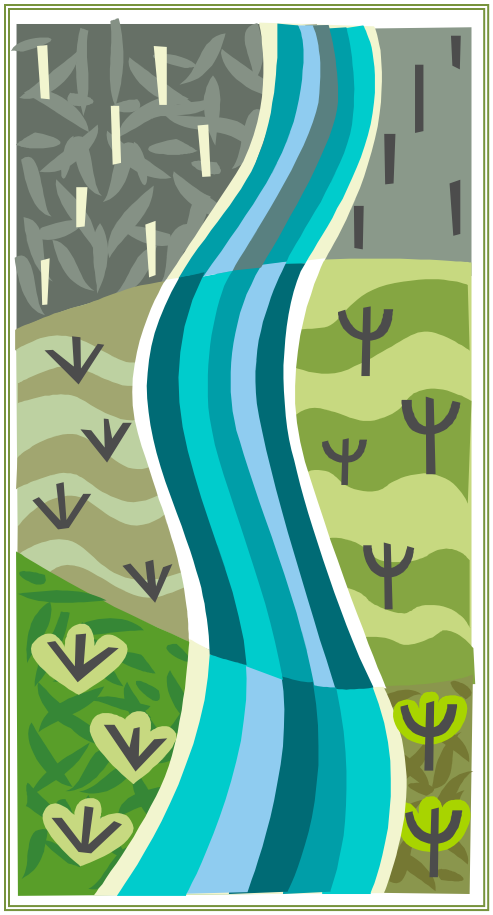

TEXAS CONSERVATION ACTION PLAN

East Central Texas Plains (Post Oak Savanna)

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.

In accordance with Texas State Depository Law, this publication is available at the Texas State Publications Clearinghouse and/or Texas Depository Libraries.

PWD insert number when approved

Citing this document:

Texas Parks and Wildlife Department. 2011. **Texas Conservation Action Plan 2011 – 2016: East Central Texas Plains Handbook**. Editor, Wendy Connally, Texas Conservation Action Plan Coordinator. PWD insert number when approved. Austin, Texas.

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ECOREGION HANDBOOK TABLES

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 East Central Texas Plains (ECPL) 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 ECPL 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 ECPL 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 ECPL 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 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).[1]

Table 1 crosswalks this ecoregion with other conservation planning units.[2]

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[3] (ESSS) which occur in this area.

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

[1] Griffith, G. 2010. Level III North American Terrestrial Ecoregions: United States Descriptions. Prepared for the North American Commission for Environmental Cooperation (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 (accessed May 2009).

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

[3] TPWD. 2002/2005. *Ecologically Significant Stream Segments*. http://www.tpwd.state.tx.us/landwater/water/environconcerns/water_quality/sigsegs/

Table 1. Crosswalk of ECPL 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.

2011 TCAP	**2005 TXWAP** Gould 1960	**The Nature Conservancy** Terrestrial Ecoregions 1999	**Ecological Drainage Units** (*Watersheds*) 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
East Central Texas Plains (**ECPL**)	Post Oak Savanna	Cross Timbers and Southern Tallgrass Prairie (32)	Corpus Christi – Frio – Nueces Guadalupe – San Antonio Lower Brazos Lower Colorado Lower Red Lower Trinity Sabine – Neches Upper Red	Oaks and Prairies JV Oaks and Prairies BCR	Gulf Coast Prairie	Nueces Coastal Bend (3) Guadalupe – San Antonio (4) Colorado Lower (5b) Brazos Lower (6b) Trinity – San Jacinto (7) Deep East Texas (8) Northeast Texas (9) Plains Rivers (10)	Southwest Plateaus and Plains Range and Cotton Region: *Northern Rio Grande Plain (83A)* Southwestern Prairies Forage and Cotton Region: *Texas Claypan Area Southern (87A), Texas Claypan Area Northern Part (87B)* South Atlantic and Gulf Coast Cash Crops, Forest, and Livestock Region: *Western Coastal Plain (133B)*	Oak Woods and Prairies

