

**Section 6 Report Review**

MAR 27 2003

Attachment to letter dated \_\_\_\_\_

**Project:** Large-Fruited Sand-Verbena Landowner Technical Assistance

**Final or interim report?** Final Report

**Job #:** WER 41

**Grant #:** E-11

**Reviewer's Station:** Austin ES FO

**Lead station was contacted and concurs with the following comments:**  
    Yes     No   X   Not applicable (reviewer is from lead station)

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<b>Interim Report</b>	<b>Final Report</b>
<u>   </u> is acceptable as is	<u>  X  </u> is acceptable as is
<u>   </u> is acceptable as is, but the comments below need to be addressed in the next report	<u>   </u> is acceptable, but needs minor revision (see comments below)
<u>   </u> needs revision (see comments below)	<u>   </u> needs major revision (see comments below)

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**Comments:**

We thank Dr. Williamson for outlining each result clearly and following up with a summary table in the appendix. The report is concise and clear.

**FINAL REPORT**

As Required by

**THE ENDANGERED SPECIES PROGRAM**

**TEXAS**

Grant No. E-11

**Endangered and Threatened Species Conservation**

**Project WER41: Large-fruited Sand-verbena Landowner  
Technical Assistance**

Prepared by: Paula S. Williamson



John Herron  
Program Director, Wildlife Diversity

Robert Cook  
Executive Director

November 1st, 2002

**FINAL REPORT**

**STATE:** Texas

**GRANT NO:** E - 11

**PROGRAM TITLE:** Endangered and Threatened Species Conservation

**PERIOD COVERED:** September 1, 1999 - August 31, 2002

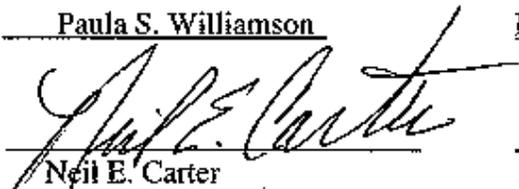
**PROJECT NUMBER:** WER41

**PROJECT TITLE:** Large-fruited Sand-verbena Landowner  
Technical Assistance

**PROJECT OBJECTIVE:**

To assist in obtaining the *recovery objective* of downlisting or delisting the species; To assess population sizes and provide technical assistance to landowners to protect existing populations of largefruited sand-verbena from present and future threats.

**PREPARED BY:** Paula S. Williamson November 1st, 2002

**APPROVED BY:**  11/22/02  
Neil E. Carter  
Federal Aid Coordinator  
Texas Parks & Wildlife Department  
Date

**FINAL REPORT**

**Large-fruited Sand-verbena Landowner Technical Assistance Project**

**September 1999 — August 2002**

**Prepared for**

**Texas Parks and Wildlife Department  
and  
U.S. Fish and Wildlife Service**

**Submitted by**

**Paula S. Williamson  
Department of Biology  
Southwest Texas State University  
San Marcos, TX 78666**

**November, 2002**

## INTRODUCTION:

Large-fruited sand-verbena, *Abronia macrocarpa*, was described and named by Galloway in 1972. The plant was listed as a federally endangered species on September 28, 1988 (U. S. Fish and Wildlife Service, 1988) and received listing as an endangered species by the State of Texas on December 30, 1988 (U. S. Fish and Wildlife Service, 1992). Due to the low number of occurrences globally and in Texas the plant's status was designated G1, S1 (Resource Protection Division, 1991). The U.S. Fish and Wildlife Service (1992) set a recovery priority of 2 for *A. macrocarpa*.

A member of the Nyctaginaceae or four o'clock family, the plant is an herbaceous perennial with a fleshy to semi-woody taproot, glandular-pubescent leaves, flowers grouped into a head, and large, thin-walled, papery anthocarps (Galloway, 1972, 1975). The species is endemic and apparently restricted in distribution to eastern, central Texas. The plants are restricted to deep sandy soils in unstable openings and disturbed areas of Post Oak Savannah Woodlands (Galloway, 1972, 1975; Turner, 1983; Poole and Riskind, 1987; Bridges, 1988). When originally described only one population was known. The type locality is located in Hilltop Lakes Resort (Leon Co.) approximately nine miles northwest of Normangee, Texas (Galloway, 1972). At the time the species recovery plan was written, two additional populations had been identified (U. S. Fish and Wildlife Service, 1992). Discovery of these two populations extended the species distributional range into Freestone County (population near Snyder Lake) and Robertson County (population at Camp Creek Sand Barrens). Additional populations were identified in both Leon County and Robertson County (Williamson, 1996). Since the only known populations occur on private land, the species is especially vulnerable.

The *A. macrocarpa* recovery plan indicates that the greatest existing threat to the species is habitat modification and destruction by man (U. S. Fish and Wildlife Service, 1992). Habitats have been modified by introduction of grasses and other non-native species for pasture improvement and soil stabilization. Clearing and fire repression have also contributed to habitat modification. Additional impacts by man include oil exploration and development, resort and residential development, and recreational activities such as off-road vehicles, hiking, horseback riding, and wildflower picking. Browsing, possibly by livestock and deer, and insect damage also pose threats to the

species. Additionally, reproductive failure and low genetic variability have been suggested as potential limiting factors.

Although some work on morphology, systematics, distribution and phenology had been carried out (Galloway, 1972, 1975; Turner, 1983; Poole and Riskind, 1987; Bridges, 1988; Kennedy, Poole, and Orzell, 1990; Corlies, 1991); little was known about the biology of the species when the recovery plan was written. Since implementation of species recovery plans requires an analysis of the taxon's ecology and biology, studies of the phenology, reproductive biology, and population genetics of *A. macrocarpa* were conducted (Williamson, et al., 1994; Williamson and Bazeer, 1997; Williamson and Werth, 1999). These studies improved our understanding of the species and provide critical information for developing land management plans to assist in alleviating threats to populations.

The species recovery plan lists a recovery priority of 2 for *A. macrocarpa* and the recovery criteria set forth are to develop and implement management plans that insure continued protection of at least 20 viable populations, each at least 25 acres in size with a stable population of at least 600 plants (U. S. Fish and Wildlife Service, 1992). Population size was well documented for only the Hilltop Lakes population (Williamson, 1996), but was not known for the other known populations. Management plans that take into account specific concerns and threats for each population had not been developed, but are necessary for continued protection of the species. The recovery plan indicates that, barring identification of a sufficient number of wild populations, new populations may need to be established through reintroduction procedures to reach the minimal number of populations required for recovery. However, seed had not been collected to serve as a source of genetically viable material for any future re-introduction efforts. Therefore, a three-year landowner technical assistance project was undertaken to assist in recovery of the species.

## **OBJECTIVES:**

The objectives of the project were to assess population sizes and provide technical assistance to landowners to protect existing populations of large-fruited sand-verberia from present and future threats. Specific objectives were to:

- 1) Educate each landowner concerning need for species protection
- 2) Determine the size of each population
- 3) Identify existing threats at each population site
- 4) Document phenology of each population
- 5) Study reproductive biology of each population
- 6) Obtain seed reserve for each population
- 7) Draft management plan for each landowner
- 8) Establish formal management agreement with landowner
- 9) Assist landowner in monitoring management plan

## **APPROACH:**

The principal investigator was Dr. Paula S. Williamson, Professor of Biology at Southwest Texas State University. Gena K. Janssen was the research consultant. The study was carried out on private lands in Freestone, Leon and Robertson Counties, Texas. Potential threats to populations were assessed through site visits and dialogue with landowners. Studies of phenology, reproductive biology, and population genetics of *A. macrocarpa* (Williamson, et al., 1994; Williamson and Bazeer, 1997; Williamson and Werth, 1999) were reviewed to glean data for use in compiling a list of compatible and noncompatible land management practices to allow landowners to develop workable land management plans.

## **RESULTS:**

Project objectives were accomplished as follows:

### **1) Educate each landowner concerning need for species protection**

Landowners were contacted in Spring 2000 to be made aware of the importance of the species and the critical need to preserve the existing populations (Appendix I, II). Literature was provided (Appendix III) and laws governing endangered plant species and private landowner rights were discussed. Each landowner was requested to voluntarily participate in our study. Site visits were made to the populations in Spring 2000. Detailed field notes of the first site visit are provided in Appendix II. Landowners were again visited during Spring 2001 to maintain landowner contact. Final visits to landowners were made during Summer 2002.

### **2) Determine the size of each population**

Populations were digitally mapped using a Global Positioning System (GPS) to determine size in area (Appendix IV). The perimeter of a population was outlined with the GPS unit, then transposed onto an aerial photo of the site using DoQQ imagery and Global Information Systems (GIS) computer capabilities. Analysis of these data was used to determine size in area of each population. These data have also enabled us to determine the number of populations (in some cases, adjacent populations previously considered as separate populations are in fact be a single large population). The number of individuals in each population was counted (Appendix I). Voucher specimens were collected and are housed at SWT.

### **3) Identify existing threats at each population site**

Threats to each population and individual landowner practices were identified through site visits and dialogue with landowners (Appendix I, II).

### **4) Document phenology of each population**

Belt transects to monitor plants were established at each population. The number of individuals and stage of development (seedling or juvenile vs. mature flowering individual) rooted within one meter above the tape measure, along ten contiguous square meters was

counted. Because an extensive, detailed analysis of phenology was carried out in a previous study (Williamson, 1996), it was determined that only numbers of individuals and developmental stage would be recorded in this study to document population structure (Table 1). Data were collected during March 2000 and March 2001 at populations 1, 2, 3, and 7. Data were collected during March 2000 at populations 5 and 6, but not during 2001 because at population 5 the landowner replaced a fence and inadvertently removed the transect and we were unable to gain access to population 6 at the time the plants were at anthesis. Population 8 was discovered in 2001, therefore data were collected that year only.

All populations consist of plants at a variety of developmental stages, including seedlings juveniles, and mature plants in flower (Table 1). Most populations, except population 3, had a high percentage of plants in the anthesis stage in 2000. All populations had a higher percentage of plants at the seedling and juvenile non-flowering stage in 2001.

##### **5) Study reproductive biology of each population**

Reproductive factors related to gene flow and fitness were examined. Pollen viability was examined in seven of the populations using aniline blue lactophenol stain (Kearns and Inouye, 1993). Pollen grains from five plants per population were collected and stained for one hour. The number of pollen grains examined per population is shown in Appendix 1. Pollen viability ranged from 84% (Population 2) to 98% (Population 6) among the populations (Appendix 1). Anthocarps were collected in March 2000 from six populations and examined to determine extent of fruit/seed production. Anthocarps were dissected and the number containing achenes recorded. Achenes are single-seeded so these data were used to calculate the percent seed set (Table 2). Seed set ranged from 43% (Population 2) to 81% (Population 1). Tetrazolium staining (Grabe, 1970; Copeland, 1981) was used to determine percent seed viability; 95-100 seed per population were examined. Seed viability (Table 3) ranged from 65% (Population 1) to 95% (Population 4). Seed not tested were deposited to serve as a seed reserve (see below).

#### **6) Maintain seed reserve for each population**

We worked closely with Anita Tiller at Mercer Arboretum and Flo Oxley at the Lady Bird Johnson Wildflower Center to maintain seed reserves and help with public education concerning this endangered species (Tiller, 2001). Seeds were collected following the Center for Plant Conservation guidelines (Falk and Holsinger, 1991), with the number of seed collected not exceeding the 10% rule-of-thumb upper limit as advised by the U. S. Fish and Wildlife Service. Seed (100 per population) from six populations (1, 2, 3, 4, 5, 7) were deposited at Mercer Arboretum in Humble, Texas in August 2000 to serve as a genetic repository, supplementing their holdings in association with the Center for Plant Conservation. Seed from all eight populations was deposited with the Lady Bird Johnson Wildflower Center in Austin, Texas in April 2001. Flo Oxley, Director of Plant Conservation at the Wildflower Center, indicated that a portion of the seed would be sent to the National Seed Storage Lab in Ft. Collins, Colorado.

#### **7) Draft management plan for each landowner**

A list of compatible and noncompatible land use practices was compiled (Appendix V). The list was presented to landowners during the final visit in 2002.

