



# TEXAS CONSERVATION ACTION PLAN

## Edwards Plateau DRAFT ECOREGION HANDBOOK JUNE 2011

Note: text in red in this document will be revised between June 10 Public Comment Draft and the final USFWS-approved document. THIS IS A SUMMARY of the HANDBOOK; more background information will be added.

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See links on Texas Parks and Wildlife Department's [Texas Conservation Action Plan 2011 Web Page](#) for additional references and supporting documents cited in this handbook.

*“Action that grows out of urgency, frustration, or even determination is missing a critical ingredient. For action to be effective, for action to be meaningful, it must also grow out of respect and a deep sense of connection to the things and people that surround us.” – Orion Magazine Editors, March/April 2011*

## SUMMARY

The Edwards Plateau (EDPT) Handbook is one of the Texas Conservation Action Plan (TCAP) thirteen handbooks, available on the Texas Parks and Wildlife Department’s [Texas Conservation Action Plan website](#):

- an **Overview** – background information about how this Plan came about and was revised;
- a **Statewide/Multi-region handbook** – broad resource concerns and opportunities; and
- 10 other ecoregion handbooks like this one for different areas of Texas with more local information.

This handbook provides insight into specific EDPT resources and conservation issues, including a list of Species of Greatest Conservation Need (SGCN), rare communities, and important habitats that support these unique features. The EDPT handbook also presents a compiled list of issues – things that prevent us from doing our best conservation work here – and proposed solutions or actions. Throughout this document, there are resources – web links, programs, incentives, and contacts – to help you participate in implementation and learn more about the natural resources this region of Texas has to offer.

**The TCAP EDPT Ecoregion Handbook takes advantage of many different perspectives to understand local changes and identify actions that will reduce threats to specific natural resources: SGCN, rare communities and the habitats on which they rely.** The Plan aims to ensure that we are able to share our natural heritage with future generations of Texans and that they understand what we did to make *progress* toward that goal.

It’s important to prioritize where we need to work to the degree that we can: human and financial resources are limited, certain issues demand more immediate resolution, and some species and habitats are simply more in need. The TCAP 2011 taps into a broad network of conservation service providers, natural resources managers, alliances and working groups, policy makers, stakeholders and the public to define **what’s at risk, what issues are most important, where we need to work, how to best engage the right partners to solve the problems, and what to do.**

This handbook is divided into sections to guide priority setting and actions:

- resources at risk - SGCN, rare communities, and the habitats on which they rely;
- issues that are most important, which could benefit from targeted stakeholder involvement; and
- conservation actions to benefit resources and make progress toward solving issues.

Certain resources also have a statewide context – riparian areas, grasslands – and additional actions at that level are proposed in the Statewide/Multi-region handbook. For more information about how content was developed for all handbooks of the Action Plan, please see the Overview handbook.

## HOW TO GET INVOLVED

This handbook contains a list of partners and programs that provide conservation services and/or information in this area. Additionally, certain conservation actions at the end of this handbook may help you connect with partners working on specific issues.

There are many wonderful, energetic public and private conservation providers in Texas who have active volunteer networks, strategic needs, and programs. For more information, check the [Natural Resource Conservation Programs and Services for Texas Landowners](#) (TPWD 2007).

If you have questions about the TCAP content and cannot find what you need on the TPWD TCAP 2011 website or in one of the handbooks, please contact the TCAP Coordinator at the TPWD Headquarters in Austin, Texas:

Phone (512) 389-4800

Email [Texas Conservation Action Plan Coordinator](#)

NOTE this email link for questions and implementation participation will be live AFTER the Public Comment period to ensure that we get all public comment through the posted survey on the

[Texas Conservation Action Plan website](#)

## OVERVIEW

A one-page description of this ecoregion is being developed during the public comment period. For more information about the ecoregion's features during this time, please review Griffith (2010) and Griffith et. al. (2007).<sup>1</sup>

**Table 1** crosswalks this ecoregion with other conservation planning units.<sup>2</sup>

**Figure 1** illustrates the location and extent of this ecoregion in Texas.

**Table 2** documents the **Ecological Drainage Units** (EDU) and **Hydrologic Units** ("HUC 8", finer scale watersheds within EDUs), and **Ecologically Significant Stream Segments**<sup>3</sup> (ESSS) which occur in this area.

**Figure 2** shows those EDUs, HUC8s and ESSS by ecoregion.

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<sup>1</sup> Griffith, G. 2010. Level III North American Terrestrial Ecoregions: United States Descriptions. Prepared for the North American Commission for Environmental Cooperation ([www.cec.org](http://www.cec.org)), version May 11, 2010. Corvallis, Oregon.

Griffith, G.E., S.A. Bryce, J.M. Omernik, J.A. Comstock, A.C. Rogers, B. Harrison, S.L. Hatch and D. Bezanson. 2007. Ecoregions of Texas. R.S. Geological Survey, Reston VA. [http://www.epa.gov/wed/pages/ecoregions/tx\\_eco.htm](http://www.epa.gov/wed/pages/ecoregions/tx_eco.htm) (accessed May 2009).

<sup>2</sup> For more information about planning boundaries, see the Overview handbook on the TCAP 2011 website <http://www.tpwd.state.tx.us/landwater/land/tcap/>

<sup>3</sup> TPWD. 2002/2005. *Ecologically Significant Stream Segments*.

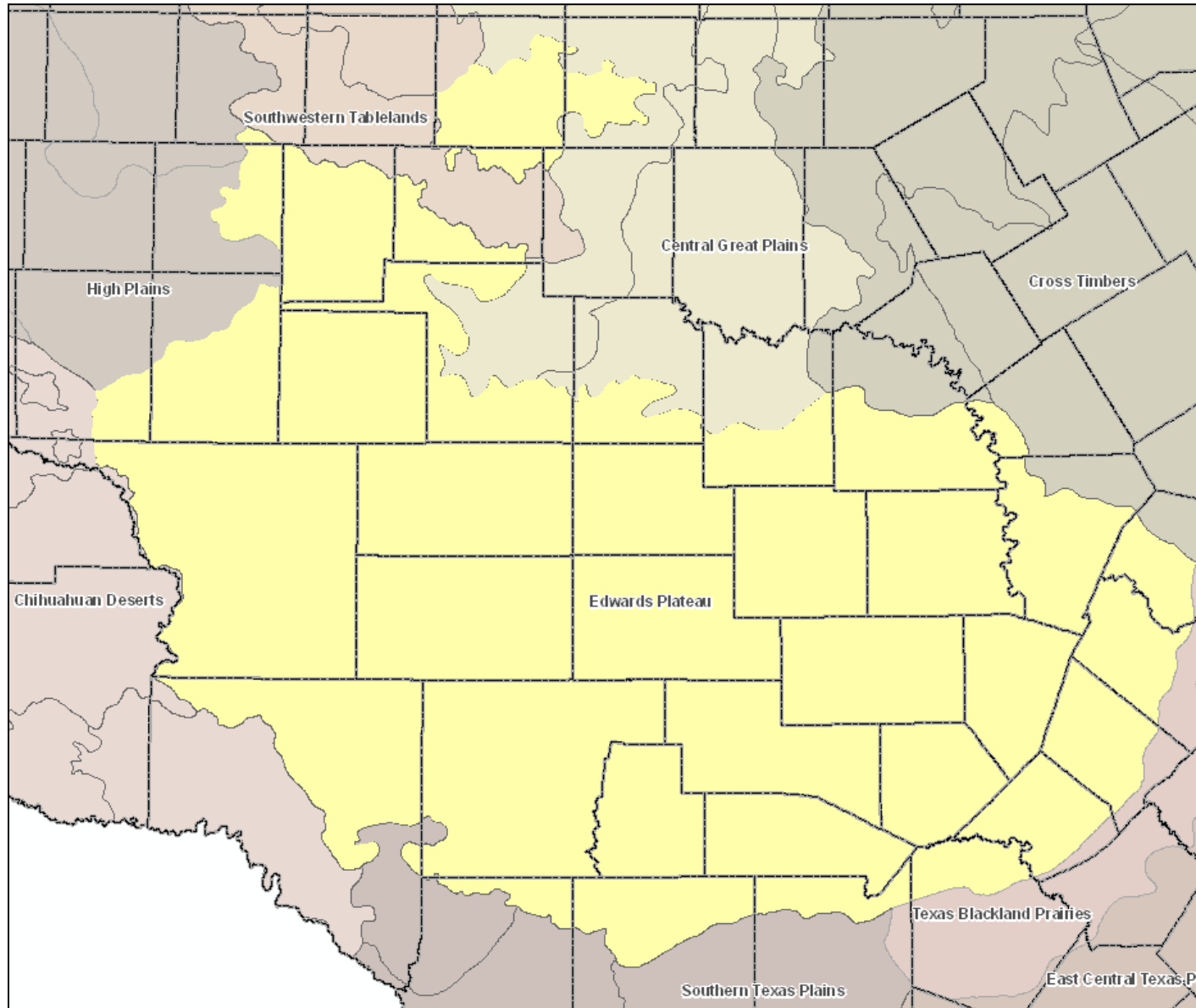
[http://www.tpwd.state.tx.us/landwater/water/environconcerns/water\\_quality/sigsegs/](http://www.tpwd.state.tx.us/landwater/water/environconcerns/water_quality/sigsegs/)

**Table 1. Crosswalk of EDPT Ecoregion with Other Conservation Plan Units**

Note Table is formatted 8-1/2" x 11" landscape orientation; see also Ecoregions map on TCAP 2011 website.

2010 TCAP *	2005 TXWAP (Gould 1960)	The Nature Conservancy Terrestrial Ecoregions (1999)	Ecological Drainage Units (Watersheds) From the National Fish Habitat Action Plan TX = Southeast Aquatic Resources Partnership and Desert Fish Habitat Partnership (AFWA 2006, Fish Habitat Partnership 2009, Esselman, et.al. 2010)	All Bird Joint Ventures (JV) and Bird Conservation Regions (BCR) (NABSCI-US 2004, USFWS 2009a)	Landscape Conservation Cooperatives (LCC) (USFWS 2009b)	2010 TPWD Land & Water Plan Strategic Regions (TPWD 2010)	Major Land Resource Regions and Areas (MLRA) (NRCS 2006)	Natural Regions of Texas (LBJ School of Public Policy 1978)
Edwards Plateau (EDPT)	Edwards Plateau	Edwards Plateau (29)	Brazos River – Prairie Colorado River – Ed Plateau Colorado River – Prairie Corpus Christi – Frio – Nueces Guadalupe – San Antonio Lower Brazos River Lower Rio Grande/Bravo	Oaks and Prairies JV Edwards Plateau BCR	Gulf Coast Prairie	Trans Pecos – Rio Grande (1) Nueces Coastal Bend (3) Guadalupe – San Antonio (4) Colorado Upper (5a) Colorado Lower (5b) Brazos Upper (6a)	Southwest Plateaus and Plains Range and Cotton Region: <i>Edwards Plateau Western Part (81A), Edwards Plateau Central Part (81B), Edwards Plateau Eastern Part (81C), Texas Central Basin (82A), Northern Rio Grande Plain (83A)</i>	Edwards Plateau and Llano Uplift

Figure 1. EDPT Ecoregion with County Boundaries



**Table 2. EDPT EDUs with Ecologically Significant Stream Segments and Reservoirs**

<b>ECOLOGICAL DRAINAGE UNIT SubBasin (HUC 8)</b>	<i>Ecologically Significant Stream Segment TPWD 2002, w/updates 2005</i>	<b>Lakes and Reservoirs</b>
<b>LOWER PECOS</b>		
Lower Pecos	Pecos River, Live Oak Creek	
Howard Draw		
<b>LOWER RIO GRANDE/BRAVO</b>		
Lower Devils	Devils River	Amistad Reservoir
Elm-Sycamore		
Upper Devils	Devils River	
Dry Devils		
<b>BRAZOS RIVER - PRAIRIE</b>		
Upper Clear Fork Brazos		Lake Abilene
<b>LOWER BRAZOS RIVER</b>		
San Gabriel	Oatmeal Creek, San Gabriel River	Lake Georgetown
<b>COLORADO RIVER - PRAIRIE</b>		
Colorado Headwaters		
Beals		
<b>COLORADO RIVER - EDWARDS PLATEAU</b>		
Jim Ned		
San Saba	Clear Creek, San Saba River	
Buchanan - Lyndon B	Gorman Creek, Colorado River	Lake Buchanan, Inks Lake, Lake LBJ
Middle Colorado - Elm		
Middle Concho	West Rocky Creek	
North Concho		
Concho		
Brady		Brady Creek Reservoir
Upper Colorado		
South Concho	Spring Creek	
North Llano		
South Llano	South Llano River	
Llano	James River, Llano River	Lake LBJ (upper)
Pedernales	Pedernales River	Lake Travis
Austin - Travis Lakes	Bull Creek, Little Barton Creek, Barton Creek, Colorado River, Onion Creek	Lake Marble Falls, Lake Travis, Lake Austin, Town Lake (Ladybird Lake),

