.0	Years 4 and 5 \$2,000
2	3.2.2	Characterize phenology	5	ES/LRGVNR UAT/UNAM/STCC/TA MUTPWD/UTPanAm	5.0	5.0	5.0	Years 4 and 5 \$3,000

PRIORITY #	TASK #	TASK DESCRIPTION	TASK TERM (YEARS)	POTENTIAL PARTNERS FWS/REGION 2 PROGRAM / OTHER	COST ESTIMATES (\$1000s)			COMMENTS
					YEAR 1	YEAR 2	YEAR 3	
2	3.2.3	Study pollination biology	3	ES/LRGVNR UAT/UNAM/STCC/TA MUTPWD/UTPanAm/EP A	3.0	3.0	3.0	Years 4 and 5 \$3,000
2	3.2.4	Study seed production and dispersal in the wild	5	ES/LRGVNR UAT/UNAM/STCC/TA MUTPWD/UTPanAm	5.0	5.0	5.0	Years 4 and 5 \$3,000
2	3.2.5	Study seedling recruitment	5	ES/LRGVNR UAT/UNAM/STCC/TA MUTPWD/UTPanAm	5.0	5.0	5.0	Years 4 and 5 \$3,000
2	3.2.6	Study population genetics	3	ES/NWRS/TAMU UT-Pan/TPWD	30.0	30.0	30.0	Necessary for reintroduction
1	4	Establish a botanical garden population and seed bank	ongoing	ES/TPWD/CPC LRGVNR SABG	12.0	12.0	12.0	Necessary to ensure survival if long-term management agreements are not sufficient to preserve the species

PRIORITY #	TASK #	TASK DESCRIPTION	TASK TERM (YEARS)	POTENTIAL PARTNERS FWS/REGION 2 PROGRAM / OTHER	COST ESTIMATES (\$1000s)			COMMENTS
					YEAR 1	YEAR 2	YEAR 3	
3	5	Establish new populations if necessary to achieve recovery	5	ES/LRGV NWR UAT/UNAM/STCC/TA MUTPWD/UTPanAm/T NC	15.0	15.0	15.0	Years 4 and 5 \$5,000
3	6	Develop a public information and awareness program	5	ES/LRGV NWR UAT/UNAM/STCC/TA MUTPWD/UTPanAm/T NC	4.0	4.0	4.0	Years 4 and 5 \$2,000 / \$2,000
3	7	Develop delisting criteria and a post-delisting monitoring plan.		ES / TPWD / LRGV NWR/TNC	0.0	0.0	0.0	No costs associated, unless it is determined that a recovery team should be convened.

**PART III - LITERATURE CITED**

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**APPENDIX A: PUBLIC COMMENTS RECEIVED ON THE  
DRAFT ZAPATA BLADDERPOD RECOVERY PLAN**

Recovery Plan Comment Letter # 1  
Zapata bladderpod



OFFICE OF THE COMMISSIONER  
UNITED STATES SECTION

INTERNATIONAL BOUNDARY AND WATER COMMISSION  
UNITED STATES AND MEXICO

JAN 31 2003

Allan M. Strand  
Field Supervisor  
U.S. Fish and Wildlife Service  
Attn: Loretta Pressly  
Corpus Christi Ecological Services  
c/o TAMU-CC  
6300 Ocean Dr., Box 338  
Corpus Christi, Texas 78412

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FEB 3 2003

FISH & WILDLIFE SERVICE  
CORPUS CHRISTI, TX

Dear Mr. Strand:

Thank you for the opportunity to comment on the "Draft Zapata Bladderpod Recovery Plan." The United States Section of the International Boundary and Water Commission (USIBWC), is interested in the recovery efforts of the endangered plant. The USIBWC requests invitation to appropriate meetings on the subject for the Lower Rio Grande Flood Control Project and the International Falcon Dam and Reservoir Project.

In the future, please address documents of this type to me, at this address. Also, please provide the USIBWC a copy of the final recovery plan once it is complete.

If you have any questions, please call Environmental Protection Specialist, Steve Fox at (915) 832-4736.