#### **8) Assist landowner in monitoring management plan**

Land management practices were monitored over the course of the study and used to refine the list shown in Appendix V.

#### **9) Establish formal management agreement with landowner**

Landowners were presented with a Conservation Agreement (Appendix VI) during the final visit in 2002. Two of the landowners signed the agreement on the spot. One landowner refused to sign because he plans to sell his property soon and did not want to make a long-term commitment. The remainder of the landowners wanted time to consider the agreement and share it with their spouses or other family members before signing. We believe there is a strong probability that these landowners will sign the agreement, but it will be necessary to continue landowner contact for that to happen.

Table 1. Number of individuals in the seedling and juvenile stage (NF) and flowering stage (FF) within 10 meter belt transects and percentages per developmental stage in populations of *Abronia macrocarpa*.

	YEAR			
	March 2000		March 2001	
<b>Population 1</b>				
total in transect	218		369	
stage of development	NF	FF	NF	FF
number in each stage	94	124	261	108
percentage per stage	43%	57%	71%	29%
<b>Population 2</b>				
total in transect	24		48	
stage of development	NF	FF	NF	FF
number in each stage	9	15	35	13
percentage per stage	38%	62%	73%	27%
<b>Population 3</b>				
total in transect	164		944	
stage of development	NF	FF	NF	FF
number in each stage	105	59	924	20
percentage per stage	64%	36%	98%	2%
<b>Population 7</b>				
total in transect	15		96	
stage of development	NF	FF	NF	FF
number in each stage	1	14	91	5
percentage per stage	7%	93%	95%	5%
<b>Population 5</b>				
total in transect	176			
stage of development	NF	FF		
number in each stage	70	106		
percentage per stage	40%	60%		
<b>Population 6</b>				
total in transect	10			
stage of development	NF	FF		
number in each stage	2	8		
percentage per stage	20%	80%		
<b>Population 8</b>				
total in transect			256	
stage of development			NF	FF
number in each stage			235	21
percentage per stage			92%	8%

Table 2. Number of anthocarps collected, number of achenes and percent seed set per population of *Abronia macrocarpa* examined.

	No. anthocarps	No. achenes	Percent Seed Set
Population 1	999	595	60%
Population 2	281	122	43%
Population 3	1204	975	81%
Population 4	277	207	75%
Population 5	505	335	66%
Population 7	1499	1042	70%

Table 3. Number of viable and nonviable pollen grains and percent pollen viability per population of *Abronia macrocarpa* examined.

	No. Viable	No. Nonviable	Percent Pollen Viability
Population 1	65	35	65%
Population 2	81	18	82%
Population 3	89	6	94%
Population 4	93	5	95%
Population 5	94	6	94%
Population 7	83	13	86%

## PROJECT SUMMARY:

*Abronia macrocarpa* may be delisted if at least 20 healthy, stable populations with a minimum of 600 plants in each can be located or established (U. S. Fish and Wildlife Service, 1992). This project documented population sizes of known populations, information mandatory to achieving the recovery criteria. Seed reserves were obtained and are stored as a refugium of genetic material. The stored seeds may be needed for any future reintroduction attempt deemed necessary.

Populations of *A. macrocarpa* are stable, consisting of plants of all age classes (seedlings, juveniles, and mature flowering individuals) such that the immature plants will replace mature plants as they age and die. The higher percentage of seedlings and juveniles observed in 2001 is likely the result of prolific seed production the previous year when the majority of plants in the transects were in the flowering stage.

In plants, gene flow is mediated by pollen and seed. Low pollen viability, low seed viability and low seed set can all contribute to rarity. Therefore, we examined these characters, which are also often correlated with fitness. Pollen viability, seed set and seed viability are within normal ranges indicating that these reproductive characters are not limiting factors contributing to rarity.

Williamson and Werth (1999) examined population genetics using isozyme electrophoresis and found significant degrees of genetic differentiation among populations with a high amount of variance among subpopulations within their respective populations. They used Rogers' similarity to produce a dendrogram to indicate how populations cluster due to genetic similarity. The Rogers' similarity analysis was used in the current study to more accurately define populations. These genetic data together with more thorough field surveys led to the recognition that what had been considered two separate populations in Leon County were better treated as a single population (Population 3) and what were considered two populations in Robertson County instead was a single population (Population 7). Genetic data also provide important information for a potential reintroduction program. Landowners with suitable habitat undertaking a reintroduction program should use seed collected from a nearest neighbor population to avoid disrupting locally coadapted gene complexes.

We now consider there to be eight known populations. Seven of the populations were included in this study. Population 8 was discovered during our fieldwork in 2001 and locality and other data collected are provided in this report. However, this population was not included in the landowner technical assistance project. All the known populations occur on private land and so are offered little protection by the Endangered Species Act. Therefore, landowner cooperation is critical to recovery of this species. Sound biological data enabled development of a list of compatible vs. noncompatible land management practices to assist landowners in managing their lands to conserve *A. macrocarpa*. Landowners have been asked to participate in a voluntary conservation agreement in which noncompatible practices would be avoided. Their voluntary conservation will help insure continued protection of the known populations. Only two of the conservation agreements have been signed thus far. Given more time, it is highly likely that other landowners will sign conservation agreements. It is our hope that we will be able to secure additional funding to continue working with the landowners toward protection of this species on private lands.

Recovery of this species will now require field surveys to search for additional populations. The recently discovered population in Freestone County (Population 8) occurs on both Pickton loamy fine sands and Wolfpen loamy fine sands and is one of the largest known sites of *A. macrocarpa*. Other known populations occur on Arenosa fine sands. Arenosa, Wolfpen, and Pickton loamy fine sands occur in at least 75% of Leon County. There is a tremendous amount of potential habitat in Leon County and this county needs to be methodically surveyed in the future. There is also much more potential habitat in Freestone County that has not yet been surveyed, and this should be done in the future. Studies to develop a population augmentation and reintroduction program are also needed.

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**APPENDIX I. Population location, landownership, size, soil type, reproductive factors and potential threats.**

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**Population 1: Located in Freestone County, on the Lanely topographic quadrangle.**

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Site Name:	Keils/Womach Site
Ownership:	3 landowners (N to S): Keils; Womach (Double Tree Ranch); and, the Sundown Company (Belvedere Land and Cattle Company)
Voucher:	Janssen & Williamson # 0684
Number of individuals:	~ 28,000
Population Area	20.7 acres / 8.4 hectares
Soils:	Pickton loamy fine sand
Geology:	Queen City Sands
Pollen Viability:	95% viable (1054 pollen grains examined)
Seed set	60%
Seed Viability:	65% viable

**Potential Treats and Landowner Practices:**

- Cattle trampling plants
  - Discing and seeding with oats
  - Herbicide use to eliminate love grass
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**Population 2: Located in Leon County, on the Round Prairie topographic quadrangle.**

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Site Name:	Mullenax Site
Ownership:	3 landowners (N to S): a tiny portion occurs on T.C. Harvey; Mullenax (majority); and, Oaks
Voucher:	Janssen & Williamson # 0685
Number of individuals:	~ 6,200
Population Area	5.5 acres / 2.2 hectares
Soils:	Arenosa fine sand
Geology:	Carrizo Sands
Pollen Viability:	84% viable (1058 pollen grains examined)
Seed set	43%
Seed Viability:	82% viable

**Potential Treats and Landowner Practices:**

- Discing and seeding with clover
  - Clearing land
  - Vehicle use by hunters
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Population 3: Located in Leon County, on the Round Prairie topographic quadrangle.

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Site Name: Petty/Winstead Site  
Ownership: 3 landowners (W to E): Petty; Carrington; Winstead  
Voucher: Janssen & Williamson # 0686  
Number of individuals: ~ 12,000  
Population Area: 90 acres / 36.3 hectares  
Soils: Arenosa fine sand  
Geology: Carrizo Sands  
Pollen Viability: 92% viable (879 pollen grains examined)  
Seed set: 81%  
Seed Viability: 94% viable

Potential Treats and Landowner Practices:

Pipelines  
Cattle

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Population 4: Located in Leon County, on the Hilltop Lakes topographic quadrangle.

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Site Name: Hilltop Lakes Site  
Ownership: Hilltop Lakes Resort  
Voucher: Collected in previous study (1992)  
Number of individuals: ~ 8,000  
Population Area: 8.5 acres / 3.4 hectares  
Soils: Arenosa fine sand  
Geology: Sparta Sands (near the Weches Formation boundary)  
Pollen Viability: 94% viable (7,370 grains examined, Williamson, 1996)  
Seed set: 75%  
Seed Viability: 95% viable

Potential Treats and Landowner Practices:

Deer browsing flowers  
Minor threats from hikers exist  
Previous threats (mowing; off-road vehicles; oil industry) have been reduced or eliminated

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**Population 5: Located in Robertson County, on the Franklin topographic quadrangle.**

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Site Name: Rabe/Morris Site  
Ownership: 2 landowners (N to S): Rabe & Morris; Mancuso  
Voucher: Janssen & Williamson 0687  
Number of individuals: ~ 4,000 along S. fenceline, plants along E. fenceline not counted  
Population Area: 2.7 acres / 1.2 hectares  
Soils: Arenosa fine sand  
Geology: Sparta Sands (near Weches Formation boundary)  
Pollen Viability: 92% viable (2230 pollen grains examined)  
Seed set: 66%  
Seed Viability: 94% viable

**Potential Treats and Landowner Practices:**

Fence construction  
Mowing  
Feral hogs

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**Population 6: Located in Robertson County, on the Camp Creek Lake topographic quadrangle.**

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Site Name: Mancusso Site  
Ownership: Cullen Mancusso  
Voucher: Janssen & Williamson # 0689  
Number of individuals: ~ 2,000  
Population Area: 10.6 acres / 4.3 hectares  
Soils: Arenosa fine sand  
Geology: Sparta Sands (near Weches Formation boundary)  
Pollen Viability: 98% viable  
Seed set: Not determined  
Seed Viability: Not determined

**Potential Treats and Landowner Practices:**

Vehicle use by hunters  
Deer browsing flowers

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Population 7: Located in Robertson County, on the Camp Creek Lake topographic quadrangle and on the Edge topographic quadrangle.

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Site Name: Ingram/ R-Cinco Ranch Site  
Ownership: Holton Ingram; The Ruhlands  
Voucher: Janssen & Williamson # 0688  
Number of individuals: ~ 4,500  
Population Area: 12 acres / 4.5 hectares  
Soils: Arenosa fine sand  
Geology: Sparta Sands  
Pollen Viability: 96% viable (1156 pollen grains examined)  
Seed set: 70%  
Seed Viability: 86% viable

Potential Treats and Landowner Practices:

Cattle  
Vehicle use by hunters  
Deer browsing flowers

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Population 8: Located in Freestone County, on the Turlington topographic quadrangle.

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Site Name: Not yet named  
Ownership: Emmons/Woodard/Jones/Swinburn/Vernon  
Voucher: Not collected  
Number of individuals: many thousands  
Population Area: 30 acres  
Soils: Pickton loamy fine sands in the southern portion and Wolfpen loamy fine sand at the northern extent  
Geology: Not determined  
Pollen Viability: Not determined  
Seed set: Not determined  
Seed Viability: Not determined

The above population was discovered in Freestone County on March 6, 2001, on the Turlington topographic map. [Directions: Take Hwy. 84 SE out of Fairfield to CR 360, turn right; go ~ 2.8 miles to PR 369, turn right, go straight ~.5 mile, plants on both sides of the road.] The landowners were identified and contacted by both mail and telephone. Permission has been granted for annual studies at the site.