Figure 1. ECPL Ecoregion with County Boundaries

East Central Texas Plains in yellow

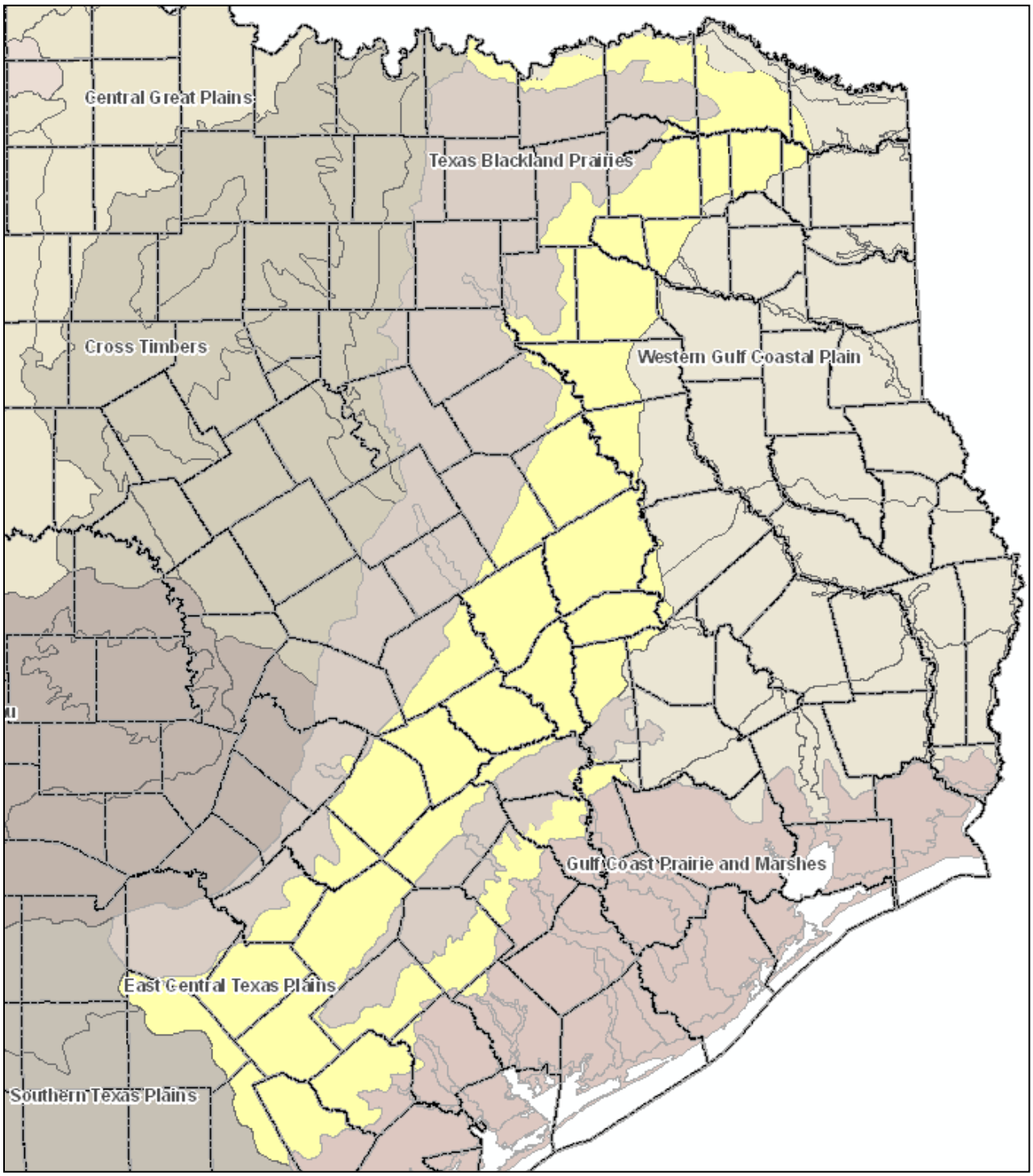


Table 2. ECPL EDUs with ESSS and Reservoirs

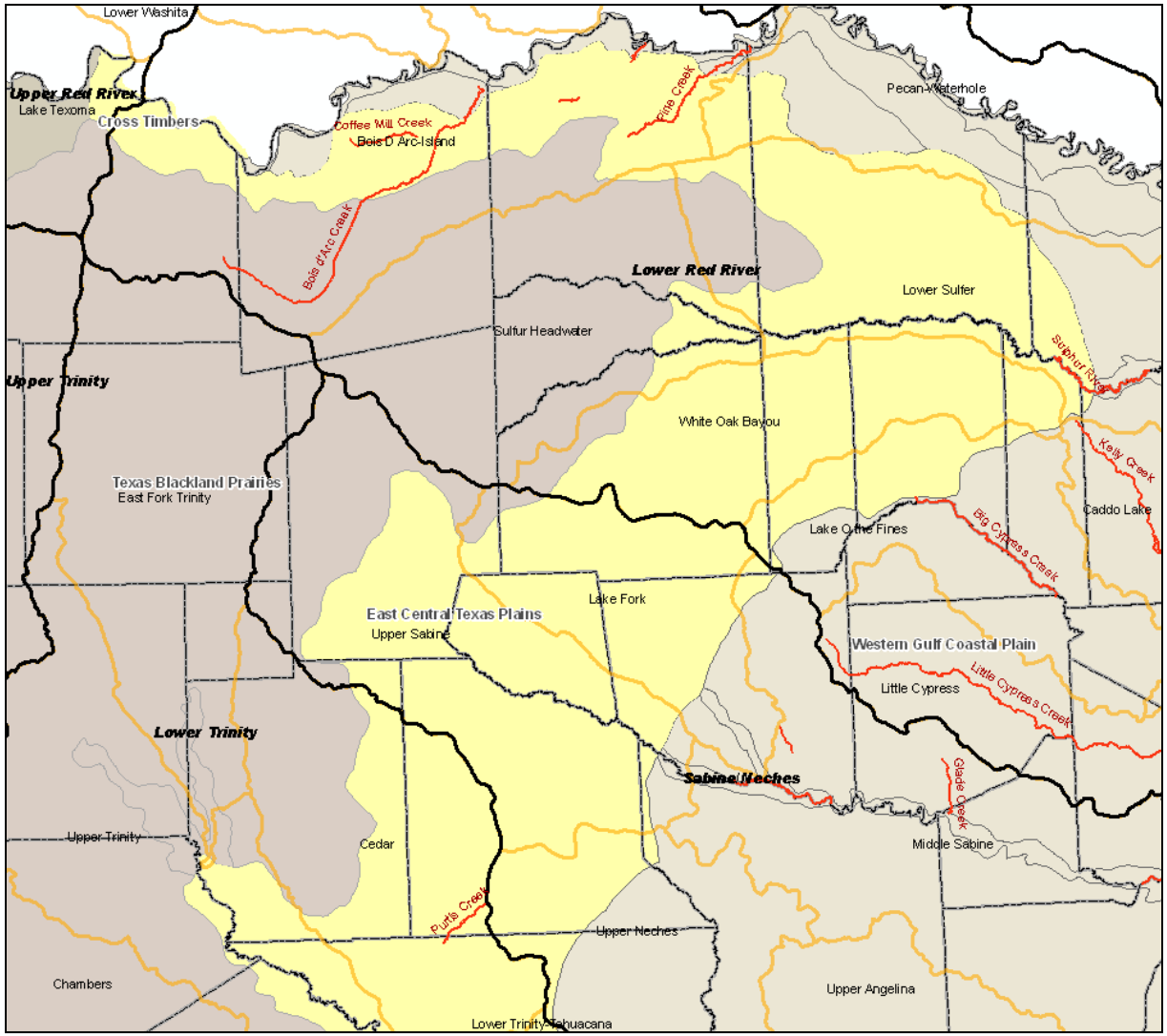
ECOLOGICAL DRAINAGE UNIT SubBasin (HUC 8)	*Ecologically Significant Stream Segment TPWD 2002, w/updates 2005*	Lakes and Reservoirs
UPPER RED RIVER		
Lake Texoma		Lake Texoma
LOWER RED RIVER		
Bois d'Arc - Island	Coffee Mill Creek, Sanders Creek, Pine Creek	Rendell Lake, Valley Lake, Lake Bonham, Coffee Mill Lake, Pat Mayse Lake, Lake Crook
Sulphur Headwater		
Lower Sulphur	Sulphur Creek	River Crest Lake, Wright Patman Lake
Pecan - Waterhole		
White Oak Bayou		Lake Sulphur Springs, Wright Patman Lake
Lake O' the Pines		Lake Cypress Springs, Lake Bob Sandlin, Lake Monticello
SABINE - NECHES		
Upper Neches		
Upper Sabine		Lake Tawakoni, Lake Holbrook
Lake Fork		Lake Fork Reservoir, Lake Quitman
LOWER TRINITY		
Cedar	Purtis Creek	Cedar Creek Reservoir (Henderson), Forest Grove Reservoir
Chambers		Richland - Chambers Reservoir
Upper Trinity	Trinity River	Trinidad Lake
Richland		Richland - Chambers Reservoir
Lower Trinity - Tehuacana	Catfish Creek, Trinity River, Upper Keechi Creek, Wheelock Creek, Linn Creek, Buffalo Creek	Fairfield Lake
West Fork San Jacinto	Lake Creek	
Lower Trinity - Kickapoo	Trinity River	
Spring		
LOWER BRAZOS		
San Gabriel		
Navasota		Lake Limestone, Twin Oak Reservoir, Camp Creek Reservoir, Gibbons Creek Reservoir

ECOLOGICAL DRAINAGE UNIT SubBasin (HUC 8)	*Ecologically Significant Stream Segment TPWD 2002, w/updates 2005*	**Lakes and Reservoirs**
Lower Brazos - Little Brazos		Bryan Utilities Reservoir
Little	Little River	
Lower Brazos	Clear Creek, Mill Creek	
Yegua		Alcoa Lake, Somerville Lake
San Bernard		
LOWER COLORADO RIVER		
Lower Colorado - Cummins	Colorado River, Cummins Creek	Lake Bastrop
Lower Colorado	Colorado River	
GUADALUPE - SAN ANTONIO		
Medina		
San Marcos	San Marcos River	
Upper San Antonio		
Cibolo		
Middle Guadalupe	Guadalupe River	Lake Gonzales
Lower San Antonio		Coleto Creek
Navidad		
Lavaca		
CORPUS CHRISTI - FRIO - NUECES		
Atascosa		
Lower Nueces		
Aransas		
Mission		

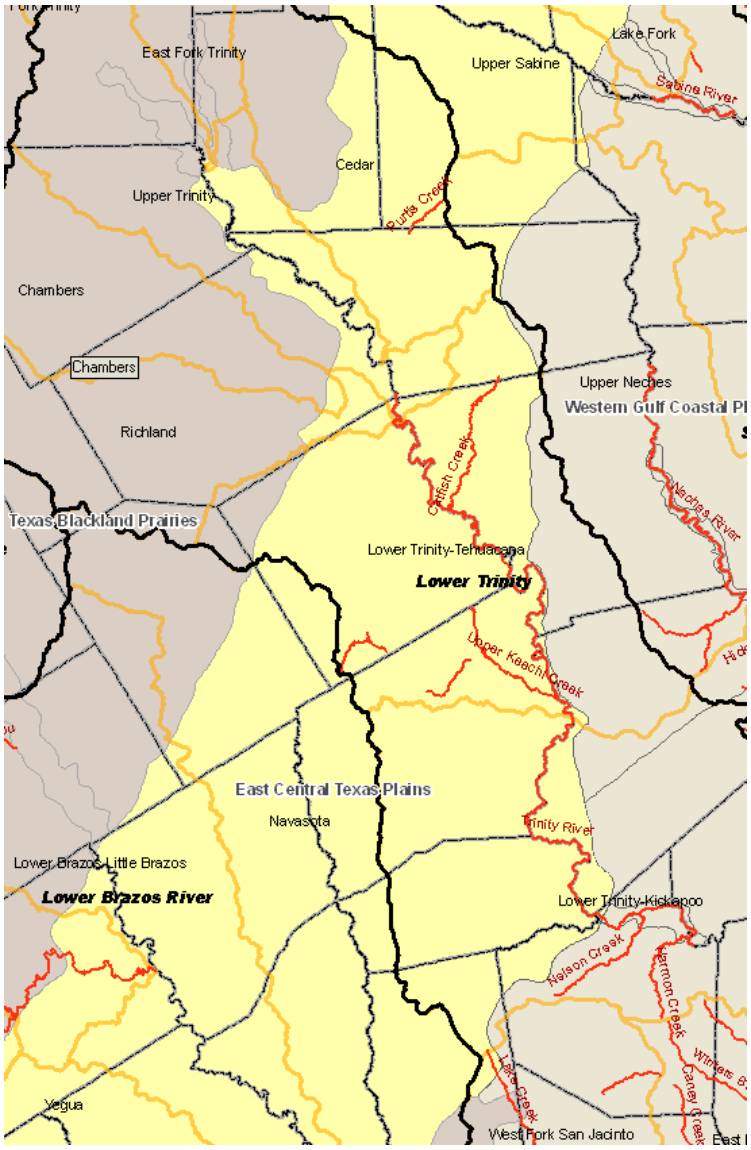
Note: Ecologically Significant Stream Segments and Reservoirs which occur in the Subbasin (HUC 8) but not in the ECOREGION are not included in this table. There may be other significant stream resources mentioned in the Priority Habitats section

Figure 2. ECPL EDUs, HUC 8s, and Ecologically Significant Stream Segments – 4 maps

