

POST-DELISTING MONITORING PLAN

For

Johnston's Frankenia
(*Frankenia johnstonii*)



U.S. Fish and Wildlife Service
Region 2
Corpus Christi Ecological Services Office
Corpus Christi, Texas

Acknowledgments

The post-delisting monitoring plan for Johnston's frankenia (*Frankenia johnstonii*) was prepared by staff of the U.S. Fish and Wildlife Service (Service) with participation from the Corpus Christi and Austin Ecological Services Field Offices, the Lower Rio Grande Valley National Wildlife Refuge, and the Southwest Regional Office. The Service acknowledges partners outside our agency who provided assistance in preparing the plan, including Jesus Franco and Jackie Poole of Texas Parks and Wildlife Department; Daniel Borunda, U.S. International Boundary and Water Commission; Patrick Conner and Sonia Najera, The Nature Conservancy; and Stirling Robertson, Texas Department of Transportation. The Service also acknowledges Gena Janssen, Dana Price, and others, including many private landowners, for outstanding conservation efforts for Johnston's frankenia.

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Johnston's Frankenia Post-Delisting Monitoring Plan

U.S. Fish and Wildlife Service

Region 2

Corpus Christi Ecological Services Field Office

Corpus Christi, Texas


Regional Director
Southwest Region
U.S. Fish and Wildlife Service

Date

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Summary

The Johnston's frankenia (*Frankenia johnstonii*) is a plant endemic to south Texas in Webb, Zapata, and Starr Counties and an adjacent area in northeastern Mexico. It is a low-growing, perennial shrub that occurs in a clumped distribution on specialized habitats of hypersaline (very salty) soil inclusions. It was listed as endangered without critical habitat on August 7, 1984 (49 FR 31418). At that time only 5 populations were known and the total number of individual plants was estimated to be 1,000. Since listing in 1984, our knowledge of Johnston's frankenia has greatly increased. Based on what we learned about the species' known range, the number of newly discovered populations, life history requirements, and clarification of the degrees of threats, we believe that Johnston's frankenia is not in danger of extinction throughout all or a significant portion of its range now or within the foreseeable future.

The post-delisting monitoring (PDM) plan is designed to verify that Johnston's frankenia remains secure from risk of extinction after removal from the list of endangered species. Because there are few ongoing concerns about the status of this species, the PDM for Johnston's frankenia is intended to be straightforward. The only potential residual impacts (those thought to be continuing after delisting) are associated with human land uses within the plant's range that permanently alter the land's surface, such as road construction, construction for oil and gas activities, gypsum mining, and residential and commercial development. The PDM will, therefore, consist of two approaches: 1) using remote sensing at 20 sites encompassing 2,740 acres (1,108 hectares) occupied by the plant to monitor land use changes over time; and 2) conducting on-site assessments of a subset of Johnston's frankenia populations at 9 sites to monitor status of the plants. The remote sensing monitoring activities will occur every 2 to 3 years and at least three times over the planned 9-year monitoring period. If negative changes are observed from either of the above monitoring activity, such as reduced numbers of plants or decreased extent of a population, then more intensive on-site observations or data collections will be employed at the affected sites. If changes are considered substantial, an education and outreach program will be implemented for plant conservation activities. If future information indicates an increased likelihood that the species may become threatened or endangered with extinction, the Service will initiate a status review of Johnston's frankenia and determine if relisting the species is warranted.

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1.0 Introduction

The PDM plan for Johnston's frankenia includes activities to verify that the species remains secure from risk of extinction after the protections of the Endangered Species Act (Act) no longer apply. The primary goal of this PDM plan is to monitor the status of Johnston's frankenia species over a 9-year period after delisting in order to make sure that re-proposing it as a threatened or endangered species is not needed.

Section 4(g) of the Act requires the Service to implement a system in cooperation with the States to monitor for not less than 5 years the status of all species that have recovered and been removed from the list of threatened and endangered plants and animals (list; 50 CFR 17.11, 17.12, 224.101, and 227.4). Section 4(g)(2) of the Act directs the Service to make prompt use of its emergency listing authorities under section 4(b)(7) of the Act to prevent a significant risk to the well-being of any recovered species. While not specifically mentioned in section 4(g) of the Act, authorities to list species in accordance with the process prescribed in sections 4(b)(5) and 4(b)(6) of the Act may also be used to reinstate species on the list, if warranted.

The Service and States have latitude to determine the extent and intensity of PDM that is needed and appropriate. The Act does not require the development of a formal PDM "plan." However, the Service generally desires to follow a written planning document to provide for the effective implementation of section 4(g) by guiding collection and evaluation of pertinent information over the monitoring period and articulating the associated funding needs. Thus, this document was prepared to describe the PDM for the Johnston's frankenia. This PDM plan follows the Post-Delisting Monitoring Plan Guidance under the Endangered Species Act (Service and National Marine Fisheries Service 2008).

2.0 Summary of Species' Status

2.1 Species Status and Distribution

The Johnston's frankenia (*Frankenia johnstonii*) is a plant endemic to south Texas and northern Mexico. It is a low-growing, sprawling, perennial shrub that occurs in a clumped distribution, most often within openings in the surrounding brush on specialized habitats of hypersaline (very salty) soil inclusions. It occurs in Webb, Zapata, and Starr Counties in southern Texas and an adjacent area in northeastern Mexico (Figure 1). The range of the Johnston's frankenia in Texas is currently estimated to encompass 2,031 square miles (mi) (5,260 square kilometers (km)), extending from northwestern Webb County in the north to central Starr County (Janssen 1999, Price *et al.* 2006).