Potential Treats and Landowner Practices:

Cattle

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**APPENDIX II. Field notes detailing our initial meeting with landowners to establish the project.**

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**Population 1: Lanely topographic quadrangle.**

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Site Name: Keils/Womach Site  
Ownership: 3 landowners (N to S): Keils; Womach (Double Tree Ranch); and, the Sundown Company (Belvedere Land and Cattle Company)

**Field Notes:**

On 16 March 2000, we met with Mr. Robert Womach and his son and daughter-in-law. They were happy to meet with us and very interested in the *Abronia macrocarpa* growing on their property. They had always admired it but never knew that it was endangered. They told us that when I had called the week before to set up the meeting and site visit that the plant was in full flower and looking just marvelous. They have two large areas on the ranch that contain the species. Unfortunately, they explained, since then the cows had broken through the fence and gotten into one of the pastures and trampled the plants. They were actually very apologetic and quite embarrassed by the whole thing. Once we got out and visited the site we noticed that, yes, the plants had been trampled somewhat, and they all appeared to be in fruit. Interestingly however, when we hiked up to the northern extent of the population on the Keils' property, all the plants there were still in full flower and only a few were starting to fruit. This observation led us to hypothesize that possibly the cattle trampling had induced just enough stress on the individuals on the Womach property to speed up the flowering/fruitletting process.

The Womachs have been actively discing the *A. macrocarpa* population through the years. Sometimes they seed with oats, and other times with various grasses that do not seem to do well in the deep sand. They plan to disc again in September 2000.

The potential affect on the plant from herbicide use was discussed with the landowner. He sprays to eliminate love grass. Our personal observations of plants growing in the SWT biology greenhouse indicate that the plants may be particularly susceptible to herbicides. However, the landowner plans to spray in the summer months, during the time that *A. macrocarpa* is dormant. A summer application should not be harmful to the plant since it is dormant and lacks above ground parts at that time.

Pollen and fruits were collected for viability testing. A voucher specimen was collected. Hawkmoths were observed visiting the flowers in the late afternoon. One white flowering individual was observed on the Keils' property on the 16<sup>th</sup>. The population periphery was GPSed on 18 March 2000. A permanent 10 meter belt transect was established to get an assessment of population structure.

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Population 2: Round Prairie topographic quadrangle.

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Site Name: Mullenax Site  
Ownership: 3 landowners (N to S): a tiny portion occurs on T.C. Harvey; Mullenax (majority); and, Oaks

Field Notes:

The site visit took place on 17 and 18 March 2000. Mr. Gondal Mullenax was contacted for the first time in 1996 and told about the *Abronia macrocarpa* that occurs on his property. He has allowed unlimited access ever since. During the site visit in 1996, Mr. Mullenax had recently disced and planted clover within the population site. The plants were very dense, especially within the rows of the plowed clover field. The Spring 2000 field visit revealed a very different site. Obviously the site has gone undiscd for quite a few years and many of the native species were starting to fill in what used to look like an open blowout area. The *A. macrocarpa* population certainly did not appear to be as dense as it had in earlier years.

The landowner to the south of Mullenax had recently cleared the majority of his property. He basically scraped the entire earth clean leaving only occasional motts of oaks and yaupon. From the fenceline we could see *A. macrocarpa* flowering within the motts. It will be interesting to see if the plant responds positively to the clearing on the Oaks property and begins to invade into the cleared areas. We have yet to make contact with this landowner (Mr. Oaks).

Pollen and fruits were collected for viability testing. A voucher specimen was collected. The plants were in full flower, only a few had started fruiting. Black and blue swallow-tailed butterflies were observed visiting the flowers. The periphery of population was GPSed. A permanent 10 meter transect was established to measure population structure.

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Population 3: Round Prairie topographic quadrangle.

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Site Name: Petty/Winstead Site  
Ownership: 3 landowners (W to E): Petty; Carrington; Winstead

Field Notes:

The site visit took place on 17 and 19 March 2000. Although this site was referred to as two separate populations in past reports, it is actually one. The plants are clumped and discontinuous, but there is never more than 1,000 air feet between clumps. In a few areas the plants are extremely dense. We visited with Mrs. Winstead and her son Bobby. Unfortunately Mr. Sam Winstead passed away last year from cancer. Mrs. Winstead and her son were still very gracious about allowing access. Bobby told us they do not keep cattle in the field with *Abronia macrocarpa* much anymore. A new pipeline was put in adjacent to one blowout area and this probably reduced the population somewhat. However, overall this population does not appear to have changed much from a visit made in 1996.

Pollen and fruits were collected for viability testing. A voucher specimen was collected. The plants were in full flower, only a few had started fruiting. The periphery of population was GPSed. A permanent 10 meter transect was established to measure population structure.

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Population 4: Hilltop Lakes topographic quadrangle.

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Site Name: Hilltop Lakes Site  
Ownership: Hilltop Lakes Resort

Field Notes:

We have studied this site since 1992 and have amassed substantial field data that has been published.

The site visit took place on 19 March 2000. Fruits were collected for viability testing. The plants were in full flower, only a few had started fruiting. The periphery of population was GPSed.

We met with the new property manager, Mr. Donald Doering, in August 2002. Mr. Doering is extremely supportive of conserving the species.

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Population 5: Franklin topographic quadrangle.

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Site Name: Rabe/Morris Site  
Ownership: 2 landowners (N to S): Rabe & Morris; Mancuso

Field Notes:

The site visit was conducted on 24 March 2000. The majority of the population is owned and managed by two couples that are a brother and a sister married to a brother and a sister. Elizabeth Rabe married Charles Morris. Karl Rabe, Elizabeth's brother, is married to Charles' sister. They each have a separate homestead on the property. The Rabe's and the Morris's had long admired the *Abronia macrocarpa* on their property but had no idea that it was an endangered species. They were very interested to know just exactly how we knew it was out there. Although fearful and skeptical at first, after we explained our project and endangered species laws, they gave us permission to return annually. Mrs. Rabe (Karl's wife, Charles' sister) said that she has seen the *A. macrocarpa* there since 1965.

According to Charles Morris, in 1999 he mowed the pasture in which the plant occurs, and he believes the plants have moved further into the pasture since then. There was evidence that the cows were recently in the area that contained the population, but the plants showed no signs of trampling or stress. They plan to remove the current fence, smooth soil along fence line and put in a new fence in May 2000.

Pollen and fruits were collected for viability testing. A voucher specimen was collected. The plants were in full flower, only a few had started fruiting. The periphery of the population was GPSed. A permanent 10 meter transect was established to measure population structure.

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Population 6: Camp Creek Lake topographic quadrangle.

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Site Name: Mancusso Site  
Ownership: Cullen Mancusso

Field Notes:

The site visit took place on 1 April 2000. The property has recently changed ownership from the Marrs McLean Trust (who had not allowed access) to Cullen Mancusso. Cullen and his son are working closely with the local Texas Parks and Wildlife biologists of the area to manage for wildlife and implement a series of prescribed burns. Many hunters were out on the property the same day as the site visit apparently tending to their hunting camp, deer blinds, and various other projects. They were motoring around the ranch on four wheelers the entire day.

This population occurs within a very expansive blow out area that the hunters have turned into a four-wheeler super highway of sorts. There have been quite a few deer blinds erected in the area along with quaint little road signs leading the way. The plants begin along the intersection of what's called the Louie Highway and Ferret Way. During the Spring 2000 visit, there was no evidence of cows within the population boundaries (i.e. no droppings, no tracks). The plants did not appear to be very dense in any one area, but they were consistent throughout the blowout. There may have been a better showing of plants in March however.

Pollen and fruits were collected for viability testing. A voucher specimen was collected. The plants were in full flower, only a few had started fruiting. The periphery of population was GPSed. A permanent 10 meter transect was established to measure population structure.

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Population 7: Camp Creek Lake and Edge topographic quadrangles.

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Site Name: Ingram Site and R-Cinco Ranch Site  
Ownership: Holton Ingram and The Ruhlands

Field Notes:

Mr. Ingram was first visited in 1996. He has allowed access ever since. The site visit was conducted on 26 March 2000. The condition of this site remains unchanged. Further surveys on this property revealed a few more areas where *Abronia macrocarpa* occurs. It appears as though this site and the one just to the south (on the R-Cinco Ranch) may actually be one large population. Population genetic evidence (Williamson and Werth, 1999) will be used to further understand population delineation.

The plants were in full flower, only a few had started fruiting. The periphery of population was GPSed.

The R-Cinco Ranch site visit was conducted on 25 March 2000. Mr. Bill Ruhland, owner, and Mr. Chuck Moore, Ranch Manager, joined us out at the site for a while as we collected data. Mr. Ruhland is an environmental law enforcement officer and lives in Houston. Chuck lives out on the ranch and runs it for the family. They have allowed access since 1996. Chuck said that it looked to him as though there were more plants this year than last. Evidence of cows in the population was apparent (droppings), but the plants showed no signs of trampling or stress.

Both Chuck and Bill expressed a keen interest in establishing *Abronia macrocarpa* on other blowout areas of the ranch. This provides an ideal site to develop a population augmentation study.

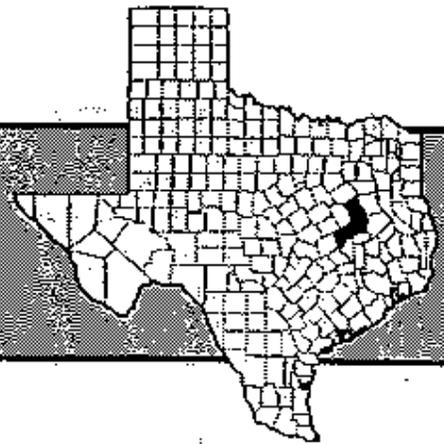
Pollen and fruits were collected for viability testing. A voucher specimen was collected. The plants were in flower and fruit. The periphery of population was GPSed. A permanent 10 meter transect was established to measure population structure.

**APPENDIX III. Literature provided to landowners.**

Federally and State Endangered

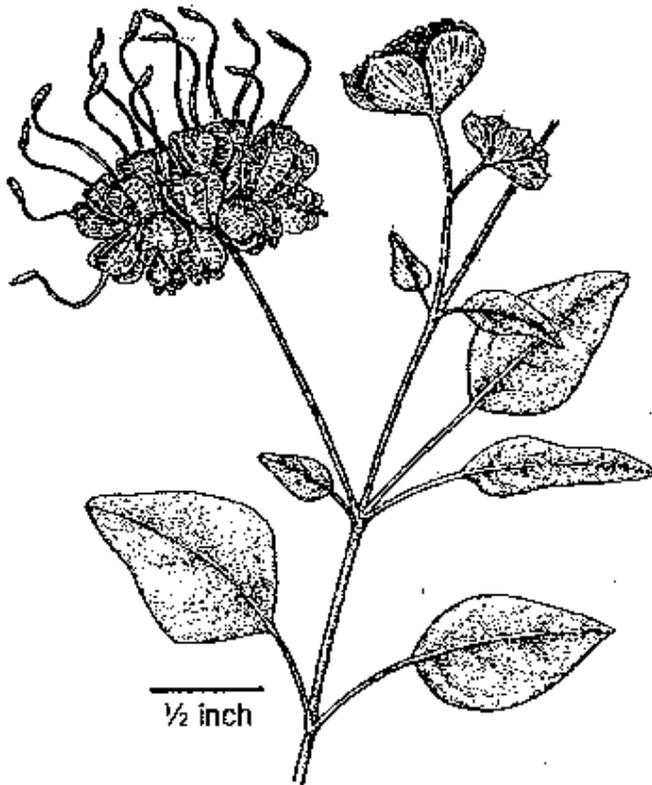
## Large-fruited sand verbena

*Abronia macrocarpa*



The large-fruited sand verbena (*Abronia macrocarpa*) was listed endangered by the U.S. Fish and Wildlife Service (USFWS) in September 1988, and listed as endangered by the State of Texas in December 1988. At the time of listing, only one population was known - from Leon County. Today, there are eight known populations in Leon, Robertson, and Freestone Counties.

This member of the four o'clock family is a herbaceous perennial that can reach 20 inches in height. The stems arise from a fleshy to semi-woody taproot, and may be erect or spreading. The leaves are opposite, somewhat egg-shaped, and about 2 inches long and 1.5 inches wide. The leaves and stem are covered with sticky glandular hairs. The inflorescences are composed of 20-75 individual flowers clustered into a rounded "head" or "capitulum". These flower heads, which sometimes resemble strawberry snowcones, can be up to 4 inches in diameter. The individual flowers are tubular, up to 1.25 inches long, with 5 lobes which create a ten-petaled appearance. Flower color varies from light pink, to fuchsia, to purple. The anthocarps (or fruits) are turbin-shaped, 5-winged, and papery—holding a single, tiny, brownish-black seed. The fruits of *A. macrocarpa* are larger than any of the other species of sand verbena, thereby giving it the common name: Large-fruited sand verbena.