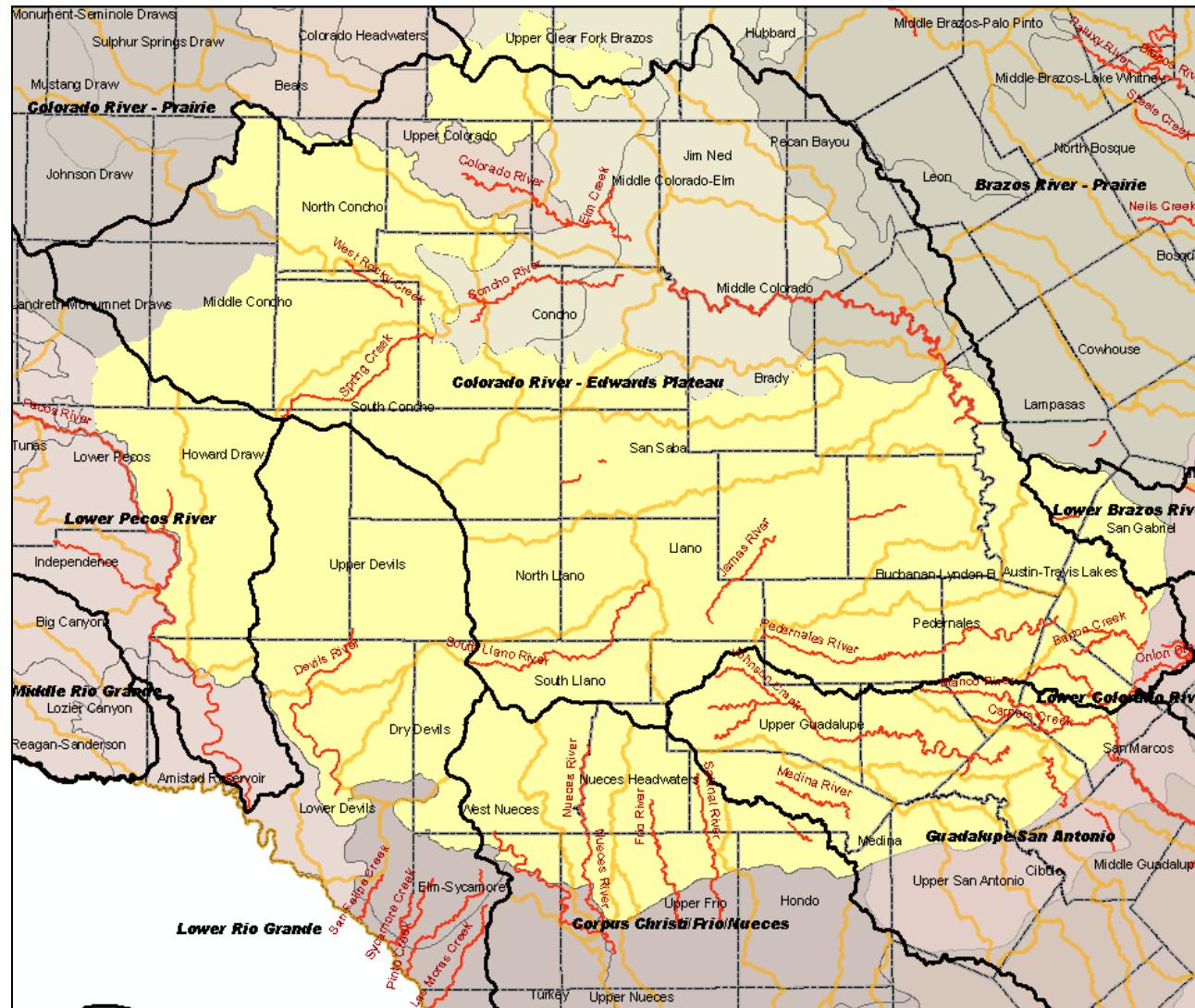


<b>ECOLOGICAL DRAINAGE UNIT SubBasin (HUC 8)</b>	<i>Ecologically Significant Stream Segment TPWD 2002, w/updates 2005</i>	<b>Lakes and Reservoirs</b>
<b>GUADALUPE - SAN ANTONIO</b>		
Medina	Medina River	Medina Lake
Upper Guadalupe	Johnson Creek, North Fork Guadalupe, South Fork Guadalupe, Guadalupe River, Honey Creek	Ingram Lake, Canyon Lake
San Marcos	Carper Creek, Little Blanco River, Blanco River, Cypress Creek, Willow Springs Creek	
Upper San Antonio		
Cibolo		
Middle Guadalupe	Guadalupe River	
<b>CORPUS CHRISTI - FRIO - NUECES</b>		
West Nueces	West Nueces River	
Nueces Headwaters	Nueces River	
Upper Nueces		
Upper Frio	Frio River, Sabinal River	
Hondo	West Verde Creek	

Note: Ecologically Significant Stream Segments and Reservoirs which occur in the Subbasin (HUC 8) but not in the ECOREGION are not included in this table. There may be other significant stream resources mentioned in the Priority Habitats section

**Figure 2. EDPT EDUs, HUC 8s, and ESSS**

EDUs black outline, HUC 8s orange outline, ESSS red lines



Note: other important stream segments are mentioned in the Priority Habitats section

## RARE SPECIES AND COMMUNITIES

While most conservation work is done at the habitat level to address issues and threats, Action Plans' [stated primary purpose](#) is to improve and sustain *species'* populations and prevent the need to list species as federally or state threatened or endangered. The Species of Greatest Conservation Need (**SGCN**) list, one of the Eight Required Elements in all states' Action Plans, is the foundation for the habitat- and issues- based actions in the Plan. In Texas, we've also identified Rare Communities for this planning process.

For more information about how the SGCN and Rare Communities lists were developed, including the changes from the 2005 list, see the [Overview Handbook](#). Species and rare communities included in the [2011 TCAP Final SGCN](#) and [Rare Communities](#) lists are supported by current science, peer-reviewed references and/or other dependable, accessible source documentation, and expert opinion. The revised lists for TCAP 2011 are substantial and representative of conservation targets needing attention in this Plan and are sorted into the following categories:

Mammals	Birds
Reptiles and Amphibians	Freshwater Fishes
Invertebrates	Plants
Plant Communities	

Other categories are listed on the full statewide list, but are not applicable in this ecoregion: Bay and Estuary Fishes, Marine Fishes, Marine Reptiles, and Marine Mammals

Each species has a [NatureServe](#) calculated state and global [conservation rank](#), which accounts for abundance, stability and threats. Additionally, several species have [federal](#) and/or [state](#) listing (endangered, threatened, candidate) status. See the [key to conservation and listing ranks](#) on the TPWD [TCAP 2011 website](#).

**Table 3. EDPT Species of Greatest Conservation Need (SGCN)**

Note Table is formatted 8-1/2" x 11" portrait orientation; more information is available in the SGCN table online.

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
<b>MAMMALS</b>					
<i>Mustela frenata</i>	Long-tailed weasel			G5	S5
<i>Myotis velifer</i>	Cave myotis			G5	S4
<i>Puma concolor</i>	Mountain lion			G5	S2
<i>Spilogale putorius</i>	Eastern spotted skunk			G4T	S4
<i>Tadarida brasiliensis</i>	Brazilian free-tailed bat			G5	S5
<i>Taxidea taxus</i>	American badger			G5	S5
<i>Lutra canadensis</i>	River otter			G5	S4
<i>Sylvilagus aquaticus</i>	Swamp rabbit			G5	S5
<i>Ursus americanus</i>	Black bear	SAT	T	G5	S3
<i>Conepatus leuconotus</i>	Hog-nosed skunk			G5	S4
<i>Antrozous pallidus</i>	Pallid bat			G5	S5
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat			G4T4	S3? S4?
<i>Cynomys ludovicianus</i>	Black-tailed prairie dog			G5T3	S3
<i>Mustela nigripes</i>	Black-footed ferret	LE		G1	SH
<i>Spilogale gracilis</i>	Western spotted skunk			G5	S5
<i>Vulpes velox</i>	Swift fox			G3	S3?
<i>Eptesicus fuscus</i>	Big brown bat			G5	S5
<i>Geomys texensis bakeri</i>	Frio pocket gopher			G2QT2	S2
<i>Geomys texensis texensis</i>	Llano pocket gopher			G3T2	S2
<i>Mormoops megalophylla</i>	Ghost-faced bat			G4	S2
<i>Nasua narica</i>	White-nosed coati		T	G5	S2?
<i>Parastrellus hesperus</i>	Canyon Bat (western pipistrelle)			G5	S5
<i>Perimyotis subflavus</i>	Tricolored Bat (eastern pipistrelle)			G5	S5
<b>BIRDS</b>					
<i>Colinus virginianus</i>	Northern Bobwhite			G5	S4B
<i>Circus cyaneus</i>	Northern Harrier			G5	S2B,S3N
<i>Tyrannus forficatus</i>	Scissor-tailed Flycatcher			G5	S3B
<i>Lanius ludovicianus</i>	Loggerhead Shrike			G4	S4B
<i>Spizella pusilla</i>	Field Sparrow			G5	S5B
<i>Ammodramus savannarum</i>	Grasshopper Sparrow			G5	S3B
<i>Chondestes grammacus</i>	Lark Sparrow			G5	S4B

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
<i>Spiza americana</i>	Dickcissel			G5	S4B
<i>Sturnella magna</i>	Eastern Meadowlark			G5	S5B
<i>Icterus spurius</i>	Orchard Oriole			G5	S4B
<i>Meleagris gallopavo</i>	Wild Turkey			G5	S5B
<i>Buteo lineatus</i>	Red-shouldered Hawk			G5	S4B
<i>Caprimulgus carolinensis</i>	Chuck-will's-widow			G5	S3S4B
<i>Vireo bellii</i>	Bell's Vireo			G5	S3B
<i>Poecile carolinensis</i>	Carolina Chickadee			G5	S5B
<i>Anthus spragueii</i>	Sprague's Pipit	C		G4	S3N
<i>Ammodramus leconteii</i>	Le Conte's Sparrow				
<i>Zonotrichia querula</i>	Harris's Sparrow			G5	S4
<i>Piranga rubra</i>	Summer Tanager			G5	S5B
<i>Passerina ciris</i>	Painted Bunting			G5	S4B
<i>Dendroica dominica</i>	Yellow-throated Warbler			G5	S4B
<i>Seiurus motacilla</i>	Louisiana Waterthrush			G5	S3B
<i>Aimophila cassinii</i>	Cassin's Sparrow			G5	S4B
<i>Vireo atricapilla</i>	Black-capped Vireo	LE	E	G3	S2B
<i>Dendroica chrysoparia</i>	Golden-cheeked Warbler	LE	E	G2	S2B
<i>Aimophila ruficeps</i>	Rufous-crowned Sparrow			G5	S4B
<i>Parabuteo unicinctus</i>	Harris's Hawk			G5	S3B
<i>Cyrtonyx montezumae</i>	Montezuma Quail			G4G5	S3B
<i>Buteogallus anthracinus</i>	Common Black-Hawk		T	G4G5	S2B
<i>Buteo albonotatus</i>	Zone-tailed Hawk		T	G4	S3B
<i>Aquila chrysaetos</i>	Golden Eagle			G5	S3B
<i>Parula pitiayumi</i>	Tropical Parula		T	G5	S3B
<b>REPTILES &amp; AMPHIBIANS</b>					
<i>Anaxyrus (Bufo) woodhousii</i>	Woodhouse's toad			G5	SU
<i>Apalone mutica</i>	smooth softshell turtle				
<i>Cheylydra serpentina</i>	Common snapping turtle				
<i>Crotalus atrox</i>	Western diamondback rattlesnake				S4
<i>Heterodon nasicus</i>	Western hognosed snake				
<i>Phrynosoma cornutum</i>	Texas horned lizard		T	G4G5	S4
<i>Terrapene ornata</i>	Ornate box turtle			G5	S3
<i>Trachemys scripta</i>	Red-eared slider				
<i>Pseudacris streckeri</i>	Strecker's Chorus Frog			G5	S3
<i>Thamnophis sirtalis</i>	Common Garter Snake			G5	S2

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
	(Eastern/Texas/ New Mexico)				
<i>Apalone spinifera</i>	spiny softshell turtle				
<i>Graptemys caglei</i>	Cagle's map turtle		T	G3	S1
<i>Ophisaurus attenuatus</i>	western slender glass lizard				
<i>Terrapene carolina</i>	Eastern box turtle			G5	S3
<i>Sistrurus catenatus</i>	massasagua				
<i>Eurycea naufragia</i>	Georgetown Salamander	C		G1	S1
<i>Graptemys versa</i>	Texas map turtle			G4	SU
<i>Drymarchon corais</i>	Indigo Snake			G5T4	S4
<i>Eurycea latitans</i>	Cascade Caverns salamander		T	G3	S1
<i>Eurycea nana</i>	San Marcos salamander	LT	T	G1	S1
<i>Eurycea neotenes</i>	Texas salamander			G1	S2
<i>Eurycea pterophila</i>	Blanco River springs salamander			G2	S2
<i>Eurycea rathbuni</i>	Texas blind salamander	LE	E	G1	S1
<i>Eurycea robusta</i>	Blanco blind salamander		T	G1Q	S1
<i>Eurycea sosorum</i>	Barton Springs salamander	LE	E	G1	S1
<i>Eurycea tonkawae</i>	Jollyville Plateau Salamander	C		G1	S2S3
<i>Eurycea tridentifera</i>	Comal blind salamander		T	G1	S1
<i>Eurycea waterlooensis</i>	Austin blind salamander	C		G1	S1
<i>Gopherus berlandieri</i>	Texas tortoise		T	G4	S2*
<i>Holbrookia lacerata lacerata</i>	Plateau earless lizard				S2
<i>Nerodia paucimaculata</i>	Concho water snake	LT-PDL		G2	S2
<b>FRESHWATER FISHES</b>					
<i>Anguilla rostrata</i>	American eel			G4	S5
<i>Percina apristis</i>	Guadalupe darter				
<i>Ictalurus lupus</i>	Headwater catfish			G3	S2
<i>Micropterus treculii</i>	Guadalupe bass			G3	S3
<i>Cyprinella lepida</i>	Plateau shiner			G1G2	S1S2
<i>Cyprinella proserpina</i>	Proserpine shiner		T	G3	S2
<i>Cyprinella sp.</i>	Nueces river shiner			G1G2Q	S1S2
<i>Cyprinodon eximius ssp</i>	Devils River pupfish				
<i>Dionda argentosa</i>	Manantial roundnose minnow			G2	S2
<i>Dionda diaboli</i>	Devils River minnow	LT	T	G1	S1
<i>Dionda nigrotaeniata</i>	Guadalupe roundnose			G4	S4

