



PAAL

United States Department of the Interior
NATIONAL PARK SERVICE
Palo Alto Battlefield National Historic Site
1623 Central Blvd., Room 213
Brownsville, Texas 78520-8326
Tel. (210) 541-2785

Not in
NRBib

IN REPLY REFER TO:

N1617

August 15, 1996

Mike Herring
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, TX 78744

not entered
no species data
only plant community
is habitat info

Dear Mr. Herring:

This letter is in response to your correspondence dated July 26, 1996. I am pleased to be able to assist you in the land conservation project. As development in Texas increases, it is important to monitor the location and status of existing vegetation.

Enclosed is the Vegetation Cover Type Data Sheet for Palo Alto Battlefield NHS. It was prepared by Karen Weaver, an AmeriCorps member working in the Division of Natural Resources.

All of the vegetation data for the park exists in digital format for GIS. The data is used in ArcView 2.1 and is available in ARC Export format.

If you want more information, please feel free to contact me at (210) 541-2785, ext. 222 or Karen Weaver, ext. 226.

Sincerely,

Thomas B. Carroll
Superintendent

KWeaver:kw:8-15-1996

Vegetation Cover Type Data Sheet

(Priorities for Land Conservation Project)

Facility Size (acres): 3,400

page 1 of 1 pages

Facility Name: Palo Alto Battlefield National Historic Site

Evaluator: Karen Weaver

Ecoregion: Gulf Coast Prairies + Marshes County: Cameron

Phone #: (210) 541-2785, ext. 226

Major Occurring Plant Communities	Vegetation Class Description	Vegetation Condition	% of Facility Represented with this Plant Community	Facility Acres Represented with this Plant Community
Glasswort - Saltwort Series (G4S4)	Medium Grassland	Excellent	69%	2,310.81
Big Sacatan Series (G4S3)	Medium Grassland	Excellent	9%	300.84
Mesquite - Granjeno Series (G5S5)	Shrubland	Good	7%	248.61
Glasswort - Saltwort Series (G4S4)	Profoundly Disturbed	Poor	6%	196.27
Glasswort - Saltwort Series (G4S4)	Woody + Herbaceous Native / Non-native	Fair	3%	127.47
Glasswort - Saltwort Series (G4S4)	Crops	Poor	2%	71.45
Mesquite - Granjeno Series (G5S5)	Profoundly Disturbed	Poor	2%	62.87
Mesquite - Huisache Series (G5S5)	Forbs	Excellent	1%	34.82
Wetlands/Tanks	Open Water	N/A	< 1%	11.39



20 JUL 1996

TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road • Austin, Texas 78744 • 512-389-4800

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Executive Director

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July 26, 1996

Mr. Tom Carroll, Superintendent
Palo Alto Battlefield National Historic Site
1623 Central Blvd. #213
Brownsville, TX 78520-8326

Dear Mr. Carroll:

Mr. Jerry Rogers, Superintendent of the Southwest System Support Office of the National Park Service, has recommended we contact you directly regarding our request for national resource information pertaining to facilities you manage. Specifics of the request are outlined below.

The Texas Parks and Wildlife Department (TPWD) is concerned at recent reports indicating the rate with which the State's native lands are disappearing. Noss and Peters⁹ (1995) reported a 20.5 % increase in development in Texas between 1982-1992. This growth, although welcome for the Texas economy, competes directly with our natural resources and can adversely impact ecological systems. Texas ecosystems reported to be most endangered and at extreme risk include: Longleaf pine forests, old-growth deciduous forests, Southwestern riparian forests, forested wetlands, tallgrass prairies, native coastal communities, and cave and karst systems. We do not know the extent of loss or threat development generates on other less threatened ecosystems or their components.

The Texas Parks and Wildlife Commission recently asked TPWD staff to address these issues by developing an assessment methodology and plan directed to define land conservation priorities for the future, our ultimate goal being to ensure the sustainability of the native Texas landscape and its ecosystems. For the purposes of this charge, TPWD defines conservation lands as areas managed exclusively or primarily for long-term maintenance of native populations or natural ecosystems. As a prerequisite to identifying land conservation priorities, TPWD has inventoried all its holdings relative to representation of ecological region and the occurrence and condition of native plant communities. To complete the picture of what is now being conserved, we would like to know the occurrence and condition of native plant communities on the facilities your organization manages. From this information we intend to identify native Texas ecosystems in greatest need of conservation and develop an assessment protocol for prioritization of the systems in order of need.

⁹ Noss, R.F., and R.L. Peters. 1995. Endangered ecosystems: a status report on America's vanishing habitat and wildlife. Defenders of Wildlife, Wash. D.C. 132 pp.



Mr. Tom Carroll

Page 2

July 26, 1996

Finally, appropriate conservation strategies (conservation easements, education, acquisition, restoration, etc.) will be proposed for each ecosystem type. You may recall assisting us in a similar manner last year regarding the quantification of wetlands on your facility for preparation of the State Wetland Conservation Plan.

We request you provide plant community occurrence and condition data relative to your facility in the format outlined in the attachments. The assessment for which we are asking your cooperation uses standardized Series level plant community types so the data will be comparable across all agency and administrative boundaries. For portions of your facility not represented by Natural Plant Communities (disturbance areas, cropland, development, non-vegetated areas) an inventory mechanism is also provided.

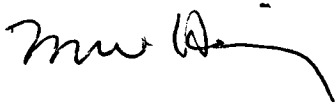
All data will be incorporated into "Access" database software for further analysis. An example report is furnished to describe how the data you provide might be used. In the example, occurrence on TPWD facilities is compiled with other attributes such as threat, distribution, conservation rank, and vegetation condition to generate a conservation rank index, a tool to be used for developing conservation priorities. Of course, we intend to share all findings with contributors.

We realize this request for information represents a substantial commitment of staff time for you, the contributor. However, the information is vital to our collective understanding of Texas' diverse natural heritage and will enable us to marshal our organizational resources to provide the highest level of ecosystem stewardship on conservation lands possible.

We request this information be provided by October 1, 1996. Please contact Jack Bauer (512-389-4911) or David Riskind (512-389-4897) to indicate whether or not you can participate in this request. We would like for you, at the minimum, to designate a primary staff contact for your organization. TPWD is willing to assist you in completing this ecosystem survey. Any questions you may have should be directed to these individuals.

We greatly need and appreciate your assistance in this effort.

Sincerely,



Mike Herring
Acting Public Lands Division Director

MH:JB:sh

Date: Tue, 23 Jul 1996 08:40:23 -0400
From: Gerald_McCrea@nps.gov (Gerald McCrea)
Subject: Draft correspondence
To: david.riskind@access.texas.gov
Content-Type: text/basic; name="TEXAS.TXT"
Content-Transfer-Encoding: 7bit
Content-Description: MS-DOS text file

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N1617(SWSO-PNS)

Mr. Mike Herring
Acting Public Lands Division Director
Texas Parks and Wildlife Department
4200 Smith School Road
Austin, Texas 78744

Dear Mr. Herring,

This letter is a follow up on your correspondence dated July 9, 1996, which was addressed to Ms. Stella Gonzales. The subject was the inventory of natural plant communities. Thank you for the opportunity to participate in this important effort!

In Santa Fe, our knowledge of the Texas parks' flora is not detailed enough to enable us to readily assist you. The most effective way for you to acquire this information would be for you to contact the parks directly.

To assist you in this effort, we have prepared an enclosure which contains the addresses of all the Texas units of the National Park System, with the exception of Chamizal National Memorial. This park is an urban park in downtown El Paso.

Should you have any questions, please feel free to call our biologist, Jerry McCrea, at (505) 988-6829.

Jerry Rogers
Superintendent
Southwest System Support Office

cc:
Nancy Skinner, SWSO-PNS, w/cy encl.

GMcCrea:dh:18July1996:PNS File: I&M\TEXAS DRAFT

DRAFT

DRAFT

TEXAS UNITS OF THE NATIONAL PARK SYSTEM

1. Mr. Bill Laitner
Superintendent

Amistad National Recreation Area
HCR 3, Box 5J
Del Rio, Texas 78840-9350

2. Mr. Jose Cisneros
Superintendent
Big Bend National Park
P.O. Box 129
Big Bend NP, Texas 79834-0129

(This superintendent also manages the Rio Grande Wild and Scenic River, but there is no federal acreage involved.)

3. Mr. Pete Peterson
Superintendent
Big Thicket National Preserve
3785 Milam
Beaumont, Texas 77701

4. Mr. Jerry Yarbrough
Superintendent
Fort Davis National Historic Site
P.O. Box 1456
Fort Davis, Texas 79734

5. Mr. Larry Henderson
Superintendent
Guadalupe Mountains National Park
HC 60, Box 400
Salt Flat, Texas 79847-9400

6. Mr. John Benjamin
Superintendent
Lake Meredith National Recreation Area and
Alibates Flint Quarries National Monument
P.O. Box 1438
Fritch, Texas 79036

7. Ms. Leslie Starr Hart
Superintendent
Lyndon B. Johnson National Historical Park
P.O. Box 329
Johnson City, Texas 78636

DRAFT DRAFT DRAFT

8. Mr. Pat McCrary
Superintendent
Padre Island National Seashore
9405 S. Padre Island Dr.
Corpus Christi, Texas 78418

9. Mr. Tom Carroll
Superintendent
Palo Alto Battlefield National Historic Site
1623 Central Blvd. #213
Brownsville, Texas 78520-8326

(At this time, this park has no federal acreage.)

10. Mr. Steve Whitesell
Superintendent

San Antonio Missions National Historical Park
2202 Roosevelt Ave.
San Antonio, Texas 78210-4919



02 AUG 1996

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TEXAS
PARKS AND WILDLIFE DEPARTMENT
4200 Smith School Road • Austin, Texas 78744 • 512-389-4800

ANDREW SANSON
Executive Director

July 31, 1996

Mr. Tom Carroll, Superintendent
Palo Alto Battlefield Nat. Hist. Site
1623 Central Blvd. #213
Brownsville, TX 78520-8326

Dear Sir:

In reference to Mike Herring's July 26, 1996 letter to you regarding our request for national resource information pertaining to facilities you manage, please discard the attachment that was provided and substitute the enclosed attachment.

I apologize for any inconvenience this may cause.

Sincerely,

A handwritten signature in cursive script that reads "Shirley A. Hoes".

Shirley A. Hoes
Administrative Support

Enclosure



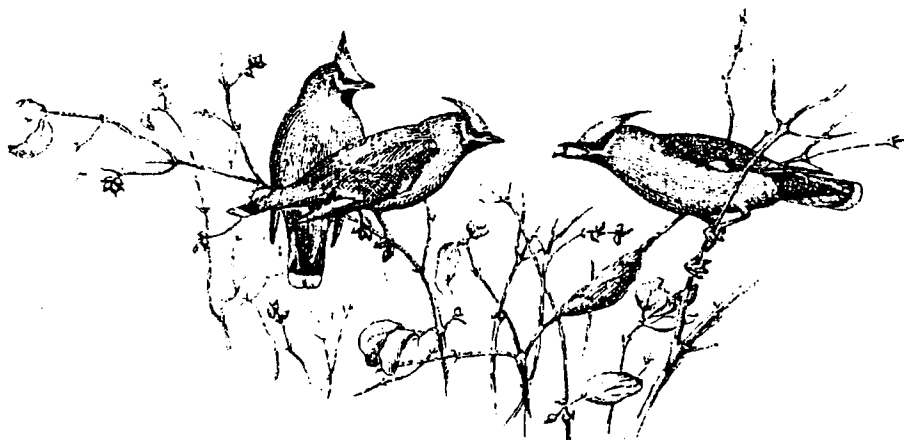
Priorities for Land Conservation Project

Purpose

To gather information for the development of a protocol for the determination of native Texas ecosystems in greatest need of conservation, and for prioritization of the systems within the Public Domain in order of need. This project represents a priority for the Texas Parks and Wildlife Commission.