Leaves, buds, and fruits of  
Large-fruited sand verbena

The large-fruited sand verbena flowers February to June. In May or June, the above-ground parts of the plants often die back, leaving the taproots buried in the sand. The plants remain dormant until October, when basal rosettes are formed. The plants remain in this form until growth begins again in the early spring.

The large-fruited sand verbena is not capable of self pollination, so the presence and abundance of pollinators is crucial to its survival. It has flowers that open late in the afternoon emitting a sweet odor that increases in strength toward evening. The flowers are open all night for pollination. These features are characteristic of moth pollinated flowers. At least two species of moths are known to be pollinators. Yaupon and grape are known to be food sources for the moth larvae, so the presence of these plants in the habitat is significant.

## Habitat

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The large-fruited sand verbena occurs on deep sandy soils such as Padina and Arenosa fine sands. Locally, they are often called "sugar sands" or "blow-out sands". The nature of these soils make them susceptible to blowing and dune formation. The plant occurs in sandy openings among scattered deciduous trees. It is found in areas with no or very light vegetative cover. Associated vegetation includes post oak, blue jack oak, yaupon, grape, sparkleberry, little bluestem, thinleaf paspalum, red threeawn, prairie clover, spiderwort, Drummond's phlox, Indian blanket, and silver croton.

Habitat modification and destruction due to human activities pose the greatest threat to the survival of the large-fruited sand verbena. Although this species may have always been rare, residential and commercial development, oil well construction and maintenance, off-road vehicles, and collection have all contributed in various degrees to its decline. In addition, relatively open areas of deep sand in the Post Oak region are often planted to coastal bermudagrass, lovegrass, or winter annuals to increase forage for cattle and/or deer and to stabilize soils. Clearing larger areas of native vegetation for pasture establishment has undoubtedly also eliminated habitat. Finally, fire suppression in much of the Post Oak Savannah has caused changes in the vegetation such as increased cover of woody plants. These successional changes may be unfavorable to a plant adapted to open areas with sparse ground cover.

## How Can You Help?

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If you see this plant, please don't pick the flowers or disturb the area where it is growing. Take a photo or request technical assistance if you need help identifying this plant. Landowners can help by learning more about this plant and its habitat requirements, and by maintaining native vegetation on deep sandy soils where it grows. Mechanical disturbances and herbicide applications should also be avoided in areas where this plant grows.

### For Further Assistance:

Please contact:

Texas Parks and Wildlife Department  
Endangered Resources Branch  
3000 IH-35 South, Suite 100  
Austin, Texas 78704  
1-800-792-1112 or 1-512-912-7011  
or your local Natural Resources Conservation Service  
(formerly SCS) office

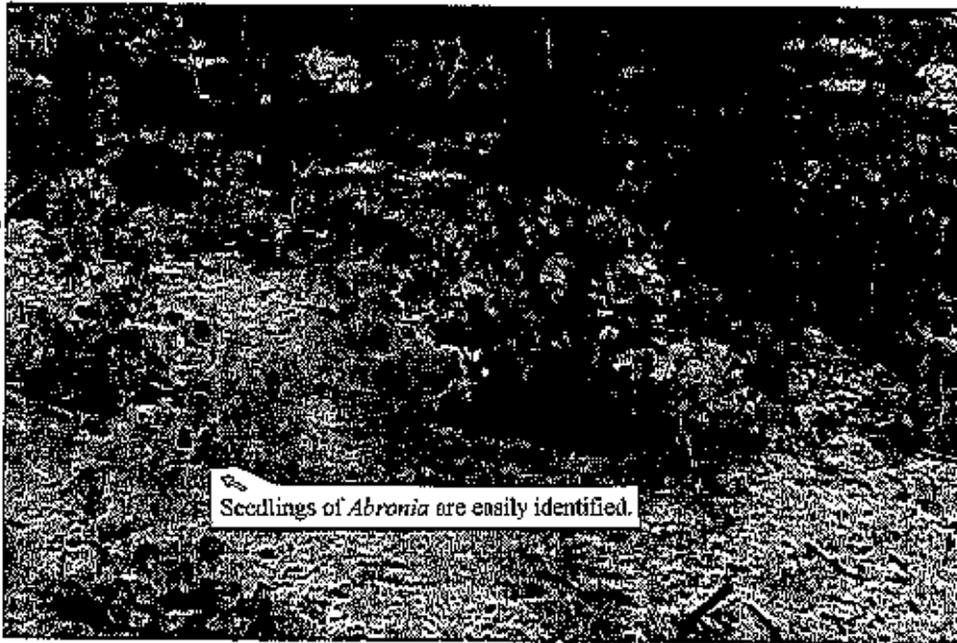
## Federally and State Endangered Large-fruited sand verbena (*Abronia macrocarpa*)



Although not a true "*Verbena*", the large-fruited sand verbena sure looks like one! It's actually in the Four O'clock Family and is distinguished from other *Abronia* species by having a larger fruit.



The flowers open late in the afternoon, remain open all night, and close around 9 a.m. the next morning. The sweet aroma released at night attracts its pollinator, the hawk moth.



Seedlings of *Abronia* are easily identified.

Large-fruited sand verbena will bloom from March to May and then die back completely. New seedlings and perennial rosettes will appear in the Fall, over-winter, and bloom again come Spring.



The habitat for *Abronia* tends to be deep sandy, sparsely vegetated openings within a Post oak-Yaupon holly dominated woodland upon soils classified as Siltsid-Padua and Arenosa.

# The Large-fruited Sand Verbena

As mentioned in the *Parkscape* Spring 2001 article titled: "Plant Conservation a Priority at Mercer", Mercer Arboretum and Botanic Gardens is one of the 28 leading botanical gardens and arboreta in the United States that maintains the National Collection of Endangered Plants for the Center of Plant Conservation. The Large-fruited Sand Verbena, *Abronia macrocarpa*, listed as endangered by the federal and Texas governments in 1988, is one of Mercer's "charter" species and is maintained in Mercer's research conservation areas for the National Collection of Endangered Plants.

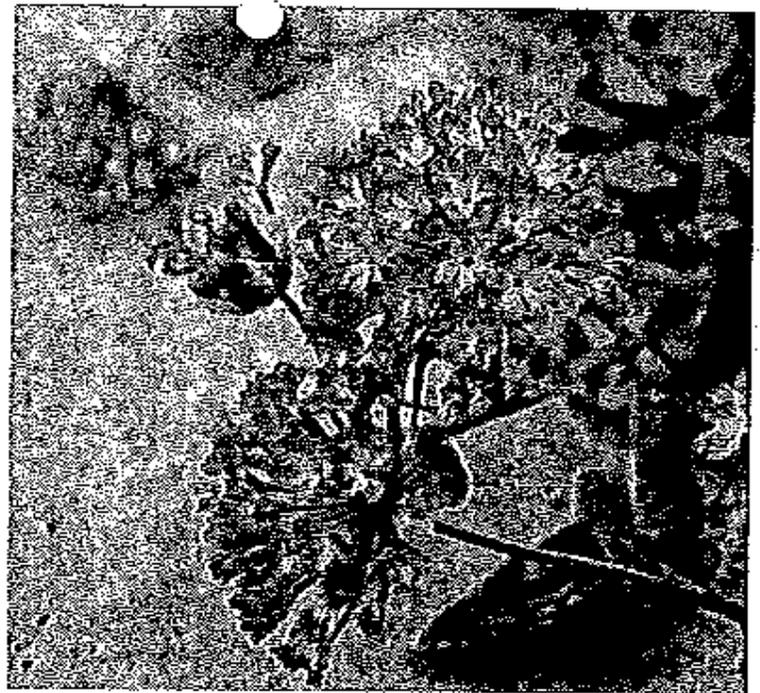
*Abronia macrocarpa*, first discovered in 1968 by the botanists, Doctors Donovan and Helen Correll, occurs only in the sand dune habitats of post oak savannas in three east-central Texas counties. The Large-fruited Sand Verbena is a herbaceous perennial and is extraordinarily well adapted to drought conditions by virtue of its persistent taproot and ability to remain dormant during the hot summer months. The magenta, golf-ball-sized flower heads of this beautiful wildflower typically appear following Spring rains and produce an intense, sweet perfume at dusk.

Contrary to its common name, the Large-fruited Sand

Verbena is a member of the Four-o'clock family or Nyctaginaceae. The Nyctaginaceae family includes the popular garden annual, Four-o'clock (*Mirabilis*) and the sub-tropical vine, *Bougainvillea* and consists primarily of tropical and subtropical herbs, shrubs and trees. In the United States, members of the Nyctaginaceae family mostly occur in the southern and Pacific regions.

Although hummingbirds typically pollinate *Bougainvillea*, moths are important pollinators of many of the Four-o'clock species and the sweet-scented *Abronia macrocarpa*. Mercer's conservation partner, Dr. Paula Williamson of Southwest Texas State University in San Marcos and her students study the genetic diversity and biology of the endangered *Abronia*. Dr. Williamson and her research group documented that hawk and noctuid moths are attracted to the perfume released from the open *Abronia* flowers at dusk. Pollination by these moths occurs until the *Abronia*'s flowers close in the morning. Cross-pollination between individual plants of this wildflower is required for the production of fertile seeds within *Abronia macrocarpa*'s characteristic large, five-winged fruits called "anthocarps".

*Abronia macrocarpa*'s restricted occurrence within



*Abronia macrocarpa*. Photo taken by Greg Wieland at Mercer's Conservation Research Area.

sites under threat from commercial development and invasive plant species has made wild populations of the plant especially vulnerable. Successful partnerships currently underway with private landowners where the Large-fruited Sand Verbena exists in the wild will help preserve this endangered plant species. Conservation and research efforts at Mercer Arboretum and Botanic Gardens, Southwest Texas State University, Stephen F. Austin Mast Arboretum and other private and government research facilities are crucial in insuring the preservation of the beautiful *Abronia macrocarpa* and all endangered Texas plants for generations to come.

Large-fruited Sand Verbena seedlings produced by the "charter" specimens are being transferred from Mercer's conservation research area to the public En-

dangered Species Garden in preparation for their bloom in Spring 2002. The Endangered Species Garden established in 1994 with the generous support from Star Enterprises, offers the public a unique opportunity to view a number of rare plant species up-close at Mercer Arboretum & Botanic Gardens.

Anita A. Tiller, Botanist  
Mercer Arboretum and  
Botanic Gardens



# LareDOS

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72 PAGES

JUNE 1998 LareDOS • PAGE 56

## Landowners help remove plant from endangered list

ZAPATA - For the first time in the history of the federal Endangered Species Act, active cooperation and conservation by private landowners has been solely responsible for a recommendation to remove a Texas species from the federal endangered species list.

A group of private ranchers in Zapata County has voluntarily signed conservation agreements to protect the rare Johnston's *frankenia*, a one-foot tall shrub with flowers that have white petals around a yellow center. At the time of its listing in 1984, only five populations or local groups of the plant were known, all in South Texas. Since then, through the help of ranchers, many more have been discovered.

The U. S. Fish and Wildlife Service (USFWS) regional office in Albuquerque, New Mexico, has recommended that Johnston's *frankenia* be taken off of the endangered species list. According to a recent memo from the Albuquerque regional director to

care of these endangered species voluntarily.

Steve Spangle, USFWS Listing Coordinator for Region 2 (including Texas), recently assured Janssen that all is ready to proceed with the preparation of the delisting package. She notes that while Spangle and others think it is likely to occur, the Johnston's *frankenia* delisting is still a recommendation, and nothing is final until it is signed by the Director of the USFWS in Washington.