Sincerely,

*Sylvia A. Waggoner*  
Sylvia A. Waggoner  
Division Engineer  
Environmental Management Division

The Commons, Building C, Suite 310 • 4171 N. Mesa Street • El Paso, Texas 79902  
(915) 832-4100 • (FAX) (915) 832-4190 • <http://www.ibwc.state.gov>



Recovery Plan Comment Letter #2  
Zapata bladderpod

**MEMORANDUM**

**TO:** Loretta Pressley  
**FROM:** Chris Best  
**SUBJECT:** Comments on Draft Recovery Plan for Zapata Bladderpod  
**DATE:** February 12, 2003

My comments and editorial suggestions refer to the line number in the left-hand column.

- 123 Change "graveled to sandy-loam" to "gravelly to sandy loam", as you do in line 133.
- 159-166 Use NVCS standards, as required by the Federal Geographic Data Subcommittee. In theory.
- 167 Change "within areas devoid of other vegetation" to "in sparse herbaceous vegetation".
- 204-205 Once again, you should cite Mitchell Sternberg; I assigned him to survey the Cuellar population in 1997. This site previously had just a few dozen plants during several years of survey. In that year, unusually abundant rainfall in March and April resulted in a population increase to over 8,000. Since then, the number of observed individuals has again been a few dozen; however, see the ongoing work of Dana Price and I. Mitch's work was done in a very scientific manner for the express purpose of providing the kind of information we need for the Recovery Plan. This includes data on associated species. I can get you a copy of a paper he submitted, if you do not already have this.
- 206 Add the adjective "ephemeral" (as you do elsewhere), since it is very important that people understand that you can't always find these plants.
- 215 We need to stress the need to study populations in Mexico. Very little survey work has been done in adjacent areas of Tamaulipas, Nuevo Leon and Coahuila, either by our botanists or Mexicans. Considering the ephemeral nature of this species, it could easily have been missed. 2-1
- 249-251 The last sentence in this paragraph needs work. I think I know what you mean, but many would be confused.
- 267 State Hwy 83 or US Hwy 83?
- 285 Please don't even mention seed germination efforts at LRGV NWR. On only one occasion (before the species was listed), I had 8 (eight) seeds, of unknown viability; I planted them in shallow sandy soil, rather than just throw them out, but it certainly didn't amount to what I consider to be a propagation effort. I need to

Rec. Plan Comment Letter # 2 Page 2  
Zapata bladderpod

obtain a section 7 consultation before collecting and germinating more seeds.

- 122-270 At some point, either under habitat, population biology, distribution and abundance, or impacts and threats, you need to cite (pers. comm) an ongoing investigation by C. Best and D. Price, in which we collected data on bladderpod abundance and associated species in a 0.26 ha ROW that had been wood-gated, compared to an adjacent area of uncleared brush. This is the same area that had over 8000 bladderpods on 3.2 ha in 1997. The pre-existing ROW had to be cleared of brush by a utility company, in December, 2000, in order to access and replace a major powerline tower. They agreed to use a wood-gator, which chops woody vegetation just above the ground without disturbing the soil, as opposed to a bulldozer. Our results from March 27-28, 2002, show that the population on the 2.6-ha ROW was 5,797 *Lesquerella thamnophila*, while the adjacent 2.6-ha of uncleared shrubland contained only 790. In other words, 15 months after the shrubs were cleared, the population density soared to more than 7 times the density of the uncleared vegetation. We will collect data again next week on this site.
- 328 Is this 2000 individuals per population? (I believe that's what you are saying).
- 347-348 Change to "...(Cuellar, .... and La Puerta tracts of Lower Rio Grande Valley NWR).
- 364-367 Change to "Seven distinct tracts....*potentially* have the type of soil..." (italics only to show the change).
- 367 Spelling errors: Cuellar (not Cuellular); Chapeño (use ALT+164 on alternate keypad to get the enye).
- 372 Question: How geographically distinct should these populations be? Can we have some kind of guideline?
- 543-544 Again, this is not correct; you simply must look at Sternberg's work. Did you never get a copy of his paper???

Implementation Table:

- 857 We must involve Mexican agencies/organizations in the search for Mexican populations.

