

Appendix E
Detailed Description of
Vegetative Regions and Biotic Provinces

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Vegetative Regions

Rolling Plains. The original prairie vegetation included tall and mid-grasses such as little bluestem (*Schizachyrium scoparium* var. *frequens*), big bluestem (*Andropogon gerardii*), sand bluestem (*Andropogon halli*), side-oats grama (*Bouteloua curtipendula*), Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), hairy grama (*B. hirsuta*), blue grama (*B. gracilis*), Canada wildrye (*Elymus canadensis*) and western wheat (*Agropyron smithii*).

Mesquite (*Prosopis glandulosa*) is a common invader on all soils, while shinnery oak (*Quercus harvardii*) and sand sage (*Artemisia filifolia*) invade only sandy soils. Juniper (*Juniperus* spp.) clings to steep slopes along rivers.

Blackland Prairies. Studies have shown that the native vegetation of the Blackland Prairies should be classified as true prairie with little bluestem being a climax dominant.¹ Big bluestem, Indiangrass, switchgrass, hairy grama, sideoats grama, tall dropseed (*Sporobolus asper* var. *asper*), silver bluestem (*Bothriochloa saccharoides*) and Texas wintergrass (*Stipa leucotricha*) represent other important grasses in the vegetational region. With heavy grazing practices, invading or increasing species such as buffalograss (*Buchloe dactyloides*), Texas grama (*Bouteloua rigidisetata*) and smutgrass (*Sporobolus indicus*), along with other annuals, may become prevalent.² Improved pastures with the introduced grass species such as dallisgrass (*Paspalum dilatatum*) and bermudagrass (*Cynodon dactylon*) are common in the area. Asters (*Aster* spp.), prairie bluet (*Hedyotis nigricans* var. *nigricans*), prairie clover (*Dalea* spp.) and late coneflower (*Rudbeckia serotina*) are common forbs of these prairies.³

Wooded areas along riparian strips in the Blackland Prairies include such species as black willow (*Salix nigra*), oaks (*Quercus* spp.), pecan (*Carya illinoensis*), osage orange (*Maclura pomifera*), elms (*Ulmus* spp.) and eastern cottonwood (*Populus deltoides*).⁴ Woody invasive species that are commonly found in the vegetational area include post oak (*Quercus stellata*),

¹ Gould, 1975.

² Gould, 1975 and Correll, S.S. and Johnston, M.C., *Manual of the Vascular Plants of Texas*, University of Texas at Dallas, 1970.

³ Hatch, S.L., Ghandi, K.N. and Brown, L.E., *Checklist of the Vascular Plants of Texas*, Texas Agricultural Experiment Station, Texas A&M University, College Station, Texas, 1990.

⁴ Hatch, et. al., 1990.

blackjack oak (*Q. marilandica*) and cedar elm (*Ulmus crassifolia*) in the north, with honey mesquite (*Prosopis glandulosa*) being a common invader in the southern portion of the region.⁵

Post Oak Savannah. Typical native woody vegetation in this area includes post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), eastern juniper (*Juniperus virginiana*) and hackberries (*Celtis* spp.). Yaupon (*Ilex vomitoria*), American beautyberry (*Callicarpa americana*) and greenbriar (*Smilax bona-nox*) are common understory constituents of wooded areas. Common native grasses in this region include little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*) and Texas wintergrass (*Stipa leucotricha*). Forbs typical of the prairie portions include indigobush (*Amorpha fruticosa* v. *angustifolia*), senna (*Cassia* sp.), tick-clover (*Desmodium* spp.), prairie-clover (*Petalostemon* spp.), western ragweed (*Ambrosia psilostachya*) and croton (*Croton* spp.).⁶

Cross Timbers and Prairies. Upland vegetation within this region may vary from open savannah consisting of such native grasses as little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), Canada wild-rye (*Elymus canadensis*), side-oats grama (*Bouteloua curtipendula*), hairy grama (*B. hirsuta*), tall dropseed (*Sporobolus* sp.) and Texas wintergrass (*Stipa leucotricha*).