"Although we are nine-tenths of the way there, we must have good solid data that will withstand the litany of reviews the delisting package will face, and I believe we have it," Janssen said. "However, I would like to invite anyone who is not yet involved with this project to join us. I will be collecting more data and conservation agreements until September. I am willing to provide on-the-ground field days and endangered plant identification training for any landowners, including local gas,

she was trying to take this species off of the endangered species list if they would just help out a little.

Over time, as trust and understanding grew, the gates opened up. Landowners would tell her not to worry, that they cared deeply about the ranch and that they would take care of their endangered plants. Those days were gratifying for Janssen. But then there were other days....

"I'll be honest—there were some days, some weeks, where I just wanted to call the whole thing off," Janssen said. "I would get a good tongue lashing at about 1,000 decibels that would send me into a tall-spin. There were a few times I was actually brought to honest-to-goodness tears. But, I never gave up because I truly believed that if we worked together we could make this happen."

Four years and 45 thriving Texas populations later, scientists now know

that the species extends up into Webb County and into Tamaulipas, Mexico. The majority, however, approximately 80% of those, are in Zapata County. That is why the commitment of many of the Zapata County ranchers is so important - they have most of them.

"I hope that people will begin to look at the endangered species on their ranches as the treasures they truly are," Janssen said. "These simple gifts from Mother Nature are among the rarest jewels in the world and some of us are lucky enough to have them! Not only that, but conserving these endangered species is so easy. All it takes is just a little awareness, a little careful thought."

Janssen says the beauty of the voluntary conservation agreements that the private landowners of Zapata County are not agreeing to do anything that they were not doing already. And for that, they are making history.

SHOULD BE SUBMITTED TO THE EDITOR BY  
March 1999.

"The reasons for this success story can be summed up in two words: cooperation and conservation," said Gena Janssen, a Texas Parks and Wildlife Department (TPWD) biologist. "The private landowners of Zapata County have cooperated with us by graciously opening their gates and allowing access to survey for this endangered species. This led to the discovery of at least 45 confirmed populations of Johnston's frankenia - all but one on private property."

Janssen and the ranchers realized that simply finding a few more populations will not assure that a rare plant gets delisted. So, many Zapata County landowners went a step further by committing to conserve this species on their ranches through voluntary conservation agreements with TPWD.

"It is these voluntary conservation agreements, representing the commitment of the landowners of Zapata County to the voluntary conservation of this species, that has led to the recommended delisting," explained Janssen.

Unlike endangered animals, endangered plants are not heavily protected on private land under the federal Endangered Species Act. Essentially, if a landowner is not using federal money or operating under a federal permit (which is 99% of the time), it is legal to remove endangered plants on their property.

"Given these facts, we knew that it would be difficult to impossible to delist this species because the U.S. Fish and Wildlife Service would consider all these private land sites 'unprotected,'" continued Janssen, "unless we could prove to the USFWS that the landowners of Zapata County are taking

easily do in the course of their normal business routine."

When Johnston's frankenia was listed as an endangered species in 1984, it was known from only five localities - two in Zapata County, two in Starr County, and one in Nuevo Leon, Mexico.

Then, in the early 90s, the former Zapata County District Conservationist and members of the Zapata County Soil and Water Board wanted someone to come to Zapata and help them take another look at this 'so-called' endangered species. They said it was everywhere in Zapata County, and maybe, they said, the species did not need to be listed at all.

Starting in May of 1995, Janssen began meeting with landowners, many of whom eventually decided to pursue voluntary conservation agreements. But it took time, patience, and persistence.

"Where are they?" I asked," said Janssen. "No one would say. 'But how can I delist this species if I cannot verify that there is actually a bunch more out there?' Silence. Tough crowd. Basically the message I got was: 'That's your job, we're just here to let you know that there is a lot of that stuff out there.' So off I went on one of the greatest Easter egg hunts of all time, and everyone knew where all the eggs were, but me."

Janssen says it took a while before she actually gained access to the first ranch. But one ranch turned into two, and two turned into three, and so on. Some days were easier than others. Most landowners were kind and inquisitive, cautious but gracious. Over and over again she would explain how the law was different for plants and how

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# Lareidos

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56 PAGES

## Ranchers, parks and wildlife make history with draft of conservation memorandum

ZAPATA (Dve) Webb and Zapata county ranchers met recently in Zapata to discuss endangered species and how best to coordinate the conservation efforts of land owners with those of the Texas Parks and Wildlife Department (TPWD).

The meeting at which TPWD botanist Gene S. Janssen of Austin addressed about 40 ranchers and landowners was sponsored by the Zapata Soil and Water

Conservation District. The SWCD drew up a memorandum of understanding by which ranchers and TPWD would agree jointly toward conservation and the specific voluntary protection of Johnston's frankenia, frankenia, Johnstonii, and ashy dogweed (*Synophylla leproleuca*), two South Texas plant species listed as endangered by the U.S. Fish and Wildlife Service (USFWS) in 1981.

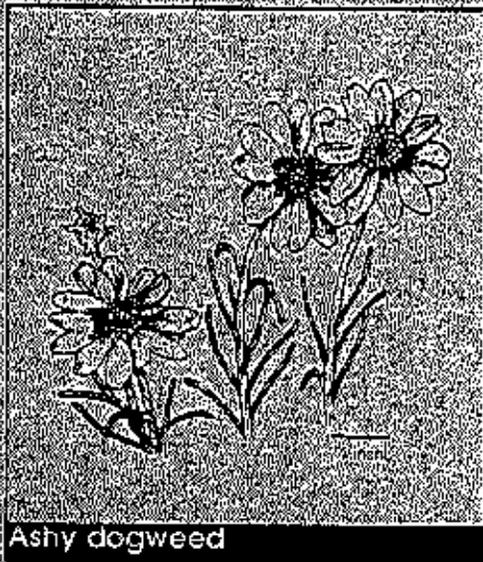
According to Zapata County rancher Jose Oscar Bodier, Jr. of the SWCD, "the essence of the agreement centers around the understanding that landowners will protect the plants and that TPWD will start the process to de-list the plants."

"Either party can say at any time that they no longer wish to do it. While it is not a binding agreement, it sure seems like a good way to do the right thing," Bodier elaborated. "Root plowing soil where Johnston's frankenia grows does not do any good. Generally, it is very salty soil and of little use. It would be easy enough to just agree not to root plow that area. Legally, the landowners have the upper hand, but what Gene and TPWD are asking is that we work together." She has conducted a much more thorough study than the one that put the

offers a completely workable plan for both the rancher and TPWD and a verifiable effort to balance the rights of the property owners with the need to address an environmental issue.

According to Janssen, a creative partnership between TPWD and the Webb and Zapata County ranchers could produce better results for the conservation of the plants than if other measures were implemented. "A conservation agreement strengthens and focuses protection and in fact, it can change the listing of the plant species or eliminate its listing altogether," she said.

"When I first began asking for permission to get on ranches to look for Johnston's frankenia and Ashy dogweed, ranchers were not that open to the idea. There was some resistance," Janssen said of the effort she began nearly three years ago. "This has changed," she said, and that speaks well for the ranchers of this area who want to do the right thing. "The agreement we proposed is the first state kind," Janssen added. "With each new population of Johnston's frankenia that we can verify, the closer we are to full recovery of this endangered species. The idea is to de-list the species to



Ashy dogweed

with five slightly fringed or toothed petals and a distinct yellow center. The subshrub blooms April to November, particularly after rainfall. The plant is easiest to identify from November to February when it takes on its crimson autumn color.

In 1984, only one colony of Ashy dogweed was identified and that was in Zapata County. Today there are three known colonies in northern Zapata County. Ashy dogweed is a herbaceous perennial wildflower that takes its name from the ashy grayish-green color of its stems and leaves. Woolly white hairs cover its stems and very thin leaves. At maturity, the species can reach almost a



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establish a list of threatened and endangered plant species for the state. An endangered plant is one that is in danger of extinction throughout all or a significant portion of its range.

At the time of its listing in 1984, only five populations of Johnston's frankenia were known — two in Zapata County, two in Starr County, and one in Mexico. Periodic visits by Janssen to Zapata County, however, have revealed the existence of more populations of this gray-to-green halophyte (salt-loving) subshrub. At maturity, Johnston's frankenia grows 2 to 3 feet tall and one or two feet wide, forming a convex-shaped, almost perfectly spherical mat shrub with tiny, oblong leaves. Salt crystals are often visible on the lighter-colored undersides of leaves. The white flowers of this desert plant are smaller than a dime when open.

At the base of the plant are woody, lily-penny-sized golden flowers with golden centers resemble composite-like daisies. Numerous flowers cover the plant in spring and summer, and in winter the plant becomes brittle and dry.

Zapata County is the only place in the world that Ashy dogweed is known to grow. There is a population on both sides of the right-of-way of Highway 83 along a private property fence line 1 1/2 miles south of the Webb-Zapata county line. If you have Ashy dogweed on your ranch, we would like to know. With each population we can verify of this rare species, we can learn more about its biology, ecology, and true status, Janssen said.

For further information on the proposed agreement between ranchers and the Texas Parks and Wildlife Department, please call Janssen at the Endangered Species Program of the Texas Parks and Wildlife Department at (512) 912-7011.

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## TPWD News

Contact  
 Steve Lightfoot  
[steve.lightfoot@tpwd.state.tx.us](mailto:steve.lightfoot@tpwd.state.tx.us)  
 (512) 289-4701



**Johnston's frankenia**  
*(Frankenia johnstonii)* -  
 Johnston's frankenia is a  
 grayish-green, or sometimes  
 bluish-green, spineless,  
 salt-loving shrub. Salt crystals  
 are often visible and tasteable on  
 the underside of the leaves.  
 From November through  
 February, Johnston's frankenia  
 turns from grayish-green to its  
 autumn color, crimson red.

© Photo courtesy Paul M. Montgomery.  
 Note: Special thanks to the  
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May 18, 1998

### Landowners Help Remove Plant From Endangered List

ZAPATA - For the first time in the history of the federal Endangered Species Act, active cooperation and conservation by private landowners has been solely responsible for a recommendation to remove a Texas species from the federal endangered species list.

A group of private ranchers in Zapata County near Laredo has voluntarily signed conservation agreements to protect the rare Johnston's frankenia, a one-foot tall shrub with flowers that have white petals around a yellow center. At the time of its listing in 1984, only five populations or local groups of the plant were known, all in South Texas. Since then, through the help of ranchers, many more have been discovered.

The U. S. Fish and Wildlife Service (USFWS) regional office in Albuquerque, N.M., has recommended that Johnston's frankenia be taken off of the endangered species list. According to a recent memo from the Albuquerque regional director to field supervisors in Texas, the delisting package for Johnston's frankenia should be submitted no later than March 1999.

"The reasons for this success story can be summed up in two words: cooperation and conservation," said Gena Janssen, a Texas Parks and Wildlife Department (TPWD) biologist. "The private landowners of Zapata County have cooperated with us by graciously opening their gates and allowing access to survey for this endangered species. This led to the discovery of at least 45 confirmed populations of Johnston's frankenia - all but one on private property."

Janssen and the ranchers realized that simply finding a few more populations will not assure that a rare plant gets delisted. So many Zapata County landowners went a step further by committing to conserve this

species on their ranches through voluntary conservation agreements with TPWD.

"It is these voluntary conservation agreements, representing the commitment of the landowners of Zapata County to the voluntary conservation of this species, that has led to the recommended delisting," explained Janssen.

Unlike endangered animals, endangered plants are not heavily protected on private land under the federal Endangered Species Act. Essentially, if a landowner is not using federal money or operating under a federal permit (which is 99 percent of the time), it is legal to remove endangered plants on their property.

"Given these facts, we knew that it would be difficult-to-impossible to delist this species because the U.S. Fish and Wildlife Service would consider all these private land sites 'unprotected,'" continued Janssen, "unless we could prove to the USFWS that the landowners of Zapata County are taking care of these endangered species voluntarily."

Steve Spangle, USFWS Listing Coordinator for Region 2 (including Texas), recently assured Janssen that all is ready to proceed with the preparation of the delisting package. She notes that while Spangle and others think it is likely to occur, the Johnston's frankenia delisting is still a recommendation, and nothing is final until it is signed by the director of the USFWS in Washington.