Instructions

Complete the attached "Vegetation Cover Type Data Sheet" using, as a guide, the enclosed sample data sheet and selection criteria found in Attachments A, B, & C. Please attempt to categorize the vegetation at your facility consistent with that described within these attachments in order to realize the highest degree of consistency of data across all facilities. Please include information relative to the amount of development existing on each facility and identify plant communities under restoration as shown in Attachment B. A Schematic of Texas Ecological Regions is provided for your use.



Vegetation Cover Type Data Sheet

(Priorities for Land Conservation Project)

page ____ of ____ pages

Facility Size (acres): 1000

Facility Name: Bluebird State Park

Evaluator: evaluator or contact person

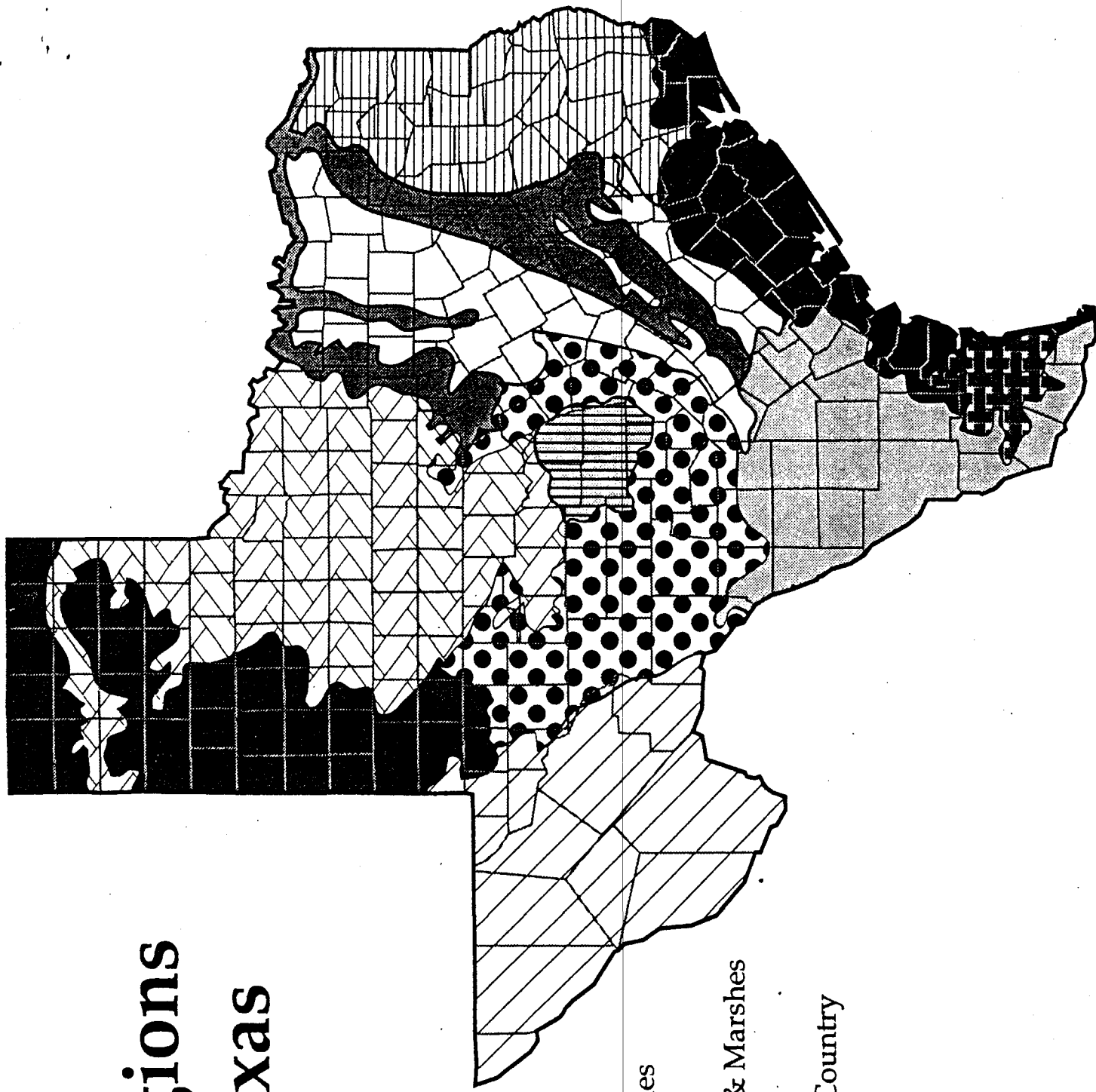
Ecoregion: Trans Pecos (see Ecoregion map)

County: Brewster & Presidio

Phone #: _____

Major Occurring Plant Communities	Vegetation Class Description	Vegetation Condition	% of Facility Represented with this Plant Community	Facility Acres Represented with this Plant Community
(Identify Major Plant Community Series from Attachment A	Sample	(Select Excellent, Good, Fair, or Poor based on conditions in descriptions in Attachment C)		(Convert to facility acres by multiplying the percent of coverage times the Facility Size)
or				
Describe occurring vegetation by listing dominant plant species)	(Select the most appropriate vegetation Class from Attachment B)		(Estimate the percent of the facilities' landscape that is represented by this major plant community)	
<i>Example:</i>				
N/A (park facilities)	Development	N/A	10	100
Baccharis-King Ranch bluestem	Old Field (medium grassland)	Fair	20	200
Alkali Sacaton-Fourwing Saltbrush	Evergreen Shrubland	excellent	25	250
Blue Grama-Buffalograss	Short Grassland	good	40	400
Cottonwood-Willow	Deciduous Forest (R) (riparian restoration)	poor	5	50

-  Piney Woods
-  Oak Woods & Prairies
-  Blackland Prairie
-  Gulf Coast Prairies & Marshes
-  Coastal Sand Plain
-  South Texas Brush Country
-  Edwards Plateau
-  Rolling Plains
-  High Plains
-  Trans Pecos
-  Llano Uplift



Attachment A
Priorities for Land Conservation Project

PLANT COMMUNITIES OF TEXAS (SERIES LEVEL)
Texas Natural Heritage Program, April 1993

Alkali Sacaton-Fourwing Saltbush Series (G4S3)

(Sporobolus airoides-Atriplex canescens)

This grassland or shrubland community type occurs primarily over saline soils in the Trans-Pecos, High Plains, and South Texas Plains. Composition varies with salinity, water relations, and disturbance. Important species include frankenia (Frankenia jamesii), alkali muhly (Muhlenbergia asperifolia), and saltgrass (Distichlis spicata). The community may grade into the mesquite-fourwing saltbush (Prosopis glandulosa-Atriplex), tobosa (Hilaria mutica), or various desert shrubland series on drier, less saline soils. On wetter or more saline soils this type may form landscape mosaics with the saltgrass-Olney bulrush (Distichlis spicata-Scirpus olneyi) and pickleweed-seepweed (Allenrolfea occidentalis-Suaeda spp.) series. The big alkali sacaton (Sporobolus wrightii) series, which is mainly restricted to the area near the mouth of the Rio Grande, is a closely related grassland.

American Beech-Southern Magnolia Series (G3S2)

(Fagus grandifolia-Magnolia grandiflora)

This forest community type is restricted to the southern portion of the East Texas Pineywoods. Soils are usually well drained but mesic, and the topography is often rolling. The topographic position is generally a mesic slope or shallow creek bottom. Loblolly pine (Pinus taeda), American holly (Ilex opaca), laurel oak (Quercus laurifolia), sweetgum (Liquidambar styraciflua), and white oak (Quercus alba) are often present. Upslope this type often grades into pine-oak communities, while downslope it usually grades into oak-dominated bottomlands or seepy creek bottoms with sweetbay magnolia (Magnolia virginiana).

American Beech-White Oak Series (G3S2)

(Fagus grandifolia-Quercus alba)

This mesic, calciphilic forest occupies ravines and ridges within creek bottoms, mostly in southeast Texas. Acid-loving species such as southern magnolia (Magnolia grandiflora) are absent, and a rich vernal calciphilic forest floor flora is present. Representative species include bigleaf snowbells (Styrax grandifolia), bluestem goldenrod (Solidago caesia), and chalk maple (Acer leucoderme). This type may grade into the sweetbay magnolia (Magnolia virginiana) series downslope in mesic canyons, and into oak or oak-pine forests upslope.

Apache-plume Series (G4S4)

(Fallugia paradoxa)

This deciduous shrubland occurs primarily along arroyos in the Trans-Pecos. Soils and drainage are variable, and composition varies with these plus elevation and cultural influences. Components include splitleaf brickellbush (Brickellia laciniata), granjeno (Celtis pallida), desert willow (Chilopsis linearis), catclaw acacia (Acacia greggii), mesquite (Prosopis glandulosa), and sumac (Rhus microphylla, R. virens). It is intermixed on the landscape with other desert shrubland and grassland communities.

Ashe Juniper-Oak Series (G4S4)

(Juniperus ashei-Quercus spp.)

This evergreen shrubland or woodland primarily inhabits shallow-soiled, sloping sites over limestone in the Edwards Plateau. Disturbed areas over deeper soils on flat uplands may also support this community. It circumscribes a fairly wide degree of variation, and on dry sites may form an open shrubland with midgrasses and xeromorphic shrubs or may form closed canopy woodlands or low forest on more favorable sites. Texas, scalybark, scrub, and plateau live oaks (Quercus buckleyi, Q. sinuata var. breviloba, Q. pungens, Q. fusiformis) along with evergreen sumac (Rhus virens) and agarito (Berberis trifoliolata) are components. To the west and north this type may grade into the redberry (Pinchot) juniper (Juniperus pinchotii)-midgrass series. This community type forms landscape mosaics with plateau live oak woodland and grasslands on uplands and deciduous oak woodlands on adjacent mesic slopes.

Baldcypress-Sycamore Series (G3S3)

(Taxodium distichum-Platanus occidentalis)

This mainly deciduous forest occurs as gallery forests along narrow floodplains and channels of perennial streams, primarily along the southern and southeastern margins of the Edwards Plateau, but also forms a gallery along streams to the south and east. Texas or Lacey oak (Quercus buckleyi, Q. laceyi) deciduous woodlands and evergreen Ashe juniper (Juniperus ashei) woodlands often inhabit the same canyons.