Much of this region has been utilized for agriculture, primarily in the form of rangeland. With the advent of overgrazing and land mismanagement, invading grasses such as hairy tridens (*Erioneuron pilosum*), Texas grama (*B. rigidisetata*) and red lovegrass (*Eragrostis secundiflora*) have become common, along with dense brush consisting of post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), mesquite (*Prosopis glandulosa*) and junipers (*Juniperus* sp.). Along streams, riparian vegetation is typically dominated by such hardwood tree species as cedar elm (*Ulmus crassifolia*) and pecan (*Carya illinoensis*) and oaks, but mesquite is also a typical invader in these areas.⁷

Edwards Plateau. Grasses that are typical of the Edwards Plateau region include switchgrass (*Panicum virgatum*), Indian grass (*Sorghastrum nutans*), beardgrass (*Bothriochloa* spp.), little bluestem (*Schizachyrium scoparium*), sideoats grama (*Bouteloua curtipendula*), Canada wildrye (*Elymus canadensis*), curly mesquite (*Hilaria belangeri*) and buffalograss (*Buchloe dactyloides*). Other plants commonly found within this vegetational area include ashe

⁵ Gould, 1975.

⁶ Correll and Johnston, 1970 and Gould, 1975.

juniper (*Juniperus ashei*), plateau live oak (*Quercus fusiformis*), Texas oak (*Q. texana*), Texas persimmon (*Diospyros texana*), elbowbush (*Forestiera pubescens*), Texas mountain laurel (*Sophora secundiflora*), prickly-pear cactus (*Opuntia* spp.) and pencil cactus (*O. leptocaulis*).⁸

Biotic Provinces

Kansan. The mixed-grass plains region is dominated by little bluestem, big bluestem (*Andropogon gerardii*) and western wheatgrass. The mesquite-grass association is dominated by mesquite (*Prosopis grandulosa*), with various species of grama (*Bouteloua* spp.), three-awn (*Aristida* spp.) and broomweed (*Gutierrezia texana*). The short-grass plains are dominated by buffalograss (*Buchloe dactyloides*) with various species of grama grasses.

Characteristic mammals of the Kansan province include: black-footed ferret (*Mustela nigripes*), striped skunk (*Mephitis mephitis*), coyote (*Canis latrans*), northern grasshopper mouse (*Onychomys leucogaster*), southern plains woodrat (*Neotoma micropus*) and Ord's Kangaroo rat (*Dipodomys ordii*).

Austroriparian. Common Austroriparian province mammals within Texas include: Virginia opossum (*Didelphis virginiana*), eastern mole (*Scalopus aquaticus*), eastern pipistrelle (*Pipistrellus subflavus*), eastern red bat (*Lasiurus borealis*), eastern gray squirrel (*Sciurus carolinensis*), eastern flying squirrel (*Glaucomys volans*), Baird's pocket gopher (*Geomys breviceps*), white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*), eastern woodrat (*Neotoma floridana*), eastern cottontail (*Sylvilagus floridanus*) and swamp rabbit (*Sylvilagus aquaticus*).

Land turtles common to this province are ornate box turtle (*Terrapene ornata*) and eastern box turtle (*Terrapene carolina*). Common snake species found in this Texas region include: cottonmouth moccasin (*Agkistrodon piscivorus leucostoma*), copperhead (*Agkistrodon contortrix*), rough green snake (*Ophedrys aestivus*), rat snake (*Elaphe obsoleta*), coachwhip (*Masticophis flagellum*) and speckled kingsnake (*Lampropeltis geluta holbrooki*). Several Austroriparian species apparently reach their western limits in this Texas province, including the eastern harvest mouse (*Reithrodontomys humulis*), cotton mouse (*Peromyscus gossypinus*), spotted salamander (*Ambystoma maculatum*), marbled salamander (*Ambystoma opacum*), mole salamander (*Ambystoma talpoideum*), pig frog (*Rana grylio*) and pickerel frog (*Rana palustris*).

⁷ Correll and Johnston, 1970 and Hatch, et. al., 1990.

⁸ Hatch, et. al., 1990.

Balconian. Fifty-seven species of mammals are known from the Balconian province but no species is restricted to this province. The mammalian fauna of the Balconian contains a strong influence from the Chihuahuan species that range into the province from the west and the Austroriparian province from the east.

Some common mammals are the nine-banded armadillo (*Dasypus novimcinctus*), fox squirrel (*Sciurus niger*), white-footed mouse (*Peromyscus leucopus*), black rat (*Rattus rattus*), house mouse (*Mus musculus*), raccoon (*Procyon lotor*) and white-tailed deer (*Odocoileus virginiana*).

