

EPA-APPROVED MISSISSIPPI REGULATIONS

State citation	Title/subject	State effective date	EPA approval date	Explanation
*	*	*	*	*
<b>11-MAC-Part 2-11 Regulations for Ambient Air Quality Nonattainment Areas</b>				
Rule 11.1 .....	General .....	9/26/2015	1/12/2016 [Insert citation of publication].	
Rule 11.2 .....	Definitions .....	9/26/2015	1/12/2016 Insert citation of publication].	
Rule 11.3 .....	Emissions Statement .....	9/26/2015	1/12/2016 [Insert citation of publication].	

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**DEPARTMENT OF THE INTERIOR**

**Fish and Wildlife Service**

**50 CFR Part 17**

[Docket No. FWS-R2-ES-2011-0084; 92220-1113-0000]

RIN 1018-AH53

**Endangered and Threatened Wildlife and Plants; Removal of *Frankenia johnstonii* (Johnston's frankenia) From the Federal List of Endangered and Threatened Plants**

**AGENCY:** Fish and Wildlife Service, Interior.

**ACTION:** Final rule; availability of final post-delisting monitoring plan.

**SUMMARY:** The best available scientific and commercial data indicate that *Frankenia johnstonii* (Johnston's frankenia) has recovered. Therefore, under the authority of the Endangered Species Act of 1973, as amended (Act), we, the U.S. Fish and Wildlife Service (Service), remove (delist) the Johnston's frankenia from the Federal List of Endangered and Threatened Plants. This determination is based on a thorough review of all available information, which indicates that the threats to this species have been eliminated or reduced to the point that the species has recovered and no longer meets the definition of threatened or endangered under the Act. We also announce the availability of the final post-delisting monitoring plan for Johnston's frankenia.

**DATES:** This rule becomes effective February 11, 2016.

**ADDRESSES:** The final rule is available on the Internet at <http://www.regulations.gov>, Docket No. FWS-R2-ES-2011-0084. Comments and

materials received, as well as supporting documentation used in the preparation of this rule, will be available for public inspection, by appointment, during normal business hours at: U.S. Fish and Wildlife Service, Corpus Christi Ecological Services Field Office, TAMU-CC, 6300 Ocean Drive, USFWS-Unit 5837, Corpus Christi, Texas 78412-5837. You may obtain copies of the final rule from the field office address above, by calling (361) 994-9005, or from our Web site at <http://www.fws.gov/southwest/es/Library/>. Persons who use a telecommunications device for the deaf (TDD) may call the Federal Information Relay Service (FIRS) at 800-877-8339.

**FOR FURTHER INFORMATION CONTACT:** Dawn Gardiner, Assistant Field Supervisor, Texas Coastal Ecological Services Field Office, Corpus Christi, at the above address, or telephone 361-994-9005 or email to [Dawn\\_Gardiner@fws.gov](mailto:Dawn_Gardiner@fws.gov). Individuals who are hearing-impaired or speech-impaired may call the Federal Relay Service at 1-800-877-8337 for TTY assistance.

**SUPPLEMENTARY INFORMATION:**

**Executive Summary**

Recovery actions for Johnston's frankenia have resulted in a reduction in the magnitude of threats due to: (1) A significant increase in the number of documented populations; (2) a major expansion of the known range for the species; (3) a population estimate of more than 4 million plants; (4) the species' ability to successfully outcompete nonnative grasses, recolonize disturbed areas, and tolerate grazing in the specialized habitat it occupies indicates it is more resilient than previously believed; and (5) improved management practices as a result of outreach activities to, and cooperative agreements with, landowners. Our review of the status of this species shows that populations are stable, threats are addressed, and

adequate regulatory mechanisms are in place so that the species is not currently, and is not likely to become, an endangered species within the foreseeable future in all or a significant portion of its range.

The regulations in title 50 of the Code of Federal Regulations (CFR) at § 424.22(d) state that a species may be delisted if (1) it becomes extinct, (2) it recovers, or (3) the original classification data were in error. In the proposed rule of May 22, 2003 (68 FR 27961), the Service proposed to delist Johnston's frankenia due to an expansion of our knowledge of the species' known range, the number of newly discovered populations—some with large numbers of individual plants, increased knowledge of the life-history requirements of the species, and clarification of the degree of threats to its continued existence. The species is also being delisted because recovery efforts have improved the species' status, and the current new data show that removing Johnston's frankenia from the List of Endangered and Threatened Plants is warranted.

**SUPPLEMENTARY INFORMATION:**

**Previous Federal Action**

Federal Government actions on this species began with section 12 of the Act, which directed the Secretary of the Smithsonian Institution to prepare a report on those plants considered to be endangered, threatened, or extinct. This report (House Document No. 94-51), which included Johnston's frankenia in the endangered category, was presented to Congress on January 9, 1975. On July 1, 1975, the Service published a notice in the **Federal Register** (40 FR 27823) that formally accepted the Smithsonian report as a petition within the context of section 4(c)(20), now section 4(b)(3)(A), of the Act, and of the Service's intention thereby to review the status of those plants. On June 16, 1976, the Service published a proposed rule in the **Federal Register** (41 FR 24524) to

list approximately 1,700 plant species as endangered and solicited comments in order for the final rule to be as accurate and effective as possible. Subsequent amendments to the Act required withdrawal of most of this proposal, including the proposed listing of Johnston's frankenia. Johnston's frankenia was again proposed for listing as an endangered species on July 8, 1983 (48 FR 31414). The final rule listing Johnston's frankenia as an endangered species was published August 7, 1984 (49 FR 31418). Critical habitat was not designated for this species. The Johnston's Frankenia Recovery Plan was completed in 1988 (Service 1988). On May 22, 2003, the Service published a proposed rule to delist Johnston's frankenia (68 FR 27961). On October 25, 2011, the Service published a notice of document availability, including updated information, to reopen the comment period on the proposed rule to delist Johnston's frankenia and announce the availability of the draft post-delisting monitoring plan (76 FR 66018).

Additional information regarding previous Federal actions for Johnston's frankenia can be obtained by consulting the species' regulatory profile found at: <http://ecos.fws.gov/speciesProfile/SpeciesReport.do?spcode=Q1WH>.

### Species Information

Johnston's frankenia (*Frankenia johnstonii*), a member of the Frankeniaceae family, is a distinct species of perennial shrub endemic to Starr, Webb, and Zapata Counties in Texas and the northeastern part of the Mexican states of Nuevo Leon, Coahuila, and Tamaulipas. It is a low-growing, perennial shrub that occurs in open interspaces of the mesquite-blackbrush community of the South Texas Plains vegetation zone. This shrub species appears to be restricted to pockets of hypersaline (very salty) soils in open, rocky, gypseous hillsides or saline flats. It is found in a clumped distribution within this very specialized soil type.

### Population Numbers and Distribution

When Johnston's frankenia was originally listed, there were six known populations, with five occurring in Starr and Zapata Counties, and one population in Nuevo Leon, Mexico. All of the U.S. populations occurred on private lands and encompassed a 35-mile (mi) (56-kilometer (km)) radius, with the population in Mexico located approximately 125 mi (201 km) to the west. Since the publication of the proposed rule to delist Johnston's frankenia in May 2003, the total number

of known populations in Texas is at least 68, covering approximately 2,031 sq mi (5,260 sq km), in Starr, Webb, and Zapata Counties, and at least 4 populations in Mexico (Price *et al.* 2006, p. 10 in Attachment B and pp. 2–5 in Attachment C; Janssen 2007, pers. comm.; Janssen 2010, pp. 5–6). Portions of 5 of these 68 populations extend onto publicly owned land including the Lower Rio Grande Valley National Wildlife Refuge (Refuge), Texas Department of Transportation (TxDOT) right-of-ways, and lands managed by the United States International Boundary and Water Commission (USIBWC) adjacent to Falcon Reservoir in Starr and Zapata Counties.

### Individual Plant Numbers

Since the original listing in 1984 when 1,000 plants were counted, additional Johnston's frankenia surveys were completed in Starr, Webb, and Zapata Counties (Janssen 1999, entire; Price *et al.* 2006, p. 10 in Attachment B and pp. 2–5 in Attachment C; Janssen 2007, pers. comm.; Janssen 2010, pp. 5–6). The results of these status surveys showed a substantial increase in individual plants to at least 4 million plants.

Further biological information (*i.e.*, more detailed physical description, distribution and threats, habitat characteristics, and life history) for Johnston's frankenia can be found in our proposal for delisting this species, published in the **Federal Register** on May 22, 2003 (68 FR 27961), and in the Johnston's Frankenia Recovery Plan (Service 1988, pp. 2–13).

Based on best available information there is no evidence to suggest the number of populations and their numbers have declined since the 2011 proposed rule.

### Summary of Comments and Recommendations

In the proposed rule to delist Johnston's frankenia published on May 22, 2003 (68 FR 27961), we requested that all interested parties submit written comments on the proposal by August 20, 2003. We also contacted appropriate Federal and State agencies, scientific experts and organizations, and other interested parties and invited them to comment on the proposal. Newspaper notices inviting general public comment were published. During the 2003 comment period, we received nine public comment letters. We did not receive any requests for a public hearing.

On October 25, 2011 (76 FR 66018), we reopened the comment period for the proposed rule of May 22, 2003 (68

FR 27961), included updated information, and requested public comment on the Draft Post-Delisting Monitoring Plan. During the 2011 comment period, we received four public comment letters.