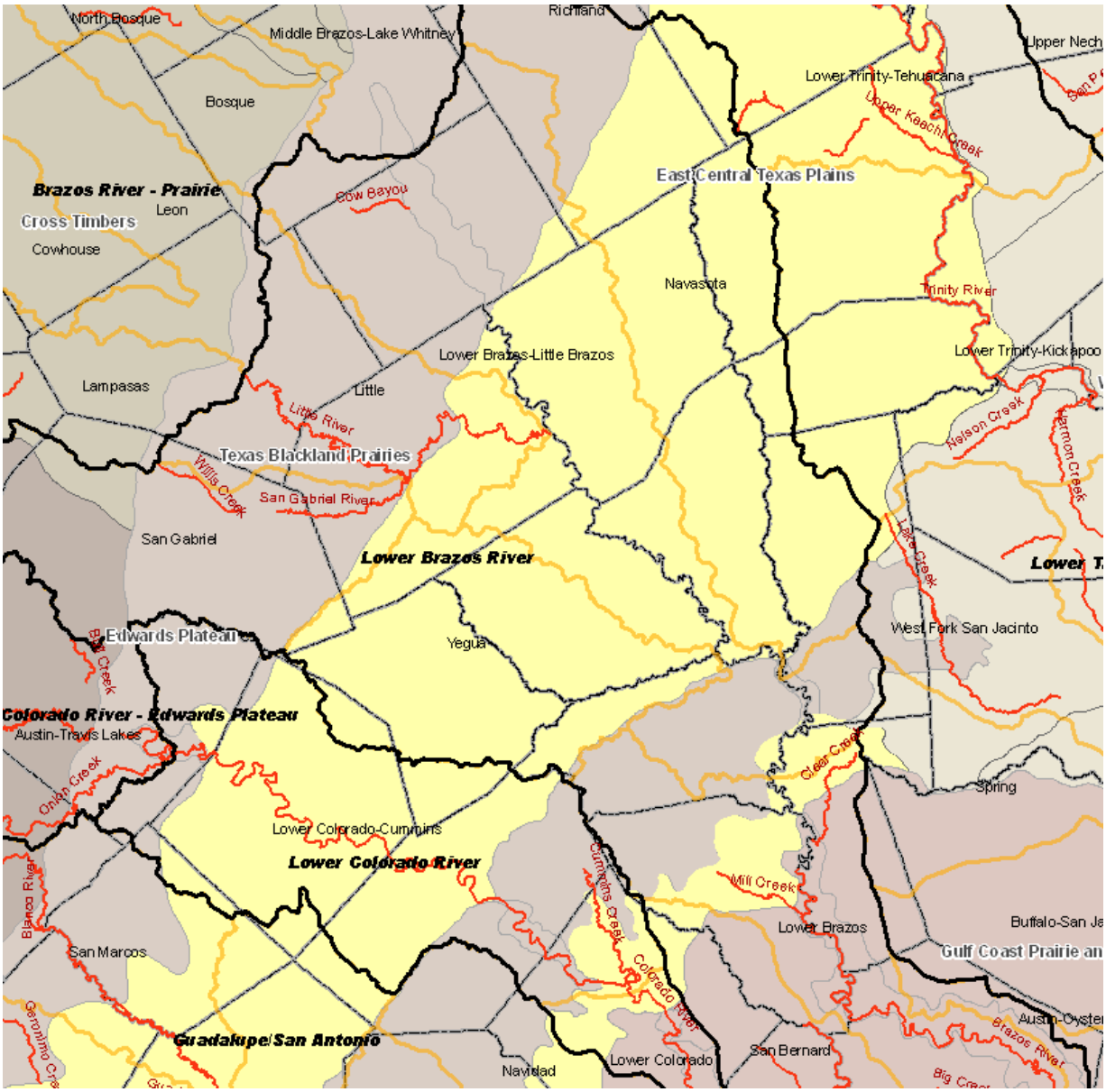
Lower Red River and Sabine Neches EDU black outline, HUC 8s orange outline, ESSS red lines



Lower Trinity EDU black outline, HUC 8s orange outline, ESSS red lines

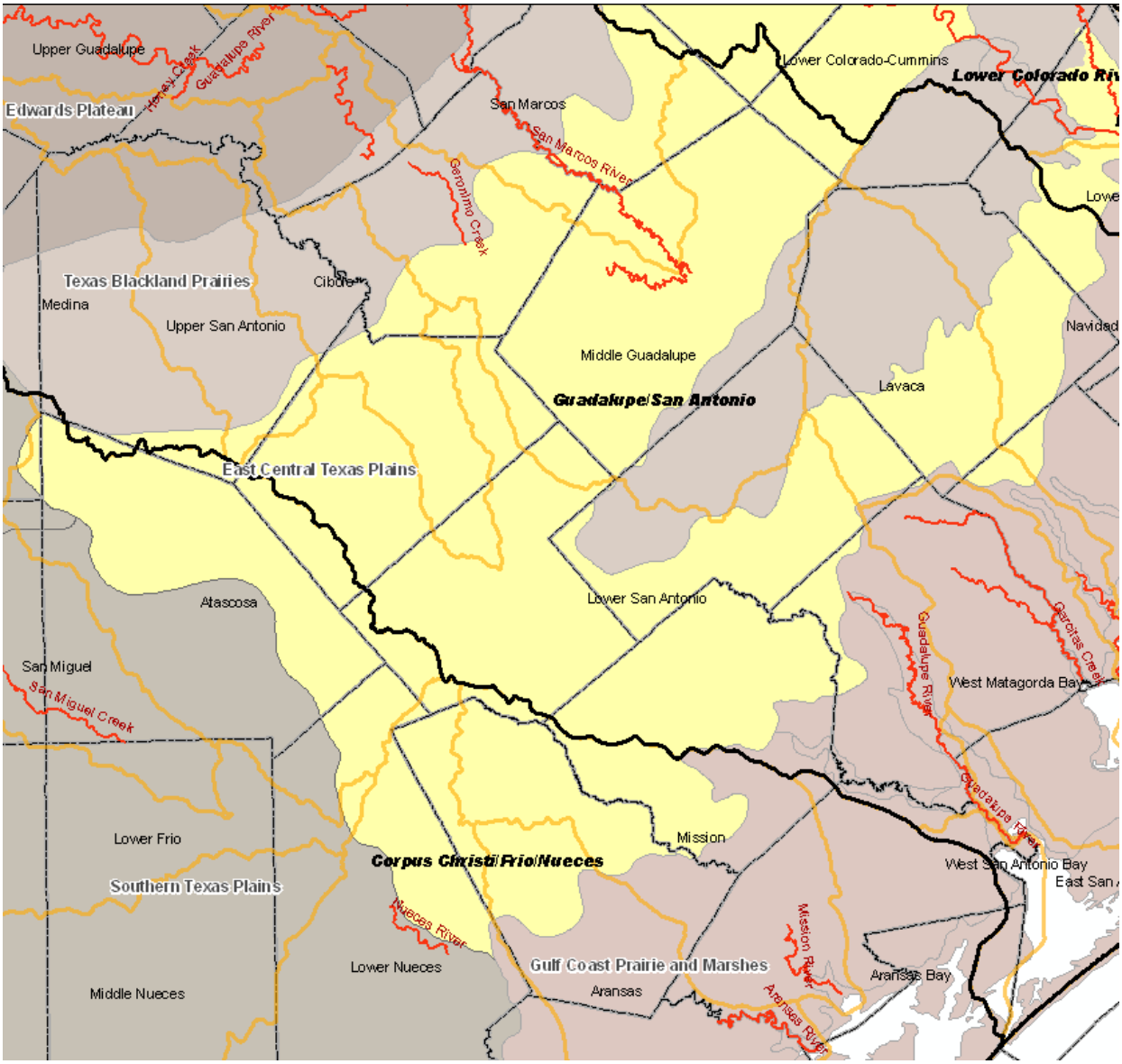


Lower Brazos River and Lower Colorado River EDUs black outline, HUC 8s orange outline, ESSS red lines



