

RARE PLANT SURVEY AND GENERAL PLANT INVENTORY
OF PACE BEND COUNTY PARK, TRAVIS COUNTY, TEXAS,
SUMMER 1996

29 September 1996 Draft

During the summer of 1996, botanical surveys were conducted on all Travis County parks west of the Balcones Escarpment. The goals of these surveys were to locate populations of rare, unusual, or management-sensitive plant species and, at each park, to conduct a general inventory resulting in an annotated checklist of all plant species observed.

More of this project's time was spent at Pace Bend than at all the other parks combined, if only because this park was the focus of particular side-projects. The park was already known to support a population of a globally-rare plant species, Texabama croton (*Croton alabamensis* var. *texensis*), and surveys on 26 June, 17 July, 25 July, and 30 July-1 August were focussed on searches for additional locations of this unusual shrub. Visits on 5 September, 12-13 September, 16-17 September, and 19 September 1996 were focussed on installation and collection of quantitative data at permanent croton monitoring sites. Additional surveys on 8 August, 14 August, 22-23 August, and 26-28 August were focussed primarily on vegetation mapping and/or resource assessment of particular sites. Despite or perhaps because of these specific efforts, as well as the large size of the park, the general botanical inventory of Pace Bend is to date less complete than those of other parks visited during this project. Even during the height of the drought of 1996, every visit seemed to result in some interesting if minor discovery into which time did not allow detailed investigation. In the opinion of this observer, there is much more to the flora of Pace Bend Park than has so far met the eye.

Location/Physical Setting

Pace Bend Park occupies 1368 acres on the northern end of the Pace Bend peninsula in northwestern Travis County, Texas. It is bordered on three sides by Lake Travis (Colorado River); terrestrially the park is accessible only from the southwest via R. M. 2322. Topography is gently rolling, with some vertical cliffs on a long cutbank of the Colorado River on the western edge of the park. According to the Pace Bend Quadrangle (USGS, 19867), elevation ranges from 681 feet, the pool level of Lake Travis, to between 880 and 900 feet on a hilltop near the center of the park.

Two perennial springs are present, one at the head of Naumann Cove in the southwestern corner of the park and the other on the north side of Taylor Cove in the northwestern corner of the park. Otherwise the park is essentially devoid of surface water except, of course, as present in Lake Travis. The narrowness of the peninsula has precluded the development of significant streams, perennial or intermittent. Despite the park's recent use as cattle pasture, there are no stock tanks or other impoundments.

The surface geology of the park is mapped on the Llano sheet of the Geologic Atlas of Texas (Barnes and Rose, 1981). Most of the park is underlain by strata of Cretaceous age. The oldest and lowest layer is the Cow Creek Limestone, which forms the bluffs overlooking the lake on the west side of the park. Above the bluff lies the Hensell Sand, a less resistant layer which forms a nearly level to very gently rolling bench especially evident in the southern half of the park. Glen Rose Limestone caps the slopes and hilltops; its alternating beds of resistant limestone and readily weathered marl tend to create a stairstep topography more dramatically displayed elsewhere in the county. Not indicated on the maps are Pleistocene gravelly high terrace deposits that mantle the limestone in at least part of the northeastern corner of the park.

Soils of the park are mapped on sheets 11, 12 and 20 in the Travis County soil survey (Werchan et al., 1971). Seven mapping units of five series are recognized. Most extensive are soils of the Brackett and Tarrant series, which formed over most of the area underlain by limestone. Brackett soils, found mostly on steeper topography, are shallow and well drained, with a surface layer of light brownish-gray gravelly clay loam or gravelly loam about 4 inches thick. The next layer, about 10 inches thick, is pale-brown clay loam. These soils are calcareous, moderately alkaline Typic Ustochrepts and are assigned to the Steep Adobe range site. Tarrant soils of more level areas are also shallow and well drained, with a surface layer of dark grayish-brown stony clay about 8 inches thick. The underlying layer is limestone. These soils are well drained, calcareous, moderately alkaline Lithic Haplustolls and are assigned to the Rocky Upland range site.

Altoga soils, which developed over alluvium, are mapped only in a small portion of the northeast corner of the park (see sheet 12 of Werchan et al., 1971). These are deep, well drained soils found high on the landscape, mostly on long narrow side slopes. The surface layer is light brownish-gray silty clay; underlying layers are silty clay loams. Altoga soils are calcareous, moderately alkaline Typic Ustochrepts and are assigned to the Rolling Blackland range site.