Approximately 400 avian species have been recorded as occurring in the Balconian Biotic Province. Common species include mourning dove (*Zenaida macroura*), yellow-billed cuckoo (*Coccyzus americanus*), chimney swift (*Chaetura pelagica*), black-chinned hummingbird (*Archilochus alexandri*), red-bellied woodpecker (*Melanerpes carolinus*), purple martin (*Progne subis*), cliff swallow (*Hirundo pyrrhonota*), blue jay (*Cyanocitta cristata*), Carolina chickadee (*Parus carolinensis*), tufted titmouse (*Parus bicolor*), Carolina wren (*Thryothorus ludovicianus*), Bewick's wren (*Thryomanes bewickii*), northern mockingbird (*Mimus polyglottos*), white-eyed vireo (*Vireo griseus*), black-and-white warbler (*Mniotilta varia*), northern cardinal (*Cardinalis cardinalis*), rufous-crowned sparrow (*Aimophila ruficeps*), lark sparrow (*Chodestes grammacus*), great-tailed grackle (*Quiscalus mexicanus*) and house sparrow (*Passer domesticus*).

Texan. Mammals typical of this province include the Virginia opossum (*Didelphis virginiana*), eastern mole (*Scalopus aquaticus*), fox squirrel (*Sciurus niger*), Louisiana pocket gopher (*Geomys breviceps*), fulvous harvest mouse (*Reithrodontomys fulvescens*), white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*), eastern cottontail (*Sylvilagus floridanus*) and swamp rabbit (*S. aquaticus*). Animals typical of grasslands of this province include the thirteen-lined ground squirrel (*Spermophilus tridecemlineatus*), hispid pocket mouse (*Chaetodipus hispidus*), deer mouse (*Peromyscus maniculatus*) and black-tailed jackrabbit (*Lepus californicus*).

Typical anuran species to this province are the Hurter's spadefoot (*Scaphiopus holbrookii hurteri*), Gulf Coast toad (*Bufo valliceps*), Woodhouse's toad (*Bufo woodhousii*), gray treefrog (*Hyla versicolor/chrysoscelis*), green treefrog (*Hyla cinerea*), bullfrog (*Rana catesbeiana*), southern leopard frog (*Rana sphenoccephala*) and eastern narrowmouth toad (*Microhylla carolinensis*).