In accordance with our peer review policy published on July 1, 1994 (59 FR 34270), we solicited expert opinions from four knowledgeable individuals with scientific expertise that included familiarity with Johnston's frankenia and its habitat, biological needs, and threats. We received responses from four peer reviewers during the original comment period associated with the proposed delisting rule on May 22, 2003 (68 FR 27961).

We reviewed all comments received from the peer reviewers and the public for substantive issues and new information regarding the listing of Johnston's frankenia. Substantive comments received during the comment period are addressed below and, where appropriate, incorporated directly into this final rule and the post-delisting monitoring plan.

*Issue 1:* Several commenters were concerned that the Service was basing this proposed delisting decision on the fact that the listing criteria and process has changed since 1984 when Johnston's frankenia was originally listed as endangered.

*Response:* The Service believes that removal of Johnston's frankenia from the Federal List of Endangered and Threatened Wildlife is justified based on the information presented throughout this rule, not due to the differences between the 1984 and 2003 listing criteria and process. This species was listed in 1984 at a time when very little was known about its biology or distribution and only 5 populations in the U.S. had been located, comprising a total plant count of approximately 1,000 individuals distributed over a 35-mi (56-km) radius. In addition, none of these populations were under protective management. We now know of at least 68 populations exceeding 4 million plants ranging over 2,031 sq mi (5,260 sq km). Thus, the significant increase in number of documented populations, the major expansion of the range for the species, added conservation protection for some populations, and a population estimate of more than 4 million plants are some of the key reasons for the proposed delisting of Johnston's frankenia. These larger numbers and more expansive range coupled with protective management of some populations and the lack of overall threats is the basis for why this species is no longer considered threatened.

*Issue 2:* Several commenters expressed concerns that the proposed rule did not define how the Geographic Information Systems (GIS) analyses were done, and that no detailed summaries or discussion of data reliability were found in the cited report by Shelley and Pulich (2000).

*Response:* The Service created several GIS maps using location information presented in a final section 6-funded Texas Parks and Wildlife Department (TPWD) report (Janssen 1999, entire). Johnston's frankenia populations, color-coded by size (small, intermediate, or large), were drawn onto a 1:250,000 United States Geological Survey topographic map that allowed a more definitive analysis of the proximity of the different-sized populations to highways, county roads, cities, towns, and Falcon Reservoir. The Service also contracted with Texas State University (formerly known as Southwest Texas State University) for a GIS report (Shelley and Pulich 2000, entire) that showed roads, cities, and colonias (low-income, unincorporated settlements that lack running water, wastewater treatment, or other services) in relation to known Johnston's frankenia locations. This latter report included projections of future human development patterns and how these may impact Johnston's frankenia populations. Their GIS methodology is summarized on page 3 (Shelley and Pulich 2000). Their report concluded that most Johnston's frankenia populations are not suffering, nor harmed in a direct way by the pressures of human population growth (Shelley and Pulich 2000, p. 11).

*Issue 3:* One commenter suggested that continued monitoring of the species is warranted, especially focusing on three aspects: (1) Gathering of more specific population data in Starr County, (2) determining the rate of habitat or population loss or damage over time, and (3) assessing the potential long-term impacts of low reproductive success in light of the species' low seed set, low seed viability, and the apparent absence of a seed bank.

*Response:* As required by the Act, the Service worked with TPWD to prepare a post-delisting monitoring plan that is designed to detect population and habitat changes over time with onsite monitoring every 3 years over a 10-year period.

*Issue 4:* One commenter submitted that the population-by-population accounts that include confidential and unverifiable locality information, especially in Webb County, complicate understanding the vulnerability of these

populations. It is undecipherable from the final report how much of the suitable soil in Webb County was surveyed and, therefore, how significant this part of the overall range is to the species. Two of the seven populations within Webb County are of the confidential and undetailed locality type, so that, while the large populations #2 and #3 are only described as being northeast and east of Laredo, respectively, it is unclear whether they are on isolated rangeland or in the zone of expected impact from urbanization in this rapidly growing area. Also in Webb County, two populations with conservation agreements are small in size, one large population with viable numbers is isolated and has mining on the site with no formal agreement for continued protection, and at least portions of the two other populations are at high risk or threatened.

*Response:* Providing confidentiality for private landowners who were not part of the voluntary agreement program was often the only way to obtain plant information and access to the site. Regarding the Webb County Johnston's frankenia populations, the Service used its GIS-produced map to determine that large populations, #2 and #3, occur approximately 20 and 10 mi (32 and 16 km), respectively, from the city of Laredo. Both of these populations are on large ranches and are no closer than 1.5 mi (2.4 km) from a road or highway. Additionally, one of the largest populations located to date, #5, as well as one intermediate-sized population, #7, occur in Webb County where the landowners have indicated their interest in conserving the species (Janssen 1999, pp. 23 and 28). Population #1 is located on the site where mining is taking place. However, this is also the population for which an extension was discovered on the neighboring ranch (Carr 2004, p. 2) where the new landowners have shown a high degree of interest in conservation of all of their rare species, offering protection to the portion of this population on their ranch (Williams 2004, pers. comm.). The Maverick-Catarina soils complex, on which all the known Johnston's frankenia populations in Webb County have been found to date, underlies approximately 13 percent (287,210 acres (ac) or 116 hectares (ha)) of the county's surface area (Sanders and Gabriel 1985, p. 127). Although the Service does not know how much of this acreage has been sufficiently surveyed for the species, the botanist who conducted most of the surveys for this species believed she had covered 75 to 80 percent of the range as

defined by suitable soils (Janssen 2001, pers. comm.). Therefore, we conclude that the majority of the large populations in Webb County are protected from threats, and that a significant portion of the suitable habitat has been surveyed.

*Issue 5:* Although Zapata County appears to be the center of Johnston's frankenia distribution in the United States, there are other potential concerns about data provided for review. First, for a number of populations referred to as "secure," landowner agreements were "pending" or not in place, and, therefore, the conclusion of security is not well supported. Second, the reports from a secondary source for nine Starr County populations have incomplete population profiles with a dearth of information and do not address present threats or landowner intentions.

*Response:* The Service agrees that Zapata County appears to be the center of the Johnston's frankenia distribution in the United States and it is the county with the highest level of protection for the species, primarily due to the lower levels of development taking place within this county and also due to the number of landowners who have taken an interest in conservation of the species, as evidenced by their participation in voluntary conservation agreements (Janssen 1999, pp. 34–114; Price *et al.* 2006, pp. 2–3 in Attachment C). As part of the post-delisting monitoring plan, the Service will work with TPWD to take advantage of any future opportunities to encourage additional surveys in Starr and Webb Counties, and work with private landowners in those counties to pursue additional conservation agreements or to assist with other actions that would help landowners in their conservation efforts.

The use of the word "secure" was used with the understanding that the term referred only to active voluntary agreements. We do not presume to know any landowner intentions beyond these agreements, thus our post-delisting monitoring plan identifies measurable management thresholds and responses for detecting and reacting to significant changes in Johnston's frankenia protected habitat, distribution, and persistence for all three counties.

The voluntary protection of Johnston's frankenia on privately owned lands is important, and we conclude that the improved management practices as a result of outreach activities to landowners, and cooperative agreements with landowners, has been very beneficial to this species. However, the key reasons

the Service is proposing to delist Johnston's frankenia is due to the significant increase in the number of documented populations, a major expansion of the known range for the species, and a population estimate of more than 4 million plants. These larger numbers and more expansive range coupled with the lack of overall threats provide the primary basis for delisting.

*Issue 6:* Several commenters had concerns with the long-term protection of Johnston frankenia because the majority of the plants occur on private lands. Private landowner voluntary protection agreements are short term and lack legal force and are, therefore, symbolic and do not ensure real protection in the long term.

*Response:* The Service understands that protection on privately owned land is voluntary. Though the voluntary protection of Johnston's frankenia on privately owned lands is important, and we conclude that the improved management practices as a result of outreach activities to, and cooperative agreements with, landowners has been very beneficial to this species, these factors are not the sole basis for delisting. The primary reasons the Service is proposing to delist Johnston's frankenia are the significant increase in the number of documented populations, a major expansion of the known range for the species, and a population estimate of more than 4 million plants. These larger numbers and more expansive range coupled with the lack of threats to the species provide the primary basis for the delisting.

*Issue 7:* It is not safe to assume continuing protection of the species on Federally owned lands following delisting unless a formal conservation agreement or plan is put in place.

*Response:* A formal agreement or plan is not needed to continue protections for this species on Federal land. The Refuge will continue to monitor its Johnston's frankenia population, and conservation of this species will continue to be included in all management activities (Castillo 2007, pers. comm.). The USIBWC does not conduct active management practices on their Falcon Reservoir property, such as mowing or clearing, and they have indicated that they intend to continue considering Johnston's frankenia as a sensitive species. They will manage the population on their Falcon Reservoir land by recommending avoidance of impacts when coordinating with entities seeking access for projects on this land (Echlin 2004, pers. comm.). Though the Service acknowledges that these informal conservation efforts are beneficial, they are not the sole basis for

delisting. The key primary reasons the Service is proposing to delist Johnston's frankenia are the significant increase in the number of documented populations, a major expansion of the known range for the species, and a population estimate of more than 4 million plants. These larger numbers and more expansive range coupled with the lack of overall threats provide the primary basis for delisting.