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
	minnow				
<i>Dionda serena</i>	Nueces roundnose minnow			G2	S2
<i>Etheostoma grahami</i>	Rio Grande darter		T	G2G3	S2
<i>Gambusia heterochir</i>	Clear Creek gambusia	LE	E	G1	S1
<b>INVERTEBRATES</b>					
<i>Heterelmis sp.</i>	Devils River Springs riffle beetle			G1*	S1*
<i>Bombus pensylvanicus</i>	American bumblebee			GU	SU*
<i>Quadrula aurea</i>	Golden orb		T	G1	S2*
<i>Quadrula houstonensis</i>	Smooth pimpleback		T	G2	S1S2*
<i>Quadrula mitchelli</i>	False Spike		T	GH	SH
<i>Truncilla macrodon</i>	Texas fawnsfoot		T	G2Q	S1*
<i>Bombus variabilis</i>	Variable cuckoo bumblebee			GU	SU*
<i>Colletes bumeliae</i>	A cellophane bee			G1*	S1*
<i>Lampsilis bracteata</i>	Texas fatmucket		T	G1	S1*
<i>Amblycorypha uhleri</i>	A katydid			G2G3*	S2?*
<i>Arethaea ambulator</i>	A katydid			G2G3*	S2?*
<i>Pogonomyrmex comanche</i>	Comanche harvester ant			G2G3*	S2*
<i>Allotexiweckelia hirsuta</i>	A cave obligate amphipod			G2G3	S2?*
<i>Almuerzothyas n. sp.</i>	An aquatic mite			G1*	S1*
<i>Apocheiridium reddelli</i>	A cave obligate pseudoscorpion			G1G2	S1*
<i>Arrenurus n. sp</i>	An aquatic mite			G1*	S1*
<i>Artesia subterranea</i>	A cave obligate amphipod			G1G2	S1?*
<i>Austrotinodes texensis</i>	Texas Austrotinodes caddisfly			G2	S2
<i>Baetodes alleni</i>	A mayfly			G1G2	S1?*
<i>Balconorbis uvaldensis</i>	Balcones ghostsnail			G1G2	S1*
<i>Batrisodes cryptotexanus</i>	A cave obligate beetle			G2*	S2*
<i>Batrisodes dentifrons</i>	A cave obligate beetle			G1G2*	S1*
<i>Batrisodes fanti</i>	A cave obligate beetle			G1G2*	S1*
<i>Batrisodes feminiclypeus</i>	A cave obligate beetle			G1G2*	S1*
<i>Batrisodes gravesi</i>	A cave obligate beetle			G2*	S2*
<i>Batrisodes grubbsi</i>	A cave obligate beetle			G1G2	S1*
<i>Batrisodes incisipes</i>	A cave obligate beetle			G1G2*	S1*
<i>Batrisodes pekinsi</i>	A cave obligate beetle			G1G2*	S1*
<i>Batrisodes reyesi</i>	A cave obligate beetle			G2G3	S2*
<i>Batrisodes shadeae</i>	A cave obligate beetle			G1G2*	S1*

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
<i>Batrisodes texanus</i>	A cave obligate beetle	LE		G1G2	S1
<i>Batrisodes venyivi</i>	A cave obligate beetle	LE		G1G2	S1
<i>Batrisodes wartoni</i>	A cave obligate beetle			G1G2*	S1
<i>Bombus sonor</i>	Sonoran bumblebee			GU	SU*
<i>Brackenridgia reddelli</i>	A cave obligate isopod			G2G3	S2?*
<i>Caenis arwini</i>	A mayfly			G1G3	S2?*
<i>Calathaemon holthuisi</i>	A cave obligate shrimp			G1G2	S1?*
<i>Chitrella ellioti</i>	A cave obligate pseudoscorpion			G1G2	S1*
<i>Cicurina bandera</i>	A cave obligate spider			G2G3	S2*
<i>Cicurina bandida</i>	Bandit Cave spider			G1G2	S1
<i>Cicurina baronia</i>	Robber Baron Cave meshweaver	LE		G1G2	S1
<i>Cicurina barri</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina browni</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina caliga</i>	A cave obligate spider			G1G2*	S1*
<i>Cicurina caverna</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina coryelli</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina ellioti</i>	A cave obligate spider			G2G3	S2*
<i>Cicurina ezelli</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina gruta</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina holsingeri</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina hoodensis</i>	A cave obligate spider			G1G2*	S1*
<i>Cicurina machete</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina madla</i>	Madla Cave meshweaver	LE		G1G2	S1
<i>Cicurina mckenziei</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina medina</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina menardia</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina mixmaster</i>	A cave obligate spider			G1G2*	S1*
<i>Cicurina obscura</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina orellia</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina pablo</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina pastura</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina patei</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina porteri</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina puentecilla</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina rainesi</i>	A cave obligate spider			G1G2	S1*



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<i>Cicurina reclusa</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina reddelli</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina russelli</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina sansaba</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina selecta</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina serena</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina sheari</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina sprousei</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina stowersi</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina suttoni</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina travisae</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina troglobia</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina ubicki</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina uvalde</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina venefica</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina venii</i>	Braken Bat Cave Meshweaver	LE		G1G2	S1
<i>Cicurina vespera</i>	Government Canyon Bat Cave Meshweaver	LE		G1G2	S1
<i>Cicurina vibora</i>	A cave obligate spider			G1G2	S1*
<i>Cicurina wartoni</i>	Warton cave Meshweaver	C		G1	S1
<i>Cicurina watersi</i>	A cave obligate spider			G1G2	S1*
<i>Cisthene conjuncta</i>	A lichen moth			G1Q	S1Q*
<i>Comaldessus stygius</i>	Comal Springs diving beetle			G1	S1
<i>Daedalochila hippocrepis</i>	Horseshoe liptooth			G1	S1
<i>Dichopetala catinata</i>	A katydid			G1?*	S1?*
<i>Dichopetala seeversi</i>	A katydid			G1*	S1*
<i>Dinocheirus cavicolus</i>	A cave obligate pseudoscorpion			G2G3	S2*
<i>Eidmennella nastuta</i>	A cave obligate spider			G1G2	S1*
<i>Eidmennella reclusa</i>	A cave obligate spider			G1G2	S1*
<i>Elaphoidella n. sp.</i>	A cave obligate copepod			G1*	S1*
<i>Haideoporus texanus</i>	Edwards Aquifer diving beetle			G1G2	S1
<i>Heterelmis comalensis</i>	Comal Springs riffle beetle	LE		G1	S1
<i>Heterelmis sp.</i>	Fern Bank Springs riffle beetle			G1*	S1*
<i>Heterelmis sp.</i>	Fessenden Springs riffle beetle			G1*	S1*

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<i>Holcopasites jerryrozeni</i>	A cuckoo bee			G1*	S1*
<i>Holospira goldfussi</i>	New Braunfels Holospira			G2G3	S2?*
<i>Holsingerius samacos</i>	A cave obligate amphipod			G1G2	S1?*
<i>Hyalella texana</i>	Clear Creek amphipod			G1	S1
<i>Hydroptila melia</i>	A caddisfly			G2G3	S2?*
<i>Ingolfiella n. sp.</i>	A cave obligate amphipod			G1G2*	S1*
<i>Leucohya texana</i>	A cave obligate pseudoscorpion			G1G2	S1*
<i>Lirceolus bisetus</i>	A cave obligate isopod			G1G2	S1*
<i>Lirceolus hardeni</i>	A cave obligate isopod			G2G3	S2?*
<i>Lirceolus pilus</i>	A cave obligate isopod			G2G3	S2?
<i>Lirceolus smithii</i>	Texas troglobitic water slater			G1G2	S1
<i>Lymanthes nadineae</i>	A cave obligate beetle			G1*	S1*
<i>Macrotera parkeri</i>	A mining bee			G1G2*	S1S2*
<i>Macrotera robertsi</i>	A mining bee			G1*	S1*
<i>Marstonia comalensis</i>	Comal siltsnail			G1	S1
<i>Mexistenasellus coahuila</i>	A cave obligate isopod			G2G3	S2?*
<i>Mexiweckelia hardeni</i>	A cave obligate amphipod			G2G3	S2?*
<i>Microceramus texanus</i>	Texas urocoptid			G2	S2*
<i>Millerelix gracilis</i>	Edwards Plateau liptooth			G2G3	S2?*
<i>Myrmecoderus laevipennis</i>	A narrow-waisted bark beetle			G1*	S1*
<i>Nectopsyche texana</i>	A caddisfly			G1G3	S2?*
<i>Neoleptoneta anopica</i>	A cave obligate spider			G1G2	S1*
<i>Neoleptoneta bullis</i>	A cave obligate spider			G1G2*	S1*
<i>Neoleptoneta concinna</i>	A cave obligate spider			G1G2	S1*
<i>Neoleptoneta devia</i>	A cave obligate spider			G1G2	S1*
<i>Neoleptoneta microps</i>	Government Canyon Bat Cave spider	LE		G1G2	S1
<i>Neoleptoneta myopica</i>	Tooth Cave spider	LE		G1G2	S1
<i>Neoleptoneta valverde</i>	A cave obligate spider			G1G2	S1*
<i>Neotrichia juani</i>	A caddisfly			G1	S1*
<i>Nitocrellopsis texana</i>	A cave obligate copepod			G1*	S1*
<i>Oncopodura fenestra</i>	A cave obligate springtail			G2G3	S2?*
<i>Oxyelophila callista</i>	A snout moth			G1?*	S1?*
<i>Oxyethira ulmeri</i>	A caddisfly			G2G3	S2?*
<i>Palaemonetes antrorum</i>	A cave obligate shrimp			G2G3	S2?*
<i>Palaemonetes texanus</i>	Texas river shrimp			G1G2*	S1?*

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<i>Parabogidiella americana</i>	A cave obligate amphipod			G2G3	S2?*
<i>Paraholsingerius smaragdinus</i>	A cave obligate amphipod			G2G3	S2?*
<i>Paralimnetis texana</i>	Pointytop finger clam shrimp			G1	S1*
<i>Paramexiweckelia ruffoi</i>	A cave obligate amphipod			G1G2	S1?*
<i>Patera leatherwoodi</i>	Pedernales oval			G1	S1*
<i>Perdita dolanensis</i>	A mining bee			G1*	S1*
<i>Petrophila daemonalis</i>	A snout moth			G1?*	S1?*
<i>Phreatodrobia conica</i>	Hueco cavesnail			G1	S1*
<i>Phreatodrobia imitata</i>	Mimic cavesnail			G1	S1
<i>Phreatodrobia micra</i>	Flattened cavesnail			G2G3	S2S3
<i>Phreatodrobia nugax</i>	Nymph trumpet			G1G2	S1*
<i>Phreatodrobia plana</i>	Disc cavesnail			G2	S2*
<i>Phreatodrobia punctata</i>	High-hat cavesnail			G2	S2*
<i>Phreatodrobia rotunda</i>	Beaked cavesnail			G1G2	S1*
<i>Plauditus texanus</i>	A mayfly			G2G3	S1?*
<i>Procloeon distinctum</i>	A mayfly			G1G3	S2?*
<i>Protandrena maurula</i>	A mining bee			G1G2*	S1S2*
<i>Protoptila arca</i>	A caddisfly			G1	S1
<i>Pygarctia lorula</i>	A tiger moth			G2G3	S2?*
<i>Quadrula petrina</i>	Texas pimpleback		T	G2	S1*
<i>Rhadine austinica</i>	A cave obligate beetle			G1G2	S1*
<i>Rhadine bullis</i>	A cave obligate beetle			G2*	S2
<i>Rhadine exilis</i>	A cave obligate beetle	LE		G1	S1
<i>Rhadine infernalis</i>	A cave obligate beetle	LE		G2G3	S1
<i>Rhadine insolata</i>	A cave obligate beetle			G1G2	S1*
<i>Rhadine noctivaga</i>	A cave obligate beetle			G1G2	S1*
<i>Rhadine persephone</i>	Tooth Cave ground beetle	LE		G1G2	S1
<i>Rhadine reyesi</i>	A cave obligate beetle			G1G2*	S1S2*
<i>Rhadine russelli</i>	A cave obligate beetle			G1G2	S1*
<i>Rhadine specia</i>	A cave obligate beetle			G2*	S2*
<i>Rhadine subterranea</i>	A cave obligate beetle			G2*	S2*
<i>Seborgia relictia</i>	A cave obligate amphipod			G2G3	S2?*
<i>Speocirolana hardeni</i>	A cave obligate isopod			G2G3	S2?*
<i>Speodesmus echinourus</i>	A cave obligate millipede			G2G3	S2?*
<i>Speodesmus falcatus</i>	A cave obligate millipede			G2 *	S2*
<i>Speodesmus ivyi</i>	A cave obligate millipede			G2 *	S2*

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<i>Speodesmus reddelli</i>	A cave obligate millipede			G2 *	S2*
<i>Sphinx eremitoides</i>	Sage sphinx			G1G2	S1?*
<i>Streptocephalus linderi</i>	Spinyfinger fairy shrimp			G2	S2*
<i>Stygobromus balconis</i>	A cave obligate amphipod			G2G3	S1
<i>Stygobromus dejectus</i>	Cascade Cave amphipod			G1G2	S1
<i>Stygobromus flagellatus</i>	Ezell's Cave amphipod			G2G3	S1
<i>Stygobromus hadenoecus</i>	Devil's Sinkhole amphipod			G1G2	S1
<i>Stygobromus limbus</i>	Border Cave amphipod			G1G2	S1*
<i>Stygobromus longipes</i>	Long-legged Cave amphipod			G2G3	S1
<i>Stygobromus n. sp.</i>	Neel's Cave amphipod			G1G2*	S1*
<i>Stygobromus n. sp.</i>	Devils River Cave amphipod			G1G2*	S1*
<i>Stygobromus n. sp.</i>	Fessenden Cave amphipod			G1G2*	S1*
<i>Stygobromus n. sp.</i>	Lost Maples Cave amphipod			G1G2*	S1*
<i>Stygobromus n. sp.</i>	San Gabriel Cave amphipod			G1G2*	S1*
<i>Stygobromus pecki</i>	Peck's Cave amphipod	LE	E	G1G2	S1
<i>Stygobromus reddelli</i>	Reddell stygobromid			G1G2	S1
<i>Stygobromus russelli</i>	A cave obligate amphipod			G1G2*	S1*
<i>Stygoparnus comalensis</i>	Comal Springs dryopid beetle	LE		G1G2	S1
<i>Stygopyrgus bartonensis</i>	Barton cavesnail			G1	S1
<i>Tartarocreagris altimana</i>	A cave obligate pseudoscorpion			G1G2*	S1*
<i>Tartarocreagris amblyopa</i>	A cave obligate pseudoscorpion			G1G2*	S1*
<i>Tartarocreagris attenuata</i>	A cave obligate pseudoscorpion			G1G2*	S1*
<i>Tartarocreagris domina</i>	A cave obligate pseudoscorpion			G1G2*	S1*
<i>Tartarocreagris grubbsi</i>	A cave obligate pseudoscorpion			G1G2*	S1*
<i>Tartarocreagris hoodensis</i>	A cave obligate pseudoscorpion			G1G2*	S1*
<i>Tartarocreagris infernalis</i>	A cave obligate pseudoscorpion			G2G3	S2?*
<i>Tartarocreagris intermedia</i>	A cave obligate pseudoscorpion			G1G2	S1*
<i>Tartarocreagris proserpina</i>	A cave obligate pseudoscorpion			G1G2*	S1*
<i>Tartarocreagris reddelli</i>	A cave obligate pseudoscorpion			G1G2*	S1*
<i>Tartarocreagris reyesi</i>	A cave obligate pseudoscorpion			G1G2*	S1*
<i>Tartarocreagris texana</i>	Tooth Cave Pseudoscorpion	LE		G1G2	S1