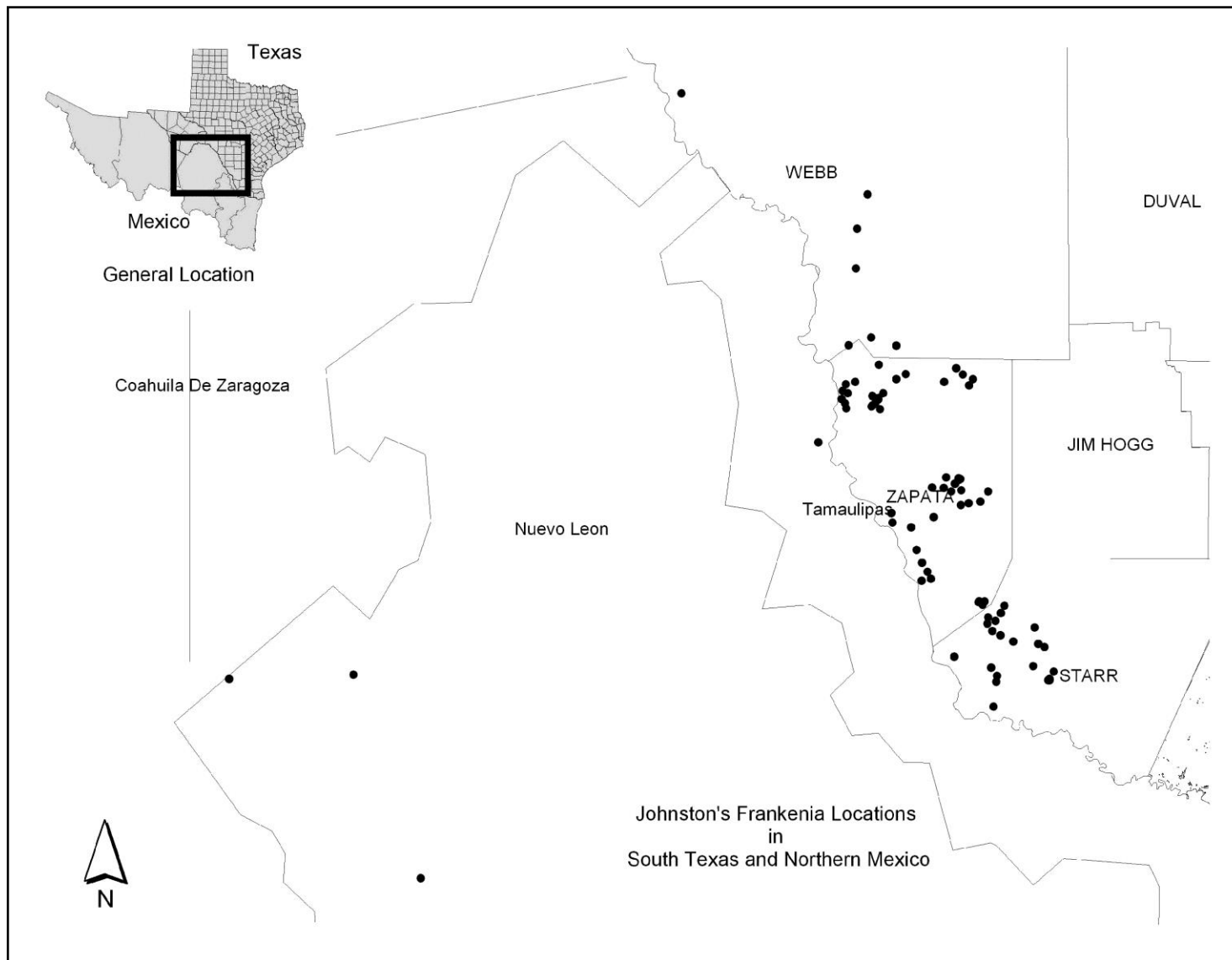
The Johnston's frankenia was listed as endangered without critical habitat on August 7, 1984 (49 FR 31418). At that time only 5 populations were known and the total number of individual plants was estimated to be 1,000. Threats to the species were considered loss and degradation of habitat and the enhanced vulnerability of the species due to its restricted distribution and small population size.

Recovery activities by the Texas Parks and Wildlife Department (TPWD), Texas State University (TSU), The Nature Conservancy (TNC), and the Service have resulted in the discovery of new populations of Johnston's frankenia. Currently, there are 64 reported populations in the United States and 4 in Mexico, with an estimated total number of individual plants exceeding 4 million (Appendix 1; Janssen 1999, 2003; Price *et al.* 2006). In addition to learning more about the species' range and abundance, results from ecological and biological research indicated that Johnston's frankenia is a species well-adapted to the hypersaline soils in which it grows (Janssen 1999, Price *et al.* 2006). Distribution of the Johnston's frankenia appears to be correlated with high salinity soils that restrict competition from many other plants, such as the invasive buffelgrass (*Pennisetum ciliare*), which cannot tolerate high salinity. Also, the salty soils are not suited to growing crops, hold very low available water, have a high content of exchangeable sodium, and are vulnerable to water erosion. High saline soils are generally not well-suited for urban development because of the clay texture, flooding hazard, and shrink and swell properties (Janssen 1999, Price *et al.* 2006). Although construction projects, including roads, well pads, and other facilities are known to have destroyed some individual plants and portions of populations, plants that remain outside of a project footprint continued to survive (Janssen 1999).

Additional recovery actions, such as working with private landowners to identify and protect populations of Johnston's frankenia, have been very successful. At various times since the mid-1990s, as many as 20 Texas populations were covered under voluntary conservation agreements between private landowners and TPWD, providing enhanced protection on private property (Janssen 1999, 2003; Price *et al.* 2006). Many private landowners were educated through outreach efforts and are now equipped to implement effective land steward methods to protect the plant from inadvertent impacts on their property.

For more background information on the Johnston's frankenia refer to Janssen's 1999 report (Janssen 1999), the 1984 final listing rule (49 FR 31418), the 1988 Johnston's Frankenia (*Frankenia johnstonii*) Recovery Plan (USFWS 1988), the 2003 proposed delisting rule (68 FR 27961), and the final delisting rule (XX FR XXXXX).

Figure 1. Johnston's frankenia locations in south Texas and northern Mexico.



2.2 Residual Impacts

Based on the new information gained through implementation of intensive recovery activities that discovered many new populations of this plant, the Johnston's frankenia is no longer considered threatened with extinction. However, we must consider if there are any potential residual impacts that may require monitoring after the species is delisted.

The primary concern is destruction of the plant and its habitat from activities such as road construction, construction for oil and gas activities, gypsum mining, residential and commercial development. If these activities occur at sites occupied by the plant, they can result in removal of vegetation and destroy the species' habitat. Any direct losses of individual plants because of these land uses are likely permanent, because these activities result in habitat destruction. However, habitat destruction from urbanization is unlikely to have substantial impacts on the species in the foreseeable future because of the remoteness of many populations, and these areas are unlikely to see major changes in land use. On the other hand, oil and natural gas exploration and production activities are ongoing in this region, but it is uncertain as to the extent and location of future development for seismic clearings, roads, well pads, and pipelines. Because these activities have the potential to impact Johnston's frankenia, they will be tracked as part of the post-delisting monitoring.

3.0 Monitoring Methods

The monitoring methods for Johnston's frankenia are intended to be straightforward and simple because there are few ongoing concerns about the status of this species. In addition, PDM does not need to be intensive because there are currently no concerns about significant range reduction or population declines. The PDM will, therefore, consist of two approaches: 1) use remote sensing in a subset of occupied habitat to monitor land use changes over time; and 2) conduct on-site assessments within a subset of populations to monitor plant status.

The Act requires PDM for at least 5 years following delisting. For this species, we have planned PDM over a 9-year period. The reason for a longer period is to provide more time to monitor the residual impacts associated with developments on the landscape that could impact habitat for the species. Nine years of monitoring should provide a sufficient basis to determine if development trends are occurring in areas where the species exists.

3.1 Land Use Monitoring with Remote Sensing

We will use remote sensing data to assess the concern of potential impacts from land use changes on the landscape in occupied Johnston's frankenia habitat. With the exception of five sites, Johnston's frankenia occurs entirely on private property, primarily on large rural ranches. Because access can be difficult to coordinate with private landowners, remote sensing allows for unobtrusive assessments of possible land use

changes that might affect the plant. Construction-related impacts can be observed using remote sensing, allowing an approximate loss of vegetation cover to be calculated over time.