*Issue 8:* Once Johnston's frankenia is delisted, funding will no longer be available to Service and TPWD staff to do the work needed to obtain and maintain conservation agreements with landowners. Without monitoring, delisting will allow Johnston's frankenia numbers to drop to dangerous levels without anyone taking notice.

*Response:* As discussed elsewhere in this rule, the Service is confident that the future existence of this species is ensured due to the significant expansion of the species' range, and increased abundance across its range. Furthermore, we have determined that the magnitude of threats facing the species is greatly reduced because of our reevaluation of the impact from the types of habitat modification activities (agricultural, industry, and residential) that were formerly considered significant. The post-delisting monitoring plan was specifically designed to detect population and habitat changes over time; if negative changes are observed from any monitoring activities, such as reduced numbers of plants or decreased extent of a population, then more intensive onsite observations or data collections will be employed. 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 and determine if relisting the species is warranted. Landowner contacts will be a requisite piece of implementing this monitoring plan, and as the level of landowner interest is investigated, voluntary conservation agreements could be offered to interested landowners.

#### **Recovery Planning and Implementation**

Section 4(f) of the Act directs us to develop and implement recovery plans for the conservation and survival of endangered and threatened species unless we determine that such a plan will not promote the conservation of the species. Recovery planning includes the development of a recovery outline shortly after a species is listed, and

preparation of a draft and final recovery plan. The recovery outline guides the immediate implementation of urgent recovery actions and describes the process to be used to develop a recovery plan. Revisions of the plan may be done to address continuing or new threats to the species, as new, substantive information becomes available. The recovery plan identifies site-specific management actions that will achieve recovery of the species, measurable criteria that set a trigger for review of the species' status, and methods for monitoring recovery progress.

Recovery plans are not regulatory documents and are instead intended to establish goals for long-term conservation of listed species, define criteria that are designed to indicate when the threats facing a species have been removed or reduced to such an extent that the species may no longer need the protections of the Act, and provide guidance to our Federal, State, and other governmental and nongovernmental partners on methods to minimize threats to listed species. There are many paths to accomplishing recovery of a species, and recovery may be achieved without all criteria being fully met. For example, one or more criteria may be exceeded while other criteria may not yet be accomplished. In that instance, we may determine that the threats are minimized sufficiently and the species is robust enough to delist. In other cases, recovery opportunities may be discovered that were not known when the recovery plan was finalized. These opportunities may be used instead of methods identified in the recovery plan. Likewise, information on the species may be learned that was not known at the time the recovery plan was finalized. The new information may change the extent that criteria need to be met for recognizing recovery of the species. Recovery of a species is a dynamic process requiring adaptive management that may, or may not, fully follow the guidance provided in a recovery plan.

The Johnston's Frankenia Recovery Plan was approved by the Service on May 24, 1988 (Service 1988). In the case of Johnston's frankenia, the overarching goal of the final recovery plan was to remove the need for protection under the Act by managing the species and its habitat in a way that would ensure the continued existence of self-sustaining populations. Objective, measurable, and adequate recovery criteria that would provide a reference point for downlisting or delisting were not established in the recovery plan. The plan's author concluded that the lack of available biological and life-history information

for Johnston's frankenia precluded development of recovery criteria at that time and indicated that implementation of studies outlined in the plan would provide the necessary information to develop recovery criteria (Service 1988, p. 14). Although the recovery plan did not contain recovery criteria, it was used extensively to guide the conservation efforts that have been taken for Johnston's frankenia.

The recovery plan's implementation schedule identified a list of actions that were needed to reduce and remove threats and move the species toward recovery. These actions included (1) maintaining the present populations through landowner agreements and habitat management; (2) providing permanent Service or conservation group protection for at least one population; (3) identifying essential habitat and searching for additional populations; (4) conducting field and greenhouse studies of the life history and ecology of the species to determine habitat requirements, vegetative physiognomy and community structure, and population biology; (5) applying data from studies to develop management recommendations; (6) monitoring populations; and (7) carrying out a campaign to develop public awareness, appreciation, and support for preservation of the species.

The listing of Johnston's frankenia and implementation of actions in the recovery plan generated increased inventory and research activities for the species throughout its known range. Among the primary conservation actions undertaken for the species was a 6-year (1993–1999) project by the TPWD to intensively survey for additional populations, conduct field and greenhouse studies to characterize the habitat requirements and life history of the species, develop a landowner outreach program to increase awareness of this unique plant, develop a voluntary conservation agreement for landowners, and coordinate with agricultural technical assistance providers to transfer knowledge regarding best management for conservation of this species (Janssen 1999, entire). Subsequent to 2000, additional botanical surveys in Starr, Webb, and Zapata Counties in Texas included Johnston's frankenia as a target species, and conservation agreements were also signed as part of this recovery effort (Price *et al.* 2006, p. 10 in Attachment B, pp. 1–5 in Attachment C).

The extensive survey efforts mentioned above led to population discoveries that have expanded the known range of the species as well as

significantly increasing the number of known populations, some with large numbers of individual plants. Studies of the species' biology and ecology increased knowledge of the life-history requirements of this species, lessening the degree of perceived threat associated with low reproductive potential and the competition from nonnative grasses. Information gathered from these studies has enhanced our understanding of this species' capability to survive, and even to recolonize, in the specialized habitat in which it grows. Habitat losses from large-scale clearing of native vegetation and planting to pasture grasses have diminished in scope as private landowners have diversified their income-generating activities to include increased hunting opportunities, which depend on keeping more acreage in native brush habitat. Also, education and outreach efforts targeted to landowners have helped to elucidate the economic disadvantage of trying to plant pasture grasses on the hypersaline (elevated salt levels) soils inhabited by Johnston's frankenia.

Because Johnston's frankenia occurs mostly on privately owned land, the recovery plan identified protection of at least one population on land controlled by the Service or a conservation group as a needed action. Now the species is known to occur on one tract of the Refuge where it is protected. Also, portions of two other populations extend onto land controlled by the USIBWC, which has indicated willingness to recognize the species as sensitive following delisting, allowing for prescribed avoidance of impacts to the species. Portions of two populations on private lands also extend onto TxDOT right-of-way in Zapata County, one along Highway 83 and the other along Highway 469. Signs have been erected to protect the plants from mowing at the Highway 83 right-of-way site.

Recovery actions have resulted in a reduction in the magnitude of threats due to: (1) A significant increase in the number of documented populations, (2) a major expansion of the known range for the species, (3) a population estimate of more than a million plants, (4) the its ability to successfully outcompete nonnative grasses in the specialized habitat it occupies indicating the species is more resilient than previously thought, and (5) improved management practices as a result of outreach activities to, and cooperative agreements with, landowners.

In summary, the implementation of the majority of actions in the recovery plan produced the information that led the Service to conclude not only that the

species is more widespread and abundant than was known when it was listed, but also that the magnitude of the threats facing this species are not as severe as they were believed to be at the time of listing and are better managed for many populations now.

#### Summary of Factors Affecting the Species

Section 4 of the Act and its implementing regulations (50 CFR part 424) set forth the procedures for listing species, reclassifying species, or removing species from listed status. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act: (A) The present or threatened destruction, modification, or curtailment of its habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) the inadequacy of existing regulatory mechanisms; or (E) other natural or human made factors affecting its continued existence. We must consider these same five factors in delisting a species. We may delist a species according to 50 CFR 424.11(d) if the best available scientific and commercial data indicate that the species is neither endangered nor threatened for the following reasons: (1) The species is extinct; (2) the species has recovered and is no longer endangered or threatened (as is the case with the Johnston's frankenia); and (3) the original scientific data used at the time the species was classified were in error.

A recovered species is one that no longer meets the Act's definition of threatened or endangered. Determining whether a species is recovered requires consideration of the same five categories of threats specified in section 4(a)(1) of the Act. For species that are already listed as threatened or endangered, this analysis of threats is an evaluation of both the threats currently facing the species and the threats that are reasonably likely to affect the species in the foreseeable future following the delisting or downlisting and the removal or reduction of the Act's protections.

A species is "endangered" for purposes of the Act if it is in danger of extinction throughout all or a "significant portion of its range" and is "threatened" if it is likely to become endangered within the foreseeable future throughout all or a "significant portion of its range." The word "range" in the significant portion of its range phrase refers to the range in which the species currently exists. For the

purposes of this analysis, we will evaluate whether the currently listed species, the Johnston's frankenia, should be considered threatened or endangered. Then we will consider whether there are any portions of Johnston's frankenia range in danger of extinction or likely to become endangered within the foreseeable future.

At the time of listing, we considered Johnston's frankenia to be vulnerable to extinction due to the following: (1) Threats to the integrity of the species' habitat such as clearing, then planting of nonnative grasses to improve pasture; (2) direct loss from construction associated with highways, residential development, and oil- and natural gas-related activities; (3) the low number and restricted distribution of populations; (4) low numbers of individual plants; and (5) the species' low reproductive potential. The following analysis examines all five factors currently affecting, or that are likely to affect, the Johnston's frankenia within the foreseeable future.