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<i>Tethysbaena texana</i>	A cave obligate crustacean			G2G3	S2?*
<i>Texamaurops reddelli</i>	Kretschmarr Cave Mold Beetle	LE		G2G3	S1
<i>Texanobathynella bowmani</i>	A bathynellid			G2G3	S2?*
<i>Texapyrgus longleyi</i>	Striated Hydrobe			G1	S1
<i>Texella brevidenta</i>	A cave obligate harvestman			G1G2	S1*
<i>Texella brevistyla</i>	A cave obligate harvestman			G1G2	S1*
<i>Texella cokendolpheri</i>	Cokendolpher Cave Harvestman	LE		G1G2	S1
<i>Texella diplospina</i>	A cave obligate harvestman			G1G2	S1*
<i>Texella grubbsi</i>	A cave obligate harvestman			G1G2	S1*
<i>Texella hardeni</i>	A cave obligate harvestman			G1G2	S1*
<i>Texella mulaiki</i>	A cave obligate harvestman			G2G3	S2*
<i>Texella reddelli</i>	Reddell harvestman	LE		G2G3	S2*
<i>Texella renkesae</i>	A cave obligate harvestman			G1G2	S1*
<i>Texella reyesi</i>	Bone Cave harvestman	LE		G2G3	S2*
<i>Texella spinoperca</i>	A cave obligate harvestman			G1G2*	S1*
<i>Texiweckelia texensis</i>	A cave obligate amphipod			G2G3	S2?*
<i>Tyrannochthonius muchmoreorum</i>	A cave obligate pseudoscorpion				
<i>Tyrannochthonius troglodytes</i>	A cave obligate pseudoscorpion			G1G2	S1*
<i>Xiphocentron messapus</i>	A caddisfly			G1G3	S2?*
<b>PLANTS</b>					
<i>Cuscuta exaltata</i>	tree dodder			G3	S3
<i>Festuca versuta</i>	Texas fescue			G3	S3
<i>Physaria engelmannii</i>	Engelmann's bladderpod			G3	S3
<i>Eriocaulon koernickianum</i>	small-headed pipewort			G2	S1
<i>Euphorbia peplidion</i>	low spurge			G3	S3
<i>Oenothera cordata</i>	heartleaf evening-primrose			G3	S3
<i>Prunus texana</i>	Texas peachbush			G3G4	S3S4
<i>Agalinis densiflora</i>	Osage Plains false foxglove			G3	S2
<i>Argythamnia apheroides</i>	Hill Country wild-mercury			G2G3	S2S3
<i>Carex edwardsiana</i>	canyon sedge			G3G4S3S4	S3S4
<i>Clematis texensis</i>	scarlet leather-flower			G3G4	S3S4
<i>Croton alabamensis</i> var. <i>texensis</i>	Texabama croton			G3T2	S2
<i>Hexalectris nitida</i>	Glass Mountains coral-root			G3	S3
<i>Pediomelum cyphocalyx</i>	turnip-root scurfpea			G3G4	S3S4

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<i>Prunus minutiflora</i>	Texas almond			G3G4	S3S4
<i>Styrax platanifolius</i> subsp. <i>platanifolius</i>	sycamore-leaf snowbell			G3T3	S3
<i>Valerianella stenocarpa</i>	bigflower cornsalad			G3	S3
<i>Ephedra coryi</i>	Cory's ephedra			G3	S3
<i>Eriogonum nealleyi</i>	Irion County wild-buckwheat			G2	S2
<i>Muhlenbergia villiflora</i> var. <i>villosa</i>	villous muhly			G5T3	S2
<i>Selenia jonesii</i>	Jones' selenia			G3	S3
<i>Amorpha roemeriana</i>	Texas amorpha			G3	S3
<i>Astragalus mollissimus</i> var. <i>coryi</i>	Cory's woolly locoweed			G5T3	S3
<i>Astragalus reflexus</i>	Texas milk vetch			G3	S3
<i>Astragalus wrightii</i>	Wright's milkvetch			G3	S3
<i>Bauhinia lunarioides</i>	Anacacho orchid			G3	S1
<i>Berberis swaseyi</i>	Texas barberry			G3	S3
<i>Brazoria enquistii</i>	Enquist's sandmint			G2	S2
<i>Brickellia dentata</i>	gravelbar brickellbush			G3G4	S3S4
<i>Brickellia eupatorioides</i> var. <i>gracillima</i>	narrowleaf brickellbush			G5T3	S3
<i>Campanula reverchonii</i>	Basin bellflower			G2	S2
<i>Cardamine macrocarpa</i> var. <i>texana</i>	Texas largeseed bittercress			G3T2	S2
<i>Chaetopappa effusa</i>	spreading leastdaisy			G3G4	S3S4
<i>Colubrina stricta</i>	Comal snakewood			G2	S1
<i>Crataegus turnerorum</i>	Turners' hawthorn			G3Q	S3
<i>Dalea hallii</i>	Hall's prairie-clover			G3	S3
<i>Dalea sabinalis</i>	Sabinal prairie-clover			GH	SH
<i>Desmanthus reticulatus</i>	net-leaf bundleflower			G3	S3
<i>Desmodium lindheimeri</i>	Lindheimer's tickseed			G3G4	S1
<i>Donrichardsia macroneuron</i>	Don Richard's spring moss			G1	S1
<i>Echinocereus coccineus</i> var. <i>paucispinus</i>	Texas claret-cup cactus			G5T3	S3
<i>Eriogonum tenellum</i> var. <i>ramosissimum</i>	Basin wild-buckwheat			G5T3	S3
<i>Galactia watsoniana</i>	Watson's milk-pea			G1	S1
<i>Gilia ludens</i>	South Texas gilia			G3	S3
<i>Glossopetalon texense</i>	Texas greasebush			G1	S1
<i>Hesperaloe parviflora</i>	red yucca			G3	S3
<i>Hexalectris warnockii</i>	Warnock's coral-root			G2G3	S2

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<i>Houstonia parviflora</i>	Greenman's bluet			G3	S3
<i>Isoetes lithophila</i>	rock quillwort			G2	S2
<i>Isoetes piedmontana</i>	Piedmont quillwort			G3	S1
<i>Lythrum ovalifolium</i>	Plateau loosestrife			G3G4	S3S4
<i>Matelea edwardsensis</i>	Plateau milkvine			G3	S3
<i>Matelea sagittifolia</i>	arrowleaf milkvine			G3	S3
<i>Monarda punctata</i> var. <i>stanfieldii</i>	Stanfield's beebalm			G5T3	S3
<i>Nesaea longipes</i>	longstalk heimia			G2G3	S2
<i>Onosmodium helleri</i>	Heller's marbleseed			G3	S3
<i>Packera texensis</i>	Llano butterweed			G2	S2
<i>Penstemon guadalupensis</i>	Guadalupe beardtongue			G3	S3
<i>Penstemon triflorus</i> subsp. <i>integrifolius</i>	Heller's beardtongue			G3T3	S2
<i>Penstemon triflorus</i> subsp. <i>triflorus</i>	threeflower penstemon			G3T3	S3
<i>Phaseolus texensis</i>	canyon bean			G2	S2
<i>Philadelphus ernestii</i>	canyon mock-orange			G3	S3
<i>Phoradendron hawksworthii</i>	Hawksworth's mistletoe			G3	S3
<i>Physostegia correllii</i>	Correll's false dragon-head			G2	S2
<i>Polygala palmeri</i>	Palmer's milkwort			G3	S2
<i>Pomaria brachycarpa</i>	broadpod rushpea			G2	S2
<i>Prenanthes carrii</i>	canyon rattlesnake-root			G2	S2
<i>Salvia pentstemonoides</i>	big red sage			G1	S1
<i>Sclerocactus brevihamatus</i> subsp. <i>tobuschii</i>	Tobusch fishhook cactus	LE	E	G4T3	S3
<i>Seymeria texana</i>	Texas seymeria			G3	S3
<i>Shinnersia rivularis</i>	springrun whitehead			G2G3	S1
<i>Spigelia texana</i>	Florida pinkroot			G3	S3
<i>Streptanthus bracteatus</i>	bracted twistflower			G1G2	S1S2
<i>Streptanthus platycarpus</i>	broadpod twistflower			G3	S3
<i>Styrax platanifolius</i> subsp. <i>stellatus</i>	hairy sycamore-leaf snowbell			G3T3	S3
<i>Styrax platanifolius</i> subsp. <i>texanus</i>	Texas snowbells	LE	E	G3T1	S1
<i>Tradescantia pedicellata</i>	granite spiderwort			G2Q	S2
<i>Tragia nigricans</i>	darkstem noseburn			G3	S3
<i>Tridens buckleyanus</i>	Buckley tridens			G3G4	S3S4
<i>Valerianella texana</i>	Edwards Plateau cornsalad			G2	S2

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
<i>Zizania texana</i>	Texas wild rice	LE	E	G1	S1



**Table 4. EDPT Rare Communities**

Note Table is formatted 11" X 17", more information is available on the Rare Communities table posted on the website.

G_RANK	S_RANK (Provisional)	COMMON_NAME	GLOBAL_NAME	ECOLOGICAL_SYSTEM_NAME	KNOWN COUNTIES	Endemic	KNOWN PROTECTED AREAS
G2G3	S2S3	Little Bluestem - Sideoats Grama - Texas Needlegrass Herbaceous Vegetation	Schizachyrium scoparium - Bouteloua curtipendula - Nassella leucotricha Herbaceous Vegetation	Edwards Plateau Limestone Savanna and Woodland CES303.660	Bell, Brown, Burnet, Callahan, Coleman, Comanche, Coryell, Eastland, Hamilton, Lampasas, Mills, and Williamson	Y	Ft. Hood (DoD) and Muse WMA (TPWD)
G2	S2	Edwards Plateau Grotto	Adiantum capillus-veneris - (Thelypteris ovata var. lindheimeri, Thelypteris kunthii) Herbaceous Vegetation	Edwards Plateau Mesic Canyon CES303.038	Bandera, Bell, Bexar, Blanco, Hays, Comal, Kendall, Medina, Kerr, Travis, Uvalde, and Williamson	Y	Balcones Canyonland Preserve (USFWS), Hamilton Pool (Travis County Parks), Lost Maples SNA (TPWD) and Love Creek Preserve (TNC)
G2	S2	American Sycamore - Arizona Walnut Woodland	Platanus occidentalis - Juglans major Woodland	Edwards Plateau Floodplain CES303.651	Bandera, Bell, Burnet, Comal, Gillespie, Hays, Kendall, Kinney, Kerr, Kimble, Lampasas, Real, Travis, and Williamson	Y	Bull Creek and Barton Creek Parks (City of Austin), Hill Country SNA (Bandera), Kerr WMA (TPWD), Lost Maples SNA (TPWD), Love Creek Preserve (TNC), and South Llano River State Park (TPWD)
G2	S2	Little Bluestem - (Yellow Indiangrass) - Tall Dropseed - Cusp Gayfeather Herbaceous Vegetation	Schizachyrium scoparium - (Sorghastrum nutans) - Sporobolus compositus var. compositus - Liatris mucronata Herbaceous Vegetation	Ecological System: Southeastern Great Plains Tallgrass Prairie CES205.685	Bell, Brown, Burnet, Callahan, Coleman, Comanche, Coryell, Eastland, Hamilton, Lampasas, Mills, and Williamson		
G1G2	S1S2	Vertisol Blackland Prairie	Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Herbaceous Vegetation	Texas Blackland Tallgrass Prairie CES205.684	Austin, Bastrop, Bell, Brazos, Burleson, Collin, Colorado, Dallas, Ellis, Fannin, Falls, Fayette, Franklin, Freestone, Grayson, Grimes, Hays, Hill, Hunt, Kaufman, Lamar, Lavaca, Lee, Leon, Limestone, Mc McLennan, Navarro, Robertson, Rockwall, Titus, Travis, Washington, and Williams	Y	Clymer Meadow Preserve (TNC), Leonhardt Prairie (TNC), Parkhill Prairie (Collin County Park), Kachina Prairie (TLC), Peters Prairie (NPAT), Riesel Prairie Preserve (NPAT)