Baldcypress-Water Tupelo Series (G4S3)

(Taxodium distichum-Nyssa aquatica)

This deciduous swamp forest occupies hydric soils in east Texas. Composition depends on depth and duration of flooding and on past disturbance, with water tupelo often present in the deepest water or in cut-over swamp, and species such as blackgum (Nyssa sylvatica), overcup oak (Quercus lyrata), water hickory (Carya aquatica), and ash (Fraxinus caroliniana, F. pensylvanica) present in shallow or less frequently

flooded areas. Minor elevational differences can cause marked variation in depth and frequency of flooding, and hence vegetation. Oak-dominated bottomland hardwood communities and shrub swamps may interdigitate with this type.

Big Sacaton Series (G4S3)

(Sporobolus wrightii)

This tall, saline grassland or marsh series is best represented north of the mouth of the Rio Grande in Cameron County. It forms a mosaic with loma thorn shrublands within the Texas ebony-snake-eyes (Pithecellobium flexicaule-Phaulothamnus spinescens) series, tidal flats in the glasswort-saltwort (Salicornia bigelovii/S. virginica-Batis maritima) series, and cordgrass (Spartina spartinae, S. patens) marshes. Seacoast bluestem (Schizachyrium scoparium var. littoralis) and Paspalum species may be components. Cordgrass marshes or herb dominated communities may occur on wetter, more saline soils seaward of this community type, and it forms landscape mosaics with subtropical shrublands on lomas in the Lower Rio Grande Valley.

Bigtooth Maple-Oak Series (G4S2)

(Acer grandidentatum-Quercus spp.)

This deciduous forest is isolated in mesic canyon bottoms of the southern Edwards Plateau and mountains of the Trans-Pecos. Bigtooth maple is often mono-dominant. Associated species vary with geographic location, with Lacey oak (Quercus laceyi), chinkapin oak (Quercus muhlenbergii), Texas oak (Quercus buckleyi), Ashe juniper (Juniperus ashei), and black cherry (Prunus serotina subsp. eximia) important on the Edwards Plateau, and gray oak (Quercus grisea), one-seed juniper (Juniperus monosperma), alligator juniper (Juniperus deppeana), pinyon pine (Pinus edulis), Chisos red oak (Quercus gravesii), and Texas madrone (Arbutus xalapensis) present in the Chisos Mountains. Adjacent slopes are usually oak-juniper dominated.

Black Mangrove Series (G5S2)

(Avicennia germinans)

This salt swamp series is limited to stands along the Gulf coast, from Galveston Bay to the Rio Grande. Even in the far south, mangrove is subject to periodic die-back because of freezing temperatures. The community type is pantropical, extending worldwide from 30° N to 30° S latitude. It is intermixed with the smooth cordgrass (Spartina alterniflora) and the glasswort-saltwort (Salicornia bigelovii/S. virginica-Batis maritima) series.

Blackbrush Series (G5S5)

(Acacia rigidula)

This shrubland occupies uplands, primarily over shallow soils, in the South Texas Plains. A variety of shrubs may be important, depending on soils, slope, and cultural influences. Mesquite (Prosopis glandulosa), guajillo (Acacia berlandieri), granjeno (Celtis pallida), lotebush (Ziziphus obtusifolia), Acacia spp., and other species may be present. This series is intermixed with the guajillo, mesquite-granjeno, and cane bluestem-false rhodesgrass (Bothriochloa barbinodis-Chloris pluriflora) series, and grades into subtropical ebony-dominated (Pithecellobium flexicaule) shrublands in the lower Rio Grande Valley.

Blue Grama-Buffalograss Series (G4S3)

(Bouteloua gracilis-Buchloe dactyloides)

This shortgrass grassland occupies typical upland soils, primarily in the central and northern High Plains, but also the Trans-Pecos and Rolling Plains. Mesquite (Prosopis glandulosa) is often a component, along with a variety of mid- and short grasses such as sideoats grama (Bouteloua curtipendula), sand dropseed (Sporobolus cryptandrus), and Aristida spp. This community type grades into midgrass communities on more mesic sites.

Bluejack Oak-Pine Series (G4S2)

(Quercus incana-Pinus spp.)

This mainly deciduous woodland usually occupies island-like patches or ridges of deep, sandy soils in east Texas. Longleaf pine (Pinus palustris) and shortleaf pine (Pinus echinata) are important in the south and east, but longleaf pine is not a component in the north and west. Other common components include southern red oak (Quercus falcata), post oak (Quercus stellata), blackjack oak (Quercus marilandica), black hickory (Carya texana), farkleberry (Vaccinium arboreum), gum bumelia (Bumelia lanuginosa), and yaupon (Ilex vomitoria). Surrounding upland woodlands and forests on heavier textured soils are oak-hickory or oak-pine dominated.

Buttonbush Series (G4S4)

(Cephalanthus occidentalis)

This shrub swamp occurs primarily in the eastern half of Texas. Composition varies with flooding regime and location, and black willow (Salix nigra), ash (Fraxinus pensylvanica, F. caroliniana), smooth alder (Alnus serrulata), swamp privet (Forestiera acuminata), and baldcypress (Taxodium distichum) may be present. This type often intermixes with marsh types and grades into the water elm-swamp privet (Planera aquatica-Forestiera acuminata) series in southeast Texas.

Cane Bluestem-False Rhodesgrass Series (G3S3)

(Bothriochloa barbinodis-Chloris pluriflora)

This midgrass grassland once occupied uplands in the South Texas Plains, but overgrazing and brush clearing have almost eliminated the type. Gramas (Bouteloua spp.), bristlegrass (Setaria spp.), pink pappusgrass (Pappophorum bicolor), buffalograss (Buchloe dactyloides), and curlymesquite (Hilaria belangeri) are components on better quality rangeland. Most of this community type is now dominated by shrubs such as mesquite (Prosopis glandulosa), prickly pear (Opuntia spp.), huisache (Acacia smallii), and blackbrush (Acacia rigidula) or has been converted to cropland or tame pasture.

Ceniza Series (G4S4)

(Leucophyllum frutescens)

This shrubland occurs over shallow soils on hills near the Rio Grande, on the Stockton Plateau, and on the South Texas Plains. A variety of shrubs including Calliandra conferta, guajillo (Acacia berlandieri), blackbrush (Acacia rigidula), and lotebush (Ziziphus obtusifolia) may be present. This community type usually grades into blackbrush, guajillo, or mesquite (Prosopis glandulosa) dominated shrubland.

Coastal Live Oak-Pecan Series (G3S3)

(Quercus virginiana-Carya illinoensis)

This mainly evergreen to mainly deciduous upland woodland is restricted to the eastern half of the Upper Coastal Prairie, usually over heavy textured, neutral or basic soils. Sugarberry (Celtis laevigata), post oak (Quercus stellata), and cedar elm (Ulmus alata) may occur in the overstory, while yaupon (Ilex vomitoria) and hawthorn (Crataegus spp.) are important in the understory. More mesic sites along river floodplains are in the water oak-coastal live oak (Quercus nigra-Q. virginiana) series, while adjacent acid, clay pan soils are often in the coastal live oak-post oak (Q. virginiana-Q. stellata) series.

Coastal Live Oak-Post Oak Series (G4S4)

(Quercus virginiana-Quercus stellata)

This mainly deciduous to mainly evergreen upland woodland occupies acid, sandy, usually clay pan soils along the northern rim of the Coastal Prairie and the far southwestern Post Oak Savannah. Blackjack Oak (Quercus marilandica), Crataegus spp., yaupon (Ilex vomitoria), and grasses such as little bluestem (Schizachyrium scoparium) and brownseed paspalum (Paspalum plicatulum) may be important. Composition ranges from mostly live oak to mainly post oak and blackjack oak with scattered live oak. Adjacent communities include water oak (Quercus nigra)-live oak on river floodplains, live oak-pecan (Carya

illinoensis) over clayey soils, and little bluestem-brownseed paspalum (Schizachyrium scoparium-Paspalum plicatulum) on adjacent grasslands.

Coastal Live Oak-Redbay Series (G3S3)

(Quercus virginiana-Persea borbonia)

This evergreen/deciduous woodland occupies deep often hummocky sands mostly on the Ingleside Barrier along the Texas Gulf Coastal Bend. Live oak is the most important canopy species, with redbay, coastal laurel oak (Quercus hemisphaerica), American beautyberry (Callicarpa americana), and yaupon (Ilex vomitoria) common in the shrub layer. In some areas the overstory is absent and rhizomatous oaks form dense thickets, and waxmyrtle (Myrica cerifera) is often present in poorly drained areas. Important components of associated grasslands include little bluestem (Schizachyrium scoparium), brownseed paspalum (Paspalum plicatulum), big bluestem (Andropogon gerardii), and Indiangrass (Sorghastrum nutans), with gulfdune paspalum (Paspalum monostachyum) important in swales.

Coastal Live Oak-Sugarberry Series (G3S3)

(Quercus virginiana-Celtis laevigata)

This essentially maritime woodland or forest generally occurs along the upper Gulf coast, including chenier woodlands east of Galveston Bay. Composition varies with soil texture and geographic distribution, with yaupon (Ilex vomitoria), cedar elm (Ulmus crassifolia), ash (Fraxinus spp.), and redbay (Persea borbonia), variously present. Little bluestem (Schizachyrium scoparium) grasslands are often intermixed with this series, and it is closely related to the coastal live oak-pecan series, which is restricted to the Upper Coastal Prairie.

Cottonwood-Tallgrass Series (G2S2)

(Populus deltoides)

This tallgrass community type inhabits sub-irrigated creek bottoms and swales, usually between dunes, in the panhandle of Texas. Big bluestem (Andropogon gerardii), switchgrass (Panicum virgatum), gamagrass (Tripsacum dactyloides), Indiangrass (Sorghastrum nutans), and alkali sacaton (Sporobolus airoides) are variously important. Seeps and marshes may be included, and surrounding dunes are Havard shin oak (Quercus havardii)-little bluestem or sandsage (Artemisia filifolia)-midgrass grasslands or shrublands.

Cottonwood-Willow Series (G3S3)

(Populus sp.-Salix sp.)

This deciduous forest community type once occupied the floodplains of perennial streams in the Trans-Pecos, but has mostly been replaced by

disturbance types. Taxonomic nomenclature of cottonwood and willow species is uncertain, but taxa now or formerly referred to as Fremont cottonwood (Populus fremontii) and Goodding willow (Salix gooddingii) are important, as well as Rio Grande cottonwood (Populus wislizenii) and other willow species (Salix lasiolepis, S. exigua, S. amygdaloides). Berlandier ash (Fraxinus berlandieri), netleaf hackberry (Celtis reticulata), and little walnut (Juglans microcarpa) are often present. This series is similar to the velvet ash (Fraxinus velutina)-Goodding willow series found in mesic Trans-Pecos mountain canyons.

Creosotebush-Mariola Series (G5S5)

(Larrea tridentata-Parthenium incanum)

This desert shrubland inhabits low elevations (3500 ft) in the Chihuahuan Desert in the Trans-Pecos. Tarbush (Florensia cernua), whitethorn acacia (Acacia neovernicosa, A. constricta), mesquite (Prosopis glandulosa), lechuguilla (Agave lechuguilla), granjeno (Celtis pallida), cacti, and short grasses such as chino and black grama (Bouteloua breviseta, B. eriopoda) may be present. This community is intermixed with other desert shrubland and grassland communities.