For the baseline analysis of Johnston's frankenia population data, we utilized two Geographic Information System (GIS) datasets from TPWD and digital aerial photography from the National Agricultural Imagery Program (NAIP) from 1996 and 2008. The first GIS dataset was a point file depicting each population as a general center point. This dataset included descriptions of the population size (as number of plants) as small, medium, or large. The second GIS dataset was a polygon file that depicted the estimated perimeters of Johnston's frankenia populations, but did not provide any data regarding number of plants.

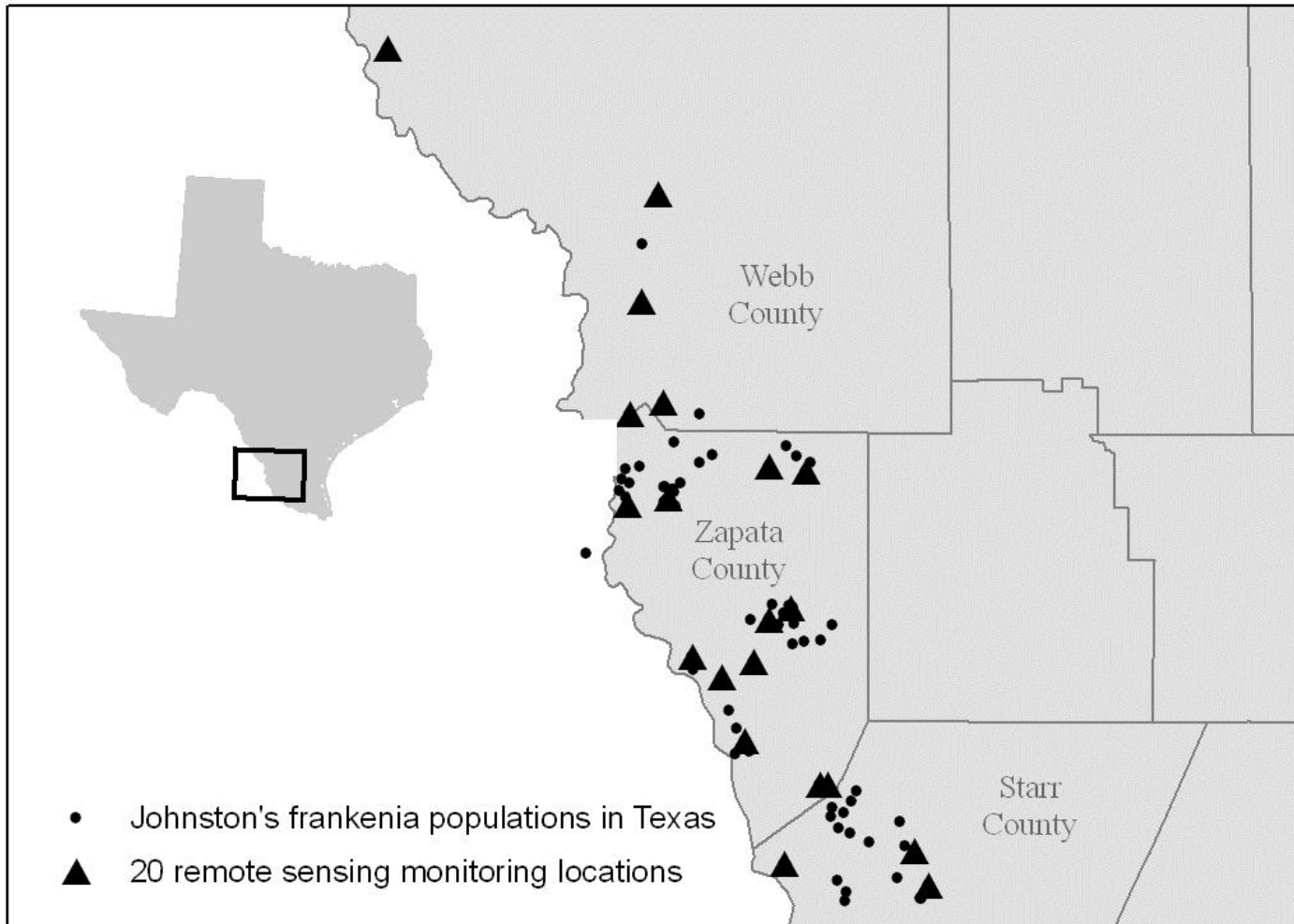
Using the two GIS layers, a spatial intersect was performed to incorporate the population size estimates with the estimated perimeters into a new dataset, for those areas where the points and polygons coincided. From this new dataset, we then determined the average area for populations described as medium and large. On average, a medium population covered approximately 60 acres (ac) (24 hectares (ha)) and a large covered approximately 200 ac (81 ha).

From our GIS datasets, we selected 10 medium and 10 large populations that represented the entire spatial range of the data (Figure 2). These 20 sites will be used as the remote sensing monitoring locations that will occur every 2 to 3 years over the planned 9-year monitoring period. Because these 20 locations were based on a point file GIS data set, we created polygons around the 20 remote sensing monitoring sites based on their estimated population size. For the 10 medium population sites we created a 60-ac (24-ha) polygon around each point location, and for the 10 large populations we created 200 ac (81 ha) polygons, which are the average areas of medium and large populations derived from the TPWD dataset.

Within each polygon for the 20 remote sensing monitoring sites, disturbed areas were digitized from both the 1996 and 2008 NAIP imagery. Depending on the size of the features in the imagery, digitizing was done at a scale between 1:2000 and 1:5000. Further analysis of the digitized areas provided estimates of disturbed areas as a percentage of overall buffer polygon areas for each year.

While digitizing disturbed areas, one particular medium population site was found to have a 90 percent disturbed area when compared to other sites in both the 1996 and 2008 imagery. Because this particular medium population site had a high percentage of disturbed area, we replaced it with another nearby site. If we had kept this highly disturbed site for future analysis, very little change could be documented because the area is already so heavily impacted. No other sites in the vicinity were classified as medium, so a large site was chosen and analyzed. This resulted in 9 medium sites and 11 large sites for the remote sensing monitoring (Appendix 1).

Figure 2. Map of the 20 Johnston's frankenia remote sensing monitoring sites.



The 20 remote sensing monitoring sites (9 medium and 11 large) encompass 2,740 ac (1,107 ha) of Johnston’s frankenia habitat (Table 1). To test this remote sensing analysis, all roads, well pads, and other construction areas were delineated within each of the 20 polygons. To determine habitat loss, comparisons were made between land cover conditions evident in 1996 and 2008 using the NAIP photography. In 1996, we determined that 12.2 percent or 282 ac (114 ha) of habitat had been lost or altered due to human-related activities for all 20 sites combined (Table 1). When we analyzed the 2008 data, we found that 12.5 percent or 306 ac (124 ha) of habitat had been altered. This is an overall average of 0.3 percent or 81 ac (33 ha) increase in habitat alteration or loss over a 12-year period.