Guadalupe/San Antonio and Corpus Christi/Frio/Nueces EDUs black outline,

HUC 8s orange outline, ESSS red lines



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. ECPL 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
MAMMALS					
Mustela frenata	Long-tailed weasel			G5	S5
Myotis velifer	Cave myotis			G5	S4
Puma concolor	Mountain lion			G5	S2
Spilogale putorius	Eastern spotted skunk			G4T	S4
Tadarida brasiliensis	Brazilian free-tailed bat			G5	S5
Taxidea taxus	American badger			G5	S5
Lutra canadensis	River otter			G5	S4
Sylvilagus aquaticus	Swamp rabbit			G5	S5
Blarina carolinensis	Southern short-tailed shrew			G5N5	S4
Blarina hylophaga plumblea	Elliot's short-tailed shrew			G5T1Q	S1
Geomys attwateri	Attwater's pocket gopher			G4	S4
Myotis austroriparius	Southeastern myotis			G3G4	S3
Ursus americanus	Black bear	SAT	T	G5	S3
BIRDS					
Ictinia mississippiensis	Mississippi Kite			G5	S4B
Anas acuta	Northern Pintail			G5	S3B,S5N
Colinus virginianus	Northern Bobwhite			G5	S4B
Circus cyaneus	Northern Harrier			G5	S2B,S3N
Asio flammeus	Short-eared Owl			G5	S4N
Tyrannus forficatus	Scissor-tailed Flycatcher			G5	S3B
Lanius ludovicianus	Loggerhead Shrike			G4	S4B
Spizella pusilla	Field Sparrow			G5	S5B
Ammodramus savannarum	Grasshopper Sparrow			G5	S3B
Chondestes grammacus	Lark Sparrow			G5	S4B
Calcarius mccownii	McCown's Longspur			G4	S4
Spiza americana	Dickcissel			G5	S4B
Sturnella magna	Eastern Meadowlark			G5	S5B
Icterus spurius	Orchard Oriole			G5	S4B
Meleagris gallopavo	Wild Turkey			G5	S5B
Egretta thula	Snowy Egret			G5	S5B
Egretta caerulea	Little Blue Heron			G5	S5B
Butorides virescens	Green Heron			G5	S5B

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
Haliaeetus leucocephalus	Bald Eagle			G5	S3B,S3N
Buteo lineatus	Red-shouldered Hawk			G5	S4B
Pluvialis dominica	American Golden-Plover			G5	S3
Sternula antillarum	Least Tern	LE*	E*	G4	S3B
Caprimulgus carolinensis	Chuck-will's-widow			G5	S3S4B
Melanerpes erythrocephalus	Red-headed Woodpecker			G5	S3B
Vireo bellii	Bell's Vireo			G5	S3B
Poecile carolinensis	Carolina Chickadee			G5	S5B
Anthus spragueii	Sprague's Pipit	C		G4	S3N
Ammodramus leconteii	Le Conte's Sparrow				
Zonotrichia querula	Harris's Sparrow			G5	S4
Piranga rubra	Summer Tanager			G5	S5B
Passerina ciris	Painted Bunting			G5	S4B
Ixobrychus exilis	Least Bittern			G5	S4B
Mycteria americana	Wood Stork		T	G4	SHB,S2N
Scolopax minor	American Woodcock			G5	S2B,S3N
Dryocopus pileatus	Pileated Woodpecker			G5	S4B
Thryomanes bewickii (bewickii)	Bewick's Wren			G5	S5B
Cistothorus platensis	Sedge Wren			G5	S4
Hylocichla mustelina	Wood Thrush			G5	S4B
Dendroica dominica	Yellow-throated Warbler			G5	S4B
Dendroica cerulea	Cerulean Warbler			G4	SHB,S3N
Protonotaria citrea	Prothonotary Warbler			G5	S3B
Limnothlypis swainsonii	Swainson's Warbler			G4	S3B
Seiurus motacilla	Louisiana Waterthrush			G5	S3B
Oporornis formosus	Kentucky Warbler			G5	S3B
Aimophila aestivalis	Bachman's Sparrow		T	G3	S3B
Ammodramus henslowii	Henslow's Sparrow			G4	S2S3N,SXB
Calcarius pictus	Smith's Longspur				
Euphagus carolinus	Rusty Blackbird			G4	S3
REPTILES & AMPHIBIANS					
Anaxyrus (Bufo) woodhousii	Woodhouse's toad			G5	SU
Apalone mutica	smooth softshell turtle				
Cheylydra serpentina	Common snapping turtle				
Crotalus atrox	Western diamondback rattlesnake				S4

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
Heterodon nasicus	Western hognosed snake				
Phrynosoma cornutum	Texas horned lizard		T	G4G5	S4
Terrapene ornata	Ornate box turtle			G5	S3
Trachemys scripta	Red-eared slider				
Crotalus horridus	Timber (Canebrake) Rattlesnake		T	G4	S4
Macrochelys temminckii	alligator snapping turtle		T	G3G4	S3
Pseudacris streckeri	Strecker's Chorus Frog			G5	S3
Thamnophis sirtalis	Common Garter Snake (Eastern/Texas/ New Mexico)			G5	S2
Apalone spinifera	spiny softshell turtle				
Anaxyrus (Bufo) houstonensis	Houston toad	E	E	G1	S1
Graptemys caglei	Cagle's map turtle		T	G3	S1
Holbrookia maculata propinqua	Eastern earless lizard				SX
Ophisaurus attenuatus	western slender glass lizard				
Terrapene carolina	Eastern box turtle			G5	S3
FRESHWATER FISHES					
Anguilla rostrata	American eel			G4	S5
Cycleptus elongatus	Blue sucker		T	G3G4	S3
Hiodon alosoides	Goldeye				
Macryhbopsis storeriana	Silver chub				
Notropis bairdi	Red River shiner				
Notropis oxyrhynchus	Sharpnose shiner	C		G3	S3
Notropis potteri	Chub shiner		T	G4	S3
Polyodon spathula	Paddlefish		T	G4	S3
Atractosteus spatula	alligator gar				
Erimyzon oblongus	Creek chubsucker		T	G5	S2S3
Etheostoma radiosum	Orangebelly darter				
Notropis atrocaudalis	Blackspot shiner				
Notropis buccula	Small eye shiner	C		G2Q	S2
Notropis chalybaeus	Ironcolor shiner				
Notropis shumardi	Silverband shiner				
Percina apristis	Guadalupe darter				
Scaphirhynchus platorynchus	Shovelnose sturgeon		T	G4	S2
INVERTEBRATES					
Bombus pensylvanicus	American bumblebee			GU	SU*

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
Potamilus amphichaenus	Texas heelsplitter		T	G1G2	S1
Quadrula aurea	Golden orb		T	G1	S2*
Quadrula houstonensis	Smooth pimpleback		T	G2	S1S2*
Quadrula mitchelli	False Spike		T	GH	SH
Truncilla macrodon	Texas fawnsfoot		T	G2Q	S1*
Bombus variabilis	Variable cuckoo bumblebee			GU	SU*
Arkansia wheeleri	Ouachita rock pocketbook	LE		G1	SH*
Chimarra holzenthali	Holzenthal's Philopotamid caddisfly			G1G2	S1
Colletes bumeliae	A cellophane bee			G1*	S1*
Cotalpa conclamara	A scarab beetle			G1*	S1*
Cotinis boylei	A scarab beetle			G2*	S2*
Eucera birkmanniella	A longhorned bee			G1G2*	S1S2*
Fusconaia askewi	Texas pigtoe		T	G2G3	S2S3*
Lampsilis bracteata	Texas fatmucket		T	G1	S1*
Megachile parksi	a leaf-cutting bee			G1*	S1*
Melanoplus alexanderi	A grasshopper			G1G2	S2?*
Obovaria jacksoniana	Southern hickorynut		T	G2	S1*
Perdita atriventris	A mining bee			G1*	S1*
Procambarus ceruleus	Blueclaw chimney crayfish			G1G3	S2*
Procambarus texanus	Bastrop crayfish			G1	S1
Sparbarus coushatta	A mayfly			G1G2	S1?*
Stallingsia maculosus	Manfreda giant-skipper			G1G2	S1S2
Susperatus tonkawa	A mayfly			G1	S1*
PLANTS					
Hymenoxys pygmea	Pygmy prairie dawn			G1	S1
Carex shinnersii	Shinner's sedge			G3?	S2
Cuscuta exaltata	tree dodder			G3	S3
Festuca versuta	Texas fescue			G3	S3
Physaria engelmannii	Engelmann's bladderpod			G3	S3
Abronia macrocarpa	large-fruited sand-verbena	LE	E	G2	S2
Agalinis navasotensis	Navasota false foxglove			G1	S1
Allium elmendorfii	Elmendorf's onion			G2	S2
Astragalus soxmaniorum	Soxman's milkvetch			G3	S3
Brazoria truncata var. pulcherrima	Centerville Brazos-mint			G4T3	S3
Calopogon oklahomensis	Oklahoma grass pink			G3	S1S2