Creosotebush Series (G5S5)

(Larrea tridentata)

This xeromorphic shrubland inhabits low elevation (below 3500 ft), flats in the Trans-Pecos. It is also a widespread disturbance type that has spread into former desert grasslands and mixed shrublands. Important species may include mariola (Parthenium incanum), fourwing saltbush (Atriplex canescens), tarbush (Florensia cernua), cacti, and Acacia spp., although many areas contain few additional species. The community type is intermixed with other desert shrublands.

Curlymesquite-Sideoats Grama Series (G3S3)

(Hilaria belangeri-Bouteloua curtipendula)

This midgrass grassland inhabits typical upland soils of the central and western Edwards Plateau. Curlymesquite may also dominate grazed grasslands throughout the Edwards Plateau. Woody species, including plateau live oak (Quercus virginiana), Ashe juniper (Juniperus ashei), and scalybark oak (Quercus sinuata var. breviloba) are often components along with a variety of grasses such as tridens (Tridens albescens, T. muticus), seep muhly (Muhlenbergia reverchonii), little bluestem (Schizachyrium scoparium), and Texas cupgrass (Eriochloa sericea). This community type is intermixed with the plateau live oak-midgrass and Ashe juniper-oak series, and grasslands on wetter sites or to the

west are dominated by little bluestem.

Douglas Fir-Pine Series (G4S1)

(Pseudotsuga menziesii-Pinus spp.)

This evergreen forest is restricted to high elevations in the Guadalupe and Chisos Mountains of the Trans-Pecos. Important components include ponderosa pine (Pinus ponderosa), southwestern white pine (Pinus strobiformis - Guadalupe), and Arizona cypress (Cupressus arizonica - Chisos). It is a common Rocky Mountain community type, and downslope grades into the ponderosa pine (Pinus ponderosa) series.

Emory Oak Series (G4S4)

(Quercus emoryi)

This semi-evergreen woodland is found at moderate elevations (4500-5500) in the Trans-Pecos mountains, especially over alluvial soils in mountain valleys. Gray oak (Quercus grisea) is a component on drier sites, while more mesic adapted species such as Chisos red oak (Quercus gravesii), Chisos oak (Quercus graciliformis; Chisos Mountains), and bigtooth maple (Acer grandidentatum) may be present on sub-irrigated sites. Junipers (Juniperus deppeana, J. pinchotii) may also be important. This type is intermixed with mid-grass grassland in the New Mexico little bluestem series (Schizachyrium scoparium var. neomexicana) or the black grama-sideoats grama (Bouteloua eriopoda-B. curtipendula) series, and adjacent steep mountain slopes are often in the pinyon-oak (Pinus cembroides/P. edulis-Quercus spp.) series.

Gamagrass-Switchgrass Series (G2S1)

(Tripsacum dactyloides-Panicum virgatum)

This tallgrass grassland is found primarily in lowlands or poorly-drained uplands over clayey soils in the Blackland, Fayette, and Upper Coastal Prairies. Indiangrass (Sorghastrum nutans), little bluestem (Schizachyrium scoparium), tall dropseed (Sporobolus asper), heath aster (Aster ericoides), Maximilian sunflower (Helianthus maximiliani), and other grasses and forbs may be important. This type occurs as isolated remnants, often surrounded by cropland.

Glasswort-Saltwort Series (G4S4)

(Salicornia bigelovii/S. virginica-Batis maritima)

This open herb dominated community type occupies alternately wet and dry, saline soils, often of wind tidal flats along the Gulf Coast. Important species may include shoregrass (Monanthochloe littoralis), camphor daisy (Machaeranthera phyllocephala), sea ox-eye daisy (Borrchia frutescens), seepweed (Suaeda spp.), cenicilla (beach purslane, Sesuvium portulacastrum), and seashore dropseed (Sporobolus virginicus). This community type forms mosaics with cordgrass

(Spartina alterniflora, S. patens, S. spartinae) and saltgrass (Distichlis spicata) marshes along the Gulf coast.

Gray Oak-Oak Series (G4S4)

(Quercus grisea)

This mainly deciduous oak woodland is restricted to a few locations in relatively mesic canyons of the mountains in the southern Trans-Pecos. Chisos red oak (Quercus gravesii), Mexican blue oak (Q. oblongifolia), Mexican pinyon pine (Pinus cembroides), and Juniperus spp. may be present. As defined, this type is similar to the pinyon pine-oak series, but is more strongly dominated by oaks rather than pine and juniper.

Guajillo Series (G5S5)

(Acacia berlandieri)

This deciduous shrubland occupies rocky slopes and is also a widespread disturbance type of the South Texas Plains and the Stockton Plateau. Composition varies with soils, slope, and past history, with blackbrush (Acacia rigidula), ceniza (Leucophyllum frutescens), lotebush (Ziziphus obtusifolia), mesquite (Prosopis glandulosa), twisted acacia (Acacia schaffneri), and a variety of additional shrub species variously important. This type is intermixed with the blackbrush series and other shrublands on the South Texas Plains.

Gulf Cordgrass Series (G4S4)

(Spartina spartinae)

This fresh to slightly salty marsh occurs along the gulf coast, in the Coastal Sand Plain, and is also isolated inland. Composition varies with salinity and drainage, and sedges, seacoast bluestem (Schizachyrium scoparium var. littoralis), switchgrass (Panicum virgatum), bushy bluestem (Andropogon glomeratus), bristlegrass (Setaria spp.), and other grasses are intermixed. This series grades into upland little bluestem-brownseed paspalum (Schizachyrium scoparium-Paspalum plicatulum) grassland or, over sandy soils, seacoast bluestem-gulfdune paspalum (Paspalum monostachyum) grassland, and into salty marsh with marshhay cordgrass (Spartina patens) and saltgrass (Distichlis spicata) downslope.

Havard Shin Oak-Tallgrass Series (G3S3)

(Quercus havardii)

This broadly-defined, mainly evergreen shrubland or tall grassland is isolated on stabilized dunes in the Panhandle, High Plains, and far northeastern Trans-Pecos (Monahans-Kermit Sand Hills). Composition varies with precipitation and with the depth and degree of stabilization of the dunes. In the Trans-Pecos large areas of

degraded sand sheet are dominated by nearly continuous stands of Havard shin oak (Quercus havardii), while a few areas of open, destabilized dunes are present. To the north large areas of open grassland with scattered patches of oaks occur. Little bluestem (Schizachyrium scoparium), sand bluestem (Andropogon gerardii var. chrysocomus), switchgrass (Panicum virgatum), sand and giant dropseed (Sporobolus cryptandrus, S. giganteus), giant sandreed (Calamovilfa gigantea), three-awns (Aristida spp.), plains yucca (Yucca campestris), mesquite (Prosopis glandulosa), sumac (Rhus spp.), plum (Prunus spp.), and sandsage (Artemisia filifolia) may be present. Interdunal drainages may support tallgrass meadows in the northern Panhandle.

Lacey Oak Series (G3S3)

(Quercus laceyi)

This deciduous woodland occupies canyon slopes in the southern, especially the southwestern, Edwards Plateau (Balcones Canyonlands). Texas oak (Quercus buckleyi), cedar elm (Ulmus crassifolia), chinkapin oak (Quercus muhlenbergii), live oak (Quercus fusiformis), and Ashe juniper (Juniperus ashei) are often important. Baldcypress (Taxodium distichum) dominated streams may occur in the same canyons and Ashe juniper evergreen woodlands occupy adjacent dry slopes. This community type is similar to the Texas oak series, which occupies similar habitats to the east.

Lechuguilla-Sotol Series (G4S4)

(Agave lechuguilla-Dasyllirion leiophyllum)

This succulent xeromorphic (desert) shrubland inhabits slopes, usually with shallow, rocky soils at low to moderate elevations (below 4500 ft) in the Trans-Pecos. Grasses such as chino grama (Bouteloua breviseta), black grama (B. eriopoda), sideoats grama (B. curtipendula), Warnock grama (B. warnockii), and tobosa (Hilaria mutica) are plentiful, as are a variety of desert shrubs. This type may grade into semi-desert grassland upslope and other desert shrublands downslope.

Little Bluestem-Brownseed Paspalum Series (G2S2)

(Schizachyrium scoparium-Paspalum plicatulum)

This tallgrass grassland occupies uplands of the Coastal Prairie and loamy soils of the Fayette Prairie. Indiangrass (Sorghastrum nutans), tall dropseed (Sporobolus asper), bristlegrasses (Setaria spp.), big bluestem (Andropogon gerardii), hairyawn muhly (Muhlenbergia capillaris), fimbry (Fimbristylis puberula), and a variety of forbs and sedges may be important. To the north similar habitats are occupied by Blackland Prairie tallgrass communities, while gulfward the type contacts coastal marshes, especially the gulf cordgrass (Spartina spartinae) series.

Little Bluestem-Indiangrass Series (G2S2)

(Schizachyrium scoparium-Sorghastrum nutans)

This broadly defined upland tallgrass grassland once occurred throughout the Blackland, Fayette, and Grand Prairies, but is now restricted to small, isolated relicts. Composition of secondary species varies rather distinctly with soil type (clayey Vertisols versus loamy Alfisols). Tall dropseed (Sporobolus asper), big bluestem (Andropogon gerardii), sideoats grama (Bouteloua curtipendula), fimbry (Fimbristylis puberula), Carex microdonta, Florida paspalum (Paspalum floridanum), and other grasses and sedges may be important, along with a variety of forbs such as Maximilian sunflower (Helianthus maximiliani), heath aster (Aster ericoides), and Mexican hat (Ratibida columnaris). Bottomlands of the prairies are wooded or support a gamagrass-switchgrass (Tripsacum dactyloides-Panicum virgatum) community type.

Little Bluestem-Nuttall's Rayless Goldenrod Series (G3S3)

(Schizachyrium scoparium-Bigelowia nuttallii)

This open grassland or forb-dominated barren community type is restricted to flat, shallow-soil areas, especially of the tuffaceous member of the Catahoula Formation in the southern portion of the East Texas Pineywoods and Post Oak Savannah. The shallow, nutrient poor soils and fluctuating extractable water suggest that these are sites distinguished by stressful environmental conditions. Juxtaposition of xeric-adapted plants and plants adapted to seasonally saturated soils is indicative of the specialized barrens habitat. Important herbaceous species may include Silveus dropseed (Sporobolus silveanus), Kearney three-awn (Aristida longespica), and narrow-leaf rushfoil (Crotonopsis linearis); cladonia lichens (Cladonia spp.) also are common components. Barrens are often interspersed within deciduous woodlands within the post oak-black hickory (Quercus stellata-Carya texana) series, or occur below hillside seepage-bogs (Sphagnum-beakrush series) or within dry longleaf pine savannas (longleaf pine-little bluestem series).

Loblolly Pine-Oak Series (G4S4)

(Pinus taeda-Quercus spp.)