#### *A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range*

##### Habitat Modification

*Agricultural Land Management Practices*—At the time of listing in 1984, all known populations were found on rangeland that was considered in poor condition. We thought this species was vulnerable due to suspected low reproductive rates, and that the populations could be adversely impacted by any habitat change brought about by (1) land and vegetation manipulation such as chaining or plowing, and (2) converting pastureland to buffelgrass. Initial concerns regarding the practice of woody brush eradication on private lands having the potential to adversely affect Johnston's frankenia populations has been alleviated by a shift in land use practices. Fluctuating cattle markets and frequent droughts in the area have provided an impetus for south Texas ranchers to diversify their sources of income, and as a result, many ranchers have shown increased interest in retaining native brush habitat to enhance wildlife habitat and hunting opportunities (Ibarra 2001, pers. comm.). Johnston's frankenia has also shown the ability to regenerate and recolonize areas that were formerly root-plowed pastures (Janssen 1999, pp. 23, 72, 78, 83, 96–97, 104; Price *et al.* 2006, p. 4 in Attachment C). These areas were root plowed 6, 10, or 15 years in the past, and regrowth was observed in eight populations. Due to the shift in

land management practices and the ability of Johnston's frankenia to successfully regenerate in disturbed areas, we no longer consider these land management practices to be a threat to the species.

As early as the 1930's, ranchers were converting their rangeland to buffelgrass due to increasing concern with drought. Buffelgrass is drought-resistant and was brought in to improve grazing on ranches where soils had been extensively cleared and root-plowed. Initial concerns regarding Johnston's frankenia vulnerability to competition from nonnative, invasive grass species planted for grazing have been lessened by the results of research on this species' life history requirements (Janssen 1999, pp. 161–172). Ecological research shows that long-term replacement of Johnston's frankenia by buffelgrass (*Pennisetum ciliare*), or other improved range grass species, is unlikely due to the hypersaline soils underlying Johnston's frankenia populations. Janssen (1999, pp. 161–164) reported that these hypersaline conditions where Johnston's frankenia populations exist differed drastically from those used by buffelgrass or other range grass species. Buffelgrass does not tolerate highly saline soils and does not appear to be a threat to the continued existence of Johnston's frankenia (Janssen 1999, pp. 161–166, 222).

To address conservation concerns associated with agricultural land management practices, during 1995 and 1996, the TPWD conducted an extensive endangered and rare species education and outreach campaign in Starr, Webb, and Zapata Counties that included activities such as landowner meetings, coordination with the NRCS, county fair exhibits, development of printed information, and school presentations. This campaign promoted conservation of Johnston's frankenia, in part by sharing the results of Janssen's field studies on the ecology and biology of this species. In October 2000, a presentation was made to NRCS District Conservationists from Starr, Webb, and Zapata Counties to emphasize their agency's role in helping landowners identify and avoid impacts to Johnston's frankenia population sites, especially in light of the lack of success converting the land cover on these hyper-saline sites to pastures of buffelgrass. In 2001 and 2007, the NRCS District Conservationists for Starr, Webb, and Zapata Counties reiterated that their approach to promoting conservation of this species is to educate landowners about the presence of Johnston's frankenia on their land and to encourage landowners to leave the Johnston's

frankenia community intact, avoiding clearing of this unique brush assemblage (Ibarra 2001, pers. comm.; Saenz 2007, pers. comm.).

In summary, according to the Natural Resources Conservation Service (NRCS) in Starr and Zapata Counties, the level of threat to Johnston's frankenia communities from agricultural land-conversion activities has diminished due to depressed economic conditions in cattle ranching and increased economic benefits from wildlife-related recreation that leads to less clearing of native brush (Ibarra 2001, pers. comm.; Saenz 2007, pers. comm.). Though the voluntary conservation agreements are beneficial, the primary reasons that the Service is proposing to delist Johnston's frankenia are the significant increase in the number of documented populations, a major expansion of the known range for the species, and a population estimate of more than 4 million plants, combined with the reduction in threats such as land conversion to grazing pastures. These larger numbers and more expansive range coupled with the lack of overall threats is the basis for delisting.

*Industry Activities*—At the time of listing, direct loss from construction activities associated with oil- and natural gas-related development was considered a threat. Oil and gas exploration and production activities had accelerated throughout the region due to the passage of the North American Free Trade Agreement (Shelley and Pulich 2000, p. 4). The Service was able to more closely document the Johnston's frankenia population locations in relation to these threats posed by oil and gas development using a GIS approach. The threats associated with oil and gas development on ranches consist primarily of road, pipeline, and well-pad construction, and their impacts are largely contained within the footprint of the actual construction. Janssen (2012, pers. comm.) did botanical surveys on three ranches and for several pipeline companies during 2011 and found all Johnston's frankenia populations were stable despite the extreme drought that summer. Janssen also indicated that visits were made over the last several years to many of the known populations and all were still intact. A Zapata County landowner also relayed that new plants were found during 2011 on the individual's land, and a Starr County landowner offered that the populations on the landowner's land were stable (Janssen 2012, pers. comm.). We also have documented Johnston's frankenia recovery after disturbance (Janssen 1999, pp. 23, 72, 78, 83, 96–97, 104;

Price *et al.* 2006, p. 4 in Attachment C). All of these survey reports indicate stable populations of Johnston's frankenia despite some level of oil and gas activity.

The threats to Johnston's frankenia populations from oil and gas development have also been minimized due to lack of exposure. The Service used a GIS-based analysis of the distribution of Johnston's frankenia populations in relation to locations of existing and proposed roads associated with industrial development (Shelley and Pulich 2000, p. 11) to pinpoint the U.S. populations most likely to be threatened within the next 20 years as well as those populations furthest removed from these types of threats. Based on the populations identified in the 1999 report, the results of this analysis showed that 15 of the intermediate-sized and largest populations, containing approximately 4 million plants (77 percent of documented plants), remain in remote locations on rangeland, where threats from industrial construction activities are diminished. Thirteen of the smallest (fewer than 2,000 individuals) Johnston's frankenia populations, containing approximately 5,300 plants (0.1 percent), also occur on remote rangeland, removed from roads associated with industrial and residential construction threats. The populations discovered in 2004 and 2007, containing approximately 4,400 plants (0.09 percent of total known Texas plants) are on isolated rangeland as well, removed from the threat of industrial and residential development in the foreseeable future (Price *et al.* 2006, pp. 2–6 in Attachment C; Janssen 2007, pers. comm.).

To address conservation concerns associated with industrial activities, voluntary agreements were developed. The TPWD voluntary landowner conservation agreements proved effective in avoiding oil- and natural gas-related activity impacts on four ranches in Zapata County. Each landowner requested a Johnston's frankenia survey, which led to the gas company surveying a much larger (50-square-mile (80.5-sq-km)) area prior to initiating any work. In addition, mitigation measures were included on all projects, which included flagging any Johnston's frankenia sites, walking seismic lines instead of driving, and the presence of an onsite monitor to protect populations (Shelley and Pulich 2000, p. 9; Janssen 2006, pers. comm.; Janssen 2010, pers. comm.). As of December 2011, Janssen (2012, pers. comm.) worked with The Nature Conservancy to get three ranch landowner conservation

agreements signed and to ensure installation of gate signs and "stay on the road" signs to protect Johnston's frankenia populations. One energy company became aware of the existence of these agreements through leasing negotiations with a signatory landowner who requested Johnston's frankenia surveys prior to seismic exploration.

In summary, the threats to Johnston's frankenia populations from oil and gas development have been minimized due to lack of exposure to these activities, and voluntary conservation agreements provide an additional layer of confidence for the future status of the species.

*Residential Development*—At the time of listing, direct loss from construction activities associated with residential development was considered a threat. Human population growth in Starr, Webb, and Zapata Counties has more than doubled since 1970 and is projected to double or triple again by 2030 (Shelley and Pulich 2000, p. 5). Human population growth leads to an increase not just in home building, but the roads and other infrastructure such as powerlines, cell towers, and other facilities necessary to support the residential development. All of these residential-related activities have the potential to modify or destroy Johnston's frankenia habitat.

Residential development has not been uniformly distributed across the three counties; instead, people are concentrating residential development in a few geographic areas, with the highest level of growth in and around the City of Laredo in Webb County. Major areas of growth follow the primary transportation corridors including Interstate 35 and Highway 83, and along the Rio Grande River downstream of the Falcon Reservoir (Shelley and Pulich 2000, p. 5). According to Shelley and Pulich (2000, p. 5), relatively few people are living far from the cities and highways.

The Service used a GIS-based analysis of the distribution of Johnston's frankenia populations in relation to locations of existing and proposed highways associated with residential development (Shelley and Pulich 2000, p. 11). The GIS modeling results provide data confirming that residential development impacts such as road and home construction would be minimal since the majority of Johnston's frankenia populations are found on isolated rangeland (see *Industry Activities* above). As stated prior, most of the known populations are located in remote areas and are deemed to be safe from development pressures (Janssen 1999, pp. 12–160; Shelley and Pulich

2000, p. 10; Price *et al.* 2006, p. 9 in Attachment B and pp. 2–3 and 6). We have no information to indicate there has been a change in the concentration of human population growth since these studies.

If the current trend in population growth holds, this growth is unlikely to impact the majority of Johnston's frankenia populations that are distant from centers of residential development or transportation corridors. Also, the high salinity of the soils supporting Johnston's frankenia, in conjunction with the arid climate of the area, results in highly erodible soils, which are not desired by most real estate developers (Shelley and Pulich 2000, p. 8). Existing Johnston's frankenia populations that are distant from current development are likely to continue to thrive in their unique environment (Shelley and Pulich 2000, pp. 8, 11).