Pedernales soils are mapped in most of the area underlain by Hensell Sand. These soils are deep and well drained, with a surface layer of reddish-brown fine sandy loam. The underlying layer is reddish-brown sandy clay. Pedernales soils are noncalcareous, mildly alkaline Udic Paleustalfs and are assigned to the Sandy Loam range site.

Travis soils, acid soils that developed in old alluvium, are mapped in two locations in the northeastern corner of the park (see sheet 12 in Werchan et al., 1971). Travis gravelly soils, 1 to 8 percent slopes, are found on a series of peninsulas, some of which are in the area currently closed for revegetation. These soils are deep and well drained, with a surface layer of gravelly fine sandy loam; the underlying layer is red gravelly sandy clay. These soils are slight acid Ultic Paleustalfs and are assigned to the Gravelly range site. Travis soils, 1 to 5 percent slopes, are mapped on a single smaller peninsula between Levi and Mudd coves. These soils are also deep and well drained, with a surface layer of brown to light-brown fine sandy loam; the underlying layer is red sandy clay. These soils are slight acid Ultic Paleustalfs and are assigned to the Sandy Loam range site.

Vegetation

In a project to map the existing vegetation of Pace Bend Park during the summer of 1996, nine plant communities or plant associations were recognized. Each is described separately below, but it should be understood that all of these somewhat fanciful entities intergrade to various extents.

1. Plateau live oak-Ashe juniper savanna. This community is probably the largest piece of Pace Bend's vegetational puzzle, occupying most of the interior and portions of the perimeter. It is the principal community in areas underlain by Glen Rose Limestone yet also occurs over other strata. Woodland mottes of various size are perhaps its most conspicuous feature. The canopy of these mottes is dominated by plateau live oak (*Quercus fusiformis*); other tree species, such as cedar elm (*Ulmus crassifolia*), are comparatively rare and often locally absent. Greater diversity is displayed in the understory, where the most common components, Ashe juniper (*Juniperus ashei*), Texas persimmon (*Diospyros texana*) and agarito (*Berberis trifoliolata*), are occasionally joined by other shrubs. Cover in the ground layer is variable depending perhaps on degree of shading; cedar sedge (*Carex planostachys*) and speargrass (*Stipa leucotricha*) are the most common species. More extensive than these woodland mottes are grassland patches of variable composition and structure. Many areas support sparse cover of early successional shortgrasses such as threeawn (*Aristida* spp.) and hairy tridens (*Erioneuron pilosum*), while comparatively few areas support dense cover of later successional midgrasses such as little bluestem (*Schizachyrium scoparium*), tall grama (*Bouteloua pectinata*), and sideoats grama (*Bouteloua curtipendula*). All of these grassland patches are punctuated with shrubs, most notably Ashe juniper. As these junipers mature, some of this savanna will become indistinguishable from the woodland described below.

2. Plateau live oak-Ashe juniper woodland. This community is similar to the preceding and distinguished from it only on the basis of a larger ratio of woodland to grassland opening; in most cases the distinction is rather arbitrary. This woodland occupies slightly deeper soils in valley bottoms, but it is also present on some hilltops and upper slopes. Cedar elm is sometimes an important canopy component.

3. Mesquite-plateau live oak savanna. This community is found on deep sandy to silty soils in valley bottoms and on gentle slopes in the southern third and northeastern tip of the park. Mesquite (*Prosopis glandulosa*) is the most conspicuous tree, at some sites occurring alone and at others, such as at the large site just north of Camp Chatauqua, mixed with plateau live oak and Ashe juniper. Pricklypear (*Opuntia lindheimeri*) is often more conspicuous in this community than elsewhere in the park. Cover in the ground layer is consistently high, reflecting previous use of most sites as cleared pasture or agricultural field.

4. Mixed shrubland. A variant of plateau live oak-Ashe juniper savanna is found on the flat dry top of the limestone bluff above Lake Travis on the west side of the park. In this community, the usual shrubs are joined by many species rare in or absent from other communities, such as brush

myrtlecroton (*Bernardia myricifolia*), Texas colubrina (*Colubrina texensis*), brasil (*Condalia hookeri*), Wright's pavonia (*Pavonia lasiopetala*), and Spanish dagger (*Yucca treculeana*).