This upland, mainly deciduous forest occurs primarily over sandy or loamy, low Ph soils in east Texas. Some combination of post, southern red, white, and water oaks (Quercus stellata, Q. falcata, Q. alba, Q. nigra) and other hardwoods is dominant in old growth communities along with loblolly and shortleaf pines (Pinus taeda, P. echinata) and hickories (Carya spp.). Understory species include flowering dogwood (Cornus florida), yaupon (Ilex vomitoria), wax-myrtle (Myrica cerifera), and American beautyberry (Callicarpa americana). This community type is wide-ranging, often occurs as a second growth or

disturbance type after logging, and thus is highly variable. To the south it grades toward longleaf pine (Pinus palustris) types, on mesic sites to various hardwood types, and to the north or on deep, sandy soils, to shortleaf pine or bluejack oak types.

Longleaf Pine-Beakrush Series (G3S2)

(Pinus palustris-Rhynchospora spp.)

This poorly drained, mainly evergreen woodland once occupied the southern extension of longleaf pine communities in southeast Texas, primarily over the Montgomery Formation. Under a frequent burning regime, herbaceous vegetation forms the matrix for scattered pines. Important species include beakrushes (Rhynchospora plumosa, R. gracilentia, R. globularis), sedges (Fimbristylis spp., Scleria spp.), yellow-eyed grass (Xyris spp.), and grasses (Panicum virgatum, Schizachyrium spp., Panicum spp., Paspalum spp.). Shrub and tree density generally increases as the frequency of fire decreases, with species such as blackgum (Nyssa sylvatica), wax-myrtle (Myrica cerifera), sweetgum (Liquidambar styraciflua), and yaupon (Ilex vomitoria) important. This type may support inclusions of evergreen forest (sweetbay magnolia series) and swamp, and to the north grades into upland longleaf pine communities over the Bentley formation.

Longleaf Pine-Little Bluestem Series (G3S2)

(Pinus palustris-Schizachyrium scoparium)

This upland, mainly evergreen woodland occurs in southeast Texas, primarily over loamy or sandy, low pH soils. Loblolly and shortleaf pines (Pinus taeda, P. echinata) and species such as bluejack, blackjack, post, and southern red oaks (Quercus incana, Q. marilandica, Q. stellata, Q. falcata) and sweetgum (Liquidambar styraciflua) may occur in the overstory. The shrub layer may contain flowering dogwood (Cornus florida), American beautyberry (Callicarpa americana), wax-myrtle (Myrica cerifera), farkleberry (Vaccinium arboreum), and deerberry (Vaccinium stamineum). The well developed herbaceous layer contains grasses such as little bluestem (Schizachyrium scoparium), slender bluestem (Schizachyrium tenerum), pineywoods dropseed (Sporobolus junceus), Carolina jointtail (Coelorachis cylindrica), switchgrass (Panicum virgatum), Panicum spp., Paspalum spp., sedges (Carex spp., Rhynchospora spp., Scleria spp., Fimbristylis spp.), and yellow-eyed grass (Xyris spp.) To the south this type generally grades into the longleaf pine-beakrush series, on xeric sands into the bluejack oak-pine series, and on more mesic soils to pine-oak or American beech (Fagus grandifolia) dominated communities.

Marshhay Cordgrass Series (G4S4)

(Spartina patens)

This brackish marsh forms a discontinuous landward ring along the Gulf of Mexico. Saltgrass (Distichlis spicata), Paspalum spp., and bulrushes (Scirpus spp.) are common components. The type often forms landscape mosaics with saltgrass, smooth cordgrass (Spartina alterniflora), and gulf cordgrass (Spartina spartinae) marshes.

Mesquite-Granjeno Series (G5S5)

(Prosopis glandulosa-Celtis pallida)

This deciduous woodland occurs primarily in the South Texas Plains, and is related to disturbance woodlands throughout the western Edwards Plateau and Rolling Plains. Important species include lotebush (Ziziphus obtusifolia), prickly pear (Opuntia spp.), brasil (Condalia hookeri), colima (Zanthoxylum fagara), catclaw acacia (Acacia greggii), huisache (Acacia smallii), and Acacia spp. Disturbance types similar to this include mesquite-juniper communities prominent on the western and central Edwards Plateau and on shallow-soiled slopes in the Rolling Plains, and mesquite-lotebush types common in the Rolling Plains. This type may grade into blackbrush (Acacia rigidula), guajillo (Acacia berlandieri), or Texas ebony (Pithecellobium flexicaule) woodlands or shrublands, or may form a mosaic with grasslands within the cane bluestem-false rhodesgrass (Bothriochloa barbinodis-Chloris pluriflora) series.

Mesquite-Huisache Series (G5S5)

(Prosopis glandulosa-Acacia smallii)

This deciduous woodland occurs over moderately to poorly drained soils, primarily in the South Texas Plains and the Coastal Prairie. It is a natural disturbance type of river floodplains and depressions that may succeed to sugarberry (Celtis laevigata) dominated forest, especially on floodplains of major streams. It is an even more widespread anthropogenic disturbance community type, with introduced species such as Chinese tallow tree (Sapium sebiferum) and Macartney rose (Rosa bracteata) associated on the upper coast and retama (Parkinsonia aculeata) on the South Texas Plains. In wet areas, huisache often forms nearly pure stands or occurs as scattered individuals within a matrix of weedy grasses during the course of secondary succession. This type may grade into blackbrush (Acacia rigidula) or guajillo (Acacia berlandieri) shrublands in south Texas and little bluestem (Schizachyrium scoparium) grasslands in the Coastal Prairie.

Mesquite-Saltbush Series (G4S4)

(Prosopis glandulosa-Atriplex spp.)

This broadly-defined shrubland community type occupies moderately saline, often sandy soils in the Trans-Pecos and South Texas Plains. Composition varies with geographic location, with wolfberry (Lycium berlandieri), lotebush (Ziziphus obtusifolia), Opuntia spp., and soaptree yucca (Yucca elata) are common shrubs, while in more saline areas there are fewer shrubs and grasses and forbs such as alkali sacaton (Sporobolus airoides), saltgrass (Distichlis spicata), and Sesuvium verrucosum are more common. This type may grade into alkali sacaton or tobosa (Hilaria mutica) grassland or may be surrounded by a matrix of desert shrubland.

Mesquite-Sandsage Series (G4S4)

(Prosopis glandulosa-Artemisia filifolia)

This deciduous shrubland is scattered over sandy soils in the Trans-Pecos. Creosotebush (Larrea tridentata), soaptree yucca (Yucca elata), broom dalea (Psoralea scoparius), Aristida spp., Sporobolus spp. and a variety of forbs such as Penstemon ambiguus, Heliotropium convolvulaceum, Abronia spp., Poliomintha spp., and Croton spp. are common components. Similar communities occur over sandy soils in the Rolling and High Plains (see sandsage-midgrass series), and this type is often intermixed with xeromorphic shrubland types.

Mohr Shin Oak Series (G4S4)

(Quercus mohriana)

This widespread deciduous shrubland occurs primarily over shallow soils derived from limestone or caliche in the Trans-Pecos, Rolling Plains, and High Plains. Redberry juniper (Juniperus pinchotii), scrub oak (Quercus pungens), Quercus spp., and grasses including sideoats grama (Bouteloua curtipendula), Aristida spp., and Tridens spp. are common components. Where sandstone outcrops are exposed along the Caprock Escarpment, Havard shin oak (Quercus havardii) is a common component. Surrounding communities include midgrass grasslands.

Netleaf Hackberry-Little Walnut Series (G4S4)

(Celtis reticulata-Juglans microcarpa)

This deciduous woodland occurs on floodplains, primarily in the Trans-Pecos and western Edwards Plateau. Willow (Salix gooddingii, S. nigra), ash (Fraxinus spp.), Mexican buckeye (Ungnadia speciosa), Apache-plume (Fallugia paradoxa), sycamore (Platanus occidentalis), cottonwood (Populus spp.), and oaks (Quercus spp.), may be important. On more mesic sites this type grades into cottonwood-ash-willow communities or to the plateau live oak (Quercus fusiformis)-netleaf hackberry type, while on drier sites it may grade toward arroyo

(Apache-plume series) shrublands.

New Mexico Little Bluestem Series (G4S3)

(Schizachyrium scoparium var. neomexicanum)

This midgrass grassland occurs at moderate to high elevations, usually over 5500 ft, in the Trans-Pecos. These mountain grasslands form landscape mosaics with the pinyon-oak (Pinus cembroides/P. edulis-Quercus spp.) or ponderosa pine (Pinus ponderosa) series woodland. Grass diversity is often high, and important species may include sideoats grama (Bouteloua curtipendula), blue grama (Bouteloua gracilis), bull muhly (Muhlenbergii emersleyi), cane bluestem (Bothriochloa barbinodis), woolspike balsamscale (Elyonurus barbiculmis), and Texas bluestem (Schizachyrium cirratum), depending on mountain range of occurrence, precipitation, and exposure. Drier grasslands are within the sideoats grama-black grama (Bouteloua curtipendula-Bouteloua eriopoda) series.

Oneseed Juniper Series (G4S4)

(Juniperus monosperma)

This evergreen shrubland occurs primarily in the northern Trans-Pecos and High Plains, usually over shallow soils and on slopes. Xeromorphic shrubs, oaks (Quercus pungens, Q. mohriana), feather dalea (Dalea formosa) and grasses such as black grama (Bouteloua eriopoda), sideoats grama (Bouteloua curtipendula), Sporobolus spp., Aristida spp., and Tridens spp. are often components. This type is intermixed with midgrass grasslands on surrounding deeper-soiled flats.

Overcup Oak Series (G4S4)

(Quercus lyrata)

This deciduous forest inhabits frequently inundated floodplains of east Texas. Common components include red maple (Acer rubrum), water hickory (Carya aquatica), and willow oak (Quercus phellos). This type is usually intermixed with bottomland hardwood communities including baldcypress (Taxodium distichum) swamps, shrub swamps, and typical (drier) water oak (Quercus nigra) or willow oak dominated floodplain hardwoods.

Pecan-Sugarberry Series (G4S4)

(Carya illinoensis-Celtis laevigata)

This deciduous forest or woodland occupies floodplains, primarily within the South Texas Plains, Edwards Plateau, and Blackland Prairie. It is best developed along major rivers, and soils are often heavy textured and calcareous. Important species may include netleaf hackberry (Celtis reticulata), cedar elm (Ulmus crassifolia), bur oak (Quercus macrocarpa), American elm (Ulmus americana), plateau live oak

(Quercus fusiformis), black walnut (Juglans nigra), ash (Fraxinus spp.), Texas oak (Quercus buckleyi), and box-elder (Acer negundo). Drier floodplains of smaller streams may fall within the plateau live oak-hackberry series, while to the east more mesic floodplains support oak-dominated bottomland hardwood communities. Adjacent dry slopes may be Ashe juniper (Juniperus ashei) or Acacia spp. dominated in the Edwards Plateau and South Texas Plains.

Pickleweed-Seepweed Series (G4S4)

(Allenrolfea occidentalis-Suaeda spp.)

This herb dominated saline wetland occurs primarily in the Trans-Pecos, in alternately wet and dry habitats. The vegetation is open, and important species may include winged sesuvium (Sesuvium verrucosum), frankenia (Frankenia jamesia), saltgrass (Distichlis spicata), alkali sacaton (Sporobolus airoides), and fourwing saltbush (Atriplex canescens). This type may grade into saline grasslands within the alkali sacaton-fourwing saltbush series or saltgrass-olney bulrush (Scirpus olneyi) series, non-saline desert shrublands, or saline shrublands within the rough tiqulia (Tiqulia hispidissima) series. It may form landscape mosaics with these and other salt tolerant community types in saline marshes or gyp influenced habitats.