"Although we are nine-tenths of the way there, we must have good solid data that will withstand the litany of reviews the delisting package will face, and I believe we have it. However, I would like to invite anyone who is not yet involved with this project to join us. I will be collecting more data and conservation agreements until September. I am willing to provide on-the-ground field days and endangered plant identification training for any landowners, including local gas, pipeline, or seismic companies. Again, this would be completely voluntary conservation that most landowners can easily do in the course of their normal business routine."

When Johnston's frankenia was listed as an endangered species in 1984, it was known from only five localities - two in Zapata County, two in Starr County, and one in Nuevo Leon, Mexico.

Then, in the early 90's, the former Zapata County District Conservationist and members of the Zapata County Soil and Water Board wanted someone to come to Zapata and help them take another look at this "so called" endangered species. They said it was everywhere in Zapata County, and, maybe, they said, the species did not need to be listed at all.

Starting in May 1995, Janssen began meeting with landowners, many of whom eventually decided to pursue voluntary conservation agreements. But it took time, patience and persistence.

"Where are they?' I asked," said Janssen. "No one would say. 'But how can I delist this species if I cannot verify that there is actually a bunch more out there?' Silence. Tough crowd. Basically the message I got was: 'That's your job, we're just here to let you know that there is a lot of that stuff out there.' So off I went on one of the greatest Easter egg hunts of all time, and everyone knew where all the eggs were but me."

Janssen says it took a while before she actually gained access to the first ranch. But, one ranch turned into two, and two turned into three, and so on. Some days were easier than others. Most landowners were kind and inquisitive, cautious but gracious. Over and over again she would explain how the law was different for plants and how she was trying to take this species off of the endangered species list if they would just help out a little.

Over time, as trust and understanding grew, the gates opened up. Landowners would tell her not to worry, that they cared deeply about the ranch and that they would take care of their endangered plants. Those days were gratifying for Janssen. But then there were other days...

"I'll be honest - there were some days, some weeks, where I just wanted to call the whole thing off. I would get a good tongue-lashing at about a thousand decibels that would send me into a tail-spin. There were a few times I was actually brought to honest-to-goodness tears. But I never gave up because I truly believed that if we worked together we could make this happen."

Four years and 45 thriving Texas populations later, scientists now know that the species extends up into

Webb County and into Tamaulipas, Mexico. The majority, however, about 80 percent of those, are in Zapata County. That is why the commitment of many of the Zapata County ranchers is so important - they have most of them.

"I hope that people will begin to look at the endangered species on their ranches as the treasures they truly are. These simple gifts from Mother Nature are among the rarest jewels in the world, and some of us are lucky enough to have them! Not only that, but conserving these endangered species is so easy. All it takes is just a little awareness, a little careful thought."

Janssen says the beauty of these voluntary conservation agreements is that the private landowners of Zapata County are not agreeing to do anything that they were not doing already. And for that, they are making history.

TH 5/18/98

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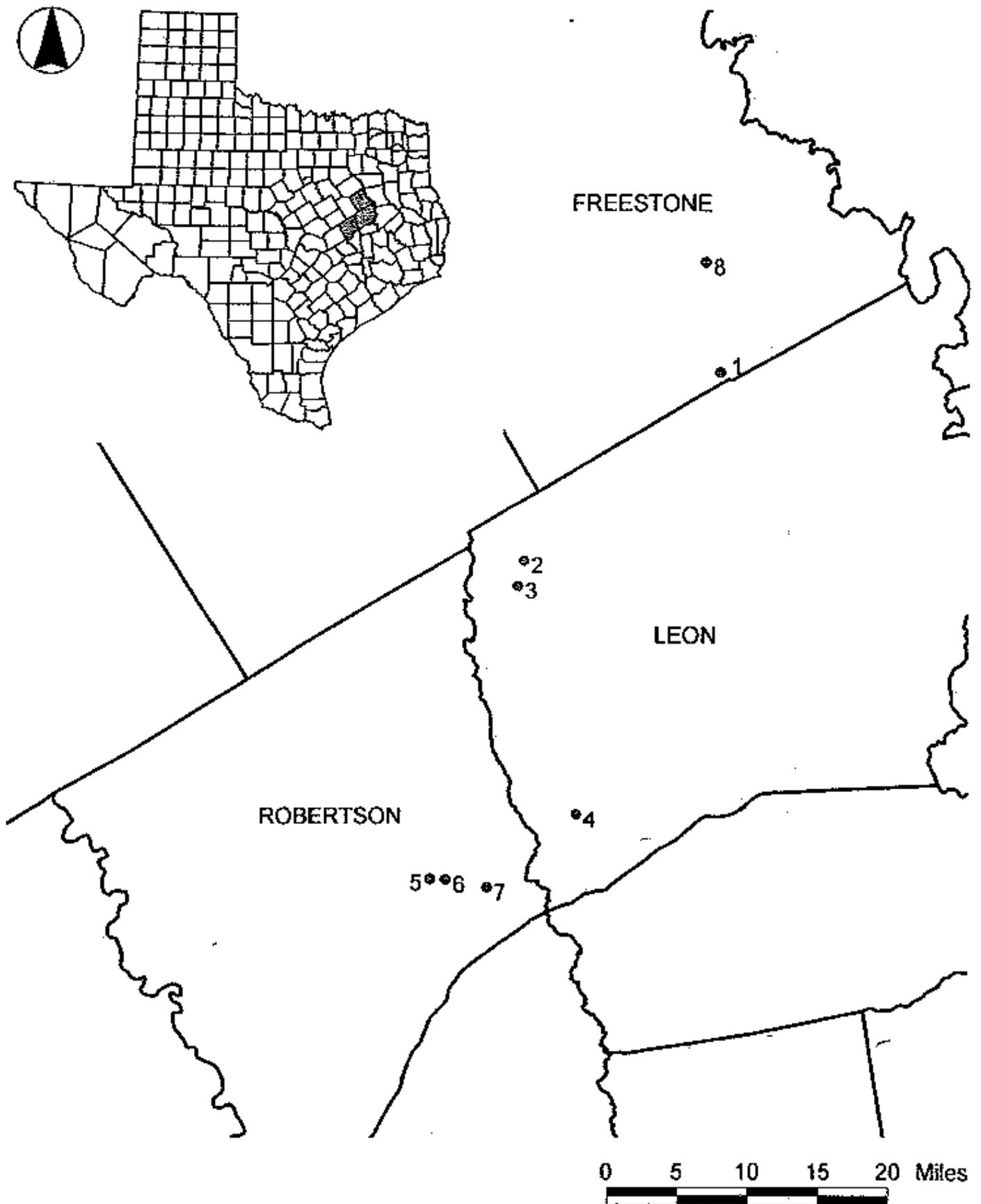
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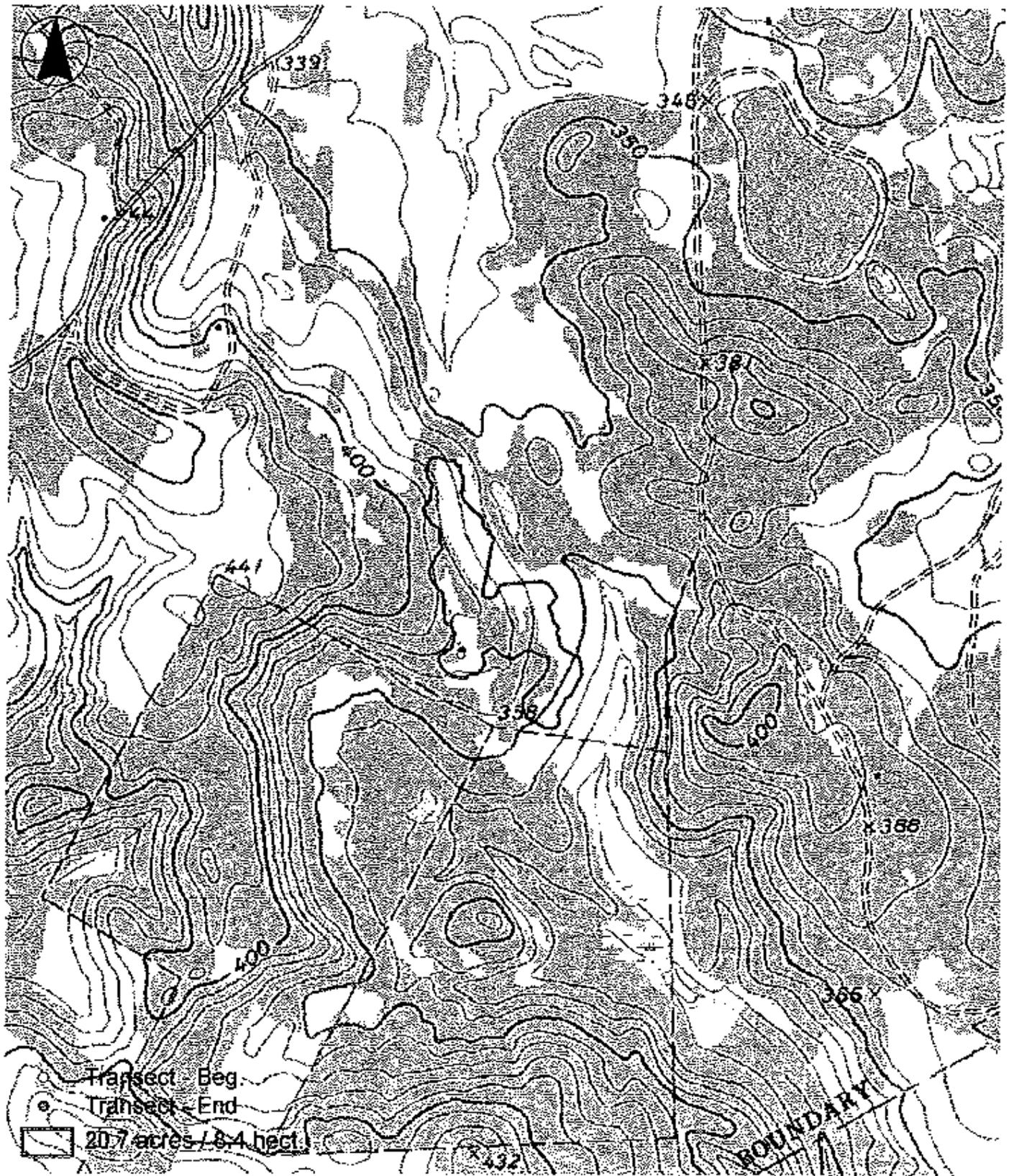
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**APPENDIX IV. Maps of populations.**