Table 1. A comparison of disturbed areas from 1996 to 2008 using remote sensing. Note: A negative value in the “Change in Percentage of Disturbed from 1996 to 2008” column represents a gain in habitat.

Site ID	Polygon Size (ha)	1996 Disturbed Area (ha)	2008 Disturbed Area (ha)	% Disturbed 1996	% Disturbed 2008	Change in % of Disturbed from 1996 to 2008
11	24	4.9	4.2	20.2	17.4	-2.8
20	24	2.8	3.0	11.4	12.3	1.0
36	24	6.0	5.8	24.6	24.1	-0.5
51	24	1.8	1.8	7.4	7.2	-0.2
68	24	4.4	4.7	18.2	19.3	1.1
71	24	6.1	5.3	24.9	21.9	-3.1
73	24	7.2	6.2	29.5	25.4	-4.1
77	24	2.0	2.0	8.3	8.4	0.0
80	24	0.7	0.7	2.9	2.9	0.0
8	81	15.5	6.8	19.1	8.4	-10.7
14	81	4.5	5.3	5.5	6.6	1.1
15	81	3.5	7.0	4.3	8.6	4.2
19	81	9.6	6.3	11.8	7.8	-4.0
30	81	4.1	7.1	5.0	8.8	3.8
32	81	4.8	6.7	5.9	8.2	2.3
37	81	4.6	8.3	5.7	10.2	4.6
47	81	11.5	8.5	14.1	10.5	-3.7
48	81	7.1	8.3	8.8	10.2	1.4
53	81	1.6	10.3	2.0	12.7	10.7
76	81	10.9	15.3	13.5	18.8	5.3
Totals	1107	113.5	123.6	12.2%*	12.5%*	0.3%*

*Represents average overall habitat disturbance.

For the PDM, we will use the 2008 digital ortho quarter quads as the baseline condition on which subsequent comparisons will be made. Remote sensing monitoring

will be carried out each year that NAIP photography becomes available, which is anticipated to be every 2 or 3 years. The remote sensing monitoring activities will occur least three times over the planned 9-year monitoring period.

3.2 On-site Monitoring of Plant Populations

In addition to the remote sensing monitoring, on-site monitoring at 9 locations would help to ensure that there are no substantial changes in the status of Johnston's frankenia (Figure 3). On-site evaluations will be done at selected population sites to document that no new major impacts arise and that individual populations at the ground level remain secure. Data will be collected to determine presence-absence of the species and overall population site conditions to document that no major changes are occurring in plant populations.

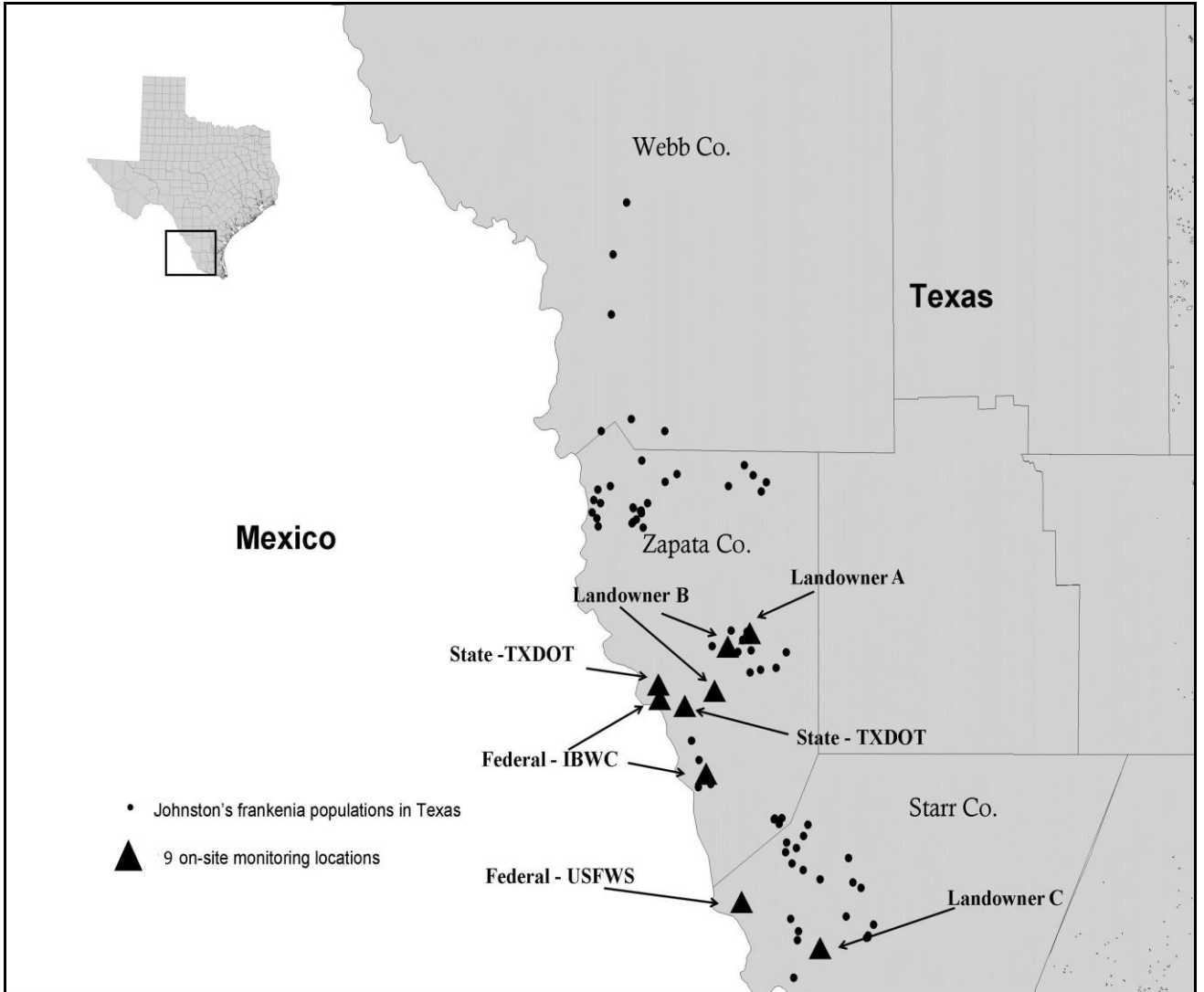
Selection of on-site monitoring sites was based on land ownership and access. The 9 sites include five public land and four privately-owned sites where landowners have given permission for monitoring. The public land populations occur on properties owned by the Service, International Boundary and Water Commission (IBWC), and Texas Department of Transportation (TXDOT). The privately-owned sites belong to three landowners (one landowner has two separate populations) who have active TPWD Voluntary Conservation Agreements or TNC Cooperative Conservation Agreements in place. These sites represent a diversity of population sizes. The locations of these selected populations include both remote rangeland sites and some that occur within 1.5 mi (2.4 km) of highways or the Falcon Reservoir. By happenstance, 6 of the 9 on-site monitoring populations are also part of the 20 remote sensing monitoring locations (Appendix 1).