5. Mixed grassland. Only two small parts of the park, one on a gentle slope southwest of the intersection of Grisham Trail and the former north-bound entrance road and the other on the upland just inside the front gate, support what might be considered grassland (as distinct from grassy openings within various woodland and savanna types). Mowing and prescribed fire are currently used to maintain relatively treeless conditions that may originally have resulted from clearing for agricultural use; in the absence of such management, these grassland patches would quickly succeed to mesquite savanna and eventually to some sort of live oak woodland. Principal components are not known at the present time; various threeawns and sand dropseed (*Sporobolus cryptandrus*) are certainly important in the warm season. Deep sandy soils at these sites support a number of forbs that are absent from clay soils in the rest of the park (except perhaps post oak woodlands) and elsewhere in Travis County, including swanflower (*Aristolochia erecta*), rockrose (*Helianthemum* sp.), and narrowleaf pinweed (*Lechea tenuifolia*).

6. Baldcypress-Sycamore woodland. This deciduous woodland occurs as linear strips in the wettest portions of canyon or cove bottoms, primarily along the western edge of the park but also in deeper coves on the eastern side. Baldcypress (*Taxodium distichum*) and sycamore (*Platanus occidentalis*) are the two common tree components. This community has been present within the park only since the creation of Lake Travis, and as a result most of these trees are not as large as those found along natural watercourses in the area. Characteristic understory shrubs include buttonbush (*Cephalanthus occidentalis*), deciduous holly (*Ilex decidua*), and American beautyberry (*Callicarpa americana*). Many of the park's hydrophytic plants, including Emory sedge (*Carex emoryi*) and tussock sedge (*Eleocharis rostellata*) are restricted to spring runs at two sites within this community.

7. Cedar elm-mixed shrub woodland. This mostly deciduous woodland occurs mostly on limestone rubble slopes below the top of the bluff along the Lake Travis shoreline on the west side of the park, extending upslope in some canyons (e.g., Gracy Cove) above the level of the baldcypress-sycamore community. Cedar elm is clearly the most common tree; other species, such as western soapberry (*Sapindus saponaria* var. *drummondii*), escarpment black cherry (*Prunus serotina* subsp. *eximia*) are comparatively rare. Characteristic shrubs, some of which are more or less restricted to cliff-faces, include Mexican buckeye (*Ungnadia speciosa*), shrubby boneset (*Eupatorium havanense*), and deciduous holly. Two woody vines, grapeleaf ampelopsis (*Ampelopsis cordata*) and the endemic sevenleaf creeper (*Parthenocissus heptaphylla*), as well as a number of lithophilic forbs and ferns, are known in the park only from this community. During the current project, very little time was afforded to explore isolated patches of wooded breakdown slopes below the bluff, areas that merit scrutiny in the future.

8. Post oak woodland. This woodland occurs on gravelly-sandy Pleistocene terrace deposits in the northeastern corner of the park. Post oak (*Quercus stellata*), a minor component of

woodlands in other parts of the park, is common here; other canopy species include cedar elm and plateau live oak. Mottes of these trees are separated by small patches of grassland often dotted with mesquite and supporting a number of herbaceous species, including field pansy (*Viola rafinesquii*), San Saba pinweed (*Lechea san-sabeana*), and Nealley globe-amaranth (*Gomphrena nealleyi*), not known to occur elsewhere in Travis County.

9. Shoreline associations. Two bands of vegetation can be recognized along most of the Lake Travis shoreline. At or near the high water mark is an intermittent band of buttonbush shrubs accompanied by fairly dense ground cover of bermudagrass (*Cynodon dactylon*) and frogfruit (*Phylla nodiflora*). Rattlepod sesbania (*Sesbania drummondii*) is locally common in this band. Downslope and exposed only during low water levels is a zone dominated by low growing annuals such as creeping lovegrass (*Neeragrostis reptans*) and fourspike heliotrope (*Heliotropium procumbens*). Diversity of the latter increases in proximity to moisture emanating from seeps and drainage from various coves on the western side of the park.

Target Rare Plant Species

Six rare plant species were sought in appropriate habitat at all of the sixteen parks included for survey during this project: Texas amorphia (*Amorpha roemerana*), Texabama croton (*Croton alabamensis* var. *texensis*), Glass Mountains coral-root (*Hexalectris nitida*), Heller marbledseed (*Onosmodium helleri*), canyon mock-orange (*Philadelphus ernestii*), and Buckley tridens (*Tridens buckleyanus*). A seventh rare plant species, bracted twistflower (*Streptanthus bracteatus*), cannot be detected during summer of a drought year and was essentially omitted from this project. Information about the relative rarity, distribution, habitat, etc., of each of these species will be provided in a separate appendix at the end of the set of park reports.