G_RANK	S_RANK (Provisional)	COMMON_NAME	GLOBAL_NAME	ECOLOGICAL_SYSTEM_NAME	KNOWN COUNTIES	Endemic	KNOWN PROTECTED AREAS
G1	S1	Eastern Gammagrass - Tall Dropseed Herbaceous Vegetation	<i>Tripsacum dactyloides</i> - <i>Sporobolus compositus</i> var. <i>compositus</i> Herbaceous Vegetation	Texas Blackland Tallgrass Prairie CES205.684	Austin, Bastrop, Bell, Brazos, Burleson, Collin, Colorado, Dallas, Ellis, Fannin, Falls, Fayette, Franklin, Freestone, Grayson, Grimes, Hays, Hill, Hunt, Kaufman, Lamar, Lavaca, Lee, Leon, Limestone, Mc McLennan, Navarro, Robertson, Rockwall, Titus, Travis, Washington, and Williams	N	No documented protected areas
G2G3	S2S3	Netleaf Hackberry - Little Walnut Savanna	<i>Celtis laevigata</i> var. <i>reticulata</i> - <i>Juglans microcarpa</i> / <i>Leptochloa dubia</i> Shrubland	Ecological System: North American Warm Desert Riparian Woodland and Shrubland CES302.753	Brewster, Crockett, Culberson, Jeff Davis, Pecos, Presidio, and Terrell	Y	Chinati Mts SNA (TPWD), Davis Mts Preserve (TNC), Big Bend NP (NPS), Guadalupe Mts NP (NPS), and Independence Creek Preserve (TNC)
G1G2	S1S2	Little Walnut - Splitleaf Brickellbush / Creek Indigo Edwards Plateau Shrubland	<i>Juglans microcarpa</i> - <i>Brickellia laciniata</i> / <i>Indigofera lindheimeriana</i> Edwards Plateau Shrubland	Edwards Plateau Riparian CES303.652	Crockett, Pecos, Terrell, and Val Verde	Y	Devils River SNA (TPWD), Diamond Y preserve (TNC), Dolan Falls Preserve (TNC)
G1	S1	Central Texas Fen	<i>Cladium mariscus</i> ssp. <i>jamaicense</i> , <i>Eleocharis</i> ssp. ( <i>E. rostellata</i> , <i>E. montevidensis</i> , and <i>E. caribea</i> ), <i>Rhynchospora</i> spp. ( <i>R. capillacea</i> , <i>R. nivea</i> , and <i>R. colorata</i> ), <i>Schoenus nigricans</i> , and <i>Muhlenbergia utilis</i>	Edwards Plateau Floodplain CES303.651	Kerr	Y	Kerr WMA (TPWD); Stowers Ranch (TNC Easement)
G2	S2	Southern Edwards Plateau Bigtooth Maple Canyon Forest	<i>Acer grandidentatum</i> - <i>Quercus muehlenbergii</i> - <i>Quercus laceyi</i> / <i>Carex edwardsiana</i> - <i>Chaetopappa effusa</i> Southern Edwards Plateau Forest	Ecological System: Edwards Plateau Mesic Canyon CES303.038	Bandera, Kendall, Real, and Uvalde	Y	Lost Maples SNA (TPWD) and Love Creek Preserve (TNC)
G2	S2	Wand Butterfly-bush - Mexican-buckeye / Red Columbine - Turpentine-root Shrubland	<i>Buddleja racemosa</i> - <i>Ungnadia speciosa</i> / <i>Aquilegia canadensis</i> - <i>Aristolochia serpentaria</i> Shrubland	Edwards Plateau Cliff CES303.653	Blanco, Comal, Hays, Kendall, and Travis	Y	Balcones Canyonland Preserve (USFWS), Bull Creek Park (City of Austin) Hamilton Pool (Travis) County Parks), Pedernales Falls SP (TPWD)
G2G3	S2S3	Switchgrass - Bushy Bluestem - Jamaica Swamp Sawgrass Herbaceous Vegetation	<i>Panicum virgatum</i> - <i>Andropogon glomeratus</i> - <i>Cladium mariscus</i> ssp. <i>jamaicense</i> Herbaceous Vegetation	Edwards Plateau Floodplain CES303.651	Edward's, Kimble, Kinney, Real, Uvalde, and Val Verde	N	Devils River SNA (TPWD), Dolan Falls Preserve (TNC),
G2G3	S2S3	Papershell Pinyon - Ashe Juniper Woodland	<i>Pinus remota</i> - <i>Juniperus ashei</i> - <i>Quercus</i> spp. Woodland	Edwards Plateau Limestone Savanna and Woodland CES303.660	Edwards, Kinney, Real, Uvalde, and Val Verde	Y	Devil's River SNA (TPWD), Devils Sinkhole SP (TPWD), and Kickapoo Cavern SP

G_RANK	S_RANK (Provisional)	COMMON_NAME	GLOBAL_NAME	ECOLOGICAL_SYSTEM_NAME	KNOWN COUNTIES	Endemic	KNOWN PROTECTED AREAS
							(TPWD)
G2G3	S2S3	Papershell Pinyon / Pinchot's Juniper - Mohr Oak Woodland	<i>Pinus remota</i> / <i>Juniperus pinchotii</i> - <i>Quercus mohriana</i> Woodland	Madrean Pinyon-Juniper Woodland CES305.797	Brewster, Hudspeth, Pecos, and Val Verde	Y	No documented protected areas
G2G3	S2S3	American Sycamore - (Black Willow) / Little Walnut - Mule's-fat Woodland	<i>Platanus occidentalis</i> - ( <i>Salix nigra</i> ) / <i>Juglans microcarpa</i> - <i>Baccharis salicifolia</i> Woodland	Edwards Plateau Riparian CES303.652	Edwards, Sutton, and Val Verde	Y	
G2G3	S1	Plateau Oak - (Post Oak) / Little Bluestem Granite Woodland	<i>Quercus fusiformis</i> - ( <i>Quercus stellata</i> ) / <i>Schizachyrium scoparium</i> Granite Woodland	Llano Uplift Acidic Forest, Woodland and Glade CES303.657	Gillespie, Llano, and Mason	N	Enchanted Rock SNA (TPWD) and Mason Mtn WMA (TPWD)
G2	S2	Lacey Oak - Ashe's Juniper Woodland	<i>Quercus laceyi</i> - <i>Juniperus ashei</i> Woodland	Edwards Plateau Mesic Canyon CES303.038	Bandera, Edwards, Gillespie, Hays, Kerr, Menard, Kendall, Kimble, Medina, Real, Uvalde, and Terrell	Y	Garner SP (TPWD), Lost Maples SNA (TPWD), Love Creek Preserve (TNC), South Llano River SP (TPWD), and Walter Buck WMA (TPWD)
G2G3	S2S3	Edwards Plateau Moist Limestone Slope Forest	<i>Quercus muehlenbergii</i> - <i>Juglans major</i> - ( <i>Ulmus rubra</i> ) / <i>Verbesina virginica</i> Forest	Edwards Plateau Mesic Canyon CES303.038	Blanco, Bandera, Comal, Kerr, Kendall, Kimble, and Real	Y	Kerr WMA (TPWD); Stowers Ranch (TNC Easement)
G2	S1	Nuttall's Stonecrop - Peruvian Spike-moss Granitic Outcrop Sparse Vegetation	<i>Sedum nuttallianum</i> - <i>Selaginella peruviana</i> Granitic Outcrop Sparse Vegetation	Llano Uplift Acidic Forest, Woodland and Glade CES303.657	Burnet, Gillespie, Llano, Mason, and San Saba	N	Enchanted Rock SNA (TPWD), Inks Lake SP (TPWD), LCRA Parks (LCRA), and Mason Mtn WMA
G2G3	S2S3	Edwards Plateau Bald Cypress - Sycamore Gallery Forest <sup>B2</sup>	<i>Taxodium distichum</i> - <i>Platanus occidentalis</i> Edwards Plateau Forest	Edwards Plateau Riparian CES303.652	Bandera, Bexar, Blanco, Comal, Hays, Kendall, Kerr, Medina, Real, Travis, and Uvalde	Y	Garner SP (TPWD), Guadalupe R/Honey Creek SP/SNA (TPWD), Hamilton Pool (Travis County), Pedernales Falls SP (TPWD),
G1	S1	Texas Wild Rice Spring Run Vegetation	<i>Zizania texana</i> - <i>Potamogeton illinoensis</i> Herbaceous Vegetation	Edwards Plateau Floodplain CES303.651	Hays	Y	No documented protected areas

## PRIORITY HABITATS

Nationally, an SGCN list forms a basis for every Action Plan; however, *species* conservation cannot be successful without defining the *lands and waters species need to survive and thrive*. If it was only important to know about individuals or even populations, we could put representatives in zoos or herbaria or other curated collections and that would be enough; but, it's not .... **It's important to conserve populations in the context in which they thrive, to the best of their abilities, where they can contribute to and benefit from the systems in which they live.**

[Broad habitat categories](#) were developed to organize all ecoregional handbooks.

See also the Statewide/Multi-region handbook for habitats that are of broader importance – shared with many other regions and/or other states or nations (e.g. riparian or migratory species' habitats as a general category).

See also [Ecoregions of Texas](#) (report is near the bottom of webpage; Griffith et. al. 2007), [Ecological Mapping Systems Project](#) (TPWD et. al. *in progress*), and the [National Fish Habitat Action Plan](#)

**Table 5. EDPT Priority Habitats**

Note Table is formatted 8-1/2" x 11" landscape orientation

From the survey

GENERAL HABITAT TYPES	EDWARDS PLATEAU (EDPT)	EDPT Ecological Systems
NATURAL AND SEMI-NATURAL TYPES	<i>Habitats in this column were identified in the workshop; additions were made by editor to riverine and cultural aquatic</i>	<i>NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications for Ecological Systems of Texas' Edwards Plateau. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 08 October 2009.</i>
Barren/Sparse Vegetation <i>See also Marine/Coastal</i>	Igneous/granitic outcrops (e.g. Enchanted Rock) Limestone, shale, and granitic cliffs/ledges	Edwards Plateau Carbonate Glade and Barrens Edwards Plateau Cliff LLano Estacado Caprock Escarpment and Breaks Shrubland and Steppe
Desert Scrub		Chihuahuan Creosotebush Desert Scrub Chihuahuan Mixed Desert and Thornscrub Chihuahuan Succulent Desert Scrub Tamaulipan Calcareous Thornscrub
Grassland	mixed prairie tallgrass prairie midgrass prairie shortgrass prairie	Central Mixedgrass Prairie Llano Uplift Acidic Forest, Woodland and Glade Texas Blackland Tallgrass Prairie Western Great Plains Shortgrass Prairie Chihuahuan-Sonoran Desert Bottomland and Swale Grassland (mixed upland and wetland)
Shrubland	mixed shrubland (oak - yaupon - forestiera - agarita)	Edwards Plateau Limestone Shrubland Western Great Plains Sandhill Steppe
Savanna/Open Woodland	Mixed oak savanna	Edwards Plateau Limestone Savanna and Woodland
Woodland	north and east facing mesic hardwood-juniper woodlands	Edwards Plateau Dry-Mesic Slope Forest and Woodland

GENERAL HABITAT TYPES	EDWARDS PLATEAU (EDPT)	EDPT Ecological Systems
Forest <i>See also Riparian and Wetlands</i>	hardwood dominated (oak, elm, cherry, maple) mesic canyons	Crosstimbers Oak Forest and Woodland Edwards Plateau Mesic Canyon
Riparian	periodically flooded or subirrigated floodplain woodlands (oak, elm, hackberry) and gallery forests (sycamore, cypress) associated with the Colorado River, southeastern-lower Pecos, and the northeastern-lower Rio Grande/Bravo rivers and perennial/ephemeral tributaries	Edwards Plateau Floodplain Edwards Plateau Riparian
Riverine	<p>Instream habitats of the watersheds which intersect this ecoregion, especially aquifer- and spring-dependent rivers/creeks</p> <p>Ecologically Significant Stream Segments - Pecos River, Live Oak Creek, Devils River, Oatmeal Creek, San Gabriel River, Clear Creek, San Saba River, Gorman Creek, Colorado River, West Rocky Creek, Spring Creek, South Llano River, James River, Llano River, Pedernales River, Bull Creek, Little Barton Creek, Barton Creek, Onion Creek, Medina River, Johnson Creek, North Fork Guadalupe, South Fork Guadalupe, Guadalupe River, Honey Creek, Carpers Creek, Little Blanco River, Blanco River, Cypress Creek, Willow Springs Creek, West Nueces River, Nueces River, Frio River, Sabinal River, West Verde Creek</p>	
Freshwater Wetland	aquifer-dependent and perched water table springs, seeps, granite vernal pools (tinajas)	Edwards Plateau Upland Depression

GENERAL HABITAT TYPES	EDWARDS PLATEAU (EDPT)	EDPT Ecological Systems
Aquifer	Edwards BFZ, Edwards – Trinity Plateau, Trinity (outcrop)	NA
Caves/Karst	Caves, Grottos, Sinkholes pseudokarst fissures/crevices see also Statewide Handbook for discussion of karst and pseudokarst	NA
CULTURAL TYPES	<i>habitats in this column must support SGCN or rare communities to be considered in this plan</i>	
Agricultural		NA
Developed		NA
<i>Urban/Suburban</i>	urban forests bridges, culverts (bats)	NA
<i>Rural</i>		NA
<i>Industrial</i>		NA
<i>Rights of Way</i>		NA
Cultural Aquatic	Reservoirs: Abilene, Georgetown, Buchanan, Inks, LBJ, Brady Creek, Travis, Marble Falls, Austin, Town (Ladybird), Medina, Ingram, Canyon	NA

## ISSUES

There are **activities and conditions** which may negatively affect the SGCN populations, rare communities, and the habitats on which they depend in this region. These issues can include **direct or indirect harm** (e.g. inappropriate mining reclamation which uses non-native vegetation or indirectly provides an opportunity for non-native invasive vegetation, streambed gravel mining that directly removes spawning habitat and/or indirectly creates poor water quality downstream) **plus basic “gaps” that prevent us from acting most effectively** (e.g. lack of information, lack of coordination to share current data, incompatible practices among land managers, lack of funding). For information about how this list was developed, see the Overview Handbook and the [descriptions of the broad issue categories](#).

**Habitat fragmentation and habitat loss, including open-space land conversion**, are always going to be broad issues that need to be addressed, at various scales – local, regional, statewide, interstate, and international. These are such broad categories and, depending on the scale of the problem, these three issues can be symptoms or causes of many other issues. These three issues are not specifically included in the Issues list, although they may be implied in many of the categories presented.

The issues covered in the EDPT Ecoregion Handbook attempt to present more of the specific causes of SGCN, rare communities, and habitats’ decline, providing appropriate context to help target our actions, identified later in this handbook. Several of the habitat types in this handbook are also considered priority habitats in the Statewide/Multi-region handbook.