Site assessments will be conducted in the fall every 3 years for a total of 3 visits during the 9-year PDM period. During the first year's assessment, the population's perimeter will be mapped to quantify the area occupied by the plant and an initial population estimate will be conducted to estimate the number of plants at the site. At least two follow-up site visits will be conducted once every 3 years, so that each site is visited at least three times over the 9-year monitoring period.

After the first year's assessment, follow-up site visits will involve qualitative evaluations of the sites to determine that no obvious significant changes have occurred. Those conducting follow-up assessments compare overall conditions at the site with prior assessments to document any apparent changes.

At each monitoring site, the condition of the population will also be monitored using two or three strategically located permanent photo points. A photo marker will be placed at a strategic point from which it can be seen in the field of view of any of the photo points. Observational data will be collected each time that photographs are taken at the photo points. Photo monitoring will document any alterations in land use or land cover, and other obvious features of the landscape that may be changing due to human activities or natural occurrences.

Figure 3. Map of Johnston's frankenia populations selected for on-site monitoring.



4.0 Implementation

4.1 Monitoring Schedule

Implementation of the remote sensing portion of the Johnston's frankenia PDM plan will follow the publication of the final rule to delist the species. Remote sensing comparisons will continue to be made every 2 to 3 years for all 20 sites so that at least 3 assessments will be conducted during the 9-year monitoring period (for example, assessments will be conducted in years 3, 6, and 9 following delisting). The exact timing of the analyses will depend on the availability of new NAIP photography data covering this three-county area.

On-site monitoring of Johnston's frankenia will be initiated in the fall following publication of the final rule to delist the species. All 9 on-site monitoring populations will be visited at least 3 different times over the 9-year period. Preferably all populations will be visited during the same year in the fall, and samples will be separated by at least 3 years.

4.2 Reporting

Progress reports will be prepared at the conclusion of each monitoring activity, either for remote sensing, population monitoring, or both. Reports should include the results of each monitoring activity, any deviations from the monitoring plans, and recommendations for any needed alterations to the monitoring activities. A final report will be prepared following the last year of monitoring. This report will summarize the results of the entire monitoring period and make final recommendations regarding the PDM program (see Section 5.0 below).

4.3 Monitoring Thresholds

4.3.1 Remote Sensing Analysis

If the remote sensing analysis suggests a substantial negative change in land use patterns, then follow-up site visits will be attempted to ground-truth the situation at the sites. A negative change in land use patterns could occur when areas are altered by human activity, mainly by construction of roads, well pads, buildings, etc.

A site visit will be triggered from remote sensing analysis when a 30 percent loss of habitat is detected within any monitored polygon when compared to the 2008 baseline data. We believe that a 30 percent loss of habitat within a single monitored polygon is an amount that may represent a concern for that particular population. As Table 1 shows, 3 of the 20 sites (Sites 36, 71, and 73) had habitat alterations greater than 20 percent by 2008; however, all 3 of these sites had vegetation growth over previously cleared areas that resulted in a gain in habitat since 1996. A second way to trigger site visits is if the overall area being assessed (2,740 ac (1,107 ha)) shows a habitat loss of 30 percent or more compared to the 2008 baseline. In other words, if we find that 822 ac (332 ha)

(cumulative for all sites) is altered due to land use change, follow-up site visits will be triggered for those areas most heavily impacted.

If either of these situations occurs and follow-up visits are necessary, then efforts will be made to contact the landowner for permission to conduct ground assessments of the affected areas. The follow-up site visits will be used to determine whether the vegetative cover loss seen in the aerial photographs includes Johnston's frankenia plants, and to ascertain the likelihood that the activity will cause future loss to remaining plants. The Service, or TPWD, or TNC will meet with the landowner to make recommendations for actions that will protect remaining plants, including such things as posting the perimeter of the population with informational signs.

If access to sites of concern cannot be gained, then the changes will be assumed to represent actual losses of occupied habitat of the plant. If these triggers are reached, both the remote sensing and the on-site population monitoring efforts should be expanded to include more areas of known Johnston frankenia populations. Expanding the monitoring efforts will allow for a rangewide assessment of the potential threats associated with land use changes and a determination of whether a more thorough status review of the species is warranted.

4.3.2 On-site Monitoring of Plant Populations

If during the on-site monitoring Johnston's frankenia populations appear to have noticeably declined in abundance at 3 or more of the 9 sites, then additional quantitative population monitoring will occur at those sites. The initial data collection from the first year's surveys should be repeated and evaluated. If population concerns appear to be widespread, efforts should be made to expand the population monitoring to include additional sites. All available efforts should be made to explain any changes in abundance of populations. If concerns are sufficiently high, the Service will conduct a full status review of the species.

4.3.3 Landowner Outreach

If the PDM effort reveals concerns about land use changes or other actions being implemented that are negatively affecting Johnston's frankenia or its habitat, the Service and TPWD will design and implement an education and outreach program to address the major causes of concern. This program will summarize impacts documented during the PDM effort and will provide recommendations to help protect the species and prevent the need for relisting under the Act.

4.4 Roles and Responsibilities of Cooperators

4.4.1 Remote Sensing

The Service will conduct the remote sensing analysis in section 3.1 of this plan. If follow-up site visits are needed from remote sensing analysis, the Service will work

with TPWD or TNC to seek landowner permission for access and to carry these out. The Service will keep TPWD, TNC, and applicable land-owners apprised of all results from analysis of remote sensing.

4.4.2 Land Access for On-site Monitoring

The Johnston's frankenia is not currently part of any formal monitoring or management plan for any of the public lands on which it occurs, except for activities carried out for the sub-population on the Lower Rio Grande Valley National Wildlife Refuge (LRGV NWR). The vast majority of Johnston's frankenia plants occur on privately-owned land. Some landowners have signed voluntary conservation agreements with TPWD or management agreements with TNC. However, many have not entered into management agreements. Because the PDM plan will require the cooperation of landowners who are amenable to site visits and data collection, the populations selected for on-site monitoring belong to landowners who currently have active conservation agreements. Zapata Landowners A and B, and Starr County Landowner C have agreed to provide access to their Johnston's frankenia populations (Figure 3). The LRGV NWR, TXDOT, and IBWC have also agreed to allow access and, in some cases, participate in monitoring of the populations on their lands.

4.4.3 On-site Monitoring

The Service is responsible for ensuring that effective post-delisting monitoring of Johnston's frankenia is accomplished. The Service does not have sufficient personnel resources for conducting the necessary on-site monitoring, data analysis, and reporting requirement for this PDM effort, thus the Service will work with partners to seek funding opportunities through existing grant programs, such as our section 6 Endangered Species Cooperative Grant Program.