Recovery Plan Comment Letter #3  
Zapata bladderpod



Ms. Loretta Pressly  
U.S. Fish and Wildlife Service  
Corpus Christi Ecological Services  
c/o TAMUCC  
6300 Ocean Dr., Box 338  
Corpus Christi, TX 78412

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FEB 18 2003

FISH & WILDLIFE SERVICE  
CORPUS CHRISTI, TX

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CHAIRMAN-EMERITUS  
FORT WORTH

February 14, 2003

Dear Ms. Pressly,

Thank you for allowing us the opportunity to comment on the draft recovery plan for the Zapata bladderpod. This draft is improved over the preliminary draft and we appreciate your consideration of the many comments and concerns we submitted in our earlier review.

We still have some concerns about the emphasis of the Recovery Plan. In particular, this draft seems to place emphasis on reintroduction, or the creation of new populations. Reintroduction is an experimental technique that is expensive, both in terms of time and money. The amount of money allotted in the Implementation Schedule would be enough to cover one site per year. It is our opinion that reintroduction should receive less emphasis in the Plan compared to protection and management of existing populations and surveys for new populations. Until surveys of potential habitat in the US as well as Mexico reveal an insufficient number of new populations that are capable of being protected, reintroduction should be a low priority. Before reintroductions are attempted, the Zapata bladderpod's habitat needs to be characterized more completely, with particular attention to the associated plant communities, soils and geology.

Since little is known about Zapata bladderpod's habitat requirements, demography, and responses to environmental variability and management practices, the Recovery Objective of reclassifying the species to threatened status is appropriate. Twelve secure populations is a reasonable goal for reclassification. The number of sites would then equal the number of current and historically recorded sites.

This draft is more internally consistent than the preliminary draft and thus, easier to follow. In the Executive Summary, the seven major actions needed correspond to the recovery cost estimates and also to the narrative outline of recovery actions (pp. 19- 36).

Specific comments in order of appearance in the text follow.

**Executive Summary**

*To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.*

4200 SMITH SCHOOL ROAD  
AUSTIN, TEXAS 78744-3291  
512-389-4800  
www.tpwd.state.tx.us



Take a kid  
hunting or fishing  
• • •  
Visit a state park  
or historic site

**Habitat Requirements** (Page vi): It is unclear if the "high calcareous sandstones and clays" are high in height or high in calcium. It would be clearer to say "highly calcareous sandstones and clays".

**Total estimated cost of recovery** (Page viii): Given the time that is required to approve a recovery plan and to identify or allocate funding sources to support recovery activities, the schedule should begin with 2004 (not 2003). The following comments on total estimated cost of recovery are also related to the Implementation Schedule:

Need 1: costs may need to be distributed more evenly to later years (4-6) of the Plan. As new information from habitat studies becomes available, it will be possible to better focus survey efforts.

Need 3: Again, costs should be distributed to years 4-6. Zapata bladderpod exists in a highly variable climate and I would not recommend that management decisions be made on the basis of a study of short duration.

Need 4: Maintaining a botanical garden collection will incur some ongoing costs.

Need 5: Establishing new populations should start only after surveys of likely habitat and attempts to locate new populations are complete.

#### **Introduction**

**Background and Distribution** (Page 1 and 5-6): The sites known in Texas that are listed here correspond accurately to those in the Biological Conservation Database. On p.6, lines 202-203, the known site at Falcon Lake West was verified as recently as 1985 (Poole 1989) but it is not certain that the type specimen was collected from precisely this location. It would be more informative to give the date of last observation. Perhaps it could be stated: "The site in the vicinity of the type locality at Falcon Lake West is believed extirpated; plants were last observed at this site in 1985".

A population has been well-documented in Mexico. A verified specimen is housed at the University of Texas at Austin herbarium. Although this site has not been revisited, the population should be considered historical and mentioned as part of the historical populations throughout the document, including the Executive Summary, the Distribution and Abundance section, and the Recovery Objective and Recovery section. Thus there are 12 historical populations: 11 in the US (7 in Starr County and 4 in Zapata County) and one in Mexico.

**Morphology** (Page 2): Among *Lesquerella* species leaf shape is an important key character, and should be added to the Morphology section. The basal leaves are narrowly elliptical to oblanceolate and acute while the cauline leaves are linear to narrowly elliptical and acute.

In Lines 117-118, it states that flowering is dependent on "timing and rainfall". Perhaps "timing of rainfall" is intended?