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
Chaetopappa imberbis	awnless leastdaisy			G3	S3
Clematis carrizoanus	Carrizo sands leather-flower			G2	S2
Coreopsis intermedia	goldenwave tickseed			G3	S3
Coreopsis nuecensis	crown tickseed			G3	S3
Crataegus sutherlandensis	Sutherland Springs hawthorn			G3Q	S3
Crataegus warneri	Warner's hawthorn			G3Q	S3
Cuscuta attenuata	marsh-elder dodder			G3	S2
Cyperus grayioides	Mohlenbrock's sedge			G3G4	S3S4
Eleocharis austrotexana	South Texas spikesedge			G3	S3
Eriocaulon koernickianum	small-headed pipewort			G2	S1
Euphorbia peplidion	low spurge			G3	S3
Helianthus occidentalis subsp. plantagineus	Shinner's sunflower			G5T2T3	S2S3
Hymenopappus carrizoanus	sandhill woolywhite			G2	S2
Liatris bracteata	coastal gay-feather			G2G3	S2S3
Liatris cymosa	branched gay-feather			G2	S2
Monarda viridissima	Texas beebalm			G3	S3
Nemophila sayersensis	Sayersville blue eyes			G2	S2
Oenothera cordata	heartleaf evening-primrose			G3	S3
Paronychia setacea	bristle nailwort			G3	S3
Physaria angustifolia	threadleaf bladderpod			G3	S1
Polygonella parksii	Parks' jointweed			G2	S2
Prunus texana	Texas peachbush			G3G4	S3S4
Pseudognaphalium austrotexanum	South Texas false cudweed			G3	S3
Psilactis heterocarpa	Welder machaeranthera			G2G3	S2S3
Rhynchospora indianolensis	Indianola beakrush			G3	S3
Rhynchospora macra	large beakrush			G3	S2
Spiranthes parksii	Navasota ladies'-tresses	LE	E	G3	S3
Symphyotrichum puniceum var. scabricaule	rough-stem aster			G5T2	S2
Tauschia texana	Texas tauschia			G3	S3
Thalictrum arkansanum	Arkansas meadow-rue			G2Q	S2
Thalictrum texanum	Texas meadow-rue			G2	S2
Thelesperma burridgeanum	Burridge greenthread			G3	S3
Valerianella florifera	Texas cornsalad			G3	S3
Xyris chapmanii	Chapman's yellow-eyed grass			G2	S2

Table 4. ECPL Rare Communities

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

Global Rank	State Rank	Common Name	Global Name	Ecological System Name	Known Counties	Endemic	Known Protected Areas
G1G2	S1S2	Northern Texas Post Oak Stream Valley Pitcher Plant Bog	(Acer rubrum var. trilobum - Alnus serrulata) / Apios americana - Sarracenia alata - Symphyotrichum puniceum var. scabricaule - Rhynchospora chalarocephala - Juncus trigonocarpus Herbaceous Vegetation	West Gulf Coastal Plain Herbaceous Seep and Bog CES203.194	Anderson, Henderson, Smith, Van Zandt, and Wood	Y	Gus Engeling WMA (TPWD)
G2	S2	Curly threeawn - Pickering's dawnflower - Silver Croton - Little Blustem Blowout Sandhill Vegetation	Aristida desmantha-Stylisma pickeringii ssp. patersonii-Croton argyranthemus-Schizachrium scoparium Herbaceous Vegetation	East-Central Texas Plains Xeric Sandyland CES205.897	Anderson, Austin, Bastrop, Burleson, Caldwell, Colorado, Freestone, Gonzales, Guadalupe, Henderson, Lee, Leon, Milam, Robertson, Smith Van Zandt, and Wood	Y	Attwaters Prairie Chicken Refuge (USFS), Bastrop SP (TPWD), Yeagua Knobs Preserve (Pines and Prairies Land Trust)
G1	S1	Texas Post Oak Savanna Oakville Sandtone Outcrop	Bouteloua spp. - Muhlenbergia capillaris - Physaria densiflora - Coryphantha missouriensis - Lygodesmia texana Herbaceous Vegetation		Grimes	Y	No documented protected areas
G1G2	S1S2	Texas Post Oak Savanna Quaking Muck Bog	Carex lurida - Andropogon glomeratus - Sarracenia alata - Symphyotrichum puniceum var. scabricaule - Doellingeria sericocarpoides Herbaceous Vegetation	West Gulf Coastal Plain Herbaceous Seep and Bog CES203.194	Anderson, Freestone, Henderson, Robertson (possibly extirpated?), Van Zandt, and Wood	Y	Gus Engeling WMA (TPWD)
G1G2	S1S2	Central Texas Post Oak Ecoregion Stream Valley Seepage-Bog	Centella erecta - Rhexia mariana - Sarracenia alata - Rhynchospora chalarocephala - Polygala cruciata - Juncus trigonocarpus - Andropogon capillipes Herbaceous Vegetation		Freestone, Houston, Leon, and Robertson	Y	No documented protected areas
G1	S1	Southern Texas Post Oak Ecoregion Stream Terrace Escarpment Seepage-Bog	Cyperus haspan - Fuirena squarrosa - Cirsium muticum - Cicuta maculata - Leersia virginica Herbaceous Vegetation	West Gulf Coastal Plain Herbaceous Seep and Bog CES203.194	Gonzales and Guadalupe	Y	No documented protected areas
G2	S1	Oklahoma Acidic Hillside Seep	Dichanthelium scoparium - Boehmeria cylindrica / Sphagnum spp. - Polytrichum commune Herbaceous Vegetation	West Gulf Coastal Plain Herbaceous Seep and Bog CES203.194	Lamar	N	Camp Maxey National Guards (DoD)
G2	S2	Southern Texas Post Oak Ecoregion Seepage Slopes and Swales	Morella cerifera / Eleocharis tortilis - Helianthus angustifolius - Rhexia mariana - Triadenum virginicum - Eleocharis flavescens - Juncus validus Herbaceous Vegetation	West Gulf Coastal Plain Herbaceous Seep and Bog CES203.194	Austin, Bastrop, Burleson, Colorado, Gonzales, Guadalupe, Grimes, Lee, Limestone, Milam, Robertson, Washington, and Wilson	Y	Bastrop SP (TPWD), Yeagua Knobs Preserve (Pines and Prairies Land Trust)
G1	S1	Keiffer Prairie Margin Oak-Ash-Hickory Forest	Quercus shumardii - Fraxinus americana - Carya myristiciformis / Viburnum dentatum / Carex cherokeensis Forest	West Gulf Coastal Plain Southern Calcareous Prairie CES203.379	Hopkins, Lamar, San Jancinto, and Red River	N	Cooper Lake SP/WMA & Pat Mayse Lake WMA (TPWD)

Global Rank	State Rank	Common Name	Global Name	Ecological System Name	Known Counties	Endemic	Known Protected Areas
G1G2	S1S2	Upper West Gulf Coastal Plain Prairie Periphery Oak Woodland	Quercus stellata / Forestiera ligustrina - Symphoricarpos orbiculatus / Carex cherokeensis - Schizachyrium scoparium Woodland	West Gulf Coastal Plain Southern Calcareous Prairie CES203.379	*Potential in Northeast Texas*	N	No documented protected areas
G1G2	S1S2	Texas Southern Post Oak Sandhills	Quercus stellata-Dichanthelium (oligosanthes, nodatum)-Acalypha radians-Eriogonum multiflorum	East-Central Texas Plains Xeric Sandyland CES205.897	Atascosa, Bastrop, Bexar, Caldwell, Gonzales, Guadalupe, Medina, and Wilson	Y	Neasloney WMA (TPWD)
G1	S1	Texas Oakville Sandstone Savanna	Quercus stellata-Quercus fusiformis-Schizachyrium scoparium-Nolina lindheimeriana Savanna Vegetation		Fayette	Y	Monument Hill SHP (TPWD)
G1	S1	Central Texas Post Oak Ecoregion Hillside Seepage Slope	Rhynchospora macra - Sarracenia alata - Eleocharis equisetoides - Xyris scabrifolia - Xyris chapmanii Herbaceous Vegetation	West Gulf Coastal Plain Herbaceous Seep and Bog CES203.194	Freestone and Leon	Y	No documented protected areas
G2G3	S2S3	Little Bluestem - Narrowleaf Pinweed - Round Copperleaf Herbaceous Vegetation	Schizachyrium scoparium - Lechea tenuifolia - Acalypha radians Herbaceous Vegetation	East-Central Texas Plains Xeric Sandyland CES205.897	Atascosa, Bastrop, Bexar, Burleson, Caldwell, Freestone, Guadalupe, Gonzales, Lee, Leon, Medina, Milam, Robertson, and Wilson	Y	Batsrop and Buescher State Park (TPWD)
G1G2	S1S2	Alfisol Blackland Prairie	Schizachyrium scoparium - Sorghastrum nutans - Bifora americana Alfisol Herbaceous Vegetation	Texas Blackland Tallgrass Prairie CES205.684	Austin, Brazos, Burleson, Colorado, Fayette, Freestone, Grimes, Lavaca, Lee, Leon, Limestone, Madison, Robertson, and Washington	Y	Fort Parker SP (TPWD)
G1G2	S1S2	Upper West Gulf Coastal Plain Dry Calcareous (Blackland) Prairie	Schizachyrium scoparium - Sporobolus compositus - Fimbristylis puberula var. puberula Wooded Herbaceous Vegetation	West Gulf Coastal Plain Northern Calcareous Prairie CES203.377	Fannin and Hunt	N	Caddo National Grasslands (USFS)
G2G3	S1S2	Southern Elm - Chinquapin Oak Forest	Ulmus (americana, rubra) - Quercus muehlenbergii Forest	Western Great Plains Floodplain CES303.678	Fannin, Franklin, Grayson, Lamar, Red River, and Titius	N	Caddoan National Grasslands (USFS)