Ultimately, the Service has the lead responsibility for this monitoring effort. Service staff will therefore participate in and maintain oversight of all activities undertaken as part of the PDM. This will include interpreting the intent of the PDM plan, developing and managing grants or contracts, reviewing and commenting on draft reports, distributing final reports and other information to interested parties, approving and documenting any changes to the PDM plan, conducting any necessary future status reviews of Johnston's frankenia, and determining when the PDM is complete.

The Service, with other partners or contractors, will lead the on-site monitoring portion of this PDM effort. The Service, or other identified partner or contractor, will serve as the main coordinator for all on-site monitoring and the Service will be the repository for all data collected during the on-site monitoring work. Additionally, the Service, or other identified partner or contractor, will perform data analysis and prepare progress reports to be delivered to the Service that detail the level of monitoring accomplished during the year and the results of these investigations. At the conclusion of

the 9-year PDM effort, the Service will review the work in conjunction with the identified partner or contractor to produce a final report.

The TNC's South Texas Project Director will take the lead on organizing field work for the site on private lands where TNC has a conservation agreement and will coordinate with the Service regarding the need for any additional assistance to carry out data collection at these sites.

For the two sites that are located on TXDOT highway right-of-way's in Zapata County, the Service will take the lead and request assistance from TXDOT, as needed, to conduct monitoring at these sites.

The IBWC's Environmental Division, El Paso, Texas, will provide access to the two populations that extend onto their land adjacent to Falcon Reservoir and may potentially provide personnel to assist with field work.

The LRGV NWR will carry out on-site monitoring on their Chapeno tract subpopulation and will assist with other sites as requested, depending on their availability.

4.4.3 Outreach Program

If needed, the Service and TPWD will work with the U.S. Department of Agriculture's Natural Resource Conservation Service, the Soil and Water Conservation District(s), and oil and gas associations to deliver the education and outreach program.

4.5 Estimated Funding Requirements

Table 2 provides a rough cost estimate of \$99,300 for completing PDM for Johnston's frankenia. These estimates are not adjusted for inflation and assume that the monitoring schedule is consistent with the methodology and schedule contained in this PDM plan. The cost estimates are based on the minimum activities of three monitoring events for both remote sensing and on-site monitoring and do not include the additional costs if increased monitoring efforts become necessary. For these reasons and others related to projecting cost estimates, the actual costs of completing the PDM could be more or less than this estimate.

Table 2. Estimated costs of Johnston’s frankenia post-delisting monitoring. Asterisks (*) indicate in-kind costs anticipated from partners.

<u>Remote Sensing</u>	
Salary (Annual Staff Time)*	
U.S. Fish and Wildlife Service	\$4,500
<u>On-Site Monitoring</u>	
Salary (Annual Staff Time)*	
U.S. Fish and Wildlife Service	\$3,100
Identified partner or contractor	\$11,500
Texas Department of Transportation	\$ 600
The Nature Conservancy of Texas	\$2,200
International Boundary and Water Commission	\$ 600
Travel (Annual)	
Service travel*	\$ 500
Partner or contractor travel	\$4,000
TNC travel*	\$ 800
IBWC*	\$ 800
Equipment & Supplies (Annual)	
Equipment and supply costs	\$4,500
<u>Annual Expenses</u>	\$33,100
<u>Total Expenses</u> for the PDM plan (assumes monitoring every 3 years over a 9-year period)	
	\$99,300

4.5.1 Potential Funding Sources

Funding of PDM following removal of any species from the Act presents a challenge for all partners. While the Act authorizes expenditure of both recovery funds and section 6 grants to the States to plan and implement PDM, to date Congress has not allocated any funds expressly for this purpose. Funding of PDM activities, therefore, will require trade-offs with the conservation needs of other competing endangered species. Much of the costs will likely be borne as in-kind services provided by cooperating agencies. Working closely with our partners, we anticipate using grant programs to provide funding for the initial years of PDM. Opportunities exist to compete for traditional section 6 grant funds or State wildlife grant funds. The Service, TPWD, TNC, and other cooperators will continue to work together to secure funding to implement this PDM plan. Many of the tasks in this PDM plan will be carried by existing staff and will represent in-kind contributions to funding the effort.

4.5.2 Anti-Deficiency Act Disclaimer

Post-delisting monitoring is a cooperative effort among the Service, State, other Federal agencies, and non-governmental partners. Funding of PDM presents a challenge for all partners committed to ensuring the continued viability of the Johnston’s frankenia following removal of protections under the Act. To the extent feasible, the Service

intends to provide funding for post-delisting monitoring efforts through the annual appropriations process. Nonetheless, nothing in this PDM plan should be construed as a commitment or requirement that any Federal agency, including the Service, obligate or pay funds in contravention of the Anti-Deficiency Act, 31 U.S.C. 1341, or any other law or regulation.

5.0 Conclusion of PDM

At the end of the planned 9-year monitoring period, the Service will conduct a final review of all the information that has been collected and produce a final report. Any potential relisting decision by the Service will require evaluating the status of Johnston's frankenia relative to the Act's five listing factors. The following four conclusions are possible at the end of the PDM period for Johnston's frankenia:

- 1. The PDM indicates that the species remains secure without Endangered Species Act protections. The PDM will be concluded at the completion of planned 9-year period and no further monitoring will be required. Additional monitoring may continue at the discretion of the Service and its partners, depending on available funding and resources.*
- 2. The PDM indicates that the species may be less secure than anticipated at the time of delisting, but information does not indicate that the species meets the definition of threatened or endangered. The duration of the PDM period may, at the discretion of the Service, be extended and additional monitoring may be planned and carried out. A new monitoring plan should build upon the information gained from this PDM effort and describe future monitoring activities.*
- 3. The PDM yields substantial information indicating a decline in the species' status since delisting, such that listing the species as threatened or endangered may be warranted. In addition to further monitoring activities discussed above, the Service should initiate a formal status review under section 4 of the Act to assess changes in threats to the species, its abundance, productivity, survival, and distribution. The purpose of the review is to determine whether a proposal for relisting Johnston's frankenia as a protected species under section 4 of the Act is warranted.*
- 4. The PDM documents a decline in the species' probability of persistence, such that the species once again meets the definition of a threatened or endangered species under the Act. If PDM reveals that the Johnston's frankenia may be threatened or endangered, then the plant should be promptly proposed for relisting under the Act in accordance with procedures in section 4(b)(5). Likewise, if the best available information indicates an emergency that poses a significant risk to the well-being of the species, then the Service may exercise its emergency listing authority under section 4(b)(7).*

6.0 Review and Adaptation of the PDM Plan

This draft PDM plan for the Johnston's frankenia was made available for review and comment by the public through a Federal Register notice. In addition, the Service received peer review of this draft PDM plan in accordance with the 1994 peer review policy (59 FR 34270). The Service solicited independent expert opinions from knowledgeable individuals with scientific expertise that includes plant ecology and conservation biology principles. All comments received from the public or peer reviewers were considered and incorporated as appropriate into a final PDM plan. Once finalized and approved by the Service's Southwest Regional Director, this PDM plan may be updated as needed to account for and respond to new information discovered as part of the ongoing data collection and analysis.