Pinyon Pine-Oak Series (G4S4)

(Pinus cembroides/ P. edulis-Quercus spp.)

This mainly evergreen woodland usually occupies moderate-elevation (5000-6500 ft) slopes of major mountain ranges in the Trans-Pecos. Gray oak (Quercus grisea), Mohr oak (Quercus mohriana), Emory oak (Quercus emoryi), alligator juniper (Juniperus deppeana), and redberry juniper (Juniperus pinchotii), plus species from semi-desert and mountain grasslands, are common components. Junipers are more common on xeric sites whereas oaks are more important on mesic sites. Mexican pinyon pine (Pinus cembroides) occurs in the Davis and Chisos Mountains, Rocky Mountain pinyon pine (Pinus edulis) in the Guadalupe Mountains, and papershell pinyon pine (Pinus remota) at lower elevations in the Glass and Del Norte Mountains and eastward onto the Stockton and Edwards Plateau. At lower elevations this type grades into or interdigitates with the black grama-sideoats grama (Bouteloua eriopoda - B. curtipendula) series, and at higher elevations it interdigitates with the New Mexico little bluestem (Schizachyrium scoparium var. neomexicana) series. Conifer woodlands occupy higher elevations and oak woodlands sometimes occur on alluvial soils in mountain valleys adjacent to these pinyon-oak woodlands.

Plateau Live Oak-Midgrass Series (G3S3)

(Quercus fusiformis)

This mainly evergreen woodland occupies uplands of the Edwards Plateau, where it is often intermixed with midgrass grassland on flats and on gentle slopes. Composition varies with substrate (i.e. between the limestone derived soils of the Plateau proper and the generally sandier soils of the Llano Uplift) and precipitation. Canopy cover ranges from open to closed, with mottes of monoculture live oak present in some areas. Texas oak (Quercus buckleyi), cedar elm (Ulmus crassifolia), post oak (Quercus stellata), Ashe juniper (Juniperus ashei), scalybark oak (Quercus sinuata var. breviloba), Quercus spp., and shrubs such as Rhus spp. and Condalia spp. are variously present. Shallow soils or disturbed areas often support Ashe juniper or mesquite (Prosopis glandulosa) dominated woodlands or shrublands, while openings in good condition are mid-grass grasslands with species such as little bluestem (Schizachyrium scoparium), sideoats grama (Bouteloua curtipendula), and curlymesquite (Hilaria belangeri).

Plateau Live Oak-Netleaf Hackberry Series (G4S4)

(Quercus fusiformis-Celtis reticulata)

This evergreen to mainly deciduous woodland or forest occupies floodplains of streams, primarily within the Edwards Plateau, South Texas Plains, and eastern Trans-Pecos. Important species may include sugarberry (Celtis laevigata), pecan (Carya illinoensis), ash (Fraxinus texana, F. berlandieri), cedar elm (Ulmus crassifolia), bur oak (Quercus macrocarpa), Ashe juniper (Juniperus ashei), and Texas persimmon (Diospyros texana). More mesic floodplains fall within the pecan-sugarberry or sugarberry-elm series. Adjacent slopes may be Ashe juniper or Acacia spp. dominated.

Ponderosa Pine Series (G4S3)

(Pinus ponderosa)

This evergreen woodland or forest is restricted to high elevations (over 6000 ft) in the Guadalupe, Davis, and Chisos Mountains in west Texas. Composition varies with elevation as well as mountain range, with Gambel oak (Quercus gambelii), southwestern white pine (Pinus strobiformis), alligator juniper (Juniperus deppeana), gray oak (Quercus grisea), chinkapin oak (Quercus muhlenbergii), Chisos oak (Quercus gravesii), and Emory oak (Quercus emoryi) variously present. In the Chisos mountains, Pinus arizonica var. stormiae is a major component that occupies habitats similar to those with ponderosa pine to the north, and Arizona cypress (Cupressus arizonica) and weeping juniper (Juniperus flaccida) are also components. Open grasslands are interspersed throughout, and Arizona fescue (Festuca arizonica), New Mexico bluestem (Schizachyrium scoparium var. neomexicana), bulb

panicum (Panicum bulbosum), needle grasses (Stipa pringlei, S. spp.), and Muhlenbergia spp. are common components. At lower elevations this type grades into evergreen pinyon pine-oak-juniper woodlands.

Post Oak-Black Hickory Series (G4S4)

(Quercus stellata-Carya texana)

This deciduous forest or woodland community type occurs primarily in east Texas and the Post Oak Savannah, usually on sandy or loamy upland soils. The woody plant diversity is highest to the east, where this type forms closed canopy forest, while herbaceous species diversity increases to the west where the type forms open woodlands over deep sands. Composition varies with location and soil texture and depth. White oak (Quercus alba), southern red oak (Quercus falcata), blackjack oak (Quercus marilandica), Pinus spp., Carya spp., flowering dogwood (Cornus florida), yaupon (Ilex vomitoria), and American beautyberry (Callicarpa americana) are common components. Drier habitats over deep sands in east Texas fall within the bluejack oak (Quercus incana)-pine series, and this type may grade into various hardwood, oak, or oak-pine types.

Post Oak-Blackjack Oak Series (G4S4)

(Quercus stellata-Quercus marilandica)

This deciduous woodland or forest occurs in east and east central Texas, including the Pineywoods, Post Oak Savannah, and Cross-Timbers. Composition of this broadly defined community type varies with geographic region and soils, with open woodlands occurring to the west or over drier soils and closed forests occurring to the east or over mesic soils. Cedar elm (Ulmus crassifolia), southern red oak (Quercus falcata), yaupon (Ilex vomitoria), American beautyberry (Callicarpa americana), water oak (Quercus stellata), black hickory (Carya texana), redbud (Cercis canadensis), and deciduous holly (Ilex decidua) are variously important. Eastern redcedar (Juniperus virginiana) is a common invader. Open woodlands often contain components of tallgrass grasslands in the herbaceous layer, and this type may intergrade with the post oak-black hickory or bluejack oak-pine (Quercus incana-Pinus spp.) series.

Redberry Juniper-Midgrass Series (G4S4)

(Juniperus pinchotii)

This evergreen woodland or shrubland occurs on slopes, often over gypsum- or caliche-influenced soils, primarily in the Rolling Plains and Trans-Pecos. Lotebush (Ziziphus obtusifolia), mesquite (Prosopis glandulosa), oaks (Quercus mohriana, Q. pungens, Q. havardii), feather dalea (Dalea formosa), Yucca spp., and grasses such as blue grama (Bouteloua gracilis), sideoats grama (Bouteloua curtipendula), Tridens

spp., Sporobolus spp., and curlymesquite (Hilaria mutica) are common components. This community type is often within a matrix of midgrass-mesquite grassland.

Rocky Mountain Juniper Series (G4S2)

(Juniperus scopulorum)

This evergreen woodland is isolated on mesic slopes and in canyons along the Caprock Escarpment. Rocky Mountain juniper forms nearly pure stands, while surrounding drier slopes are more open redberry juniper (Juniperus pinchotii)-midgrass communities.

Rough Tiquilia Series (G4S4)

(Tiquilia hispidissima)

This mainly deciduous or semi-evergreen dwarf desert shrubland is isolated on gypsum-influenced soils of the Trans-Pecos. Substrate ranges from windblown gypsum dunes to nearly bare gyp deposits, and composition varies accordingly. Torrey yucca (Yucca torreyi), gypgrass (Sporobolus nealleyi), chino grama (Bouteloua breviseta), Indian blanket (Gaillardia multiceps), moonpod (Selinocarpus spp.), gyp ringstem (Anulocaulis gypsogenus), and cactus species are common components. This type is often isolated within a matrix of xeromorphic shrubland, and may form landscape mosaics with other gyp tolerant community types in alternately wet and dry habitats.

Rush-Sedge Series (G4S3)

(Juncus spp.)

This broadly defined marsh community type is scattered across the state, but is most common along the Gulf coast and in east Texas. A variety of grasses, sedges, rushes and aquatic plants may be important. Along the Gulf coast, this type often grades into brackish marsh.

Saltgrass-Cordgrass Series (G4S4)

(Distichlis spicata-Spartina spp.)

This salt or brackish marsh community occurs along the Gulf coast. Saltgrass often forms nearly pure stands, but smooth cordgrass (Spartina alterniflora), marshhay cordgrass (Spartina patens), Paspalum spp., Sporobolus spp., and Eragrostis spp. may be present. This type forms landscape mosaics with coastal cordgrass marshes and saline herblands along the Gulf Coast.

Saltgrass-Olney Bulrush Series (G3S2)

(Distichlis spicata-Scirpus olneyi)

This marsh or wet shortgrass community type is associated with perennial seeps in the Trans-Pecos. Saltgrass sometimes forms nearly pure stands on slightly elevated sites, while Olney bulrush occupies

adjacent wetter areas. Other important species may include alkali sacaton (Sporobolus airoides), big sacaton (Sporobolus wrightii), alkali muhly (Muhlenbergia asperifolia), and fourwing saltbush (Atriplex canescens). This type sometimes forms landscape mosaics with the pickleweed-seepweed (Allenrolfea occidentalis-Suaeda spp.) and the alkali sacaton-fourwing saltbush series in response to various depths and duration of flooding and salinity. A narrow band of mesquite (Prosopis glandulosa) may form an outer ring, while surrounding uplands are desert shrublands.

Sandsage-Midgrass Series (G4S4)

(Artemisia filifolia)

This evergreen shrubland or midgrass grassland occurs over sandy soils in the Rolling and High Plains. Composition varies with precipitation, disturbance, and soil texture, with mid-grasses common on good quality rangeland. Mesquite (Prosopis glandulosa) may also be a component (see mesquite-sandsage series). Important grasses include little bluestem (Schizachyrium scoparium), sand dropseed (Sporobolus cryptandrus), prairie sandreed (Calamovilfa gigantea), Aristida spp., Bouteloua spp., and Eragrostis spp. This type is related to other sandy-soil types, including the Havard shin oak-tallgrass (Quercus havardii) and mesquite-sandsage series. It occurs within a matrix of mid-and shortgrass community types.

Scrub Oak-Mountain Mahogany Series (G4S4)

(Quercus pungens-Cercocarpus montanus)

This mainly evergreen shrubland is restricted to mid-elevation areas (4500-5500 ft) in the mountains of the Trans-Pecos, and occupies slopes that are pinyon-oak-juniper communities further north. Important shrubs include Rhus spp., Gregg ash (Fraxinus greggii), desert ceanothus (Ceanothus greggii), oaks (Quercus mohriana, Q. turbinella), mountain laurel (Sophora secundiflora), fendlerbush (Fendlera rupicola), greasebush (Forsellesia spp.), and silktassel (Garrya ovata, G. wrightii). This type is intermixed with succulent desert shrubland and semi-desert grassland.