**Table 6. EDPT Priority Issues Affecting Conservation**

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
Invasive Species		
Non-native Plant	Salt cedar/tamarisk ( <i>Tamarix spp.</i> ), giant reed/river cane ( <i>Arundo donax</i> ) Cultivated and Old World grasses (e.g. Lehmann's lovegrass, King Ranch (KR) bluestem, Bermuda grass) Hydrilla, water hyacinth Ligustrum, chinaberry, nandina, Chinese tallow Golden alga	Salt cedar affects hydrology, monotypic stands, and outcompetes native riparian vegetation (cottonwood, sycamore) at all seral stages and canopy levels; salt cedar and <i>Arundo</i> armor the banks and contributing significantly to channel incision and narrowing, which reduces the diversity and quality of habitat for aquatic species Non-native grasses either as improved pastures or naturally expansive have established in many grasslands, are a substantial threat to grassland-dependent species (e.g. grassland-obligate birds) Non-native plant invasion may also contribute to loss of native pollinators (e.g. honey bee, moths, hummingbirds, others) and the animals which rely on insect fauna now changed by these invasions Aquatic invasive species are highly successful in area lakes and in some riverine systems, crowding out native aquatic vegetation, inhibiting access by nesting freshwater fishes to bottom substrates, depleting nutrients and degrading flow/natural hydrograph Several species are "escaped" landscaping plants which aggressively colonize in riparian areas, along ephemeral stream courses, and canyons Golden alga (which waterways, waterbodies, what effects to SGCN?)
Non-native Animal	feral and/or free-ranging "pets" FERAL HOGS Nutria Domestic waterfowl Introduced ungulates for hunting introduced fishes and mollusks - freshwater springs, streams and marshes Red Imported Fire Ants (RIFA) Raspberry Crazy Ants (RCA)	Free ranging pets are introduced predators which adversely affect small mammals, small reptiles, and birds; also contribute pathogens and diseases Feral hogs also decimate important and fragile habitats (e.g. springs, seeps, riparian areas, swale depressional wetlands), degrade instream water quality, and decrease hardwood seedling viability (rooted up, eaten) Aoudad, axis, and other introduced exotic hoofstock alter and destroy habitat, compete with native small mammals and ungulates for food, and are disease vectors which can affect native ungulates and domestic livestock; axis are particularly fecund and in some areas cause more widespread damage than hogs Nonnative aquatic species can be a predatory risk (small mouth bass are voracious predators on many SGCN), some are detrimental to native aquatic vegetation (tilapia, carp), species compete or hybridize with natives (small mouth bass with Guadalupe Bass, baitfish releases "minnows" may hybridize with certain <i>Gambusia</i> sp.), may be densely successful and crowd out natives and/or affect water flow and quality (zebra mussels) RIFA are highly invasive, successful predators on many EDPT SGCN: karst invertebrates, karst dependent amphibians, black-capped vireos and other low-shrub nesting SGCN, grassland birds at all periods Unknown effects of RCA
Native Problematic	Native shrub (e.g. ashe juniper, mesquite, creosote, whitebrush) or "brush" White-tailed deer Brownheaded Cowbird	Invasive native brush/trees where they are not supposed to naturally occur (canyons, steep slopes, swales, karst areas – depending on species) are a significant threat to grassland-obligate birds: grassland loss decreases habitat availability and quality for grassland nesting birds, trees provide perches for hunting raptors which also decrease grassland bird, small mammal and reptile success; Mesquite has displaced grasslands especially in areas with subsurface moisture Whitetailed deer are insufficiently harvested in this region and in many areas overbrows hardwood seedlings, decreasing hardwood regeneration Overly abundant and expansive into most every type of habitat, BCHB have been documented parasitizing nests of many SGCN, decreasing successful nests for those species.
Pests, Parasites, Pathogens		
Pests	Cactus moth ( <i>Cactoblastis cactorum</i> ) Soapberry borer Emerald Ash borer	<i>Cactoblastis cactorum</i> has been used a biological control for prickly pears ( <i>Opuntia</i> spp.) in areas where prickly pears are non-native; however, introductions to the Caribbean have led to the moth's appearance along the eastern Gulf Coast of the US and potentially the moths could arrive in Texas and Mexico. The loss of biodiversity, habitat, forage, agricultural products, and the nursery industry could be substantial. Both borer species adversely affect hardwoods which are essential components to desired ecological condition in this region
Parasites	Fountain darter gill parasite	
Pathogens	White-nose Syndrome (WNS) Oak wilt, oak decline, thousand canker Chytrid fungus	WNS affects hibernating bats and is spread through human (we think) and bat vectors, through cave visitation. Mortality is high; prevention and overall cause is unknown. Plant pathogens listed adversely affect hardwoods in this region, a component of many important SGCN habitats and rare communities Amphibian decline and population decimation are potential from this fungus; not much is known about its extent in Texas; many of our amphibian

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
		species in this region are extremely rare and vulnerable even if not threatened by other factors; an infection of this type in one of the Eurycea populations may have extremely serious consequences
Power Development and Transmission		
Wind Generation	See also full discussion in Statewide Handbook Competitive Renewable Energy Zones (CREZ): McCamey, Central Turbine operations	High ridges and elevated plains in the region are of high potential for wind development and have been mapped as priority areas; these features typically intersect raptor migration corridors (impacts to Golden Eagle, Ferruginous Hawk, Swainson's Hawk) network of maintenance and access roads can impact small mammals, birds, and reptiles; typically these are avenues for invasive plants typically impacts vegetation communities that occur on these ridges - grasslands, shrublands (grassland birds, black-capped vireo, shrikes) deep footings may impact karst in certain areas even if these features don't harbor SGCN, could impact recharge ability, connectivity Migratory birds (especially nocturnal) and bats adversely affected through barotrauma and direct collision
Solar or PV (photovoltaic) array siting	level or nearly level sites with high PV potential occur throughout the region	array siting, with the network of maintenance and access roads, impacts shortgrass mesa and other open lowland grassland communities (direct loss and invasive species competition), blocks sun and rain needed for photosynthesis and recovery of vegetation communities; plant and plant community protections are insufficient to trigger environmental compliance in this industry; deep footings may impact karst in certain areas; some may require large quantities of water
Hydro (Dam and Reservoir)		<i>see also Water Development, Management and Distribution</i>
Biofuels	Row Crop, Switchgrass, Herbaceous: native rangeland and open grasslands converted to croplands (monotypic stands of switchgrass and others)	Loss of native and open grassland birds' habitats for foraging, nesting, and shelter -- Baird's Sparrow (winter), Eastern Meadowlark, Long-billed Curlew, and Cassin's Sparrow These crops are not food crops and may have higher rates of fertilizer and pesticide applications; water quality (from stormwater runoff) and adjacent wildlands (from overspray) may be more affected near these sites than food production sites.
Transmission	New development and expansion of existing lines/corridors construction of new power infrastructure corridors to meet urban user needs, from CREZ generation projects in this region to central TX loads maintenance and operations maintaining clear right-of-way for vehicle clearance/access, prevention of line and tower danger	Broad, long, linear fragmentation of all habitat types. During route selection, environmental considerations are given secondary consideration to agricultural and developed areas. Contributes to edge through interior habitats (woodlands, forest) in the same way that oil/gas pipelines and road networks for wind generation sites, causing potential for greater predator and invasive species access. While some of these facilities are compatible with grassland and prairie communities in this ecoregion, these pathways are not required to reclaim or maintain cleared areas with native seed or plant sources. May hinder daily or seasonal movements and behavior for species which avoid open areas adjacent to remaining woodlands. Oak trimming or construction through oak woodlands in inappropriate seasons, with inappropriate post-trimming treatment, can cause spread of oak wilt and decline Provides vector for predator access and nest parasite access (brown-headed cowbird) into more interior woodland and forested habitats Transmission lines can be strike hazards for raptors during migration.
Distribution	Development to power grid and retail users: construction of new power infrastructure corridors to meet urban user needs	Similar impacts to transmission lines, but on smaller scales Bird collisions have been documented to occur more in distribution line corridors than transmission line corridors Occasionally, because the area to be treated is less than a transmission line, the company may employ herbicides Oak trimming or construction through oak woodlands in inappropriate seasons, with inappropriate post-trimming treatment, can cause spread of oak wilt and decline
Oil and Natural Gas Production and Delivery		
Seismic exploration	surface and subsurface impacts - linear networked vegetation clearing and soil disturbance, vibration and "explosive" disturbance	habitat loss and fragmentation in arid lands that do not recover quickly vector for invasive species (plant) introductions from equipment and opportunistic colonization in wake of habitat clearing and no reclamation disruption of daily and seasonal activities for fossorial animals (small mammals, reptiles, ground-foraging and ground-nesting birds)
Traditional extraction site development and operation,	on-site spill potential salt water injection wells	Similar to electrical transmission lines, communications lines, and transportation corridors, oil and gas pipelines create edge through woodland, canyon, and riparian habitats; impact wetlands which are not jurisdictionally protected (isolated seeps, springs); little to no native reclamation is

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
including pumping and pad sites, gathering stations, transmission/delivery facilities (distribution lines, roadway	flaring road networks	required. These openings create opportunity for enhanced predator access to interior woodlands, invasive species (many thrive in disturbed sites), and microclimate changes that dry water features.  limited surface waters are in many areas interconnected with groundwater resources (cieneegas, swale wetlands, springs, seeps), both of which are highly sensitive to change/contamination are at risk from chemical, drilling material, and oil spills and groundwater contamination caused by salt water injection  flaring increases acid deposition which affects <a href="http://www.esa.org/education_diversity/pdfDocs/aciddeposition.pdf">http://www.esa.org/education_diversity/pdfDocs/aciddeposition.pdf</a> - not sure how this directly affects SGCN or habitats?  Extraction operations cause clearing, road networks, pad sites, and large mechanical infrastructure(s) which contribute to direct habitat loss, direct and indirect habitat fragmentation, direct mortality from vehicles and operations, and noise/light disturbance (e.g. nocturnal migratory birds and bats can be adversely impacted by the light and noise pollution)  Road networks, constant traffic and noise, and mechanical infrastructure interrupt seasonal and daily movements, foraging and mating behaviors of some mammals, reptiles, and birds; small geographically limited populations of aridland plants fragmented or lost
Hydraulic fracturing ("fracking") or "shale gas" extraction	<a href="http://www.energyindustryphotos.com/shale_gas_map_shale_basins.htm">http://www.energyindustryphotos.com/shale_gas_map_shale_basins.htm</a> Part of the Permian and Barnett Shale deposits lie under the western edges of this ecoregion Frac-ing is done by deeply injected chemical liquid which fractures substrates and releases gas for capture and delivery: potential groundwater risks, potential chemical spill risks, geologic destabilization	Groundwater and its surface expression in seeps, springs and other subirrigated wetlands and riparian zones, in addition to cave and karst features, are extremely important habitats in this ecoregion (e.g. <i>darters</i> , <i>Eurycea sp.</i> , <i>several springfed river minnows</i> , <i>other karst invertebrates</i> ); Groundwater contamination could cause total loss of isolated aquatic populations, adversely affect vegetation that depends on water quantity and quality at springheads, seeps, riparian areas, and instream. Contamination also poses a risk to human and livestock water sources. Fracturing activities may also adversely affect the recharge capacity of porous rock layers and networked karst features.
Lack of Reclamation	reclamation standards vary, requirements limited unmonitored/unregulated decay of obsolete production sites - toxic chemicals in soils and leftover equipment, decaying equipment	Reclamation not required back to NATIVE vegetation (invasive species allowed to colonize or are directly planted for soil stabilization)
Mining		
Sand and Gravel - upland and riverine	sand and gravel mining along and within streams and rivers	<a href="http://www.tshaonline.org/handbook/online/articles/gpm01">http://www.tshaonline.org/handbook/online/articles/gpm01</a> need map of sand and gravel mines in TX loss of riparian habitats for instream and adjacent mining, sedimentation in streams contributes to loss and degradation of instream habitats
Caliche	caliche - small scale on ranches, large scale for county roads	typically for road base, unreclaimed sites, complete/permanent loss of surface communities; several SGCN plants and plant communities may be affected
Limestone and Granite	"boutique" operations on private lands Larger commercial operations	"Boutique" limestone and granite mining operations to serve the tile and countertop industry with one-of-a-kind locally sourced materials; these are typically on unregulated private operations and can adversely impact cave and karst feature integrity, connectivity to larger networked sites, groundwater quality and quantity (can impact recharge ability), and the fauna within these features. Larger commercial quarries are also present in the region and can have the same kinds of impacts on larger scales; limited to no reclamation is required to native conditions
Communications Infrastructure		
Cell and other communication towers	towers need to be limited in height and lit to minimize bird strikes (bird-friendly)	Species impacted by towers include all nocturnal migrants including Yellow-billed Cuckoo, Painted Bunting, Summer Tanager, and other species.
Transportation		
road and bridge construction (new)	Largescale National Transportation Corridor priorities Bridge/culvert construction without consideration for stream gradient, downstream scour, passage for seasonal and daily movements	While the Trans Texas Corridor 35 and connecting or related surface improvements are not in this ecoregion, a portion of one of the other National Highway System Congressional Priority Corridors ( <a href="http://www.fhwa.dot.gov/planning/nhs/hipcorridors/hpccor.html#I56">http://www.fhwa.dot.gov/planning/nhs/hipcorridors/hpccor.html#I56</a> , 2008) – Ports to Plains, from Laredo TX to Denver CO – intersects this region. Population growth in this region is high and transportation improvements will continue. Because several of the regions' sensitive resources can be adversely affected by stormwater runoff, deep footings (into karst), and lack of passage for stream and terrestrial species, impacts from transportation