**Table E-1.
Federal and State-Listed Threatened and Endangered Species
of Potential Occurrence in the BGRWPA**

Common Name	Scientific Name	USFWS/State	County of Occurrence
Amphibians			
Georgetown Salamander	<i>Eurycea naufragia</i>	C/R	Wi
Houston Toad	<i>Bufo houstonensis</i>	LE/E	Br, Bu, Le, Ro
Jollyville Plateau Salamander	<i>Eurycea tonkawae</i>	NL/R	Wi
Salado Springs Salamander	<i>Eurycea chisholmensis</i>	C/R	Be
Reptiles			
Alligator Snapping Turtle	<i>Macroclmys temminckii</i>	NL/T	Br, Gr,
Brazos Water Snake	<i>Nerodia harteri</i>	NL/T	Bo, Ea, Er, Ha, Ho, Jo, Jn, Pa, Sh, So, Th, Yo
Concho Water Snake	<i>Nerodia paucimaculata</i>	LT/T	Co, La
Louisiana Pine Snake	<i>Pituophis melanoleucus ruthveni</i>	C/T	Br, Gr,
Spot-tailed Earless Lizard	<i>Holbrookia lacerata</i>	NL/R	Ta, Wi
Texas Garter Snake	<i>Thamnophis sirtalis annectens</i>	NL/R	All Counties (except Sn, Wa)
Texas Horned Lizard	<i>Phrynosoma cornutum</i>	NL/T	All Counties
Timber/ Canebrake Rattlesnake	<i>Crotalus horridus</i>	NL/T	Bo, Br, Bu, Er, Fa, Gr, Hi, Ho, Jo, Le, Li, Mc, Mi, Pa, Ro, So, Wa, Wi
Arachnids			
Bone Cave Harvestman	<i>Texella reyesi</i>	LE/R	Wi
Insects			
Coffin Cave Mold Beetle	<i>Batrisesodes texanus</i>	LE/R	Wi
Leon River Winter Stonefly	<i>Taeniopteryx starki</i>	NL/R	Bo, Co, Cr, Ea, Er, Ha, So
Tooth Cave Ground Beetle	<i>Rhandine peresphone</i>	LE/R	Wi
Birds			
American Peregrine Falcon	<i>Falco peregrinus anatum</i>	DL/E	Bu, Ca, Co, Ea, Er, Fi, Gr, Ha, Hs, Ho, Jn, Ke, Kn, La, Le, Mi, No, Pa, Ro, So, St, Sn, Sh, Ta, Th, Wa, Wi, Yo
Arctic Peregrine Falcon	<i>Falco peregrinus tundrius</i>	DL/T	All Counties
Baird's Sparrow	<i>Ammodramus bairdii</i>	NL/R	Co, Ea, Er, Fi, Hs, Ho, Jn, Ke, Kn, No, Pa, So, Sn, Ta
Bald Eagle	<i>Haliaeetus leucocephalus</i>	LT-PDL/T	All Counties
Black-capped Vireo	<i>Vireo atricapillus</i>	LE/E	Be, Bo, Ca, Co, Cr, Er, Ha, Ho, Jo, La, No, Pa, So, St, Ta, Wi
Ferruginous Hawk	<i>Buteo regalis</i>	NL/R	Fi, Hs, Jn, Ke, Kn, No, Sn, Ta
Golden-cheeked Warbler	<i>Dendroica chrysoparia</i>	LE/E	Be, Bo, Co, Cr, Er, Ha, Jo, La, Pa, So, St, Wi
Henslow's Sparrow	<i>Ammodramus henslowii</i>	NL/R	Be, Bo, Br, Bu, Cr, Er, Fa, Gr, Ha, Hi, Ho, Jo, Le, Li, Mc, Mi, Pa, Ro, So, Th, Wa, Wi, Yo
Interior Least Tern	<i>Sterna antillarum athalassos</i>	LE/E	All Counties
Lesser Prairie Chicken	<i>Tympanuchus pallidicinctus</i>	C/R	Fi, Hs, Jn, Ke, Kn, No, Sn,
Migrant Loggerhead Shrike	<i>Lanius ludovicianus migrans</i>	NL/R	Be, Bo, Cr, Fa, Hi, Jo, Li, Mc
Mountain Plover	<i>Charadrius montanus</i>	PT/R	All Counties
Piping Plover	<i>Charadrius melodus</i>	LT w/CH	All Counties
Red-cockaded Woodpecker	<i>Picoides borealis</i>	LE/E	Gr
Snowy Plover	<i>Charadrius alexandrinus</i>	NL/R	Fi, Hs, Jn, Ke, Kn, No, Sn
Western Burrowing Owl	<i>Athene cunicularia hypugaea</i>	NL/R	Be, Bo, Ca, Co, Cr, Ea, Er, Fa, Fi, Ha, Hs, Hi, Ho, Jo, Jn, Ke, Kn, Li, Mc, No, Pa, Sh, So, St, Sn, Th, Yo
White-faced Ibis	<i>Plegadis chihi</i>	NL/T	Fa, Hi, Ho, Jo, Li, Mc, Wa
Whooping Crane	<i>Grus americana</i>	LE/E	All Counties
Wood Stork	<i>Mycteria americana</i>	NL/T	Br, Bu, Gr, Ha, La, Le, Mi, Ro, Wa
Zone-tailed Hawk	<i>Buteo albonotatus</i>	NL/T	Mi, Ta
Fishes			
Blue Sucker	<i>Cycleptus elongatus</i>	NL/T	Br, Bu, Gr, Mi, Ro, Wa
Guadalupe Bass	<i>Micropterus treculi</i>	NL/R	Be, Bo, Cr, La, Mc, Mi, Wi
Sharpnose Shiner	<i>Notropis oxyrhynchus</i>	C/R	Co, Ea, Er, Ha, Ho, Kn, Pa, So
Smalleye Shiner	<i>Notropis buccula</i>	C/R	Be, Bo, Br, Bu, Co, Cr, Ea, Er, Fa, Ha, Ho, Ke, Kn, Li, Mc, Pa, So, Ta

Table E-1 (Continued)