Public lands on which Johnston's frankenia occurs include Refuge and USIBWC-controlled lands including Falcon Reservoir, and sites on two TxDOT right-of-ways. All three sites (and possibly a fourth where landownership is unknown) on Federal land are small populations, and TxDOT right-of-way sites have a combined total of only 536 individual plants.

The Lower Rio Grande Valley National Wildlife Refuge ensures the continued protection of this species where it extends onto their tract by regular monitoring of the previously mapped and known populations (Best 2004, pers. comm.; Castillo 2007, pers. comm.). The National Wildlife Refuge System Improvement Act of 1997 (Pub. L. 105–57) (Refuge Improvement Act) establishes a conservation mission for Refuges. The Refuge Improvement Act requires all refuges to have an approved Comprehensive Conservation Plan. The Comprehensive Conservation Plan for the Lower Rio Grande Valley National Wildlife Refuge lists specific management objectives for threatened and endangered plants. The Refuge has indicated that they will continue to implement these actions following delisting (Castillo 2007, pers. comm.). In part, these management objectives include the following actions: (1) Monitor populations of threatened and endangered floral and faunal species on Refuge tracts and throughout the area of ecological concern, (2) implement recovery objectives identified in recovery plans, and (3) in conjunction with the various lead offices, determine threatened and endangered species needs on the Refuge and develop strategies to provide for such needs. These strategies include habitat enhancement and restoration, support

for research and recovery actions, and propagation and reintroduction into appropriate sites.

For the portions of two populations that extend on to lands managed by the USIBWC, they have agreed to continue protection of the species after delisting by designating this plant as a sensitive species (Borunda 2004, pers. comm.; Anaya 2013, pers. comm.). The USIBWC has indicated that it will recommend avoidance of impacts to Johnston's frankenia when coordinating with entities seeking access for projects on this land (Echlin 2004, pers. comm.; Anaya 2013, pers. comm.). This designation will allow consideration for these populations during project review by a number of Federal agencies, including the Service, as USIBWC requires licenses or permits for any proposed activities that cross or encroach upon the floodplains within their jurisdiction (USIBWC 2000, p. 2). The USIBWC has indicated that its agency does not carry out active management activities around Falcon Reservoir, such as mowing or clearing, on the land where Johnston's frankenia occurs, although any future flooding that refills the reservoir could conceivably impact the populations if the water level rises significantly above current levels (Echlin 2004, pers. comm.). Even though USIBWC has agreed to continue protection of these two portions of Johnston's frankenia populations, which we anticipate will continue into the foreseeable future, we are not placing undue reliance on the conservation of these areas. Considering the known occurrence of 68 widely distributed populations that number into the millions of plants, we find that the potential loss of any portion of these two populations would be insignificant to the species as a whole.

Portions of two Johnston's frankenia populations, one consisting of 36 plants and the other estimated to contain around 500 plants, exist on TxDOT right-of-ways with the remainder of both populations extending onto neighboring private ranches. The TxDOT manages for rare plants in right-of-ways under a Memorandum of Understanding with TPWD. Stipulations include outlining the perimeter of the population with reflector stakes, restrictive signage, and no mowing, blading, or herbicides within delineated areas (TXDOT 2001, entire). As long as Johnston's frankenia remains on the Texas Conservation Action Plan's Species of Greatest Conservation Need list, it will continue to be covered (Poole 2013, pers. comm.).

In a further effort to promote conservation of populations occurring on private land, TPWD initiated a

voluntary conservation agreement program in 1995 to protect Johnston's frankenia from mechanical and chemical habitat alteration and overstocking of cattle. The conservation agreements included recommendations for land management practices that would avoid root plowing, bulldozing, disking, roller chopping, and herbicide applications in Johnston's frankenia sites, as well as using stocking rates appropriate to acreage and rainfall. The agreements also allowed TPWD staff, with prior landowner contact, to enter the property at least once per year to survey and monitor each population site for the 10-year life of the agreement and to compile this information in a report. The agreements included provisions for landowners to contact TPWD whenever damage accidentally occurs or is anticipated so that TPWD could inspect Johnston's frankenia populations and make recommendations for avoidance or recovery. The agreements also provided for TPWD to act as the landowner's liaison to the Service on any occasion in which concerns regarding this species were raised. The TPWD has agreed to work closely with the FWS to implement the post-delisting monitoring plan (Anaya 2013, pers. comm.).

In summary, while voluntary conservation agreements are not considered essential for the survival of this species, they provide additional confidence for its long-term security and the threats to Johnston's frankenia populations from residential development have been minimized due to lack of exposure to such development.

#### Climate Change and Drought

Beyond documenting new populations, climate change was not analyzed in the 2003 proposal to delist. In our 2011 proposed rule, we outlined the state of our knowledge on climate change (IPCC 2007, pp. 5, 8, 12, 13, and 15; Seager *et al.* 2007, p. 1181). There is unequivocal evidence that the earth's climate is warming based on observations of increases in average global air and ocean temperatures, widespread melting of glaciers and polar ice caps, and rising sea levels, with abundant evidence supporting predicted changes in temperature and precipitation in the southwestern deserts (IPCC 2014, entire). It is very likely that over the past 50 years, cold days, cold nights, and frost have become less frequent over most land areas, and hot days and hot nights have become more frequent (IPCC 2007, p. 8). Each of the last three decades has been successively warmer at the Earth's surface than any preceding decade since

1850 (IPCC 2014, p. 2). Further, the period from 1983 to 2012 was likely the warmest 30-year period of the last 1,400 years in the Northern Hemisphere (IPCC 2014, p. 2).

As part of the current, worldwide collaboration in climate modelling under the IPCC, climate assessments of the full dataset of 30 climate models for historical and 21st century comparisons provide predictions at scales ranging from global to county level in the U.S. (USGS National Climate Change Viewer 2015; [http://www.usgs.gov/climate\\_landuse/clu\\_rd/nccv/viewer.asp](http://www.usgs.gov/climate_landuse/clu_rd/nccv/viewer.asp)). This global climate information has been recently downscaled by NASA to scales relevant to our region of interest, and projected into the future under two different scenarios of possible emissions of greenhouse gases (Alder and Hostetler 2013, p. 2). From this dataset, annual mean maximum temperature, precipitation, and evaporative deficit were analyzed in relation to the Johnston's frankenia.

At the state level for Texas as a whole, these models depict a temperature increase into the future in both mean maximum and minimum temperatures annually. Between 1950–2005 and 2025–2049, the mean model prediction (of 30 models) in annual maximum temperature is an increase of 3.2–3.6 °F (from the 1950–2005 average of 77.7 °F to 81.0–81.3 °F between 2025–2049) under 2 different scenarios for Texas. The lesser value of a 3.2 °F change is dependent on lower greenhouse gas emissions, while the greater value of a 3.6 °F change represents a higher greenhouse gas emission scenario into the future. At this time, we lack the ability to predict which scenario will be more accurate; hence both scenarios are analyzed to create the predicted range of change. Further time frames, from 1950–2005 to 2050–2074, and then from 1950–2005 to 2075–2099, predict an increase of an average of 4.3–6.1 °F and 5.0–9.0 °F, respectively, in annual mean maximum temperatures (USGS National Climate Change Viewer 2015; [http://www.usgs.gov/climate\\_landuse/clu\\_rd/nccv/viewer.asp](http://www.usgs.gov/climate_landuse/clu_rd/nccv/viewer.asp)).

Higher resolution information for annual mean maximum temperature at the county level for Starr, Webb, and Zapata counties reveals similar trends (Table 1). For example, for Webb County, which is the largest of the counties and farthest to the north, the annual mean maximum temperature from 1950–2005 at 84.4 °F will increase by 3.1 to 3.4 °F, to 87.4 to 87.8 °F, by the 2025–2049 time period; by 2050–2074, there will be a change by 4.1 to 5.9 °F, to 88.5 to 90.3 °F average annual maximum temperature. Between 1950–



2005 and 2075–2099, the average annual maximum temperature is predicted to rise by 4.7 to 8.6 °F, to 89.1 to 93.0 °F,

depending on which of the two scenarios plays out. Annual Mean Maximum Temperature (°F)—Each new time frame is compared

to the original temperature averaged during the 1950–2005 period, bolded.

	1950–2005	Change in °F	2025–2049	Change in °F	2050–2074	Change in °F	2075–2099
Scenario:	STARR COUNTY						
1 .....	<b>85.3</b>	3.1	88.3	4.0	89.2	4.5	89.8
2 .....	<b>85.3</b>	3.4	88.7	5.8	91.0	8.3	93.6
	WEBB COUNTY						
1 .....	<b>84.4</b>	3.1	87.4	4.1	88.5	4.7	89.1
2 .....	<b>84.4</b>	3.4	87.8	5.9	90.3	8.6	93.0
	ZAPATA COUNTY						
1 .....	<b>85.5</b>	3.1	88.5	4.0	89.4	4.5	90.0
2 .....	<b>85.5</b>	3.4	88.9	5.8	91.3	8.5	94.0

**Table 1.** Annual mean maximum temperature changes from years 1950–2005, 2025–2049, 2050–2074, and 2075–2099 under two emissions scenarios. Each average represents compiled data from 30 climate models, downscaled to the county level.