**Habitat** (Page 3): Little is known about the habitat of *L. thamnophila*. The Plan's descriptions of the soils in which Zapata bladderpod has been documented are as

Recovery Plan Comment Letter # 3 Page 3  
Zapata bladderpod

accurate as presently available information allows. However, soils have primarily been identified using soil surveys, which in the case of Zapata County consists of an extremely generalized map. Plants often occur on small pockets of soils within larger areas of different soils, and Zapata bladderpod occurs on sloping areas in which soils are often highly eroded. For these reasons it is not readily apparent which soil type is actually supporting the bladderpod and Zapata bladderpod's actual habitat may be more narrowly defined than soil maps indicate. Soils should be identified with the help of soil scientists. The same is true for the sandstone geologic formation with which *L. thamnophila* is usually associated. When more detailed information is available concerning soils, geology, associated species, hydrology, microclimate, pollination biology, etc., then informed decisions can be made concerning areas of potential habitat as well as potential reintroduction sites.

3-1

**Population biology** (Page 4): The use of the term "sp." indicates that you do not know the species of *Prosopis*. The only native mesquite tree in South Texas is *P. glandulosa*.

3-2

Is it accurate to say that "Zapata bladderpod may grow within areas devoid of other vegetation" (Page 5, line 167)? While the plants have been observed to grow in full sun, these areas generally support an herbaceous community of grasses and forbs.

Another possible reason for the occurrence of *L. thamnophila* under shrub canopies may be browsing by native wildlife, domestic or exotic animals.

**Distribution and abundance** (Page 7, line 213): it is preferable to state that the results of the Wu and Smeins study suggest (rather than "indicate") the potential for Zapata bladderpod habitat to extend into Webb County. This study did not conduct a detailed soils analysis (see comments about soils).

**Impacts and Threats** (Page 7, lines 222-223): Although browsing by native wildlife may be natural, populations of these animals are often greater than several hundred years ago due to predator eradication, disease control, and feeding (both directly and indirectly) by humans. In particular white-tailed deer populations should be assessed to determine if they are beyond carrying capacity.

Another potential threat that has recently become evident is road construction and vegetation clearing undertaken by the Border Patrol.

**Conservation efforts** (Page 10): it would be more accurate to say that TPWD and Service personnel visit the known sites at least annually for monitoring and at other times for qualitative observation. We don't make a set number of visits to the sites, but stop at the more accessible sites whenever time allows. TxDOT personnel also visit their ROW sites occasionally.

Please give a source for the "informal propagation efforts" at LRGV NWR (Page 11, line 286). Presumably this is C. Best, pers. comm.



**Narrative Outline of Recovery Actions**

**Monitoring** (Page 23, lines 48-489): Depending on the availability of funding, it may not be realistic to expect monitoring to occur three times a year. If monitoring is to occur this frequently at all sites, it will be important to develop a rapid assessment protocol so that each site can be assessed in a few hours. Populations should be monitored quantitatively at least once a year and should be visited for qualitative observation at other times such as following significant rainfall events.

**Stewardship agreements** (Page 24, lines 497-504): This section is very important. TPWD's landowner Incentive Program, while it is a valuable conservation tool, does not pay landowners to simply conserve species. This program provides cost-share funds for management actions and is appropriate when a landowner needs to make improvements or begin a management program (such as protective fencing or controlled burning) to manage or protect rare or endangered species. TPWD's LIP is not a mechanism for long-term funding; projects last only a few years and the landowner is not bound by any agreement beyond the length of the project. A more binding agreement, as stated, would be a conservation easement sold or donated to a land trust, TNC, or FWS. There still may be a need for additional incentive programs for private landowners.

**Study indirect effects of land use...** (Page 27-28, line 562-563): Insert "soil" to clarify this sentence. [...alteration of the soil edaphic characteristics]

**Pollination biology** (Page 31, line 632): There is no (instead of "little") data to suggest that the species reproduces vegetatively; it exhibits a long taproot and no rhizomes or lateral growth.

**Establish a botanical garden population; establish new populations** (Page 33): Nothing is known of this species genetically. Knowledge of the genetic diversity within and among populations is essential for the evaluation of the long-term viability of known populations and for selecting propagative material to produce new populations. Perhaps genetic studies could be undertaken along with the work of collecting seeds from a genetically representative sample of sites for seed banking.