# Abronia macrocarpa Populations



# Population 1 - Lanely USGS Quad



Scale 1:12,000

0 200 400 600 800 Meters

# Population 2 - Round Prairie USGS Quad



Scale 1:12,000

0 200 400 600 800 Meters

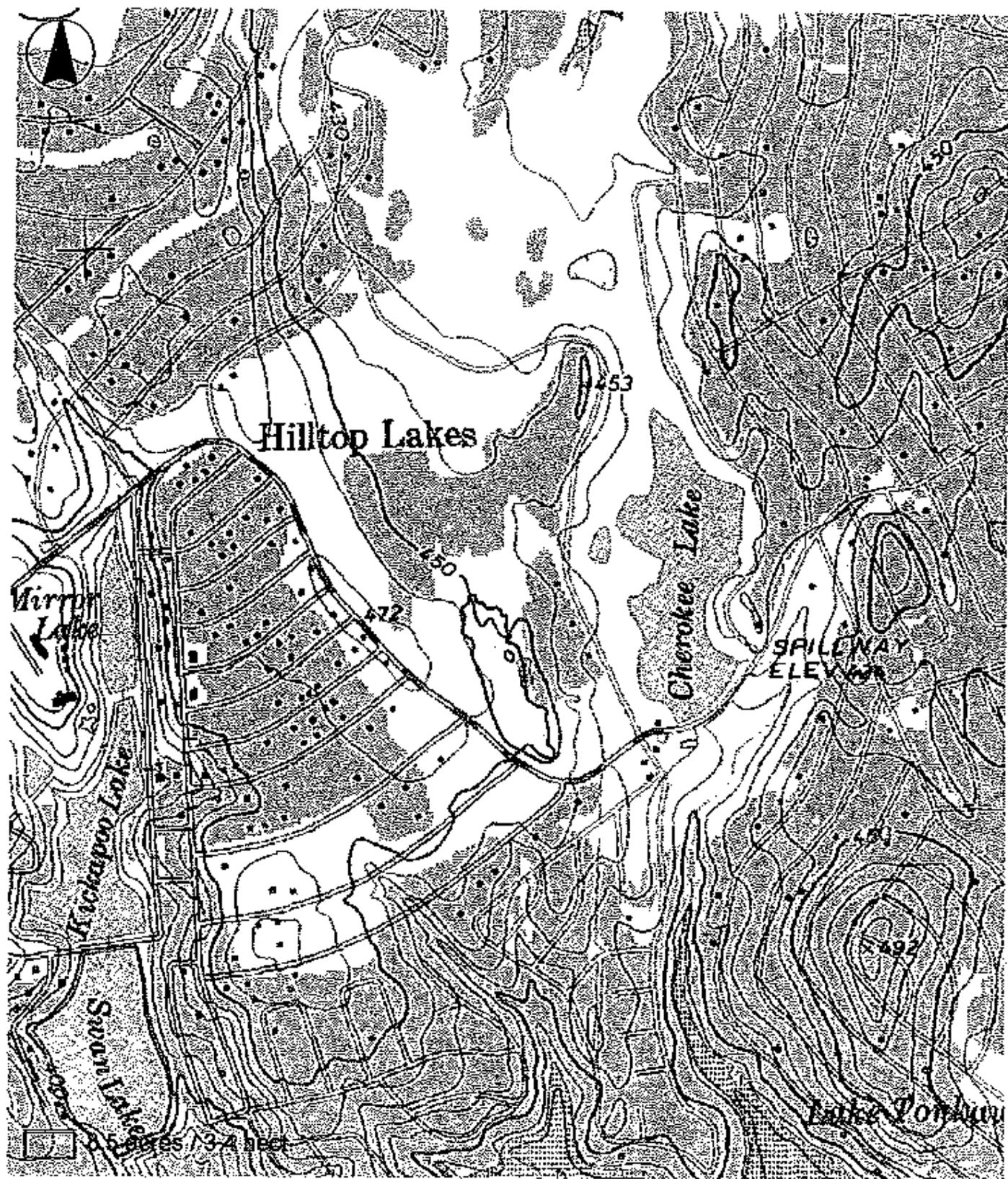
# Population 3 - Round Prairie USGS Quad



Scale 1:12,000

0 200 400 600 800 Meters

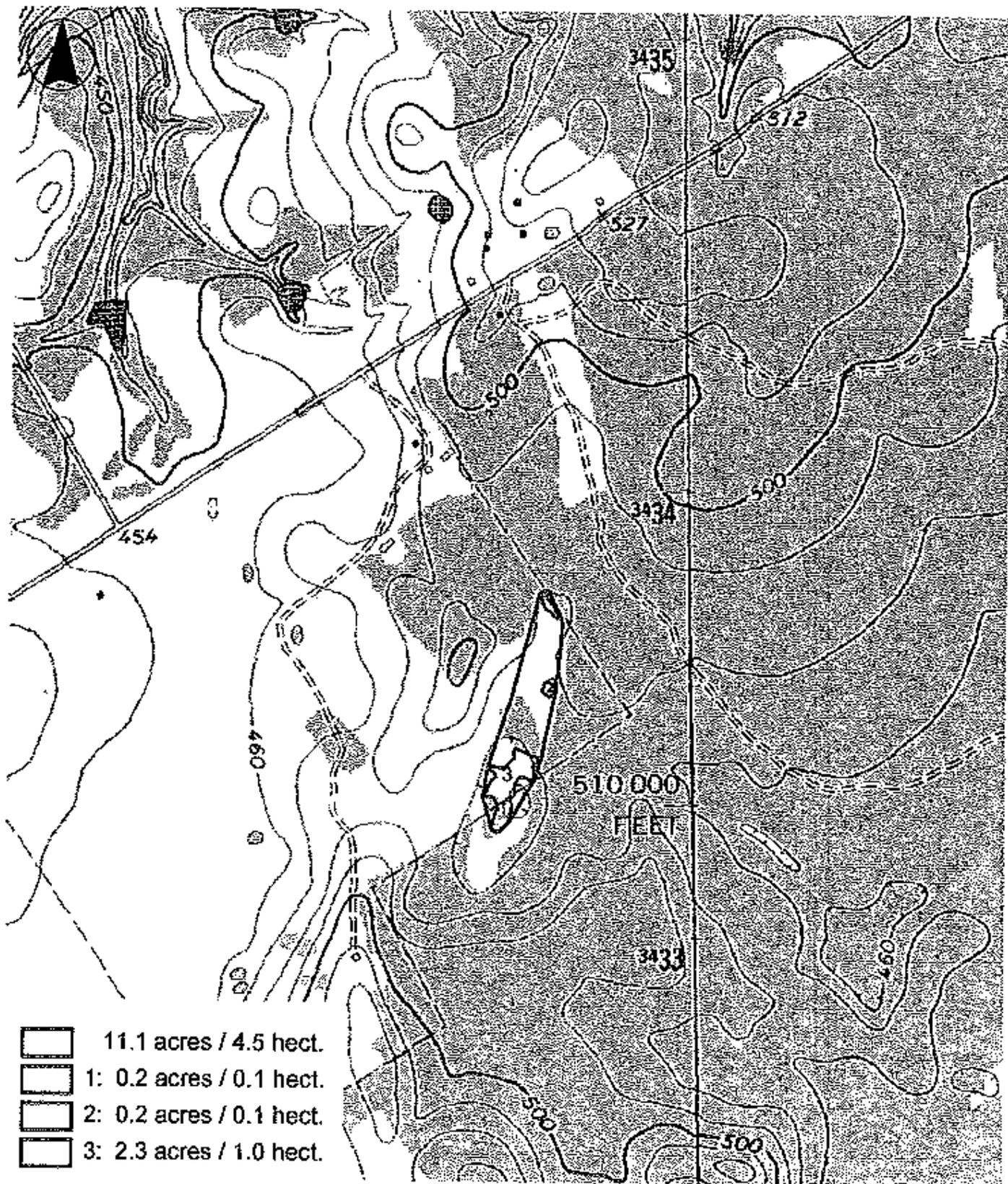
# Population 4 - Hilltop Lakes USGS Quad