At the state level, precipitation changes for Texas are expected to be minimal yet still in a predicted decreasing trend. Model means indicate an average change in mean precipitation from 1950–2005 to 2025–2049 to be 0.0 to –0.4 to inches/day × 100, (from 7.5 to 7.1 – 7.5 inches/day × 100) followed by the same predictions from 2050–2074, and then all models settle on a solid –0.4 inches/day × 100 loss into the 2075–2099 time frame, indicating a slight loss in precipitation. This loss of

precipitation may be enhanced by the predicted increase in the annual mean evaporative deficit, which will lead to drier overall conditions. The evaporative deficit annual mean rate for Texas from 1950–2005 was 1.4 inches/month for both scenarios. This deficit grows to 1.8 inches/month in the 2025–2049 predictions, and to 1.9 – 2.2 inches/month in the 2050–2074 range, followed by an increased evaporative deficit into 2075–2099 of 2.0 – 2.6 inches/month.

At the county level, the annual mean precipitation appears to have no change for Webb County from the 1950–2005 to the 2075–2099 time period; however, both Starr and Zapata Counties indicate a similar slight decrease in precipitation by –0.4 inches/day × 100 over the same time period (Table 2).

Annual Mean Precipitation (inches/day × 100)—Each new time frame is compared to the original temperature averaged during the 1950–2005 period, bolded.

	1950–2005	Change (in/day × 100)	2025–2049	Change (in/day × 100)	2050–2074	Change (in/day × 100)	2075–2099
Scenario:	STARR COUNTY						
1 .....	<b>5.5</b>	–0.4	5.1	–0.4	5.1	–0.4	5.1
2 .....	<b>5.5</b>	–0.4	5.1	–0.4	5.1	–0.4	5.1
	WEBB COUNTY						
1 .....	<b>5.5</b>	0.0	5.5	0.0	5.5	0.0	5.5
2 .....	<b>5.5</b>	0.0	5.5	0.0	5.5	0.0	5.5
	ZAPATA COUNTY						
1 .....	<b>5.5</b>	–0.4	5.1	–0.4	5.1	–0.4	5.1
2 .....	<b>5.5</b>	–0.4	5.1	–0.4	5.1	–0.4	5.1

**Table 2.** Annual mean precipitation predictions from years 1950–2005, 2025–2049, 2050–2074, and 2075–2099 under two emissions scenarios. Each average represents compiled data from 30 climate models, downscaled to the county level.

Data depicting annual mean evaporative deficit was calculated using the same set of 30 models and two scenarios, and was simulated using the temperature and precipitation models at the county level for Starr, Webb, and Zapata Counties (Alder and Hostetler, 2013, p. 10). As seen in Table 3, an increase in water lost to evaporative processes is expected for all three counties. Webb County has the lowest level of current water deficit (at 2.3

inches/month lost to evaporation and plant transpiration), and has the least pronounced increase in water deficit of the three counties into the future. Starr and Zapata Counties currently have a higher water deficit (at 2.5 inches/month of water lost), yet Zapata County shows the most pronounced future predicted water deficit of the three counties (Table 3). Monthly averages of evaporative deficit are predicted to show enhanced peaks in the warmer

months from current levels, starting in May and ranging through August, with a steadily growing peak in July through the range of time frames. This indicates that the evaporative deficit will become more extreme in the warmer months, especially in July, compared to rates occurring today.

Annual Mean Water Deficit (inches/month)—Each new time frame is compared to the original temperature

averaged during the 1950–2005 period, bolded.

	1950–2005	Change (in/mo)	2025–2049	Change (in/mo)	2050–2074	Change (in/mo)	2075–2099
Scenario:	STARR COUNTY						
1 .....	<b>2.5</b>	0.5	3.0	0.6	3.1	0.7	3.2
2 .....	<b>2.5</b>	0.5	3.0	1.0	3.5	1.4	3.9
	WEBB COUNTY						
1 .....	<b>2.3</b>	0.5	2.8	0.6	2.9	0.8	3.1
2 .....	<b>2.3</b>	0.6	2.9	1.0	3.3	1.5	3.8
	ZAPATA COUNTY						
1 .....	<b>2.5</b>	0.6	3.1	0.7	3.2	0.8	3.3
2 .....	<b>2.5</b>	0.6	3.1	1.0	3.5	1.5	4.0

**Table 3.** Annual mean water deficit predictions from years 1950–2005, 2025–2049, 2050–2074, and 2075–2099 under two emissions scenarios. Each average represents compiled data from 30 climate models, downscaled to the county level.

A fourth climate variable available at a county level is annual mean runoff, measured in inches/month. Although the overall runoff amount over the year will likely remain the same throughout the time periods of the climate models, reflecting a similar amount per month, future time series predictions show runoff occurring in more extreme events than those experienced during the 1950–2005 period (USGS National Climate Change Viewer 2015; [http://www.usgs.gov/climate\\_landuse/clu\\_rd/nccv/viewer.asp](http://www.usgs.gov/climate_landuse/clu_rd/nccv/viewer.asp)). Monthly averages of runoff for the three future time periods indicate a slight increase in runoff inches/month during September, which could correlate to more heavy rainfall events occurring over briefer time periods, at least within September.

Collectively, climate information for the counties of Starr, Webb, and Zapata in south western Texas predicts future patterns of increasing temperatures, somewhat stable precipitation, and increasing evaporative deficits into the future, at a gradual rate. This suggests a gradual trend toward hotter, drier conditions for the Johnston’s frankenia. The interaction of these climate variables with other local topographic, edaphic, and microclimate conditions, as well as local ecological interactions, leads to a complexity of possible outcomes for the future status of Johnston’s. For instance, localized evaporative loss will be dependent on soil type, chemistry, content of organic matter, root depth, and overall vegetative cover, among other factors. As Johnston’s frankenia is known to live in washes, being in this type of location could buffer impacts of water loss from increased temperatures and increased evapo-transpiration due to greater shading and access to moisture.

Moreover, if rainfall events become more intense, the hydrological flow into drainages and washes could either benefit Johnston’s frankenia or lead to increased gully erosion and potentially scour out individual Johnston’s frankenia plants. Therefore, it is difficult to predict how climate will impact this species throughout its range into the future.

Nevertheless, we believe that increasing global temperatures and drought conditions will likely have little impact on Johnston’s frankenia because this species is well adapted to the warm, arid landscape of south Texas. Despite the drought of 2011, and because this species is drought-deciduous (leaves sprout after small rain events), Johnston’s frankenia populations remained stable (Janssen 2012, pers. comm.). In addition, we suggest that climate change may actually benefit Johnston’s frankenia by making the landscape more arid, thus reducing competition with other less physiologically adapted plants. However, we continue to lack specific evidence as to how climate change will directly or indirectly affect this species.

*Summary of Factor A:* Intensive survey efforts by TPWD in south Texas have shown Johnston’s frankenia to be much more widespread and abundant than was known at the time of listing or when the recovery plan was prepared. The occurrence of sizable populations in areas relatively isolated from industrial activities and residential development, the large numbers of individual plants and widely dispersed populations, the diminished threat of pasture clearing and nonnative grass planting, less emphasis on livestock grazing, and the species’ ability to recover from some level of ground

disturbance, has ameliorated concerns regarding the threats to the species’ habitat. Habitat modifications will continue to occur (agricultural land management practices, industry activities, and residential development), but the resulting impacts will be to a smaller number of individual plants rather than entire populations, and these threats will not occur throughout the entire range of the species. In summary, habitat modification is no longer a threat to the species, nor is this factor likely to become one within the foreseeable future. The significant increase in Johnston’s frankenia abundance makes it more resilient, and its widened distribution makes it better represented throughout its range, minimizing the impacts from any one, or combination of, the above described threats. The specific effects of climate change and drought on Johnston’s frankenia remain uncertain; however, it seems that the plant is well adapted to arid conditions. Therefore, climate change does not appear to be a threat to this species. In addition, conservation measures and the voluntary conservation agreements are beneficial to the species; however, they are not necessary for the long-term survival of this species.

*B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes*

Johnston’s frankenia is not a highly collected or sought after species. There is no evidence to indicate that this species is currently or will be collected for any commercial, recreational, scientific, or educational purpose.

*Summary of Factor B:* We conclude that overutilization is not a current or foreseeable threat to the species.

### C. Disease or Predation

In the original 1984 listing rule, all the known populations were located in heavily grazed rangelands (Turner 1980, entire). Detrimental effects referred to in the recovery plan (Service 1988, pp. 12–13) were browsing of tender, new growth that might contribute to lowered reproductive success, direct trampling of young plants or seedlings, and soil compaction, which may negatively affect germination. Janssen observed that the population showing the most harmful effects of grazing was one where the fenced area was inadequate to support the number of cattle being stocked and the animals were not receiving any type of supplemental feed (Janssen and Williamson 1993, p. 8; Janssen, 1999, p. 9). Observations of cottontail rabbits and jackrabbits nibbling on Johnston's frankenia indicate a likelihood that other mammals will also browse on this plant (Janssen 2001, pers. comm.). Janssen (1999, p. 9) did not entirely agree that grazing was heavy across the entire range or that it was a major threat as mentioned in the recovery plan (Service 1988, pp. 11–13) based on Turner's (1980, p. 6) observations. Based on Janssen's 6 years of field observations, she felt there was little difference in the appearance of Johnston's frankenia populations between ranches with and without cattle, and because the majority of the populations were remote and dispersed enough to minimize concentrated grazing impacts, Janssen concluded that grazing should not be considered a direct threat (Janssen 1999, p. 9).

There is no evidence to indicate that Johnston's frankenia is threatened by any disease. Therefore, we conclude that disease is not a current or foreseeable threat to the species.