If substantial changes are made to the PDM plan or if significant deviations to described PDM procedures set forth in this document occur, this PDM plan will be revised by the Service to document the changes. Recognizing the need for future changes to the PDM plans will provide the necessary flexibility to ensure effective PDM for the Johnston's frankenia. The final PDM plan for the Johnston's frankenia will be announced with the final delisting rule and made available on the Service's web page (<http://endangered.fws.gov>) and the Southwest Region's electronic library (<http://www.fws.gov/southwest/es/Library>).

7.0 Literature Cited

- Janssen, G.K. 1999. Site characteristics and management of Johnston's frankenia (*Frankenia johnstonii*). Final Report. Endangered Species Act, Endangered and Threatened Species Conservation, Section 6. Grant E-1, Project 50. Texas Parks and Wildlife Department, Austin, TX. 259 pp.
- Janssen, G.K. 2003. Johnston's frankenia (*Frankenia johnstonii*) annual monitoring. Final Report. Endangered Species Act, Endangered and Threatened Species Conservation, Section 6. Grant E-10. Texas Parks and Wildlife Department, Austin, TX.
- Price, D., G.K. Janssen, and L. Williams. 2006. Lower Rio Grande Valley candidate plant conservation agreement. Final Report. Endangered Species Act, Endangered and Threatened Species Conservation, Section 6. Grant No. E 28. Texas Parks and Wildlife Department, Austin, TX. 75 pp.
- U.S. Fish and Wildlife Service. 1988. Johnston's frankenia (*Frankenia johnstonii*) recovery plan. Region 2, Albuquerque, NM. 49 pp.
- U.S. Fish and Wildlife Service and National Marine Fisheries Service. 2008. Post-delisting monitoring plan guidance under the Endangered Species Act.

Appendix 1. Table listing all documented Johnston’s frankenia populations

POPULATION ID	COUNTY	LOCATION DESCRIPTION	OWNERSHIP	ESTIMATED POPULATION SIZE	ESTIMATED AREA COVERED	MONITORING METHOD
1	Webb	Near Rio Grande; Remote	Private	~ 10,000	~ 50 ac	Remote Sensing / On-Site
2	Webb	NE of Laredo; Remote	Private	~ 5,000	~ 30 ac	Remote Sensing
3	Webb	E of Laredo; Within 1.5 mi of Hwy 59	Private	~ 5,000	~ 100 ac	
4	Webb	Colonia near Laredo, Many 5-ac ranchettes; Within 1.5 mi Hwy 359	Private - Multiple Landowners	~ 2,500	~ 50 ac	Remote Sensing
5	Webb	Remote	2 Private Ranches - 2 Landowners	Hundreds of Thousands	~ 300 ac	Remote Sensing
6	Webb	Remote	Private	~ 500	~ 5 to 10 ac	
7	Webb	Remote	Private	~ 2,050, 3 sub-pops	~ 15 ac	Remote Sensing
8	Zapata	N Zapata Co. just S of Webb/Zapata line; Remote	Private	~ 750	~ 22 ac	
9	Zapata	NE Zapata Co. Majority pop on one ranch (1 corner of this large population is original type locality); Remote	2 Private Ranches - 2 Landowners	> 1 million, 13 sub-pops.	150 - 200 ac	
10	Zapata	E Pasture; Remote	Private	~ 200	< 1 acre	
11	Zapata	2 pastures; Remote	Private	~ 1,150, 2 sub-pops.	~ 11 ac	
12	Zapata	One pasture; Remote	Private	~ 2,150	~ 6 ac	Remote Sensing
13	Zapata	One pasture; Remote	Private	~ 1 million	> 200 ac	Remote Sensing
14	Zapata	North-central Zapata Co. ; Remote	Private	~ 5,700, 2 sub-pops.	~ 11 - 13 ac	
15	Zapata	N - central; Remote	Private	~ 1000 one	~ 20 ac	

POPULATION ID	COUNTY	LOCATION DESCRIPTION	OWNERSHIP	ESTIMATED POPULATION SIZE	ESTIMATED AREA COVERED	MONITORING METHOD
				continuous Pop.		
16	Zapata	N. Zapata Co.; Remote	Private	> 500,000 and 300 in 2 sub pops.	~ 35-40 ac	
17	Zapata	N. Zapata Co.; Remote	Private	< 100	< 1 acre	
18	Zapata	NW Zapata; Remote	Private	~ 500	~ 10 ac	
19	Zapata	NW Zapata; Remote	Private	~ 250	~ 1 acre	
20	Zapata	Remote	Private	~ 400	~ 23 ac	
21	Zapata	NW Zapata; Within 1.5 mi of Hwy 83	Private	~ 200	1 acre	
22	Zapata	NW Zapata; Within 1.5 mi of Hwy 83	Private	~ 3,400, 3 sub-pops	~ 12+ ac	
23	Zapata	NW Zapata; Within 1.5 mi of Hwy 83	2 Private Ranches - 2 Landowners	~ 10,500, 2 sub-pops	~ 15 ac	
24	Zapata	NW Zapata; Within 1.5 mi of Hwy 83	Private	~ 300	< 1 acre	
25	Zapata	Within 1.5 mi of Hwy 83	2 Private Ranches - 2 Landowners	~ 10,000	~ 130 - 150 ac	Remote Sensing
26	Zapata	Falcon Mesa subdivision. Extends onto IBWC property; Within 1.5 mi of Hwy 83	Multiple ownership - private residential and Federal	~ 2,150, 3 sub pops	~ 3 ac	On-Site
27	Zapata	"Big Hwy 16 Cluster" - nine private ranches in central Zapata Co.; Adjacent to Falcon Reservoir	9 Private Landowners	~ 40,450, 17 sub pops.	~ 150 - 170 ac, 1 mi. across	
28	Zapata	Central Zapata; Within 1.5 mi of Hwy 16	Private	~ 2,900, 3 sup pops	~ 60 - 70 ac	On-Site
29	Zapata	Central Zapata Co.; Remote	Private	~ 300	~ 1 acre	