Results of Rare Plant Surveys

One and perhaps two of the seven target species have been found at Pace Bend Park. Texabama croton was discovered in 1993 by staff of DLS Associates, who reported four plants from one location in the northeastern corner of the park. Subsequent surveys have since revealed well over 200 plants at nineteen locations lying mostly on Hensell Sand terraces along the periphery of the park in widely scattered locations. The information about Texabama croton at Pace Bend is destined to become so voluminous as to require a separate report (see Appendix 1). An immature grass that may well be a second target species, Buckley tridens, was encountered during Texabama croton monitoring just before this interim report was due; hopefully there will be time during the fall of 1996 to investigate this possibility.

None of the other five target species have been encountered to date at Pace Bend, despite considerable field work during the last five years by various field biologists. Staff of DLS Associates

conducted the most extensive and intensive surveys to date, visiting the park four times during April and May of 1993 and four times during summer and fall of the same year. These surveys involved vegetation mapping and rare bird surveys as well as searches for rare plant species, and resulted in the discovery of Texabama croton within the park (DLS Associates, 1994). W. R. Carr of the Texas Natural Heritage Program visited small portions of the park on 16 April 1991 to search in vain for canyon mock-orange and bracted twistflower and again on 25 October 1993 to examine the recently-discovered Texabama croton population (Carr, 1991; Carr 1993). Searches for canyon mock-orange, Texas amorpha, Heller's marbleseed, and Glass Mountain coral-root were conducted in various locations during 18 visits during the summer of 1996. Although this summer was a pitiful time to try to find plants, each of these species was seen at other Travis County Parks during the same woeful period. It seems like that the combined efforts of all of these surveys would have revealed the presence of any of these other target species, or at least promising habitat. As mentioned above, Buckley tridens, a very late bloomer, is probably present but its status within the park remains to be investigated.

Results of General Plant Inventory

As of 27 August 1996, 424 plant species had been reported from Pace Bend Park. During quantitative sampling at Texabama croton sites in September, a few (5-10) species were added. Other new species should be encountered if this project continues throughout the fall of 1996; many more would be added should a thorough botanical inventory be undertaken during a wet or even normal spring. The total number of species to be expected in the park is at least 500 and may approach or exceed 600.

Numbers alone can be confusing if not downright meaningless. Of these 400 (or 600) species, those that might be of management concern are those that are globally rare, such as Texabama croton and any of the other globally rare target species that materialize in the future.

Also of interest and perhaps management concern are those that are common from a global perspective but rare from a local, county-based perspective. In this category one might include a number of species found within the park in grassland openings in sandy Pedernales soils over the Hensell Sand or in post oak woodlands on Travis soils over gravelly Pleistocene terrace deposits. This florula includes three species not known to grow anywhere else in Travis County: San Saba pinweed (*Lechea san-sabeana*), field pansy (*Viola rafinesquii*), and Nealley globe-amaranth (*Gomphrena nealleyi*). It also includes several other species which have been collected but a few times, often decades ago, in the county: swanflower (*Aristolochia erecta*), previously collected in Travis County in 1901 and 1967; butterfly-pea (*Centrosema virginianum*), previously collected in Travis County in 1940; a rockrose (*Helianthemum* sp.), no species of which has been collected in Travis County since 1946; flameflower (*Talinum aurantiacum*) last collected in Travis County in 1936; and bracted zornia (*Zornia bracteata*), collected only twice in Travis County. Suitable habitat for these sandyland species is absent from other Travis County Parks.

The flora of Pace Bend County Park includes 17 species that are endemic to (found only in) Texas, most of which are actually endemic to the Edwards Plateau:

plateau agalinis (*Agalinis edwardsiana*)
rock cress (*Arabis petiolaris*)
tall wildmercury (*Argythamnia simulans*)
drooping milkvetch (*Astragalus reflexus*)
hairy lestdaisy (*Chaetopappa bellidifolia*)
widow's tears (*Commelinantia anomala*)
Texabama croton (*Croton alabamensis* var. *texensis*)
San Saba pinweed (*Lechea san-sabeana*)
plateau bladderpod (*Lesquerella recurvata*)
canyon muhly (*Muhlenbergia involuta*)
devil's shoestring (*Nolina lindheimeriana*)
sevenleaf creeper (*Parthenocissus heptaphylla*)
big-stipule scurfpea (*Pediomelum latestipulatum* var. *appressum*)
goldeneye phlox (*Phlox roemeriana*)
Engelmann sage (*Salvia engelmannii*)
Texas groundsel (*Senecio ampullaceus*)
twistleaf yucca (*Yucca rupicola*)

Except for Texabama croton, these endemic are mostly fairly widespread and of no particular management concern. Notes on locations of these and all other plant species encountered during 1996 surveys are provided in the attached annotated plant species list.