*Summary of Factor C:* The final listing rule included some evidence to indicate that this species was threatened by cattle grazing. We acknowledge that the anecdotal observations that Johnston's frankenia does not appear to differ on grazed or ungrazed rangelands does not necessarily mean there are no effects to Johnston's frankenia; however, to date there has been no substantial evidence to the contrary. Though the final listing rule included some evidence of detrimental effects due to cattle grazing and other browsers on plant growth, no data suggest that populations are threatened, and the majority of populations are remote and dispersed enough to minimize concentrated grazing impacts. We have also found that the species has a much broader distribution than originally thought as

well as a substantial increase in the number of populations. Because we have no data to suggest that either grazing or other browsing threatens any of the populations, we find that predation is not a threat to the species as a whole. In summary, grazing is no longer considered a threat to the species, nor is it likely to become one within the foreseeable future.

### D. The Inadequacy of Existing Regulatory Mechanisms

Prior to the species' listing in 1984, no Federal or State laws protected Johnston's frankenia (49 FR 31418, August 7, 1984), and its known distribution was limited to Starr and Zapata Counties. As previously described, implementation of specific recovery actions and surveys have resulted in and documented many more individuals, sites, and populations than were previously known. In addition, the majority of these populations are located on private land. Endangered plants do not receive a high degree of protection on private property under the Act. If the landowner is not using Federal funding or does not require any type of Federal permit or authorization, listed plants may be removed at any time unless prohibited by State law. Under Chapter 88 of the Texas Parks and Wildlife Code, any Texas plant that is placed on the Federal list as endangered is also required to be listed by the State as endangered. The State prohibits taking and possession of listed plants for commercial sale, or sale of all or any part of an endangered, threatened, or protected plant from public lands.

The Service anticipates Texas removing Johnston's frankenia from its State list of endangered species as a result of the Federal delisting. State law, similar to the Act, primarily provides protection on public lands, and Johnston's frankenia primarily occurs on private land and is, therefore, by and large, not protected by State law. Therefore, the State delisting is not expected to result in a significant change in its protective status.

*Summary of Factor D:* Johnston's frankenia was not, and is not presently, threatened by inadequate regulatory mechanisms. The level of regulatory protection provided to this plant will not differ significantly following delisting because the majority of the populations are on private land. Therefore, we find that the level of regulatory protection provided to this plant will not change significantly following delisting. In addition, since there are no threats under the other factors from which the species needs to

be protected, no additional regulatory mechanisms are needed.

### E. Other Natural or Human-Made Factors Affecting Its Continued Existence

#### Biological Characteristics

In the original 1984 listing rule, certain inherent biological characteristics, including small numbers of individuals, restricted distribution, and low reproductive potential, were thought to affect the continued existence of Johnston's frankenia. The recovery plan for Johnston's frankenia referred to the approximately 1,000 plants known at the time of listing and their occurrence in small populations with none greater than a few hundred plants, implying a small gene pool with limited variability and, therefore, a diminished capacity for tolerating stresses and threats (Service 1988, p. 11). However, the recovery plan also indicated that scattered populations, disjunct distributions, and low reproductive capacity are commonly seen in the genus *Frankenia* (Whalen 1980, pp. 54–193).

Data were collected on reproductive characteristics from six large populations in Starr, Webb, and Zapata Counties (Janssen 1999, pp. 177–212). Results of field observations showed that this species flowers throughout the year, but less abundantly in winter, with the highest numbers of flowers and fruit in spring and early summer. The percentage of seed set among populations that Janssen studied ranged 15–30 percent. Turner (1980, p. 6) observed seed set at less than 50 percent for Johnston's frankenia. Using seed viability tests, Janssen (1999, p. 182) found 31 percent of the seeds were viable. Results of soil seed bank analysis from three populations over 1 year yielded the germination of only four total seedlings (Janssen 1999, pp. 177–212). All attempts at germination in a greenhouse ended in failure, which was attributed to insufficient light conditions within the greenhouse (Janssen and Williamson 1996, p. 182; Janssen 1999, p. 182). Poole noted that seedlings are rarely seen (Service 1988, p. 12). Seedling recruitment studies monitoring 2 populations over 2 years documented 32 of 39 seedlings (82 percent) surviving in 1 population and 17 of 18 (94 percent) surviving in the other (Janssen 1999, pp. 203–204). With respect to these factors, Johnston's frankenia has low fruit-to-flower ratio, low seed set, and low seed viability. Janssen (1999, pp. 208–212) acknowledged that her results regarding these factors might reflect decreased

vigor in the limited number of populations on which she was able to conduct reproductive studies.

The seeds are small in size, may remain for the most part in the above-ground litter, and probably could not emerge if buried deep. The seed's thin coat is suited for absorbing water rapidly and germinating. This may be the reason that, despite low seed set and viability, those seeds that do germinate have a high rate of recruitment (82 and 85 percent in the two populations studied). The fruit does not appear to be specialized for dispersal, and seedlings are always found in close proximity to the parent. Timing of germination and seedling size are critical in determining the fate of seedlings. The variation in timing of germination and seedling survival seen in Johnston's frankenia may be tied to rainfall amounts. Seedling loss seems to be primarily a result of browsing, trampling, and lack of precipitation Janssen 1999, p. 212).

The results of Janssen and Williamson's (1996, pp. 13–16) reproductive analysis of Johnston's frankenia showed this species to be a generalist with respect to pollinators. A large variety of diurnal (daytime) pollinators visited Johnston's frankenia flowers including flies, bees, and butterflies, with bee flies and bees being the most common. Plant species, like Johnston's frankenia, that have the capacity to attract multiple pollinators, reduce the risk of population declines due to the disappearance of one pollinator. The high rate of floral visitation to Johnston's frankenia by these insects shows the plant to be competing successfully for pollinators (Janssen 1999, pp. 197–198, 208). Although Johnston's frankenia is readily cross-pollinated, this species also has a floral morphology that allows self-pollination, and self-compatibility is indicated (Janssen and Williamson 1996, pp. 13–16; Janssen 1999, pp. 194–196, 208). Janssen (1999, pp. 208–209) concluded that “although self-pollination can result in less genetic variability, it may not be so detrimental for plants that occupy narrow ecological habitats.”

In summary, though studies to address the question of low reproductive potential were conducted on a limited number of populations, research results indicated low fruit-to-flower ratio, low seed set, low seed viability, nonpersistent seed bank, and small and thin-walled seeds. Combined, these biological traits would suggest low reproductive potential for Johnston's frankenia despite having multiple pollinators.

*Summary of Factor E:* In the original listing rule, threats to Johnston's frankenia, as discussed in Factor E, focused on the species' inherent biological characteristics, including small population numbers, restricted distribution, and low reproductive potential, that might restrict the gene pool of the species and diminish the species' capability to deal with stress and other threats. Although the reproductive characteristics of Johnston's frankenia may contribute to a reproductive potential that is relatively lower than many flowering plant species (yet common to all *Frankenia* spp.), this plant readily cross-pollinates and has the capability to self-fertilize. This plant also hosts a variety of pollinators, reducing its dependence on the survival of any single pollinator species. There does not appear to be any reason for the gene pool to be more restricted now than it was in the past. In addition, with regard to low numbers and restricted distribution, we now know that the species is much more prevalent and widely distributed than originally thought, with close to 4 million more plants found over 2,031 sq mi (5,260 sq km). Therefore, we conclude that low reproductive potential, while appearing to be a biological characteristic of Johnston's frankenia, is no longer considered a threat to this species now or in the foreseeable future.

#### Determination

At the time of the Johnston's frankenia listing in 1984, the Service knew of only two counties in Texas (Starr and Zapata) and one locality in Mexico where this plant occurred. Approximately 1,000 plants in 5 populations were known to exist in a 35-mi (56-km) radius area in Texas, and several hundred plants in Mexico. We concluded that there were relatively small populations occurring in highly specialized habitats on rocky gypseous hillsides or saline flats. All known populations were located on privately owned lands with poor rangeland conditions. The plants were not reproducing well and showed signs of having been browsed by cattle. Given the small number of plants, their restricted distribution, land management practices that could potentially degrade or destroy habitat, the impact of grazing on the plants, and the low reproductive potential of the species, Johnston's frankenia was regarded as a species in danger of becoming extinct.

After reviewing new information on the status of Johnston's frankenia, the Service proposed to remove this plant

from the List of Endangered and Threatened Plants under the Act in 2003. This plant was then known to occur in three counties in south Texas (Starr, Webb, and Zapata) and several northeastern states of Mexico (Nuevo Leon, Coahuila, and Tamaulipas). And by 2011, additional surveys found a total of more than 4 million plants in 68 populations ranging over an area of approximately 2,031 sq mi (5,260 sq km) in Texas, and 4 healthy populations in Mexico. As a result of increased recovery efforts, extensive surveys in south Texas have shown Johnston's frankenia to be much more widespread and abundant than was known at the time of listing or when the recovery plan was prepared.

By 2003, the Service indicated that, although the reproductive characteristics of Johnston's frankenia may contribute to its low reproductive potential, this plant appears to be well adapted to the arid climate and saline soils that it inhabits. The species takes advantage of sporadic rainfall events and uses the moisture to germinate quickly. It readily cross-pollinates, but also has the capability to self-fertilize. This plant is a generalist with respect to pollinators, thus reducing the danger associated with the decline of any one pollinator. And, although the reproductive characteristics of Johnston's frankenia may contribute to a reproductive potential that is relatively low, there does not appear to be any reason for the gene pool to be more restricted now than it was in the past.