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
		<p>facilities are an issue.</p> <p>Texas Department of Transportation coordinates with TPWD regarding potential natural resources impacts to listed species; however, there is little accommodation for sensitive habitats unless those features are federally protected (federally listed species habitat, critical habitat, jurisdictional wetlands). State-listed species habitats, SGCN, rare communities and the habitats on which they rely are unprotected. The transportation improvements proposed under regional upgrades of existing facilities and new construction may create barriers to fish and wildlife resources' daily and seasonal movements, vectors and opportunities for nonnative species invasions, water quality impacts through stormwater runoff, loss of nonjurisdictional wetlands, and important riparian, grassland and savanna habitats that are not protected under regulation. In addition to any planned larger facilities, local connection transportation projects may also contribute to the same kinds of losses and may require even less coordination regarding environmental impacts from planning to implementation if no federal money is used.</p>
right of way maintenance	maintaining clear right-of-way for vehicle clearance/access, minimizing fire danger, and maintaining driver visibility	<p>mowing, trimming (permanent fragmentation, erosion)</p> <p>non-native plant species used for reseeding, reclamation, or maintenance; opportunities for invasion because of poor native grassland health in these areas (mowing timing does not allow natural regeneration, reseeding)</p> <p>herbicide application</p> <p>some rare plants are known only from sites in ROW; these are not always adequately protected as staff changes occur, management plans are filed away, information not passed through entire chain of command - needs better communication in some places</p>
Timber Production & Management		
Salvage	Instream salvage: cypress, oak, elm	<p>Removes instream naturally occurring large woody debris important for many species – turtles, frogs, fishes, invertebrates</p> <p>Large mature woody debris is natural in many of these areas and contributes to stream rehabilitation, decreases scouring from flash flood events, provides cover for many smaller species to escape predation</p>
Land & Water Mgmt: FARM	See also Water Development section	
Lack of soil and water management and conservation practices	chemical-laden irrigation water runoff	There is very little rowcrop agriculture in this region; however orchards, vineyards and some concentrated animal feeding operations without stormwater pollution prevention protection in place contribute to adverse impacts to sensitive aquatic insects and other invertebrates, fishes, and amphibians
Unsustainable irrigation	See also <i>Groundwater Planning and Distribution</i>	This is not a huge issue in this ecoregion, but is related to regional groundwater planning efforts
Land & Water Mgmt: RANCH	See also Water Development section	
Incompatible stocking practices	<p>In some areas, working lands are still recovering from historic uses, out-of-date stocking and grazing practices (prior to soil, native vegetation, and water conservation knowledge we have today)</p> <p>historic and/or current range-intensive livestock operations out of sync with land capacity</p> <p>non-native hoofstock for hunting operations</p>	<p>Overgrazing or intensive non-rotational grazing contributes to the decline of native grasslands</p> <p>Overstocking can lead to excessive brush clearing out of drainages, steep slopes, canyons, karst areas, and other sites which would not naturally have burned for “out of capacity” grazing practices to reap more grass cover; is detrimental to shrubland, woodland, and karst dependent species; these practices can also contribute to a shift in the overall vegetation community, microclimate of the site (drier), and decreased recharge (recent science indicates that brush clearing is not always site-appropriate for increased water yield or recharge).</p> <p>Introduction of non-native hoofstock (hogs, axis, aoudad, others) depletes resources for native wildlife, damages sensitive features (springs, seeps, upland grasslands) and can contribute disease to native populations</p>
Landowner/land management incentive programs working at cross-purposes	single-objective management such as all-game, all-livestock, all-recreation	<p>incentive programs, technical guidance, and management assistance "menu" is pre-limited for the landowner in the first contact, without letting the landowner choose from a full menu of land and water management options; responding to only landowner request rather than proactively offering options in addition to or in lieu of the requested service</p> <p>Landowners do not have a one-stop shop to choose best management practices for their site, for their goals</p>
Unsustainable withdrawal	See also <i>Groundwater Planning and Distribution</i>	This is not a huge issue in this ecoregion, but is related to regional groundwater planning efforts
Fencing	high game fencing	High game fencing reduces genetic viability in all species inside the fence (depending on construction), fences in non-natives and can degrade natural habitats quickly without VERY intensive management to control hogs and other destructive non-natives, makes management of a public resource onerous on the landowner, requires intensive planning and is not suitable for most wildlife species or the longterm financial condition of most ranches

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
Clearing and loss of important natural sites/habitats	Springs, swales altered for stock uses	Loss of natural spring and swale habitats for aquatic and grassland species, changes vegetation community in these areas
Lack of soil management and conservation practices	<b>inappropriate herbicide application (Spike)</b> lack of soil conservation (vegetation conservation/restoration) along stream courses and on grazing lands, soil erosion	<b>is this in the right place – what category better??</b> Hydrology and streamside vegetation are altered, soil and vegetation is lost in upland areas, water quality is degraded through sediment-laden runoff; dealing with historical and contemporary issues, need, in some instances, different approaches for recovery/restoration
Land ownership changes	Subdivision to smaller parcels	Multiple landowners more difficult to target with a conservation incentives than one single larger landowner Each landowner has a different goals for their land Fragmentation of larger habitats and landscapes more likely Large-patch habitat dependencies are adversely affected; land management is more resource- and time-intensive and recovery "starts" at different points  SEE ALSO STATEWIDE HANDBOOK FOR THIS ISSUE and ACTIONS
Landowner disconnection from rural attitudes/values	Subdivided lands, absentee ownership, and/or non-rural ownership changes in values - no longer a working landscape, but now a recreational or disposable income	
Fire suppression and lack of or inappropriate application of Rx fire	reduced or no efficacy of applied fire - scale of application does not match ecological need managing wildfire (more Rx burning needed to reduce the risk of wildfires)	Without fire in these habitats, grassland to shrubland or closed canopy woodland conversion (afforestation) with less of a natural mosaic important to species which co-evolved in this system  While some portions of this ecoregion (primarily canyons, karst outcrops, and riparian areas) are supposed to be closed canopy mature woodlands which eventually grow to naturally suppress understory, most upland habitats in this region require fire or some kind of disturbance to prevent thickened understory and encourage the natural mosaic of woodland – grassland and allow for mature forest regeneration.
Land & Water Mgmt: Municipal	See also Water Development section	
Lack of Zoning and Planning	Throughout this and adjacent ecoregions, urban expansion, sprawl, and suburban development into the outlying counties to escape city jurisdictions is an evergrowing issue. Much of the eastern portion of this region is considered “emerging”, as identified in the Texas State Forest Resources Strategy  County authority lacking	Metropolitan Planning Organizations, Councils of Government, Regional Transportation authorities, and other planning entities which encompass emerging and outlying communities rarely consider fish and wildlife resources, rare communities and habitats as part of their constraints process. Additionally, more of a burden is placed on county resources to deal with environmental issues outside of city jurisdictions in many of these areas; however counties rarely have such authority to require stormwater pollution prevention, flood control projects, appropriate road development, conservation of nonjurisdictional wetlands, open space planning, or water or other conservation measures from developers. And, even those authorities which have this ability rarely use it during planning processes to set aside, plan around, or plan to mitigate for areas important to fish and wildlife resources – floodplains and riparian areas (intact and those with restoration potential), grasslands, wetlands of all kinds, groundwater.  Urban sprawl, bedroom communities, suburban commuter communities all continue to contribute to woodland clearing, filling non-jurisdictional wetlands, and degradation of instream and stream-adjacent habitats from water quality and quantity impacts. This is not just an issue for fish and wildlife resources, but also for prime rangeland in these areas. Zoning current agricultural or ranching lands for future commercial or municipal use removes the opportunity to restore these lands to functional habitats and contributes to their disconnection/fragmentation.  Development is concentrated in these outlying areas where it’s most scenic, and this coincides in many instances with sensitive features – canyons, cliffs, near lakes waterways and floodplains, springs. While some cities have sensitive environmental feature protection, most non-jurisdictional areas do not. Karst filling, stream armoring and the lack of stormwater pollution prevention are also issues.
Unsustainable groundwater withdrawals	Unaccounted withdrawals for “personal use”	Related to regional groundwater planning efforts, see below
Land & Water Mgmt: Conservation & Recreation		
Inadequate/Inappropriate Management	Limitations based on occupancy, timing, knowledge	Recreational uses and periods may not mesh well with needed restoration or management practices; may be adjacent to urban areas which would prevent active management
Inappropriate Recreational Uses	ORV use in sensitive areas (stream beds, cliffs, steep cuts)	Adverse water quality effects through direct disturbance, soil erosion, fuel/oil spills, and degradation/loss of vegetation communities and aquatic habitats
Lack of connectivity between public lands managed for		

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
conservation		
Lack of long-range conservation planning and cohesive land conservation/management strategies in each ecoregion		
Water Development, Management and Distribution	SEE ALSO STATEWIDE HANDBOOK	
Surface Water Planning	<p>Natural resources not well-defined or required as a "constraint" in Regional Water Planning (RWP) processes; natural resource professionals are not consistently involved in RWP processes Large municipalities' demands are the primary driving force in surface and groundwater planning</p> <p>Overallocation and dewatering of region's principle rivers</p> <p>New water line construction not considered in planning or operational impacts/costs to resources</p>	
Reservoir Construction and Operation	<p>Creation of new and modification (expansion) of existing reservoirs</p> <p>Unregulated small stream impoundments on private lands</p> <p>Invasive species</p> <p>Shoreline development - vegetation removal for viewshed, recreational access; hardening and armoring banks</p> <p>Timing/Periodicity/Intensity of Water Releases releases are unnaturally intense, in the "wrong" season to mimic natural flooding processes, and change water chemistry and sediment load in all areas downstream, to the estuaries</p>	<p>Unnatural hydrograph scours instream and stream-adjacent habitats, shifts vegetation communities out of sync with other riparian communities where flooding is more "natural", vegetation communities and instream animal (invert, fishes, etc.) cannot "rely" on the seasonal changes under which they evolved.</p> <p>Development: bulkheading, clearing to water's edge, on-site septic leakage or non-compliance, development on steep sites.</p>
Groundwater Planning and Distribution	<p>Not all aquifers have groundwater districts; groundwater districts are political subdivisions, not aligned necessarily with aquifer boundaries</p> <p>Extraction: groundwater pumping without full accounting of all uses and without consideration of natural resources as a "use"</p>	<p>Inconsistency in districting across the landscape creates conflict and natural resources do not fare well.</p> <p>physical changes to karst, springs (water amount and quality) and riparian areas/streams fed by groundwater adversely impact some species' thresholds for survival and/or sustainable life history (reproduction, foraging, resting)</p> <p>subirrigated and instream aquatic habitats which rely on springflow through decreased amount of water near the surface or coming into the stream (flow, depth, substrate changes, adjacent riparian habitat changes from dry conditions) and changes in instream water conditions such as temperature, oxygen availability, and other nutrient and chemical factors (such as the age of water source that comes from the aquifer)</p> <p>decreased and degraded aquifer recharge capacity ("drying out the sponge or seive" at certain levels within the aquifer can affect the flow quantity and quality into the aquifer from recharge events)</p>
Other Water Source Developments and Technologies	<p>Interbasin Transfers (Surface and Groundwater)</p> <p>Municipal demands on water and potential for well field development for commercial export out of the region or to the largest municipalities</p>	<p>Lack of ecological accounting for impacts from interbasin transfers: water chemistry differences, potential transfer of exotic species (hydrila, water hyacinth, zebra mussels)</p> <p>Most of this is addressed at the statewide level; <b>are there specific resources affected in this region??</b></p>
Lack of Information & Resources	One response stated this is an issue, but did not provide additional information	
	Lack of Data (amount, type)	
	Predator control without biological standards or supporting management	<p>It is unknown whether predator control activities are affecting the stability of SGCN populations or their contribution to natural system function. Predator control efforts cannot be declared "insufficiently regulated" or "underreported" as limited information is available to assess the stability of these populations. Community-based solutions will need to be devised based on a full and accurate accounting of these populations and their effects on the natural systems and ranching communities in which they range.</p>

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
		Predator trapping and/or baiting has an adverse effect on non-target species including smaller mammals such as skunks, foxes
	Lack of Processing <i>Existing</i> Data this tied to "Lack of Information (amount, type)	Where census, survey, records and collections are documented, little is done with the data to detect trends and causes for upward or downward shifts. Without this information, it is difficult to focus or prioritize management objectives or share information with private landowners about the importance of some sites, populations or communities. Sharing this information with landowners is crucial as most of Texas is privately owned and conservation must occur with their stewardship help.
	Inadequate understanding of available or widely-accepted conservation Best Management Practices	
Inadequate Policies, Rules, Enforcement		
	Poaching, Permitting Avoidance and Violations insufficient law enforcement for non-game issues	
	Unregulated shoreline development, floodplain development	
	Loss of and impact to "non-jurisdictional" wetlands and other waters	Small order stream impoundments on private lands No protections for springs, seeps loss in development projects
	Human disturbance	In some areas, caves and karst features which harbor hibernating bats, maternity colonies, and/or rare invertebrates need more protection from human disturbance during key periods
Other Cross-Cutting Issues		
	Climate Change Grasslands, arid-land wetlands and water-dependent features (riparian and instream) at risk	highly localized and intrinsically rare species will have few options to adapt as habitats shift, change, or disappear with climate change in this region; options for transplanting or translocation are few to none as many of these habitats are edaphically specialized in the region.
	Economics Working Lands	Landowner incentives cannot compete currently with market forces; market forces in some areas cannot support continued large ranch ownership See Statewide Handbook also



## CONSERVATION ACTIONS

*“Like the resource it seeks to protect, wildlife conservation must be dynamic, changing as conditions change, seeking always to become more effective.” – Rachel Carson*

To make conservation progress, we need to work with the information we have, document our progress, share lessons learned, and adapt our approach when necessary. Conservation actions in this handbook are aimed at reducing the negative effects of issues that affect SGCN, rare communities and their habitats at various scales. [Broad actions categories](#) are defined to help organize handbooks. For information about how the Actions framework was developed and for definitions of Action categories, see the *Overview Handbook*.<sup>4</sup>

Actions proposed for the EDPT Ecoregion ([Table 8](#)) state what we need to work on, where, and why (what problem we can solve with that action). Actions lay out how that work contributes to a specific desired effect –progress and success.

It is important to acknowledge that one conservation action typically does not solve one conservation problem. There may be several actions employed over time to achieve a conservation goal. In some instances, defining the conservation goal *is* the action – for some things, we don’t yet know enough to define what successful conservation looks like for that SGCN population, rare community, or habitat.

It has become increasingly important to determine if the work we do is actually leading to the overall conservation outcomes we desire – **restoration, recovery, sustainability, and resiliency**. As conservation practitioners, we can use milestones (or intermediate results) and reporting to communicate our progress and leverage future conservation action, partnerships, policy changes, and funding.

From [project inception, well-crafted monitoring and evaluation](#) (cost effective, answers key questions) informs management and allows conservation practitioners to “course-correct” as necessary for effective conservation (CMP 2007, Salzer and Salafsky 2006). With the need for Action Plans to take advantage of several “pots of conservation money,” the people we serve and those who govern private and public conservation funds demand reporting, transparency, and *demonstration* that projects are *positively impacting the conservation of species and habitats*. To get beyond reporting that money was spent and projects were done, AFWA TWW convened a committee in 2009 to craft “effectiveness measures” for the conservation actions across all Plans. A [toolkit for classifying and measuring conservation action effectiveness](#) was produced in 2011, approved by AFWA TWW Executive Committee comprised of state fish and wildlife agency directors and others. These measures will be an important part of moving the plans and conservation forward.

With this revision, the TCAP becomes more involved in a national movement to track conservation actions and progress across local, state, regional and national levels. As with the 2005 Plan, actions presented in this edition vary in detail, scale, and duration; however, this edition encourages the use of the incremental measures of success for conservation projects’ development, implementation, and tracking. To that end, the toolkit in [Measuring the Effectiveness of State Wildlife Grants](#) (AFWA TWW, 2011) is **strongly recommended** to define projects, target audiences and partners, identify desired step-wise intermediate results, and collect the “right” data to report our conservation achievements.

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<sup>4</sup> The category “*Data Collection, Analysis, and Management*” meets Action Plan Required Element 3 – “priority research and survey”. Many of the proposed actions include a monitoring component (Action Plan Required Element 5).