Seacoast Bluestem-Gulfdune Paspalum Series (G4S3)

(Schizachyrium scoparium var. littoralis-Paspalum monostachyum)

This tall to midgrass community type occupies stabilized secondary dunes and vegetated flats on barrier islands and is the predominant grassland of the Coastal Sand Plain. On the Coastal Sand Plain, live oak mottes (see coastal live oak-sugarberry series) or rather extensive woodlands are intermixed with open grasslands, often with scattered mesquite (Prosopis glandulosa). tanglehead (Heteropogon contortus), brownseed paspalum (Paspalum plicatulum), Silveusgrass (Trichoneura

elegans), Dichanthelium spp., and Pan-American balsamscale (Elyonurus barbiculmis) are common components. Minor changes in drainage cause shifts in compositions, and poorly drained inclusions may support Gulf cordgrass (Spartina spartinae) or fresh marsh. Sporobolus spp., Eragrostis spp., and sedges (Carex spp., Scirpus spp., Fuirena spp., Fimbristylis spp.) are important on barrier islands, where this type grades into the Sea

Oats-Bitter Panicum (Uniola paniculata-Panicum amarum) series on drier, less stable dunes.

Sea Oats-Bitter Panicum Series (G4S3)

(Uniola paniculata-Panicum amarum)

This mid to tallgrass community occupies excessively drained sands on partially stabilized dunes of the coastal barrier islands and patches of mainland Gulf shoreline. Sea oats (Uniola paniculata) is the most important component, but is replaced along the Upper Coast by bitter panicum (Panicum amarum). Trailing succulent perennial forbs such as beach purslane (Sesuvium portulacastrum), goatfoot morning-glory (Ipomaea pes-caprae), and fiddleleaf morning-glory (Ipomaea stolonifera) usually dominate the gulfward face of the dunes. At the foot of the landward side of the dune this community grades abruptly into seacoast bluestem-gulfdune paspalum (Schizachyrium scoparium var. littoralis-Paspalum monostachyum) dominated grasslands of wetter soils on barrier island flats.

Shortleaf Pine-Oak Series (G4S4)

(Pinus echinata-Quercus spp.)

This mainly deciduous upland woodland occupies shallow to deep, usually sandy soils, primarily in northeast Texas. Composition varies with soils and exposure, with pines more common on shallow, dry soils or in disturbed habitats. Important oaks include post, blackjack, southern red, black, and white (Quercus stellata, Q. marilandica, Q. falcata, Q. velutina, Q. alba), depending on soil water relations, and loblolly pine (Pinus taeda) and Carya spp. may also be important. This type grades into oak-hickory forest on more mesic sites in the north, and often interdigitates with oak-loblolly pine types in central east Texas.

Sideoats Grama Series (G3S3)

(Bouteloua curtipendula)

This broadly defined midgrass grassland is characteristic of uplands over relatively deep soils in the Rolling Plains and also occurs in the central and western Edwards Plateau. Shrubs such as lotebush (Ziziphus obtusifolia), juniper (Juniperus pinchotii, J. ashei), Opuntia spp.,

and mesquite (Prosopis glandulosa) are components that increase under grazing pressure. Important grasses include blue grama (Bouteloua gracilis), Texas wintergrass (Stipa leucotricha), curlymesquite (Hilaria belangeri), slim tridens (Tridens muticus), Aristida spp., cane bluestem (Bothriochloa barbinodis), vine-mesquite (Panicum obtusum), little bluestem (Schizachyrium scoparium), Indiangrass (Sorghastrum nutans), and California cottontop (Digitaria californica). In the Rolling Plains, this type is intermixed with Pinchot (redberry) juniper shrubland over steep, xeric soils, and adjacent sandy soils support midgrass grasslands within the sandsage (Artemisia filifolia)-midgrass series. In the Edwards Plateau, this type forms mosaics with plateau live oak (Quercus fusiformis) and Ashe juniper

(Juniperus ashei) woodlands, and to the west or over dry soils grades into the curlymesquite-sideoats grama series.

Sideoats Grama-Black Grama Series (G4S3)

(Bouteloua curtipendula-B. eriopoda)

This midgrass-dominated semi-desert grassland inhabits moderate elevations (3500-5200 ft) of the Trans-Pecos mountains and plateaus. Composition varies with abiotic factors and grazing history, with black grama (Bouteloua eriopoda) often dominant on rocky slopes and blue grama (B. gracilis) dominant on deeper soils. Other important grasses include sideoats grama (B. curtipendula), Tridens spp., Bothriochloa spp., and three awns (Aristida spp.). Annual grasses and shrubs and succulents such as cane cholla (Opuntia imbricata), mesquite (Prosopis glandulosa), soaptree yucca (Yucca elata), spanish dagger (Yucca treculeana), and javelina bush (Condalia ericoides) increase under grazing pressure. This community type is intermixed with or grades into pinyon-oak-juniper woodlands at higher elevations or succulent desert shrubland (lechuguilla-sotol series, Agave lechuguilla-Dasyllirion leiophyllum) on dry slopes.

Silveanus Dropseed Series (G2S2)

(Sporobolus silveanus)

This tallgrass community type occupies loamy, low Ph upland soils in the northeastern Blackland Prairie. Important species include sedges (Carex meadii, Fimbristylis puberula, Scleria spp.), longspike tridens (Tridens strictus), Indiangrass (Sorghastrum nutans), switchgrass (Panicum virgatum), and eastern gamagrass (Tripsacum dactyloides) along with a diversity of forbs. On clayey soils in this region relict communities are dominated by gamagrass and switchgrass.

Smooth Cordgrass Series (G4S4)

(Spartina alterniflora)

This salt marsh is restricted to areas along the Gulf coast that are subject to the daily ebb and flow of tides. Juncus roemerianus, saltgrass (Distichlis spicata), Juncus spp., big cordgrass (east) (Spartina cynosuroides), and marshhay cordgrass (Spartina patens) may be components. This community grades into brackish marsh landward and forms landscape mosaics with other cordgrass and saltgrass marshes.

Spanish Bayonet Series (G4S3)

(Yucca faxoniana)

This xeromorphic desert shrubland occupies mid-elevation (3500-5000 ft) slopes in the southern Trans-Pecos, especially the Dead Horse Mountains. Spanish bayonet (giant dagger) is the visual dominant, but grasses such as black and chino grama (Bouteloua eriopoda, B. breviseta) and succulent shrubs such as lechuguilla (Agave lechuguilla) and chaparral-like species (Quercus pungens, Rhus virens, Rhus microphylla, Cercocarpus montanus, Ceanothus greggii) are also important. This community type usually occurs at lower elevations or on more xeric sites than the scrub oak-mountain mahogany (Quercus pungens-Cercocarpus montanus) series.

Sphagnum-Beakrush Series (G4S2)

(Sphagnum spp.-Rhynchospora spp.)

This graminoid-dominated community type includes various types of seepage bogs which occur primarily in east Texas. Sphagnum mosses may or may not be abundant, and beakrushes (Rhynchospora oligantha, R. gracilentia, R. spp.) along with yellow-eyed grass (Xyris scabrifolia, Xyris spp.), nutrush (Scleria reticularis), and grasses (Schizachyrium spp., Dichanthelium spp., Panicum spp.), pitcher plant (Sarracenia alata), and sedges may be dominant. Occurrences of this community type are usually small and isolated within a matrix of upland pine or pine-oak forest, and the herbaceous flora is diverse with numerous restricted species. Small trees, shrubs, and vines such as sweetbay magnolia (Magnolia virginiana), evergreen bayberry (Myrica heterophylla), and laurel greenbriar (Smilax laurifolia) invade many bogs in the absence of fire. Surrounding uplands often occur over a sandy substrate on which open oak or pine woodlands are common.

Sugarberry-Elm Series (G4S4)

(Celtis laevigata-Ulmus spp.)

This broadly defined deciduous forest occurs on floodplains and mesic slopes, primarily in central and south Texas. American elm (Ulmus americana) is common on wetter sites, while cedar elm (Ulmus crassifolia) increases to the west and south. Composition varies with

flooding regime and geographic location. Pecan (Carya illinoensis), ash (Fraxinus berlandieri, F. pensylvanica, F. texensis), oaks (Quercus muhlenbergii, Q. buckleyi, Q. macrocarpa), and sycamore (Platanus occidentalis) are variously important, but geographic differences are poorly documented. The plateau live oak-netleaf hackberry (Quercus fusiformis-Celtis reticulata) and pecan-sugarberry series are defined for the Edwards Plateau, South Texas Plains, and Blackland Prairie. Sugarberry or netleaf hackberry and cedar elm dominated communities are a widespread and common disturbance type of uplands and floodplains of central and south Texas. To the east this type grades into typical bottomland hardwoods communities within the water oak-willow oak (Quercus nigra-Q. phellos) series.

Swamp Chestnut Oak-Willow Oak Series (G3S3)

(Quercus michauxii-Quercus phellos)

This deciduous bottomland forest occurs on intertributary flats in southeast Texas. Sweetgum (Liquidambar styraciflua), overcup oak (Quercus lyrata), and cherrybark oak (Quercus falcata var. pagodifolia) are often important, and dwarf palmetto (Sabal minor) is common in the understory. This type is closely related to the typical water oak (Quercus nigra)-willow oak series of floodplains, but lacks water oak as an important species.

Sweetbay Magnolia Series (G4S4)

(Magnolia virginiana)

This mainly evergreen to mainly low forest occurs over seeps, in wet creek bottoms, and in other permanently moist soils in east Texas. There is considerable north to south variation which has not been well documented. Gallberry holly (Ilex coriacea), black titi (Cyrilla racemiflora), wax-myrtle (Myrica heterophylla), red maple (Acer rubrum), buttonbush (Cephalanthus occidentalis), swamp gum (Nyssa biflora), laurel greenbrier (Smilax laurifolia), possumhaw viburnum (Viburnum nudum), and maleberry (Lyonia ligustrina) may be components, depending on geographic location and soil reaction. This type is often associated with the sphagnum-beakrush series (bogs), and may be successional to bogs in the absence of fire.

Sycamore-Willow Series (G5S5)

(Platanus occidentalis-Salix nigra)

This broadly defined mostly deciduous strip forest or woodland occupies moist to wet often gravelly soils in periodically scoured creek and river beds across most of the Edwards Plateau and adjacent areas. Sycamore, black willow, and eastern cottonwood (Populus deltoides) are usually present, often as scattered small trees representing growth

since the most recent catastrophic flood. A poorly developed shrub layer composed of willow baccharis (Baccharis neglecta), buttonbush (Cephalanthus occidentalis), creek indigo (Amorpha fruticosa) and/or little walnut (Juglans microcarpa) may be present, along with a ground layer that varies widely depending on moisture, stratum, disturbance and other factors.

Texas Ebony-Anacua Series (G2S1)

(Pithecellobium flexicaule-Ehretia anacua)

This evergreen subtropical forest occurs primarily on well-drained but moist river or resaca terraces in the lower Rio Grande valley. Snake-eyes (Phaulothamnus spinescens), coma (Bumelia celastrina), tenaza (Pithecellobium pallens), tepeguaje (Leucaena pulverulenta), colima (Zanthoxylum fagara), brasil (Condalia hookeri), granjeno (Celtis pallida), lotebush (Ziziphus obtusifolia), and mesquite (Prosopis glandulosa) may be important. This type is similar to subtropical shrubland (Texas ebony-snake-eyes series), which occupies drier sites.