Common Name	Scientific Name	USFWS/State	County of Occurrence
Mammals			
Black Bear	<i>Ursus americanus</i>	T-SA/T	Br, Bu, Ho, Wa
Black-footed Ferret	<i>Mustela nigripes</i>	LE/E	Fi, Hs, Jn, Ke, Kn, No, Sn
Black-tailed Prairie Dog	<i>Cynomys ludovicianus</i>	C/R	Fi, Ha, Jo, Ke, Kn, No, Sn, Ta, Yo
Cave Myotis Bat	<i>Myotis velifer</i>	NL/R	Be, Bo, Bu, Ca, Co, Cr, Er, Fa, Fi, Ha, Hs, Hi, Jn, Ke, Kn, La, Le, Li Mc, Mi, No, Ro, Sn, Ta, Th, Wi, Yo
Louisiana Black Bear	<i>Ursus americanus luteolus</i>	LT/T	Br, Bu, Gr, Wa
Plains Spotted Skunk	<i>Spilogale putorius interrupta</i>	NL/R	All Counties
Rafinesque's Big-eared Bat	<i>Corynorhinus rafinesquii</i>	NL/T	Br, Gr,
Southeastern Myotis Bat	<i>Myotis austroriparius</i>	NL/R	Br, Gr,
Swift Fox	<i>Vulpes velox</i>	NL/R	Fi, Hs, Jn, Ke, Kn, No, Sn
Texas Kangaroo Rat	<i>Dipodomys elato</i>	NL/T	Kn, Th, Yo
Plants			
Branched gayfeather	<i>Liatris cymosa</i>	NL/R	Br, Bu, Gr, Le, Wa
Comanche Peak prairie-clove	<i>Dalea reverchonii</i>	NL/R	Ho
Dwarf broomspurge	<i>Chamaesyce jejuna</i>	NL/R	No
Glen Rose yucca	<i>Yucca necopina</i>	NL/R	Ho, So
Large-fruited sand verbena	<i>Abronia macrocarpa</i>	LE/E	Ro
Navasota false foxglove	<i>Agalinis navasotensis</i>	NL/R	Gr
Navasota ladies tresses	<i>Sprianthes parksii</i>	LE/E	Br, Bu, Gr, Mi, Ro, Wa
Parks' jointweed	<i>Polygonella parksii</i>	NL/R	Bu, Mi, Ro
Sandhill woollywhite	<i>Hymenopappus carrizoanus</i>	NL/R	Ro
Small-headed pipewort	<i>Eriocaulon koernickianum</i>	NL/R	Br, Li
Texabama croton	<i>Croton alabamensis var. texensis</i>	NL/R	Be, Cr, Wi
Texas meadow rue	<i>Thalictrum texanum</i>	NL/R	Br, Gr, Wa
Texas windmill-grass	<i>Chloris texensis</i>	NL/R	Br,
Warnock's coral root	<i>Hexalectris warnockii</i>	NL/R	Ta
United States Fish and Wildlife Service Listing Abbreviations (USFWS):			
LE: Endangered (in danger of extinction throughout all or a significant portion of its range)			
LT: Threatened (likely to become endangered within the foreseeable future)			
PE, PT: Proposed endangered/threatened			
LE/SA,LT S/A: Endangered/threatened by similarity of appearance			
DL, PDL: Delisted, proposed delisted			
C: Candidate for listing, with biological vulnerability and threats to support listing			
LT w/CH: Threatened with Critical Habitat in Texas			
NL Not Federally Listed			
Texas Parks and Wildlife Department (TPWD) Listing Abbreviations:			
E: Listed as Endangered by the State of Texas			
T: Listed as Threatened by the State of Texas			
R: Rare, but with no regulatory listing status			
County Name Abbreviations			
Be: Bell	Hs: Haskell	No: Nolan	
Bo: Bosque	Hi: Hill	Pa: Palo Pinto	
Br: Brazos	Ho: Hood	Ro: Robertson	
Bu: Burleson	Jo: Johnson	So: Somervell	
Ca: Callahan	Jn: Jones	St: Stephens	
Co: Comanche	Ke: Kent	Sn: Stonewall	
Cr: Coryell	Kn: Knox	Sh: Shackelford	
Ea: Eastland	La: Lampasas	Ta: Taylor	
Er: Erath	Le: Lee	Th: Throckmorton	
Fa: Falls	Li: Limestone	Wa: Washington	
Fi: Fisher	Mc: McLennan	Wi: Williamson	
Gr: Grimes	Mi: Milam	Yo: Young	
Ha: Hamilton			
Data obtained from the Texas Parks and Wildlife Department Biological and Conservation Data System, May 20, 2004.			