Scale 1:12,000

0 200 400 600 800 Meters

# Population 5 - Franklin USGS Quad



Scale 1:12,000

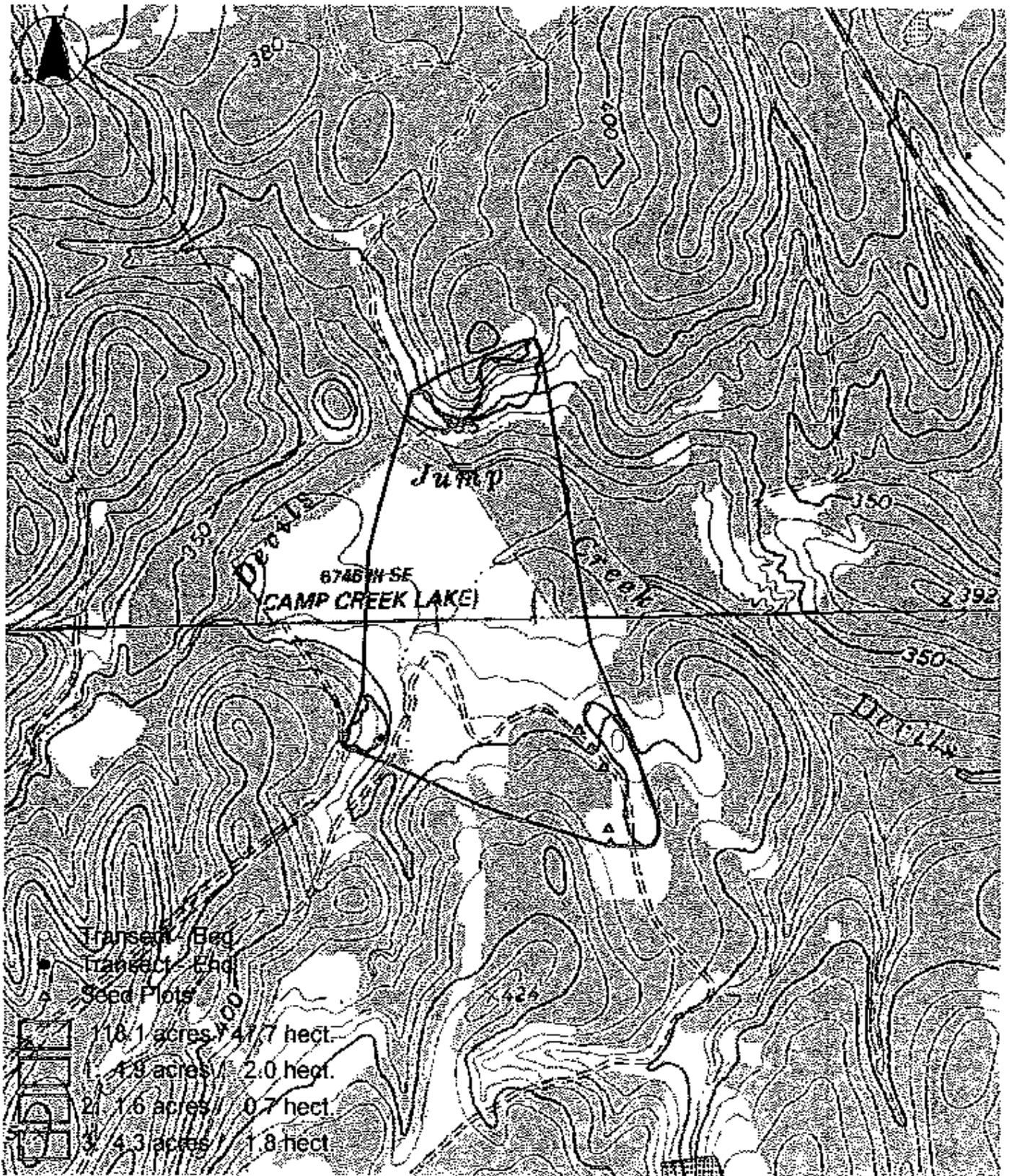
0 200 400 600 800 Meters

# Population 6 - Camp Creek Lake USGS Quad

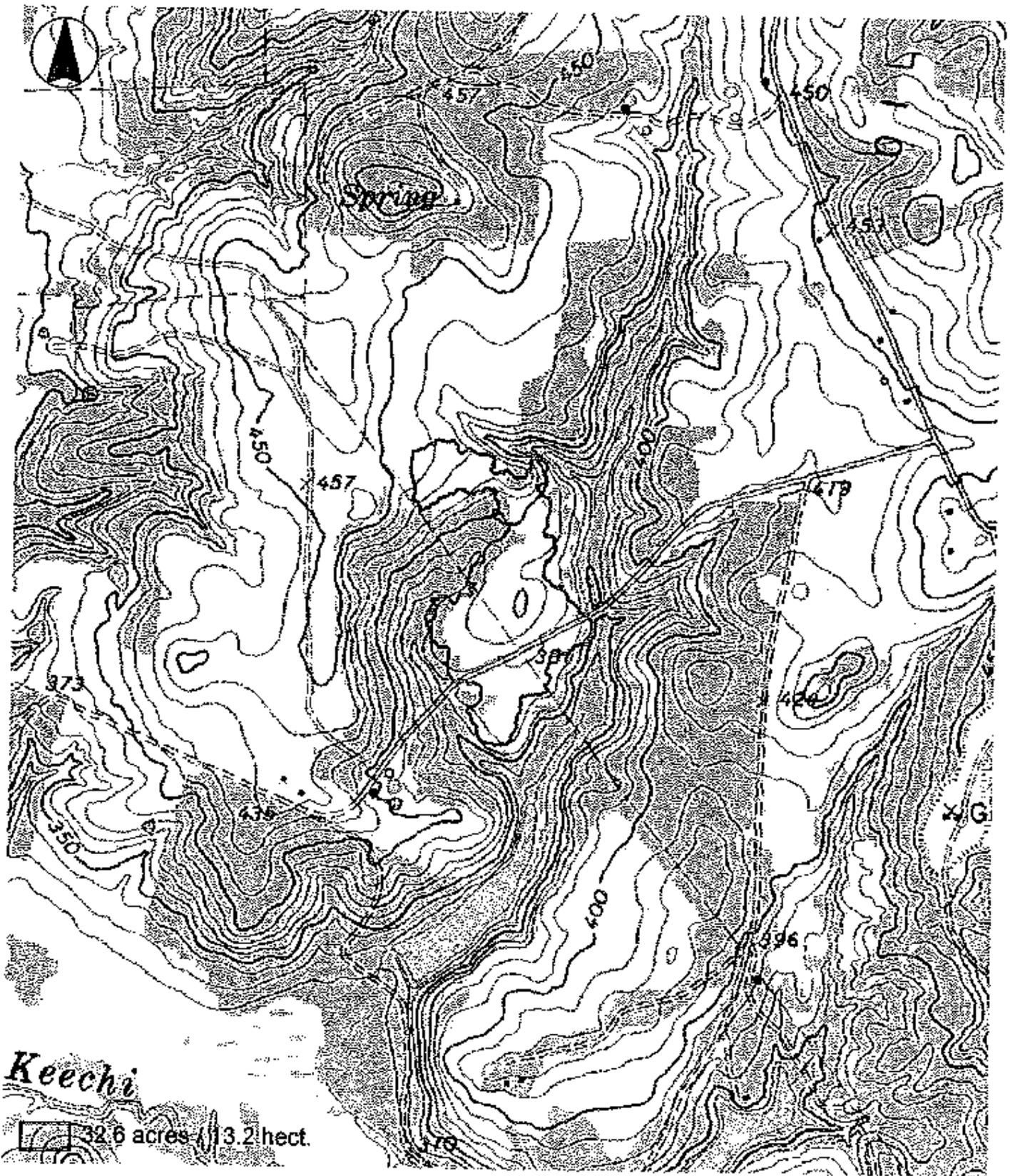


Scale 1:12,000

# Population 7 - Camp Creek Lake/Edge USGS Quads



# Population 8 - Turlington USGS Quad



*Keechi*

32.6 acres (13.2 hect.)

Scale 1:12,000



**APPENDIX V. List of land management practices that are compatible and are not compatible with populations of *Abronia macrocarpa*.**

The Effect of Some Land Management Activities on Large-fruited sand verbena (*Abronia macrocarpa*)

ACTIVITY	COMPATIBLE	NOT COMPATIBLE
<p><b>Improvements for Wildlife and Cattle</b></p>	<p>Range Improvements are compatible within and adjacent to populations of <i>Abronia</i>. These activities include brush control, prescribed burning, seeding with native grasses and other species native to the area to enhance the natural habitat.</p>	<p>Pasture Improvements are not compatible within or immediately adjacent to populations of <i>Abronia</i>. These activities include broad-scale clearing of the native species, followed by discing, liming, seeding with non-native species of pasture grasses (such as coastal Bermuda), and fertilizing. These activities need to be repeated every couple of years or so, and the <i>Abronia</i> simply cannot survive. The establishment of pastures of this sort away from existing populations of <i>Abronia</i> has no effect.</p>
<p><b>Food Plots for Wildlife</b></p>	<p>Annual Food Plots appear to be compatible (for the most part) within and adjacent to populations of <i>Abronia</i>. Annual food plots are created by raking and seeding or shallow discing and seeding to rye, wheat, barley, oats (etc.), and fertilizing. Careful timing is key. As long as these plots are established in August &amp;/or September (before the basal rosettes of <i>Abronia</i> appear), they have little impact on the population. Of course, annual food plots away from existing populations of <i>Abronia</i> have no effect.</p>	<p>Perennial Food Plots are not compatible within populations of <i>Abronia</i>. These plots are usually planted in the spring with Canada wild rye, Maximillion sunflower, bundle flower, partridge pea (etc.) using the same methods as described to the right. Since <i>Abronia</i> is in flower and fruit from late February to late April, any activity within the population at this time will destroy the population and its ability to reproduce or re-establish. Of course, perennial food plots away from existing populations of <i>Abronia</i> have no effect.</p>
<p><b>Cattle Grazing</b></p>	<p>Active cattle ranching and populations of <i>Abronia</i> appear to be compatible as long as a good rotational grazing system is practiced, and/or the stocking rates are relatively low, OR the cattle are</p>	<p>Cattle and populations of <i>Abronia</i> are not compatible when stocking rates are high, and the cattle are concentrated in the pasture in which the <i>Abronia</i> occurs during the critical flower and fruiting time from</p>

<b>Cattle Grazing (con't)</b>	completely absent from the pasture in which the population of <i>Abronia</i> occurs during the critical flower and fruiting time from late February to late April.	late February to late April.
<b>Herbicide Use</b>	The use of herbicides appears to be compatible within and adjacent to populations of <i>Abronia</i> if used during <i>Abronia</i> 's dormant season from May to September.	The use of herbicides would not be compatible if used within or directly adjacent to populations of <i>Abronia</i> during the growing season from October through April.
<b>Clearing for fences, roads, etc.</b>	Small-scale clearing for general ranch maintenance such as fence clearing and road clearing are compatible within populations of <i>Abronia</i> if done any time during the dormant season from May to September.	Small-scale clearing is not compatible within populations of <i>Abronia</i> during the critical flower and fruiting season from late February to late April. Clearing elsewhere on the ranch during this time, of course has no effect.
<b>Use of ORV's (off-road-vehicles)</b>	The use of ORV's is compatible within and adjacent to populations of <i>Abronia</i> anytime during the dormant season from May through September. Since the basal rosettes appear in the fall, ORV use during hunting season should be done carefully on established roads and trails within populations.	Indiscriminate use of ORV's within populations of <i>Abronia</i> during the growing season from October through April is not compatible. This is especially true during the critical flower and fruiting season from late February to late April.
<b>Mowing</b>	Mowing is completely compatible within populations of <i>Abronia</i> anytime during the dormant season from May through September. Mowing on a high setting from October to January is also acceptable.	Mowing is not compatible within populations of <i>Abronia</i> during the critical flower and fruiting season from late February to late April.
<b>Oil and Gas Activities</b>	Oil and gas activities and populations of <i>Abronia</i> can be compatible IF direct impacts are avoided within and adjacent to existing populations. This can be accomplished by working closely with the	Oil and gas activities are not compatible with populations of <i>Abronia</i> if planned and executed directly within or immediately adjacent to the population.

<p><b>Oil and Gas Activities (con't)</b></p>	<p>gas and oil companies on your property and letting them know where your endangered plants occur. With good communication and careful site selection, direct impacts can usually be avoided. Utilizing options such as lateral drilling, narrowing pipeline and other easements to "one blade width", and careful navigation of roads around populations can mean the difference between the complete eradication of a population vs. the conservation of one.</p>	
<p><b>Other Activities</b></p>	<p>Feral hog trapping may actually be beneficial since there is evidence that they dig up and eat the very large tap root of <i>Abronia</i>. Hunting appears to have no effect (but see ORV use above).</p>	<p>Broad-scale insecticide use within and adjacent to populations of <i>Abronia</i> may have a negative impact on the necessary pollinators (primarily hawk moths).</p>

**APPENDIX VI. Conservation agreement presented to landowners for signature.**

**CONSERVATION AGREEMENT**  
for  
**Large-fruited sand verbena (*Abronia macrocarpa*)**

**Introduction**

*Abronia macrocarpa* was listed as endangered by the U. S. Fish and Wildlife Service (USFWS) and by the State of Texas in 1988. At the time of its listing, only one population was known (Leon County, Texas). Recently, because of the commitment and cooperation of private land owners, Southwest Texas State University biologists, private consultants, and the Texas Parks and Wildlife Department, additional populations have been verified. Today, at least eight populations are known and the range has been extended to include Freestone and Robertson Counties.

**Purpose**

This Conservation Agreement has been initiated to conserve large-fruited sand verbena by reducing the threats, stabilizing the populations, and maintaining its habitat. This document's primary purpose is to conserve large-fruited sand verbena throughout its range on private land in Texas. Individual land owners are capable of protecting large-fruited sand verbena and its habitat on their land, interested in achieving conservation, and take pride in maintaining these rare resources for our Texas heritage.

This document's secondary purpose is, with assured land owner protection, to assist in recovery of the species.

I. **Species Involved:** Large-fruited sand verbena (*Abronia macrocarpa*)

II. **Parties Involved:**

A.

Landowner Name:

Address:

Telephone:

B. Texas Parks and Wildlife Department

Wildlife Diversity Branch

3000 IH 35 South, Suite 100, Austin, Texas 78704

III. **Authority:** Texas Parks and Wildlife Code--Chapter 12 [ 12.025. (a) ]  
Texas Parks and Wildlife Code--Chapter 88

**IV. Status and distribution of large-fruited sand verbena:**

*Attached*

**V. Threats to large-fruited sand verbena:**

The primary threat to large-fruited sand verbena is alteration of the habitat. Habitats have been modified by the introduction of (primarily) non-native grasses creating monotypic grass stands and the introduction of other non-native species for pasture improvements and soil stabilization. Clearing has also contributed to habitat modification. Additional impacts include oil exploration and development, residential development, and recreational activities. A study by Southwest Texas State biologists and private consultants assessed threats to known populations. A list of the effect of land management activities on large-fruited sand verbena resulting from this study is attached in table form.

**VI. Conservation actions that will be carried out:**

Areas containing populations of large-fruited sand verbena will be left in their natural state. The land owner and any lessee of the property will avoid all aforementioned habitat alterations in these areas. Land management activities that are not compatible (see attached list) will be avoided.

Texas Parks and Wildlife Department biologists, or, most likely, Conservation biologists contracted by TPW, will enter the property, with permission from the landowner, at least once a year to survey and monitor each population site. The data from this annual monitoring will be compiled in a report. Texas Parks and Wildlife biologists will share this report with the U. S. Fish and Wildlife Service.

Texas Parks and Wildlife Department biologists or their contracting agents will act as the landowner's liaison/ambassador concerning any federal endangered species issues or concerns expressed by the U. S. Fish and Wildlife Service, or any other federal agency if the landowner requests such.

**VII. Duration of Agreement:**

The duration of this Conservation Agreement is for ten (10) years following the date of the last signature. The parties involved will review the Conservation Agreement and its effectiveness annually during each monitoring visit to determine whether it should be revised. During the last month in which it is valid, the Conservation Agreement must be reviewed and either modified, renewed, or terminated. Either party may choose to terminate this agreement at any time, but all parties must be notified beforehand, if possible.

**VIII. Other unforeseeable impacts:**

Even the most perfectly laid plans are subject to mishaps. If at any time there may be impacts to the populations of large-fruited sand verbena that are out of the landowner's control, Texas Parks and Wildlife biologists or their contracting agents are to be notified. Texas Parks and Wildlife biologists or their contracting agents may be able to offer recommendations in difficult situations if the land owner requests Department assistance. If at any time there are impacts to the populations of large-fruited sand verbena that are accidental, again Texas Parks and Wildlife biologists or their contracting agents are to be notified. Often accidents provide a perfect learning opportunity, and a study could be initiated to determine the recovery potential of the species.

**IX. Signatures:**

Landowner Name: \_\_\_\_\_

Address: \_\_\_\_\_

\_\_\_\_\_

Signature \_\_\_\_\_

Date \_\_\_\_\_

Robert L. Cook, Executive Director

Texas Parks and Wildlife Department

4200 Smith School Road

Austin, Texas 78744

Signature \_\_\_\_\_

Date \_\_\_\_\_