Texas Ebony-Snake-eyes Series (G2S2)

(Pithecellobium ebano-Phaulothamnus spinescens)

This subtropical evergreen shrubland or low forest occurs primarily over heavy soils in the lower Rio Grande valley. There is considerable variation with soil type and location, and shrublands on lomas in South Bay are also included as a variant of this series. Coma (Bumelia celastrina), brasil (Condalia hookeri), lotebush (Ziziphus obtusifolia), colima (Zanthoxylum fagara), mesquite (Prosopis glandulosa), and granjeno (Celtis pallida) may be important. This type is closely related to taller Texas ebony-anacua forests on wetter sites, but contains a greater compliment of xeromorphic shrubs. It grades into non-subtropical shrublands to the north and west.

Texas Oak Series (G3S3)

(Quercus buckleyi)

This mainly deciduous woodland or forest occurs primarily on mesic slopes over calcareous soils of the eastern and southern Edwards Plateau and Lampasas Cut Plain. Cedar elm (Ulmus crassifolia), sugarberry (Celtis laevigata), netleaf hackberry (Celtis reticulata), plateau live oak (Quercus fusiformis), chinkapin oak (Q. muhlenbergii), scalybark oak (Q. sinuata var. breviloba), Ashe juniper (Juniperus ashei), black cherry (Prunus serotina subsp. eximia), and Texas ash (Fraxinus texensis) are variously important. Plateau live oak woodlands or mixed grasslands occupy adjacent deep upland soils, while Ashe juniper woodlands occupy drier slopes. Adjacent floodplains are sugarberry, elm, pecan, or live oak dominated. In a relatively small portion of the south central Edwards Plateau, similar sites may support

the Lacey oak (Quercus laceyi) series, and to the east scalybark oak is locally dominant.

Texas Palmetto Series (G2S1)

(Sabal mexicana)

This evergreen subtropical woodland or forest is limited to a few sites along the Rio Grande south of Brownsville, although populations of palm are known from as far north as Victoria County. It was probably never widespread in Texas, and may be dependent on frequent flooding and fire. Texas ebony (Pithecellobium ebano), brasil (Condalia hookeri), cedar elm (Ulmus crassifolia), anacua (Ehretia anacua), tenaza (Pithecellobium pallens), tepeguaje (Leucaena pulverulenta), and coma (Bumelia celastrina) are present. This type is closely related to the Texas ebony-anacua series.

Tobosa Series (G4S4)

(Hilaria mutica)

This shortgrass grassland usually occurs over heavy soils on flats within the Trans-Pecos, southwestern Rolling Plains and northwestern Edwards Plateau. These grasslands sometimes occupy sites that receive excess runoff from the surrounding landscape and hence represent small, internally drained basin bottoms. Mesquite (Prosopis glandulosa) may be scattered throughout, and common grasses include buffalograss (Buchloe dactyloides), vine-mesquite (Panicum obtusum), California cottontop (Digitaria californica), Bouteloua spp., Tridens spp., and Sporobolus spp. This series occurs within a matrix of a variety of shrublands and mixed grasslands, with saline areas sometimes grading toward alkali sacaton (Sporobolus airoides) dominated grassland.

Velvet Ash-Willow Series (G3S2)

(Fraxinus velutina-Salix spp.)

This deciduous woodland occurs in mesic canyons and along floodplains in the Trans-Pecos. Composition varies with soil moisture and flooding regime, and western soapberry (Sapindus drummondii), netleaf hackberry (Celtis reticulata), Fremont cottonwood (Populus fremontii), Mexican buckeye (Ungnadia speciosa), mesquite (Prosopis glandulosa), little walnut (Juglans microcarpa), and scrub oak (Quercus pungens) are variously present. This type is closely related with the cottonwood-willow series, which once occupied floodplains of larger rivers in the region.

Viscid Acacia Series (G4S4)

(Acacia neovernicosa)

This xeromorphic shrubland occurs primarily at low to moderate (below 4000 ft) elevations, often on slopes, in the Chihuahuan Desert region.

Viscid acacia is closely related to, and probably hybridizes with, mesquit acacia (Acacia constricta) and Schott acacia (Acacia schottii). The three species occupy similar habitats, although mesquit acacia is most common along the Rio Grande in gravelly soils, and Schott acacia is most common on gypseous soils. All of the species are referred to as whitethorn acacia. Creosotebush (Larrea tridentata), mariola (Parthenium incanum), mesquite (Prosopis glandulosa), tarbush (Flourensia cernua), tobosa (Hilaria mutica), Sporobolus spp., and Bouteloua spp. may be important. This type is intermixed with other xeromorphic shrublands.

Water Elm-Swamp Privet Series (G4S4)

(Planera aquatica-Forestiera acuminata)

This mainly deciduous shrub swamp inhabits frequently flooded areas in southeast Texas. Buttonbush (Cephalanthus occidentalis), black willow (Salix nigra), ash (Fraxinus caroliniana, F. pensylvanica), smooth alder (Alnus serrulata), water hickory (Carya aquatica), hehuckleberry (Lyonia ligustrina), and baldcypress (Taxodium distichum) may be present, depending on flooding regime and geographic location. This type often intergrades with baldcypress swamp, bottomland hardwood, and fresh marsh communities, and is replaced by the buttonbush series to the north and west where many components with southeastern affinities are not present.

Water Oak-Coastal Live Oak Series (G3S3)

(Quercus nigra-Quercus virginiana)

This mainly deciduous woodland occurs on floodplains and along bayous in the Upper Coastal Prairie. Pecan (Carya illinoensis), cedar elm (Ulmus crassifolia), sugarberry (Celtis laevigata), yaupon (Ilex vomitoria), Crataegus spp., and deciduous holly (Ilex decidua) may be present. This type is similar to water oak and willow oak (Quercus phellos) dominated bottomlands to the east. It may occur in the landscape with coastal live oak-pecan or post oak (Quercus stellata)-coastal live oak upland forests and little bluestem grasslands.

Water Oak-Willow Oak Series (G4S3)

(Quercus nigra-Quercus phellos)

This broadly defined deciduous bottomland hardwood forest occupies often-inundated floodplains of major streams in east Texas. Composition varies with minor changes in elevation and with geographic location. Common components include sweetgum (Liquidambar styraciflua), cherrybark oak (Quercus falcata var. pagodifolia), ash (Fraxinus spp.), and overcup oak (Quercus lyrata) in the overstory and ironwood (Carpinus caroliniana), eastern hop-hornbeam (Ostrya virginiana), deciduous holly (Ilex decidua), and Florida maple (Acer

saccharum var. floridana) in the understory. Swamps and marshes are often intermixed, and surrounding uplands are usually oak-hickory or oak-pine types.

Attachment B
Major Vegetation Classes
Mostly Natural Communities

Note: if the site vegetation cover class being identified is under a restoration management regime, add (R) to the Vegetation Class title, e.g., "Medium Grassland (R)".

Evergreen Forest	Trees over 15' tall forming 61% - 100% canopy cover. Canopy never w/o some green; some trees may shed their leaves.
Deciduous Forest	Trees over 15' tall forming 61% - 100% canopy cover. Majority of trees shed foliage due to drought and/or cold.
Evergreen Woodland	Trees over 15' tall forming 26% - 60% canopy cover. Canopy never w/o some green; some trees may shed their leaves.
Deciduous Woodland	Trees over 15' tall forming 26% - 60% canopy cover. Majority of trees shed foliage due to drought and/or cold.
Evergreen Shrubland	Shrubs 18" to 15' tall forming 26% or greater canopy cover. Canopy never w/o some green; some shrubs may shed their leaves.
Deciduous Shrubland	Shrubs 18" to 15' tall forming 26% or greater canopy cover. Majority of shrubs shed foliage due to drought and/or cold.
Tall Grassland	Herb-dominated with trees or shrubs 25% or less of the canopy cover. Grasses and/or forbs over 36" tall.
Medium Grassland	Herb-dominated with trees or shrubs 25% or less of the canopy cover. Grasses and/or forbs 18" - 36" tall.
Short Grassland	Herb-dominated with trees or shrubs 25% or less of the canopy cover. Grasses and/or forbs 18" or less in height.
Forbs	Herb-dominated with trees or shrubs 25% or less of the canopy cover. Forb cover exceeding 50%.
Bog	Herb-dominated with trees or shrubs 25% or less of the canopy cover.
Swamp	Wetlands with woody species dominant.
Marsh	Wetlands with herbaceous species dominant.
Non-vegetated	Few vascular plants occurring (salt or wind tidal flats, bedrock, interior and coastal strands, bare sand dunes). Identify substrate present.
Open Water	Streams, lakes, ponds, estuaries, lagoons, oxbows, water treatment facilities, etc.

Attachment B
Major Vegetation Classes (continued)

Mostly Disturbed or Altered Landscapes/Vegetation Regimes

Crops	Annual cover crops (haygrazer, sunflower), cultivated row crops (corn, cotton), or woody vegetation (orchard, tree farm, pine plantation) used for the purpose of producing food and/or fiber for man, domesticated animals, or wildlife. Includes lands in short-term fallow.
Old Field	Former cropland out of production that is not under planned restoration management.
Regenerating Forest	Forest land used for production of wood products (paper pulp, saw timber) within the past fifteen years.
Profoundly Disturbed	Sparsely vegetated areas not expected to recover to a productive state (dumps, borrow pits, dredge spoil, mined areas, contaminated areas).
Development	Facilities and infrastructure including lands occupied by structures or manmade objects (buildings, camping areas, maintenance yards, dams, roads, levees, oil & gas drill pads).
Non-native Grassland	Permanent cover crop of essentially monodominant non-native grass species (coastal burmuda pasture, powerline and pipeline rights-of-way). May have a low density tree or shrub component.
Woody & Herbaceous Native/Non-native	Early succession regrowth with a large component of invading woody native and non-native species such as Chinese tallow, Tamarix, or Huisache. May represent a substantially altered but stable plant community.

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To	Karen Weaver	From	Shirley Hales
Co.	-	Co.	572-229-4868

Attachment C
Vegetation Condition Criteria

Estimate vegetation condition across the major plant community based on the following criteria:

- Excellent:** 76% - 100% of the composition and structure of the natural vegetation occurs within the plant community.
- Good:** 51% - 75% of the composition and structure of the natural vegetation occurs within the plant community.
- Fair:** 26% - 50% of the composition and structure of the natural vegetation occurs within the plant community.
- Poor:** less than 25% of the composition and structure of the natural vegetation occurs within the plant community.

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To	Karen Weaver	From	Shirley Hales
Co.	-	Co.	572-339-4868

Attachment C
Vegetation Condition Criteria

Estimate vegetation condition across the major plant community based on the following criteria:

Excellent: 76% - 100% of the composition and structure of the natural vegetation occurs within the plant community.

Good: 51% - 75% of the composition and structure of the natural vegetation occurs within the plant community.

Fair: 26% - 50% of the composition and structure of the natural vegetation occurs within the plant community.

Poor: less than 25% of the composition and structure of the natural vegetation occurs within the plant community.