**Minimization of Threats**

**Listing factor A- destruction or modification of habitat** (Page 37): item (e), Encouraging stewardship agreements, is already stated in (b) on the previous page.

**Listing factor C- disease or predation** (Page 38, lines 746-748): Determining the effects of non-native plants on the Zapata bladderpod would alleviate listing factor A (habitat modification) rather than C (disease or predation)- unless competition is included in this factor.

**Listing factor E** (Page 39, lines 764-769): Fiber optic cable projects are an added, direct threat to the two populations on highway right-of-way. Communications companies sometimes operate without consultation.

**Implementation schedule:**

Line 854 (Develop and implement management plans): This is a critically important activity. However, we don't yet know what management practices best conserve Zapata bladderpod. Funding may be needed beyond year 5 to incorporate new information into the management plans.

Line 857 (Search for new populations): Add TAMUK and South Texas Community College to the list of partners here and to all research actions (including everything under task 3).

Line 858 (Study soils and geology): This knowledge will provide necessary information to guide survey and reintroduction efforts, and should be accorded priority 2 along with other research.

Line 860-861 (Study effects of land-use practices; study response to periodic processes): These should be 5- year or longer term studies. The extreme fluctuations of climate in the area will likely make it difficult to detect any effects in the short term.

Line 863 (Demographic analysis): Again, due to climatic fluctuation, this study should be conducted for a minimum of 5 years.

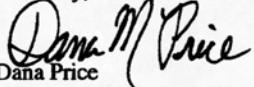
Line 868 (Establish a botanical garden population): ongoing funding will be necessary to maintain the seed collection and cultivated plants.

Line 869 (Establish new populations): Reintroductions may not be necessary if surveys in suitable habitat reveal additional populations. Reintroductions should start after Year 3 of the Plan, following the completion of habitat studies and searches for new populations. We agree that this task should receive priority 3.

Thank you for considering these comments.

If you have questions, please contact Jackie Poole at (512)912-7019 or Dana Price at (512)912-7043.

Sincerely,

  
Dana Price  
Botanist  
Wildlife Diversity Program



Recovery Plan Comment Letter #4  
Zapata bladderpod



# Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-8585

February 28, 2003

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MAR 10 2003

**FISH & WILDLIFE SERVICE  
CORPUS CHRISTI, TX**

U.S. Fish and Wildlife Service,  
Corpus Christi Ecological Services  
C/o TAMU-CC  
6300 Ocean Dr., Box 338  
Corpus Christi, TX 78412  
Attn. Loretta Pressly

Dear Ms. Pressly:

**4-1**

Thank you for providing the Texas Department of Transportation (TxDOT) the opportunity to comment on the proposed draft recovery plan for the Zapata bladderpod (*Lesquerella thamnophila*).

We would like to note that the draft recovery plan does not provide guidelines or cost estimates of what the role of TxDOT will be in achieving recovery. The draft recovery plan recognizes that the highway populations may be lost if the highway is widened. The draft recovery plan should include some guidelines for the fate of those populations if they are to be impacted by highway expansion.

According to the Endangered Species Act (ESA) Sec. 4, (f), (1), (B) the content of a recovery plan is to contain a description of site-specific management actions as may be necessary to achieve the plan's goals, objective, measurable criteria which, when met would result in delisting, and an estimate of the time required and the cost to carry out those measures needed to achieve the plan's goals.

There are currently seven populations of the species known. Two of those populations (p.2, p.6) are known from TxDOT-highway right of way (28% of the known populations).

The draft recovery plan recognizes that there is an informal agreement between the Texas Parks and Wildlife Department (TPWD) and TxDOT for management for the populations on highway right of way (p. 10).

In this draft of the recovery plan, no site specific management actions as required by the section of the ESA cited above are listed for the populations on highway right of way.

There are measurable criteria for delisting, but these criteria don't relate to specific populations, including the populations on highway right of way.

There is an estimate of the time involved to achieve recovery, and there is a cost table (p. viii) but these items don't address any specific agency or any specific population.

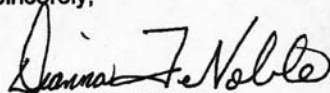
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Recovery Plan Comment Letter # 4 Page 2  
Zapata bladderpod

(2)

If you have any questions please contact Karen Clary at TxDOT, Environmental Affairs Division, Austin, tel. 512-416-2767, fax 512-416-2319 or e-mail [kclary@dot.state.tx.us](mailto:kclary@dot.state.tx.us).