**Table 7. EDPT Conservation Actions**

Note: Table is formatted 11" x 17", landscape orientation – SEE ALL OF THE [EFFECTIVENESS MEASURES](#) FOR EACH OF THE OVERALL ACTIONS TO ESTABLISH FINER DETAIL IN PROJECT IMPLEMENTATION

Conservation Action	Direct Mgmt of Natural Resources	Species Restoration	Creation of New Habitat	Acquisition, Easement, or Lease	Land Use Planning	Training, Technical Assistance	Data Collection, Analysis, Management	Conservation Area Designation	Education, Targeted Outreach	Environm Review	Mgmt Planning
<p>Surface water management is a key issue in this ecoregion, which covers many municipalities and watersheds, feeding many of our coastal estuaries. Identify a coalition or natural resources advisory group of terrestrial and aquatic ecologists across natural resources management entities for the ecoregion by basin. Craft SPECIFIC recommendations based on available science and regionally specific information about terrestrial and aquatic concerns, instream flow needs for fish and wildlife (including estuarine health), sensitive and unique areas to avoid reservoir development, opportunities for water quality improvement (see TMDL recommendation) to conserve SGCN and rare communities and priority habitats related to surface water management. Support the conversion or transfer of existing unused water rights to the Texas Water Trust to protect instream uses. Develop a means to aid in funding the transfer of unused water rights to TWT. Study current water use and rates paid in large urban areas, versus the cost of longterm ecological loss from reservoirs or other water development projects. Convey the findings to regional surface water planning groups and make recommendations for changes to accommodate realistic mitigation. Additional recommendations for accurate and complete water accounting would be useful for all planning processes. Given small budgets for time and travel, select a spokesperson (or rotating spokesperson) to attend and participate in Regional Surface Water Planning meetings and convey the group's recommendations.</p>											
<p>Groundwater management is a key issue in this ecoregion, which covers many municipalities and watersheds, related to surface waters which contribute to our coastal estuaries.</p> <p>Support the establishment of groundwater conservation district(s) that align most closely with the aquifer boundaries and use areas in and out of these basins to support management for conservation, preservation, recharging, and prevention of waste of groundwater resources.</p> <p>Identify a coalition or natural resources advisory group of terrestrial and aquatic ecologists across natural resources management entities for the ecoregion by aquifer. Craft SPECIFIC recommendations based on available science and regionally specific information about terrestrial and aquatic concerns, groundwater-surface water connection for instream flow needs for fish and wildlife (including estuarine health), sensitive and unique areas which may be adversely affected by groundwater withdrawals to conserve SGCN and rare communities and priority habitats related to groundwater management. Additional recommendations for accurate and complete water accounting would be useful for all planning processes. Given small budgets for time and travel, elect a spokesperson (or rotating spokesperson) to attend and participate in Regional Surface Water Planning meetings and convey the group's recommendations. Evaluate the effectiveness of this activity and share lessons learned in other regions which could benefit from this experience..</p>											

Conservation Action	Direct Mgmt of Natural Resources	Species Restoration	Creation of New Habitat	Acquisition, Easement, or Lease	Land Use Planning	Training, Technical Assistance	Data Collection, Analysis, Management	Conservation Area Designation	Education, Targeted Outreach	Environm Review	Mgmt Planning
Support the recommendations of the Edwards Aquifer RIP process which will at a minimum cover the following species with conservation actions: fountain darter ( <i>Etheostoma fonticola</i> ), San Marcos salamander ( <i>Eurycea nana</i> ), San Marcos gambusia ( <i>Gambusia georgei</i> ), Texas blind salamander ( <i>Eurycea rathbuni</i> ), Peck's cave amphipod ( <i>Stygobromus pecki</i> ), Comal Springs dryopid beetle ( <i>Stygoparnus comalensis</i> ), and the Comal Springs riffle beetle ( <i>Heterolemis comalensis</i> ). Coordinate with adjacent ecoregions for implementation and support.											
Work with local landowners and planning partners to identify and designate Important Bird Areas, primarily for grasslands, canyonlands											
Form multi-partner working group(s) to establish scientifically sound best management practices for <b>prescribed fire application</b> for the ecoregion (timing/season, period/duration, intensity, parameters for RX) for the restoration of sites and heterogeneity in grasslands, but also the longterm health and sustainability of desired ecological conditions (plant communities); work with Rx fire technical experts AND rare species experts to identify concerns, barriers, and solutions. Identify key species by subregion of the Edwards Plateau to monitor for effectiveness (e.g. best species to monitor to indicate effectiveness may be different in the Llano Uplift than in the more dissected Canyonlands). Identify data collection repository and reporting to share lessons learned with other conservation practitioners and make changes as science evolves or supports practice.											
Form multi-partner working group(s) to establish scientifically sound best management practices for <b>chemical/mechanical brush control</b> for the ecoregion and specific watersheds – slope, aspect, species, techniques, avoidance areas. work with brush control technical experts AND rare species experts to identify concerns, barriers, and solutions. Identify key species by subregion of the Edwards Plateau to monitor for effectiveness (e.g. best species to monitor to indicate effectiveness may be different in the Llano Uplift than in the more dissected Canyonlands). Identify data collection repository and reporting to share lessons learned with other conservation practitioners and make changes as science evolves or supports practice.											
Form multi-partner working group(s) to establish scientifically sound best management practices for <b>riparian restoration</b> (cottonwood, sycamore, cypress), including timing, water needs, reasonable recommendations for initial planting diversity, ways to encourage full complement of desired ecological condition of community, how to prevent or control specific invasives without negatively impacting restoration, locally sourced seed and plant materials for the ecoregion (and finer scales if needed) Identify key species by subregion of the Edwards Plateau to monitor for effectiveness (e.g. best species to monitor to indicate effectiveness may be different in the Llano Uplift than in the more dissected Canyonlands). Identify data collection repository and reporting to share lessons learned with other conservation practitioners and make changes as science evolves or supports practice.											
Create a multi-disciplinary ecology committee to identify three to five years of highest priority research projects (actual projects, not just concepts) that can be rolled out to universities and colleges to collect the information most needed at the PRACTICAL level for management and conservation improvement on the ground.											

Conservation Action	Direct Mgmt of Natural Resources	Species Restoration	Creation of New Habitat	Acquisition, Easement, or Lease	Land Use Planning	Training, Technical Assistance	Data Collection, Analysis, Management	Conservation Area Designation	Education, Targeted Outreach	Environm Review	Mgmt Planning
Identify a host website to share ecoregional practitioner (not novice, not landowner, but professional) cross-training opportunities for RX fire, stream rehabilitation, reintroductions, brush management, GIS and corridor identification, <i>other ...</i>											
Conservation easements and landowner incentive programs are the best instruments for landowner participation in this region. Landowners with intact grassland-woodland mosaic (especially those within priority grassland areas identified by the Rio Grande Joint Venture, Oaks and Prairies Joint Venture, and The Nature Conservancy, USFWS Partners Program, NRCS Farm Bill wildlife biologists), grasslands with restoration potential for little investment, riparian corridors along Ecologically Significant Stream Segments (and to their headwaters), diverse hardwood canyons, cave or karst landscapes, and/or springs should be first-eligible. Monitoring of key species (to be identified) must be a part of these projects. Information about methods, short and longterm success (or failure) need to be shared through conservation networks (see Statewide/Multi-region Issues handbook – Information Actions section).											
Work with willing landowners <i>especially adjacent to and in corridors between</i> well-managed public lands to restore and manage riparian communities in large single-ownership or smaller acreage cooperatives – opportunities to connect/improve historically fragmented management											
Many SGCN in this region lack distribution and POPULATION status information. This lack of information can contribute to “false rarity” determinations; more information and cooperation from private landowners may reduce the risk of listing, enhance recovery options, and contribute to conservation of many sensitive habitats just through awareness and documentation.											
<p>Information Needs (Specific)</p> <ul style="list-style-type: none"> <li>▪ Mapping the most invasive species in the region, to determine priority areas for control and restoration</li> <li>▪ Presence and status of the following species (<i>why? Are these particular indicators in their habitats? Are they highly threatened? Are they good monitoring indicators for particular habitat health?</i>): <ul style="list-style-type: none"> <li>○ Need list</li> </ul> </li> <li>• Research on effects of managed flows on the Colorado River (<i>other rivers?</i>)</li> <li>• Research into extent and nature of recharge of important springs and aquifers; research into methods of converting non-native pasture to natural grassland;</li> <li>• additional inventories of cave fauna, especially in parts of the region that have been little surveyed</li> <li>• Specific levels of impact of groundwater withdrawals on spring and habitats that support rare and endemic species (<i>where– be specific about which species you will monitor to determine site health</i>)</li> </ul>											

Conservation Action	Direct Mgmt of Natural Resources	Species Restoration	Creation of New Habitat	Acquisition, Easement, or Lease	Land Use Planning	Training, Technical Assistance	Data Collection, Analysis, Management	Conservation Area Designation	Education, Targeted Outreach	Environm Review	Mgmt Planning
Review TPWD policies and regulations on trapping of furbearers and non-game species to reduce unintentional loss of non-target SGCN including (black bear, badger, hog-nosed skunk, hooded skunk, western spotted skunk, and swift fox). Increasing trap inspection intervals from every 36 hours to every 24 hours for furbearers and requiring 24 hour trap checks for non-furbearing target species would potentially reduce the number of non-target losses. Consider implementing mandatory trapper education classes to improve trapping techniques that reduce non-target losses											
Climate change models and effects on isolated habitats, riparian areas, and springs/groundwater resources											
Host landowner workshops on conservation instruments – Safe Harbor Agreements, Candidate Conservation Agreements, others – to dispel myths about regulatory constraints. Showcase specific studies and examples from the region (or adjacent ecoregions) for better relationship building. Document through conservation practice and partner surveys over the course of three to five years whether the workshops increase opportunities for these tools to be used and the SPECIFIC barriers to their use											
<p>Improve Environmental Review and Consultation for voluntary practices (wind, solar, communications, transportation):</p> <p>Create mapped zones of sensitive areas (raptor migration corridors, proximity to colonial habitats, other?) to share with wind developers to encourage better siting</p> <p>Identify timing and intensity of barotraumas and impact hazards from wind turbines and encourage wind generation companies to modify practices</p> <p>Identify non-compliant communications towers and provide incentives to bring into compliance (lighting, height); outreach to communications companies about the local hazards of communication towers and recommendations to improve practice to improve conditions for all nocturnal migrants and Yellow-billed Cuckoo, Painted Bunting, Summer Tanager,</p> <p>See Transportation section of Statewide/Multi-region handbook regarding bridge and culvert design</p>											
Determine market values that are driving livestock production, hunting and other recreation, and land sales in this region. Craft a recommendation to landowner incentive program providers that can be used to index conservation practice incentives in ecoregions. Monitor whether this approach was effective to change the conservation program values AND landowner participation in those programs before & after the change.											

Conservation Action	Direct Mgmt of Natural Resources	Species Restoration	Creation of New Habitat	Acquisition, Easement, or Lease	Land Use Planning	Training, Technical Assistance	Data Collection, Analysis, Management	Conservation Area Designation	Education, Targeted Outreach	Environm Review	Mgmt Planning
Identify the barriers to RX fire application to significant grassland – woodland mosaic restoration areas. Make management recommendations (timing, season, periodicity) to overcome barriers AND match more natural fire episode timing. Craft TARGETD outreach plans to overcome these barriers and work with landowners in core grassland restoration and recovery areas to benefit pronghorn, grassland birds, and small mammals and reptiles. Select a few keystone species for monitoring in these areas – see above.											
Work with private landowners and conservation partners to minimize feral hog populations through aerial shooting, hunting, and trapping. Provide technical guidance and educational programs about the impact and management of feral hogs to benefit ground nesting birds, small mammals, aquatic species											
Where wildlife and fisheries management are not the primary objective and where livestock production is the primary objective, refer landowners to partners who can assist them with best management practices for rotational and site-appropriate grazing management											
Species Restoration: ▪											
State Scientific Area Designation for San Marcos River											

Conservation Action	Direct Mgmt of Natural Resources	Species Restoration	Creation of New Habitat	Acquisition, Easement, or Lease	Land Use Planning	Training, Technical Assistance	Data Collection, Analysis, Management	Conservation Area Designation	Education, Targeted Outreach	Environm Review	Mgmt Planning
<p>Conservation service providers and ecologists need to engage with urban biologists to convey conservation needs and priorities to urban planning efforts through Metropolitan Planning Organizations, Councils of Government, Regional Transportation Authorities, Parks Boards, Counties, and others in current and emerging urban areas. Every conservation organization cannot attend every meeting (see the recommendations above about surface and groundwater advisory roles). Key issues may be:</p> <ul style="list-style-type: none"> <li>▪ Park and open space planning for habitat connectivity (daily and seasonal movements), riparian and streamside protection, water quality protection, floodplain set asides, mitigation banks for in-jurisdiction projects</li> <li>▪ Water quality protection through stormwater pollution prevention plans and facilities even where not required by regulation, leaving natural floodways intact rather than armoring</li> <li>▪ Karst, cliff, spring, and other sensitive feature protections</li> <li>▪ Water conservation practices</li> <li>▪ Invasive species prevention and removal in public land, rights of way, planned developments (e.g. encourage native plant use in new housing areas, incentives for landscape conversion to natives especially in areas near waterways)</li> <li>▪ Collaboration with counties for environmental protections (stormwater, invasive species, reclamation, dumping, other?)</li> <li>▪ Tax incentives or disincentives for open land conversion, restoration, conservation planning</li> </ul> <p>Identify sources of volunteers and/or funding which could help municipalities and counties employ conservation practices.</p> <p>As with any outreach program, these efforts need to have reporting objectives and monitoring of sorts to determine effectiveness, share lessons learned and hone approaches for future and emerging areas which will be experiencing these issues in the future.</p>											

NOTE: Almost all of these actions would benefit from more regular cooperation among conservation practitioners in the region. A share-site for conservation practice would be a useful tool. See Statewide/Multi-region handbook AND the [Effectiveness Measures](#) report's evaluation of existing conservation practice sharing tools (Appendix IV). This will go a long way toward landscape-level planning and shared priorities.

## CONSERVATION PARTNERS AND PROGRAMS

This section to be developed following all Actions, prior to USFWS review in August 2011

## RESOURCES AND REFERENCES

Resources and References will be finalized after the handbook has been completely drafted. These and other resources will be compiled into one large document on the website after USFWS review.

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