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. ECPL Priority Habitats

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

GENERAL HABITAT TYPES	EAST CENTRAL PLAINS (ECPL) also called Post Oak Savanna	ECPL Ecological Systems
NATURAL AND SEMI-NATURAL TYPES	*Habitats in this column were identified in the workshop; additions were made by editor to riverine and cultural aquatic*	*NatureServe. 2009. International Ecological Classification Standard: Terrestrial Ecological Classifications for Ecological Systems of Texas' East Central Plains. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 08 October 2009.*
Barren/Sparse Vegetation *See also Marine/Coastal*		Southeastern Coastal Plain Cliff
Desert Scrub		Tamaulipan Mixed Deciduous Thornscrub
Grassland	Saline prairies midgrass prairies blackland tall grass prairies within the oak savanna mosaic	East-Central Texas Plains Xeric Sandyland Tamaulipan Savanna Grassland Texas Blackland Tallgrass Prairie
Shrubland	Mesquite shrublands Yaupon upland shrublands?	Edwards Plateau Limestone Shrubland
Savanna/Open Woodland	northern sandhills: post oak savanna - sandjack oak, sand post oak southern sandhills: bluejack oak not present, south of Caldwell Co, yaupon holly drops out sandstone glades limestone/chalk glades	East-Central Texas Plains Post Oak Savanna and Woodland
Woodland	Need local name for this habitat type in ECPL	West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland
Forest *See also* Riparian *and* Wetlands	Mesic slope forest pine-oak forest/savanna (e.g. Lost Pines)	East-Central Texas Plains Pine Forest and Woodland (e.g. "Lost" or Bastrop Pines) West Gulf Coastal Plain Pine-Hardwood Forest

GENERAL HABITAT TYPES	EAST CENTRAL PLAINS (ECPL) also called Post Oak Savanna	ECPL Ecological Systems
Riparian	periodically flooded or subirrigated intact floodplain of Lower Red, Sabine-Neches (incl headwaters), Lower Trinity, Lower Brazos, Lavaca, Guadalupe-San Antonio, and Corpus Christi - Frio - Nueces rivers and tributaries stream valley bogs and marshes along stream courses, sandhills on both sides late successional bottomland hardwood forests	Southeastern Great Plains Floodplain Forest Southeastern Great Plains Riparian Forest West Gulf Coastal Plain Large River Floodplain Forest West Gulf Coastal Plain Small Stream and River Forest West Gulf Coastal Plain Pine-Hardwood Flatwoods (mixed upland and wetland)
Riverine	Instream habitats of the watersheds which intersect this ecoregion Ecologically Significant Stream Segments - Coffee Mill Creek, Sanders Creek, Pine Creek, Sulphur Creek, Purtis Creek, Trinity River, Catfish Creek, Upper Keechi Creek, Wheelock Creek, Linn Creek, Buffalo Creek, Lake Creek, Little River, Clear Creek, Mill Creek, Colorado River, Cummins Creek, San Marcos River, Guadalupe River **unchannelized streams are particularly important*	NA
Lacustrine *See also* Cultural Aquatic	oxbows of the which stream/river systems	NA
Freshwater Wetland	hillside or "hanging" bogs seeps springs quaking bogs swamps	West Gulf Coastal Plain Herbaceous Seep and Bog
Estuary/Estuarine		NA
Aquifer	Carrizo – Wilcox (outcrop, subcrop) Edwards – Trinity Plateau (subcrop)	

GENERAL HABITAT TYPES	EAST CENTRAL PLAINS (ECPL) also called Post Oak Savanna	ECPL Ecological Systems
CULTURAL TYPES	*habitats in this column must support SGCN or rare communities to be considered in this plan*	
Agricultural	Fallow agricultural row crop fields	NA
Developed		NA
Urban/Suburban/Rural		NA
Industrial		NA
Rights of Way		NA
Cultural Aquatic	Reservoirs: Texoma, Randell, Valley, Bonham, Coffee Mill, Pat Mayse, Crook, River Crest, Wright Patman, Sulphur Springs, Bob Sandlin, Monticello, Tawakoni, Holbrook, Lake Fork, Quitman, Cedar Creek (Henderson), Forest Grove, Richland - Chambers, Trinidad, Fairfield, Limestone, Twin Oak, Camp Creek, Gibbons Creek, Bryan Utilities, Alcoa, Somerville, Bastrop, Gonzales, Coleto Creek	NA

Texas shares its border with four states – New Mexico, Oklahoma, Arkansas, and Louisiana. The ECPL ecoregion in Texas extends a short distance into Oklahoma, over the Red River boundary. Table 6 identifies habitat priorities which have been identified in the Oklahoma Wildlife Action Plan which may be shared with the ECPL. Every adjacent state's Action Plan mentions the importance of **intact native riparian zones** and **floodplains**, **high quality instream habitats**, **wetlands** of all types, and **native grasslands**. These habitat types are also found in the ECPL and are priorities for conservation in this ecoregion. See Statewide/Multi-region handbook for broadscale Conservation Actions for these priorities.

Table 6. Shared Habitat Priorities with Adjacent State – Oklahoma

Adjacent States	Ecoregions Shared with Texas	Habitat Priorities Shared with Texas[4]
Oklahoma (OK)	High Plains Southwestern Tablelands Central Great Plain Cross Timbers **East Central Texas Plain** Western Gulf Coastal Plain	wetlands mixed grass prairie ephemeral and perennial tributaries and mainstem of the Red River, and associated riparian zones and floodplains tall grass prairie oak woodlands and savanna bottomland forests shortleaf pine – oak forests/woodlands/savanna TX – OK HUC 8 at very high risk: Lake Texoma, Bois d'Arc Island, Pecan Waterhole

[4] Priorities were determined by reviewing the state's Action Plan online (Oklahoma Comprehensive Wildlife Conservation Strategy. 2006. http://www.wildlifedepartment.com/CWCS.htm) and the National Fish Habitat Risk Assessment Viewer online (NBII and USGS. 2011. http://fishhabitat.org/index.php?option=com_content&view=category&layout=blog&id=42&Itemid=61).

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 ECPL 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 7. ECPL 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	Cultivated and Old World grasses (e.g. Lehmann's lovegrass, King Ranch (KR) bluestem, Bermuda grass) Non-native invasive plants sold in nursery trade (e.g. ligustrum, chinaberry, nandina); tallow and tree of heaven Aquatic invasives – giant salvinia, water hyacinth, …OTHERS specifically a problem in this ecoregion?	Non-native grasses either as improved pastures or naturally expansive have established in many Trans-Pecos grasslands, are a substantial threat to grassland-dependent species (e.g. grassland-obligate birds and pronghorn) 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
Non-native Animal	feral and/or free-ranging "pets" FERAL HOGS Red Imported Fire Ants (RIFA) introduced fishes and mollusks - freshwater springs, streams and marshes Baitfish released by anglers and “aquarium dumping” by hobbyists	Free ranging pets (cats, dogs as individuals and as packs) are introduced predators which primarily adversely affect small mammals, small reptiles, and birds; in packs, can also adversely affect larger mammals and ground-nesting birds; also contribute pathogens and diseases Feral hogs decimate important and fragile habitats (e.g. springs, seeps, riparian areas, wetlands), degrade instream water quality, and decrease hardwood seedling viability (rooted up, eaten) RIFA are a predator to all ground-nesting and some shrub-nesting birds, small mammals, reptiles and amphibians; RIFA will invade and destroy/eat a nest of eggs and/or young Within streams, zebra mussels compete with native freshwater mussels, many of which are listed as state threatened. May also be gill parasites on certain fishes, unknown if they adversely affect any SGCN freshwater fishes. Small mouth bass are voracious non-native predators taking a toll on smaller fishes in these systems. Non-native baitfish and aquarium species releases compete with native fishes in many habitats and can be very detrimental if they are predacious.
Native Problematic	Native shrub (e.g. mesquite, whitebrush, yaupon, juniper) or "brush" encroachment into prairie systems Brown-headed cowbird (BHCB)	Mesquite and juniper invasion of prairies/grasslands throughout ecoregino, yaupon invasion in pine-oak woodlands, whitebrush invasion in woodlands and grasslands to the south Native brush invasion, where these species should not naturally occur or in abundances that are out of balance with the native communities, degrades grassland suitability and hardwood regeneration potential. Most of these “infestations” can be controlled by a restoration plan including prescribed fire or some kind of mechanical/chemical brush treatment, then a maintenance plan to mimic natural processes if the sites are large enough to function as a system on their own. BHCB are overabundant and are particular issues for shrubland, grassland and woodland nesting birds
Pests, Parasites, Pathogens		
Pests		
Parasites		
Pathogens	Oak wilt, Oak decline Chinquapin wilt Red Bay Infection	The key woody plant communities in this ecoregion are hardwood dependent – oak pine savanna, oak woodlands, and bottomland hardwoods – all potentially affected by the wilt and decline pathogens. Redbay is part of a declining and rare plant community also.
Power Development and Transmission		
Wind Power	Wind generation tower siting (“wind farms”) is not an issue in this ecoregion; however, many of the migrants that pass through this ecoregion encounter wind turbines in central and north Texas – it is a concern that needs to be addressed	*See north and central Texas ecoregion handbooks and the Statewide Handbook*
Hydro (Dam and Reservoir)	There are many dams and hydropower facilities in this and adjacent ecoregions, to the Coast; operations impact downstream aquatic and riparian communities	*See also* **Water Development, Management and Distribution** *below*