Sincerely,



Dianna F. Noble, P.E.  
Director of Environmental Affairs

Recovery Plan Comment Letter #5  
Zapata bladderpod



"Martin Terry"  
<mterry@txcyber.com  
>

To: "Loretta Pressly" <Loretta\_Pressly@fws.gov>

02/20/2003 05:55 PM

cc:  
Subject: Draft Zapata Bladderpod Recovery Plan

Loretta,

I found the draft recovery plan generally well written, given the current state of knowledge about the biology and ecology of the plant. A few minor comments:

Page 9, lines 259-262: This reads as if additional seismic operations would almost inevitably result in the kinds of major oil/gas discoveries that would produce the types of development described. Have you talked to many geologists and petroleum engineers about the prospects for major new discoveries in that part of South Texas? I believe they would downplay the probability of such phenomena.

5-1

Page 10, lines 268-270: I think this would say much more clearly what you want to say, if rewritten as follows:

Given the incomplete [or "limited"] survey information, there is also potential for currently unidentified populations to be affected by infrastructure expansion on this highway.

Page 14, line 331: The Mace and Lande 1991 reference is not included in your bibliography (p. 41), and should be.

Page 18, lines 401-402: Why not make a recommendation now, one way or the other? There are clearly advantages and disadvantages to either horn of this dilemma, but don't you want to make a decision? If not, who will make it, and when?

Page 33, line 661, and p. 34, line 687: By using the singular "population" instead of the plural, you are reverting to a non-biological use of the word. By making it plural, you would maintain consistency in this document.

Good job!

Sincerely,

Martin

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**APPENDIX B: RESPONSE TO COMMENTS TO THE DRAFT ZAPATA  
BLADDERPOD RECOVERY PLAN**

## RESPONSE TO COMMENTS

The Service initially distributed 30 copies of the first draft of the plan to various stakeholders including State, Federal, and County agencies, universities in both the U.S. and Mexico, and non-governmental agencies and individuals. After revisions were made the amended draft was then sent to 97 agencies or individuals in January of 2003. An additional 64 agencies, organizations, or individuals were issued a letter announcing the availability of the draft for public review and comment. A request for comments was published in the Federal Register on January 16, 2003. Peer review was requested from 3 individuals including biologists/ecologists from the Lower Rio Grande Valley National Wildlife Refuge, the Texas Parks and Wildlife Department/Wildlife Diversity Program, and the Texas A & M University at College Station.

Where applicable, the Service has incorporated the comments into the plan and the following response section. All comments were considered when revising the draft plan. The Service appreciates the time that it took to review the draft and to submit comments.

The comments discussed below represent a composite of those received. Those of a similar nature are grouped together. Substantive comments that question approach, methodology, or financial need called for in the draft plan, or suggest changes to the plan are discussed here. Comments received that related to the original listing decision and general comments about the Endangered Species Act are not discussed here. Comments that offered further clarification of detail and specificity in biological studies and simple editorial suggestions such as better wording, spelling or punctuation were incorporated as appropriate without discussion here. All comments received are retained as a part of the administrative record of the recovery plan in the Corpus Christi, Texas, Ecological Services Field Office.

### **Comment Letter # 1. Ms. Sylvia A. Waggoner/Division Engineer. International Boundary and Water Commission, United States and Mexico**

- 1-1. The Service appreciates your interest in recovery for this endangered species, and looks forward to working with your agency on the conservation of the Zapata bladderpod.