POPULATION ID	COUNTY	LOCATION DESCRIPTION	OWNERSHIP	ESTIMATED POPULATION SIZE	ESTIMATED AREA COVERED	MONITORING METHOD
30	Zapata	Central Zapata Co.; Remote	Private	~ 50	< 1 acre	
31	Zapata	Central Zapata Co.; Remote	Private	~ 2,600, 2 sub-pops	~ 40 ac	
32	Zapata	Central Zapata Co.; Remote	Private	~ 500K to 1 million	~ 175 - 185 ac	
33	Zapata	Central Zapata Co.; Remote	Private	~ 5,000	~ 20 ac	
34	Zapata	Central Zapata Co.; Remote	2 Private Ranches - 2 Landowners	~ 10,000, 3 sub, pops, 1 air mi long	80 - 100 ac	
35	Zapata	Central part of ranch; Within 1.5 mi of Hwy 16	Private	~ 25,550, 5 sub-pops	~ 50 ac, 1.5 air mi wide	Remote Sensing / On-Site
36	Zapata	Private ranch - Central part; Remote	Private	~ 5,000	~ 40 ac	Remote Sensing / On-Site
37	Zapata	W. Zapata Co, just S. of town of Zapata. Extends onto TPWD Hwy ROW; Remote	Private and State (TxDOT)	~ 2,886, 13 sub-pops	~ 90-95 ac	On-Site
38	Zapata	West Zapata Co.; Within 1.5 mi of Hwy 83	2 Private Ranches	~ 900, 3 small sub-pops	~ 16 - 17 ac	
39	Zapata	W Zapata Co.; Adjacent to Falcon Reservoir	Private	~ 500	~ 10 ac	
40	Zapata	W. Zapata Co. Extends onto IBWC.; Adjacent to Falcon Reservoir	3 Private Landowners and Federal (IBWC)	~ 1 million, one large continuous pop.	~ 500 ac	Remote Sensing / On-Site
41	Zapata	W Zapata Co. Small parcel private land; Adjacent to Falcon Reservoir	Unknown & maybe IBWC	~ 300	~ 3 ac	
42	Zapata	W Zapata Co; Adjacent to Falcon Reservoir	Private	~ 500	~ 5 ac	

POPULATION ID	COUNTY	LOCATION DESCRIPTION	OWNERSHIP	ESTIMATED POPULATION SIZE	ESTIMATED AREA COVERED	MONITORING METHOD
43	Starr	NW Starr Co.; Remote	Private	Unknown	~ 23 ac	
44	Starr	NW Starr Co.; Remote	Private	~100	~ 15 ac	
45	Starr	NW Starr Co.; Remote	Private	Unknown	~ 40 ac	
46	Zapata	W Starr Co.; Remote	Private	Unknown	~ 8 - 9 ac	
47	Zapata	W Starr Co.; Remote	Private	Unknown	~ 17 - 18 ac	
48	Starr	W Starr Co. on both sides of Loma Banco Rd; Remote	Multiple Private Ranches	Unknown, 5 sub-pops	~65 - 70 ac	
49	Starr	W Starr Co.; Remote	Private	~ 500	~ 2 ac	
50	Starr	On both sides of Sanchez Ranch Rd.; Remote	Private	Unknown, 4 sub-pops	~ 30 ac	
51	Starr	W Starr Co.; Remote	Private	Unknown, 4 sub-pops	~ 20 ac	
52	Starr	W Starr Co; Remote	Private	~ 500	~ 3 - 4 ac	
53	Starr	E of town of El Sauz; Remote	2 Private Landowners	~ 10,000, long, narrow strip	~ 28 - 30 ac	Remote Sensing
54	Starr	NWR tract & neighboring private lands; Remote	USFWS & Private	~ 2000, 5 sub-pops	19 -20 ac	Remote Sensing / On-Site
55	Starr	W Starr Co.	Private	Unknown	~ 11 ac	
56	Starr	private property W. Starr Co	Private	Unknown	~ 15 - 16 ac	
57	Starr	South of El Sauz - in W. Starr Co.	2 Private Ranches - 2 Landowners	~ 500	~ 10 ac	
58	Starr	W Starr Co.	Private	~ 400, 2 sub pops	~ 10 - 20 ac	
MX1	Tamaulipas	Junction of Hwy 2 & the road leading to San Ignacio, MX; Directly adjacent to Highway 2	Unknown	~ 5,000	~ 30 ac	
MX2	Nuevo L	Along Hwy 53 at border of the 2	Unknown	~ 600	Not Given	

POPULATION ID	COUNTY	LOCATION DESCRIPTION	OWNERSHIP	ESTIMATED POPULATION SIZE	ESTIMATED AREA COVERED	MONITORING METHOD
		states. Directions: 100km NW of Monterrey near the 100 km marker on Hwy 53 between Monterrey & Monclova; Remote				
MX3	Nuevo L	N of Hwy 53 on the road to Rancho Lechuguilla; Remote	Unknown	Not Given	Not Given	
MX4	Nuevo L	La Soledad, Mina, Nuevo Leon; within town of Mina	Unknown	Abundant	Not Given	
Pvt1a	Starr	Martinez Ranch	Private	Not Given	Not Given	On-Site
Pvt1b	Starr	Martinez Ranch	Private	Not Given	Not Given	On-Site
S6_#1	Zapata	Hancock Ranch	Private	50 or more	Not Given	
S6_#10a	Zapata	Flores Ranch	Private	500 or more	Not Given	Remote Sensing
S6_#10b	Zapata	Flores Ranch	Private	500 or more	Not Given	Remote Sensing
S6_#11a	Zapata	Flores Ranch	Private	200 scattered	Not Given	
S6_#11b	Zapata	Flores Ranch	Private	200 scattered	Not Given	
S6_#12	Zapata	Rancho Santa Anita	Private	200 or more	Not Given	
S6_#13	Zapata	Rancho Santa Anita	Private	1000's	Not Given	Remote Sensing
S6_#14	Zapata	Rancho Santa Anita	Private	300 or more	Not Given	Remote Sensing
S6_#15	Zapata	Rancho Santa Anita	Private	100 or more	Not Given	
S6_#16	Starr	Starr Cactus Ranch	Private	3	Not Given	
S6_#17	Starr	The Kelsey	Private	500 or more	Not Given	Remote Sensing
S6_#18	Starr	J&B Ranch	Private	100's	Not Given	
S6_#19	Starr	J&B Ranch	Private	7	Not Given	
S6_#2	Zapata	Hancock Ranch	Private	50 or more	Not Given	
S6_#3	Zapata	Hancock Ranch	Private	50 or more	Not Given	
S6_#4	Zapata	Hancock Ranch	Private	50 or more	Not Given	
S6_#5	Zapata	Santo Nino Ranch	Private	100's	Not Given	Remote Sensing
S6_#6	Zapata	Santo Nino Ranch	Private	100's	Not Given	

POPULATION ID	COUNTY	LOCATION DESCRIPTION	OWNERSHIP	ESTIMATED POPULATION SIZE	ESTIMATED AREA COVERED	MONITORING METHOD
S6_#7	Zapata	The Palomas	Private	1000 or more	Not Given	
S6_#8a	Zapata	CR 469	Private	500 or more	Not Given	Remote Sensing / On-Site
S6_#8b	Zapata	CR 469	Private	500 or more	Not Given	Remote Sensing / On-Site
S6_#9	Zapata	Flores Ranch	Private	3	Not Given	
Unknown1	Zapata	Not Given	Not Given	5	Not Given	
Unknown2	Starr	Not Given	Not Given	Not Given	Not Given	