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
Coal-fired plants	Fourteen plants proposed in Texas (citation?), how many in this ecoregion? Map?	Footprint of power plant and adjacent reservoir is direct loss of terrestrial habitat If the water cooling pond is dammed natural waterway, then contributes to loss of instream flows for aquatic SGCN and riparian communities; if cooling pond is "created", water must still be drawn from existing water budgets which do not adequately account for fish and wildlife needs Coal fired plants are also a source of evaporative loss from the water system – towers and open ponds Mercury releases (citation? How does this adversely affect which SGCN?)
Biofuels	Row Crop (primarily corn for ethanol), Switchgrass, other Herbaceous Rangeland, existing cropland, and other open grasslands converted to fast production, monotypic biofuel production	Loss of native and open grassland birds' habitats for foraging, nesting, and shelter Because these crops are not food sources, chemicals used for pest and weed control and fast growth fertilizers can be used; stormwater or irrigation runoff or overspray into adjacent wildlands from these applications are potentially hazardous to native habitats.
Transmission	New development and expansion of existing lines/corridors construction of new power infrastructure corridors to meet urban user needs, 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 (few species have aversion to tall structures in this region, unlike High Plains or Coastal Prairies), 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. Transmission lines can be strike hazards for Whooping Cranes and raptors during migration.
Distribution	Development to power grid and retail users: construction of new power infrastructure corridors to meet urban user needs	mowing, trimming (permanent fragmentation, erosion) herbicide application directly takes habitat and species during construction (loss), degrades adjacent habitat (fragmentation), and may hinder movement (daily or seasonal) Migratory bird strikes are more prevalent with distribution facilities than transmission facilities; more careful site selection is important to avoid or minimize impacts when nearthe coast, along waterways, adajacent to wetlands and throughout the flyway.
Oil and Natural Gas Production and Delivery		
Extraction	Very little occurs in this ecoregion; however, region is crossed with delivery lines (see next)	
Delivery	Pipelines for oil and natural gas delivery cross the area; long, linear cleared swaths through rangelands, native habitats	Similar to electrical transmission lines, communications lines, and transportation corridors, oil and gas pipelines create edge through woodland and bottomland habitats, impact wetlands which are not jurisdictionally protected (isolated bogs, seeps, springs); little to no native reclamation is 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.
Lack of Reclamation	reclamation standards vary, requirements limited	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	Occurs in upland sites as well as along and within streams and rivers	http://www.tshaonline.org/handbook/online/articles/gpm01 [need map of sand and gravel mines in TX] lack of reclamation; permitting process does not adequately allow environmental review to require avoidance, minimization or mitigation of impacts to instream and stream-adjacent habitats (riparian, sand hills, and uplands); mining off of water courses do not go through TPWD review for potential natural resources impacts. Not all are required to have stormwater pollution prevention facilties or plans (acreage threshold)
Lignite	Upland sites and drainages affected	loss of vegetation and water resources (dewatering, stream diversion, ponding, wetland fill) during construction and operation over large landscape and long periods of time; complete loss of soil microorganism integrity Environmental review late in process to avoid or minimize impacts, no input into reclamation review or evaluation Reclamation not back to desired ecological conditions (tied to productivity levels in a certain time frame, short, 5-year window for "recovery"), so companies use fast-growing species, not necessarily native seed or plant source materials, usually monotypic instead of diverse natural community
Communications Infrastructure		

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
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 noctural migrants including Yellow-billed Cuckoo, Painted Bunting, Summer Tanager, and other species. In rare instances kills totalling thousands of Longspurs have been found around towers.
Transportation		
road and bridge construction (new)	I-69/Hwy 59 – while no longer Trans Texas Corridor (TTC), area highways are going to be upgraded to accommodate interstate levels of traffic through the area, from the Valley and Corpus Christi to Texarkana; while most routes take these improvements close to developed and impacted areas then north, route alternatives cross some sensitive areas; and, there will be adjacent capacity developed for urban connections, including new toll roads which are usually developed for larger future capacity.	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 the I-69 upgrade of existing and new construction may create barriers to fish and wildlife resources' daily and seasonal movements, water quality impacts through stormwater runoff, loss of nonjurisdictional wetlands, and important riparian, bottomland, prairie and savanna habitats that are not protected under regulation. In addition to these larger facilties, 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.
right of way maintenance	maintaining clear right-of-way for vehicle clearance/access, minimizing fire danger, and maintaining driver visibility	mowing, trimming (permanent fragmentation, erosion) herbicide application 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
Timber Production & Management		
Deforestation/Harvest	Hardwood clearing for rangeland production, small batch hardwood timber production, conversion to faster pine production, recreational access, "deadwood" clearing	Mature bottomland hardwoods are a very rare community type and even dead snags in this community are important to many regional SGCN, into the Western Gulf Coastal Plain and the Gulf Coast Prairies and Marshes (chenier). Hardwoods in pine-oak savanna community also serve to diversify the forage and roosting habitats in these systems. And, of course, hardwoods are a key component of the post oak savanna/prairie matrix – this region's primary habitat type – which provides the basis for the system that supports many types of rare bogs, seeps, springs, and other wetlands.
Land & Water Mgmt: FARM	See also Water Development section	
Lack of soil and water management/conservation practices	Indiscriminate pesticide use, especially adjacent to or within overspray area of native grasslands, rangelands, woodlands Chemical-laden (pesticide, herbicide, fertilizer) irrigation water runoff Lack of streamside management zones Overhaying	Overspray can decrease or completely wipe out native insect fauna, important pollinators in native grassland and prairie systems Insufficient stormwater controls between agricultural production and waterways (or dry drainages that lead to waterways during rain events) adverse lead to chemical impacts to sensitive aquatic insects, freshwater mussels, riparian invertebrates, freshwater fishes, amphibians, and eventually bay and estuary systems – invertebrates, fishes, and birds. Streamside Management Zones are important buffers between agricultural practices and aquatic impacts, and these riparian areas serve as important habitats in their own right for many forest and woodland dependent SGCN. Riparian and floodplains are frequently cleared for agricultural production because they are relatively flat, have access to water, and soils are productive. Over frequent haying of native prairie decreases grassland diversity (certain seed sources are not allowed to naturally develop and reseed the area; without diverse natural reseeding, certain species become more dominant and the entire prairie loses diversity over time) and contributes to invasion of non-native grasses Haying during bird breeding season also contributes to decline in several ground-nesting SGCN birds (*Northern Bobwhite, Dickcissel, Eastern Meadowlark, LeConte's Sparrow, Henslow's Sparrow)*.
Clearing and loss of important natural sites/habitats	Local surface water development: small impoundments on tributary creeks, streams, springs, seeps to form stock tanks, ponds, private lakes	Similar to reservoir development on mainstem rivers, negative impacts caused by impoundments on creeks and springs are just at a smaller scale: loss of instream habitats, loss of wetlands, loss of riparian habitats and natural floodways. The replacement value – still deeper water for flowing waters, pond for stream – is not ecologically synonymous. This may be more of an issue in the emerging "urban/suburban" areas.
Landowner/land management incentive programs working at cross-purposes	Farm Bill programs not competitive (conservation vs. ethanol) Farm Bill penalty insufficient to deter short term conversion	See *Biofuel* section Using Farm Bill programs can be one of the best tools to engage private landowners in longterm conservation practices; however, must be market-competitive and contract-savvy to be effective as a conservation tool.
Land & Water Mgmt: RANCH	See also Water Development section	