At the time of the Johnston's frankenia listing in 1984, the Service summarized the threat of habitat modification in terms of agricultural practices such as grazing and use of chaining and plowing with supplemental planting of nonnative grasses for pastures. By 2003, the Service found these threats to be minimal because use of nonnative grasses did not prove to result in any competitive disadvantage to Johnston's frankenia. The species has also shown the ability to regenerate and recolonize areas that were formerly root-plowed pastures. Recent observations over a 6-year period revealed little difference in Johnston's frankenia abundance in grazed areas versus non-grazed areas. In addition, the species has a much broader distribution than originally thought, and the majority of the populations are remote and dispersed enough to minimize concentrated grazing impacts. In addition, ranchers in the area are now retaining more native brush and grass habitat to enhance wildlife hunting opportunities instead of planting nonnative species for crops.

No data were available at the time of listing with regard to the future increase in industrial activities and residential development in Johnston's frankenia habitat. In 2003, the Service addressed these potential threats in conjunction with the significant increase in populations over a much larger range, and found that sizable populations were in areas relatively isolated from industrial and residential development. The species' ability to recover from some level of ground disturbance has also minimized concerns regarding these threats. In addition, education and voluntary conservation easements are expected to continue to benefit Johnston's frankenia in the future.

In summary, we have carefully assessed the best scientific and commercial data available regarding the past, present, and future threats to Johnston's frankenia. We have found that the magnitude of habitat stressors is far reduced. Overall, we now know that this plant has multiple populations distributed widely across a much broader area than previously known, with an estimated total number of 4 million individual plants. Johnston's frankenia appears to be well adapted to its semi-arid environment, and has the ability to recover from several types of disturbance, including currently anticipated changes likely from climate change. Its range of genetic variation due to number of plants, populations, and locations will allow the species' adaptive capabilities to be conserved. Further, increased awareness and a number of voluntary conservation agreements are likely to reduce potential for new threats impacting the species. Any remaining stressors that may negatively affect individuals or populations are not expected to cumulatively affect the species as a whole. Based on the analysis above and given the lack of overall threats and the large population numbers previously described in this final rule, Johnston's frankenia does not currently meet the Act's definition of endangered, in that it is not in danger of extinction throughout all of its range, or the definition of threatened, in that it is not likely to become endangered in the foreseeable future throughout all its range.

#### **Significant Portion of the Range Analysis**

Having determined that Johnston's frankenia does not meet the definition of endangered or threatened throughout its range, we must next consider whether there are any significant portions of its range that are in danger of extinction or likely to become endangered. A portion of a species'

range is significant if it is part of the current range of the species and is important to the conservation of the species as evaluated based upon its representation, resiliency, or redundancy.

If we identify any portions of a species' range that warrant further consideration, we then determine whether in fact the species is endangered or threatened in any significant portion of its range. Depending on the biology of the species, its range, and the threats it faces, it may be more efficient for the Service to address the significance question first and in others the status question first. Thus, if the Service determines that a portion of the range is not significant, the Service need not determine whether the species is endangered or threatened there. If the Service determines that the species is not endangered or threatened in a portion of its range, the Service need not determine if that portion is significant.

For Johnston's frankenia, we applied the process described above to determine whether any portions of the range warranted further consideration. As discussed above, a portion of a species' range is significant if it is part of the current range of the species and is important to the conservation of the species because it contributes meaningfully to the representation, resiliency, or redundancy of the species. The contribution must be at a level such that its loss would result in a decrease in the ability to conserve the species. While there is some variability in the habitats occupied by Johnston's frankenia across its range, the basic ecological components required for the species to complete its life cycle are present throughout the habitats occupied by the 68 populations. No specific location within the current range of the species provides a unique or biologically significant function that is not found in other portions of the range. The currently occupied range of Johnston's frankenia encompasses approximately 2,031 sq mi (5,260 sq km) in Starr, Webb, and Zapata Counties in Texas.

In conclusion, major threats to Johnston's frankenia have been reduced, managed, or eliminated. Though habitat modifications will continue to occur (agricultural land management practices, industry activities, and residential development), the resulting impacts are expected to affect a smaller number of individual plants rather than entire populations due to increased awareness and voluntary conservation efforts. Therefore, we have determined that Johnston's frankenia is not in

danger of becoming extinct throughout all or a significant portion of its range nor is it likely to become endangered now or within the foreseeable future throughout all or any significant portion of its range. On the basis of this evaluation, we believe that Johnston's frankenia no longer requires the protection of the Act, and we remove Johnston's frankenia from the Federal List of Endangered and Threatened Plants (50 CFR 17.12(h)).

#### **Effects of the Rule**

This final rule will revise 50 CFR 17.12(h) to remove the Johnston's frankenia from the Federal List of Endangered and Threatened Plants. Because no critical habitat was ever designated for this species, this rule will not affect 50 CFR 17.96.

The prohibitions and conservation measures provided by the Act, particularly through sections 7 and 9, no longer apply to this species. Federal agencies are no longer required to consult with the Service under section 7 of the Act in the event that activities they authorize, fund, or carry out may affect the Johnston's frankenia.

#### **Post-Delisting Monitoring**

Section 4(g)(1) of the Act requires us, in cooperation with the States, to implement a monitoring program for not less than 5 years for all species that have been recovered and delisted. The purpose of this requirement is to develop a program that detects the failure of any delisted species to sustain itself without the protective measures provided by the Act. If, at any time during the monitoring period, data indicate that protective status under the Act should be reinstated, we can initiate listing procedures, including, if appropriate, emergency listing.

Section 4(g) of the Act explicitly requires cooperation with the States in development and implementation of post-delisting monitoring programs, but we remain responsible for compliance with section 4(g) and, therefore, must remain actively engaged in all phases of post-delisting monitoring. We also seek active participation of other entities that are expected to assume responsibilities for the species' conservation after delisting.

We have finalized a Post-Delisting Monitoring Plan for Johnston's frankenia that identifies measurable management thresholds and responses for detecting and reacting to significant changes in Johnston's frankenia protected habitat, distribution, and persistence. The Post-Delisting Monitoring Plan will consist of two approaches: (1) Use remote sensing in a

subset of occupied habitat to monitor land use changes over time; and (2) conduct onsite assessments within a subset of populations to monitor plant status over a 10-year period. If declines are detected equaling or exceeding defined thresholds (Service 2013), the Service in combination with other post-delisting monitoring participants will investigate causes of these declines, including consideration of habitat changes, substantial human persecution, stochastic events, or any other significant evidence. The result of the investigation will be to determine if the Johnston's frankenia warrants expanded monitoring, additional research, additional habitat protection, or resumption of Federal protection under the Act.

The final Post-Delisting Monitoring Plan is available with this final rule at <http://www.regulations.gov>, Docket No. FWS-R2-ES-2011-0084, and on the Southwest Region's electronic library (<http://www.fws.gov/southwest/es/Library>).

#### Required Determinations

##### *National Environmental Policy Act*

We have determined that environmental assessments and environmental impact statements, as defined under the authority of the National Environmental Policy Act of 1969 (42 U.S.C. 4321 *et seq.*), need not be prepared in connection with regulations pursuant to section 4(a) of the Act. We published a notice outlining

our reasons for this determination in the **Federal Register** on October 25, 1983 (48 FR 49244).

##### *Government-to-Government Relationship With Tribes*

In accordance with the President's memorandum of April 29, 1994, Government-to-Government Relations with Native American Tribal Governments (59 FR 22951), E.O. 13175, and the Department of the Interior's manual at 512 DM 2, we readily acknowledge our responsibility to communicate meaningfully with recognized Federal Tribes on a government-to-government basis. In accordance with Secretarial Order 3206 of June 5, 1997 (American Indian Tribal Rights, Federal-Tribal Trust Responsibilities, and the Endangered Species Act), we readily acknowledge our responsibilities to work directly with Tribes in developing programs for healthy ecosystems, to acknowledge that tribal lands are not subject to the same controls as Federal public lands, to remain sensitive to Indian culture, and to make information available to Tribes. We have determined that no Tribes will be affected by this rule.

#### References Cited

A complete list of all references cited in this final rule is available at <http://www.regulations.gov> at Docket No. FWS-R2-ES-2011-0084 or upon request from the Texas Coastal Ecological Services Field Office, Corpus Christi (see **ADDRESSES**).

#### Author

The primary authors of this final rule are staff members of the Texas Coastal Ecological Services Field Office, Corpus Christi (see **FOR FURTHER INFORMATION CONTACT**).

#### List of Subjects in 50 CFR 17

Endangered and threatened species, Exports, Imports, Reporting and recordkeeping requirements, Transportation.

#### Regulation Promulgation

Accordingly, we amend part 17, subchapter B of chapter I, title 50 of the Code of Federal Regulations, as set forth below:

#### **PART 17—[AMENDED]**

■ 1. The authority citation for part 17 continues to read as follows:

**Authority:** 16 U.S.C. 1361–1407; 1531–1544; 4201–4245; unless otherwise noted.

##### **§ 17.12 [Amended]**

■ 2. Amend § 17.12(h) by removing the entry for “*Frankenia johnstonii*” under “FLOWERING PLANTS” from the List of Endangered and Threatened Plants.

Dated: December 21, 2015.

**Stephen Guertin,**

*Acting Director, U.S. Fish and Wildlife Service.*

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