### **Comment Letter # 2. Mr. Chris Best/Ecologist/Lower Rio Grande National Wildlife Refuge**

- 2-1. Throughout the Recovery Plan, coordination efforts with Mexico are stressed to help with federal and state issues regarding regulatory guidance, non-governmental organizations that may have ties with private landowners, universities for research and surveying, agricultural agencies to assist with information on land use practices and surveying, and private land owners to allow surveying and research to be performed. Specific tasks identified in the recovery plan to include Mexico are;

*1) Formal and informal conservation measures for the species (e.g., a formal Memorandum of Understanding between the United States and Mexico to manage and protect populations, or encouraging voluntary private lands conservation) should be pursued as part of the long-term conservation strategy for the species, if deemed appropriate based on further clarification of existing habitat. 2) A recovery team should be formed and scientific workshops should be held to discuss and resolve information needs for Zapata bladderpod. Research priorities, genetic data analysis, and*

*reintroduction protocol are all topics integral to the development of recommendations for survival and long-term viability of the species. Workshops should include Federal, State, academia, conservation personnel, and other experts as necessary, including binational collaborators from Mexico. 3) Work with the government of Mexico (as populations are located) to provide information on the significance of the preservation and natural heritage of the plant so both countries can work collectively with landowners. Landowner cooperation is an essential requirement for the preservation of currently known and newly discovered populations. 4) Additionally, information on the Zapata bladderpod should be included within any Lower Rio Grande or Mexico/United States Binational Ecosystem program so that a coordinated approach to recovery can be implemented.*

**Comment Letter #3. Ms. Dana Price/Ecologist. Texas Parks and Wildlife Department Wildlife Diversity Program**

- 3-1. Additional information is necessary on the soils, geology, and vegetation of the area where the bladderpod occurs. Description of the soils where the Zapata bladderpod occurs are as accurate as possible given the available information. Within this recovery plan, tasks are outlined to study these parameters.
- 3-2. Correll and Johnston (Manual of the Vascular Plants of Texas 1979) reports additional species of mesquite that occur in Texas. Besides *Prosopis glandulosa*, which is the only *native* mesquite tree found in South Texas, another species of mesquite in the area where the bladderpod occurs is *P. reptans*, (Tornillo). Additional species of mesquite found in Texas include the *P. Laevigata*, which is a rare species known in Texas mostly from the Coastal Bend Region, but is known to be widespread in Mexico, north to Tamaulipas, Nuevo Leon, and into Durango, Texas, although it may be an introduced but established plant. *P. pubescens*, although not found normally in the vicinity of the bladderpod, is found in Texas in the Trans Pecos region.

**Comment Letter #4. Ms. Dianna F. Noble, P.E./Director of Environmental Affairs. Texas Department of Transportation**

- 4-1. Under Section 7 of the Endangered Species Act of 1973...*All Federal agencies shall, in consultation with and with the assistance of the Secretary (DOI), insure that any action authorized, funded, or carried out by such agency is not likely to jeopardize the continued existence of any endangered species or threatened species.....*

The Texas Department of Transportation (TxDOT) would continue to coordinate with the U. S. Fish and Wildlife Service on proposed projects that may disturb existing populations as well as unknown populations that may be located during future roadway maintenance or expansion activities. During this review period, specific guidelines would be discussed to protect and manage those populations. It is the Service's opinion that TxDOT be included as a member of the recovery team as the plant is found on State highway rights-of-way.

As stated in the recovery plan, the TxDOT personnel assess the two known sites for monitoring and at other times for qualitative observations. One population located on a highway right-of-way is currently protected under an informal agreement between the Texas Parks and Wildlife Department and TxDOT that includes mowing on the right-of-way only during certain times of the year to reduce loss of reproductive organs from the plant. These agreed upon activities should continue unless further information indicates the agreement should be modified to further protect the population. If

these two populations of bladderpod were to be disturbed through proposed changes to the highway, then efforts should be made to consult with the Service.

**Comment Letter #5. Dr. Martin Terry/DVM, PhD. Department of Biology. Texas A&M University College Station**

- 5-1. Seismic operations are ongoing in the area where the bladderpod is known to occur. It is not known whether these operations have produced wells, it does however present evidence that there is still a continuing interest in the discovery of oil or natural gas in the area. Additionally, the clearing of vegetation and construction of roadways that accompany these activities contribute to further development in an area that is specific to the bladderpod. The Service appreciates the additional comments and have incorporated them into the final document.

**U.S. Fish and Wildlife Service  
Corpus Christi Ecological Services Field Office  
c/o Corpus Christi State University  
Campus Box 338  
6300 Ocean Drive  
Corpus Christi, Texas 78412  
361/994-9005  
361/994-8262**

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Office of Endangered Species  
P.O. Box 1306  
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505/248-6920  
505/248-6788 Fax**

**<http://www.fws.gov>**

**September 2004**