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
Incompatible stocking practices	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) on the advice of county tax appraisers rather than range scientists or ecologists historic and/or current range-intensive livestock operations “continuous” even if rotational; out of sync with land capacity landowners may not be aware of potential benefits of wildlife valuation for recovery, rest, or native habitat conversion non-native hoofstock for hunting operations	Promotes conversion of native grassland to non-native (Bermuda, other sod-forming grasses) Intensive grazing degrades native plant communities and contributes to the need to supplemental feed livestock, which then introduces exotics into remaining native plant communities Concentrated feeding of livestock herds attract large numbers of brown-headed cowbirds which are parasitic nesters to a number of SGCN birds.
Landowner/land management incentive programs working at cross-purposes	single-objective management such as all-game, all-livestock, all-recreation incentive programs, technical guidance, and management assistance "menu" is pre-limited for the landowner in the first contact, landowner should be able to choose from a full menu of land and water management options Landowners do not have a one-stop shop to choose best management practices for their site, for their goals	single species or single habitat type management; e.g. grasslands instead of mosaic and patchy habitat values, productivity vs. diversity? Ranching with associated livestock grazing can be beneficial to SGCN. Many variables effect the pros and cons of each ranching operation. Need site-specific assessment and recommendations which include a community-approach to fish and wildlife resource management, including SGCN and rare communities in management plans Streamside Management Zones (riparian conservation, riparian BMPs) need to be a priority in landowner incentive programs
Clearing and loss of important natural sites/habitats	conversion of woodland to pasture riparian and floodplain clearing for livestock watering access Small impoundments on tributary creeks, streams, springs, seeps to form stock tanks, ponds, private lakes.	Impoundments: similar to reservoir development on mainstem rivers, negative impacts caused by impoundments on creeks and springs are just at a smaller scale: loss of instream habitats, loss of wetlands, loss of riparian habitats and natural floodways. The replacement value – still deeper water for flowing waters, pond for stream – is not ecologically synonymous. This may be more of an issue in the emerging “urban/suburban” areas.
Lack of soil management and conservation practices	lack of soil conservation (vegetation conservation/restortaion) along stream courses (Streamside Management Zones, Streamside Best Management Practices/Buffers) Overgrazing (see above)	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
Subdivision of larger lands into smaller parcels ("ranchettes")	Ownership changes in values, approaches to management (not always a detriment to conservation practices) Subdivided lands create many more land management philosophies, approaches in one area	While not all land subdivision is necessarily a negative event for conservation, subdivision typically brings with it very diverse land ownership styles and objectives, increased potential for feral animal and escaped landscaping, additional surface and groundwater demands on regional resources, and loss of habitat for homesite development and “ponds” Outreach, technical guidance and incentive programs have a more difficult time serving this constituency because the effort and resources required are multiplied, but no more service resources (people, time, money) are available. Additionally, it is difficult to provide conservation services that are of value to the ecological needs of the area with many fractured landscapes and objectives. Some tools (e.g. RX fire) and incentive programs are not available for use at smaller scales or cannot be effective to improve conservation values.
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)	The lack of fire and excessive grazing during drought has resulted in mesquite and cresotebush encroachment of desert grasslands. This increase in brush species and reduction in grasses may reduce recharge in certain areas from uplands into local aquifers and riparian habitats, further accentuating a reduction in surface water. .
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. Most of this area is part of many of the emerging communities, identified in the Texas State Forest Resources Strategy	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), prairies and other grasslands, wetlands of all kinds. Urban sprawl, bedroom communities, suburban commuter communities all continue to contribute to prairie loss, woodland clearing, filling non-jurisdictional wetlands, and degradation of instream and stream-adjacent habitats from water qualityand quantity impacts. This is not just an issue for fish and wildlife resources, but also for prime farmland and ranchland in these areas.

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
Water Demands	Dallas – Fort Worth and emerging areas (Tyler, Temple, Waco) San Antonio and emerging areas Houston	These growing metropolitan areas and their outlying emerging communities continue to seek water resources outside of their basins: reservoir development, interbasin transfers, groundwater development and pipelines. Water costs are related to what ratepayers will pay and not related to the water development impacts – mitigation for resource loss under reservoirs, to groundwater, and to estuaries, is insufficient and rates do not replace ecological values.
Land & Water Mgmt: Conservation & Recreation		
Restoration Barriers	Lack of locally adapted seed/cultivar sources	Lack of native seed and plant material sources for blackland prairie restoration within the savanna: species adapted to low pH sandier soils need to be made available commercially at affordable prices (e.g. broomsedge where forage is not a consideration, as it is the backbone of good quail and grassland bird habitat in the southeast); species such as splitbeard bluestem, pinehill bluestem or cultivars of the big 4 prairie grasses that are adapted to local ecotypes need to be collected and increased at plant material centers.
Inadequate/Inappropriate Management	Prescribed fire	Difficult to apply prescribed fire in urban-wildland interface for prairie restoration Many landowners are unfamiliar with their potential to use RX fire for brush control or grassland improvement Regional conservation service providers do not have enough RX fire certified leaders and teams to provide this as a landowner incentive service, even if the demand could be enhanced
Inappropriate Recreational Uses	ORV use in sensitive areas (stream beds, sand hills, wet soils of all types, bottomlands)	Water quality degradation, instream habitat loss (substrates disrupted or lost), riparian loss, slope vegetation loss or impact, human disturbance in nesting or roosting areas
Paucity of Conservation Lands	Lack of conservation lands – public or private – for certain habitat types at a meaningful scale, longterm	In this ecoregion, and in the Blackland Prairie adjacent, lack of lands managed for conservation of key habitat types – oak woodland/blackland prairie matrix, riparian corridors and bottomland hardwoods, wetlands with rare communities – at scale/duration that is meaningful for longterm sustainability and resiliency of these community types
Not all "public" or "managed" lands are "conservation" lands	Recreation at cross purposes with conservation needs	Whle most public lands in this region are managed for recreation compatible with wildlife and fisheries resources, some improvements could be made to trails and recreation facilities to prevent soil erosion and water quality impacts, vegetation loss (especially near water resources), reduce human disturbance in roosting or breeding areas
Lack of long-range conservation planning and cohesive land conservation/management strategies in each ecoregion	Lack of ecological connectivity between/among existing public and private conservation lands: land and water trusts, NGO preserves and conservation easements, Habitat Conservation Plan lands, wildlife managed lands for conservation, parks and wildlife management areas	While fee-title or easement protections “fenceline to fenceline” are not necessarily needed in this region, largescale conservation benefits could be realized by mapping existing conservation lands and practices, reviewing opportunities to share resources and improve land management through shared guidance, and identifying landowners and sites which could benefit landscape and conservation management connectivity in the long term through landowner incentive programs – riparian, prairie, shortleaf pine savanna, bottomland hardwoods.
Water Development, Management and Distribution	SEE ALSO STATEWIDE HANDBOOK	
Surface Water Planning	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, especially out of the region, are the primary driving force in surface and groundwater planning TMDL recommendations need to consider fish and wildlife resources needs as well Instream flow recommendations need to be stepped out from headwaters to estuaries to influence regional water planning processes Overallocation/dewatering and damming of region's principle rivers
Reservoir Construction and Operation	At least three large reservoir sites in this region in the 2007 State Water Plan, all on important regional resource streams; creation of new and modification (expansion) of existing reservoirs Invasive species Shoreline development - vegetation removal for viewshed, recreational access; hardening and armoring banks 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	See also Statewide Handbook for this issue 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.

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
Flood Control	Changes to natural stream courses to block or convey floodwaters	Levees, bank armoring, culverts all remove instream and stream adjacent habitats, contribute to unnatural sediment and nutrient loading downstream and to estuaries
Groundwater Planning and Distribution	East Texas lacks groundwater conservation districts, rule of first capture is the “management plan” Groundwater districts are political subdivisions, not aligned necessarily with aquifer boundaries Extraction: groundwater pumping without full accounting for natural resources as a "use"	Aquifers continue to drop and are unmanaged at the current time. Groundwater conservation districts would allow management for conservation, preservation, recharging, and prevention of waste of groundwater resources. Aquifers of concern include Carrizo-Wilcox, Trinity, Nacatoch, and Woodbine. Subirrigated, instream and stream-adajcent and isolated habitats which rely on groundwater are adversely affected by dry conditions, some of which are permanently impacted after drought periods; overpumping lowers water table and and changes instream and wetland conditions such as temperature, oxygen availability, and other nutrient and chemical factors on which aquatic life relies In some instances, a significantly low water level can decrease and degrade aquifer recharge capacity ("drying out the sponge " at certain levels within the aquifer can affect the flow quantity and quality into the aquifer from recharge events)
Other Water Source Developments and Technologies	Interbasin Transfers (Surface and Groundwater) Reuse Water Treatment Wetlands	Most of this is addressed at the statewide level; are there specific resources affected in this region?? Water Reuse reduces available water at any particular time (needs to account for instream flows) and can change the chemistry (temperature, oxygen, and other characteristics) from the discharge. While a useful tool and potentially a benefit to some wildlife and fish resources, Water Treatment Wetlands are not typically managed as natural systems (e.g. vegetation homogenous, not natural habitats for local wetland dependent SGCN)
Lack of Information & Resources	One response stated this is an issue, but did not provide additional information	
Many SGCN in this region lack updated status or any information from which to determine status, recovery, or management	Without full accounting of species distributions, habitat needs, and range, it is difficult to make accurate management recommendations, apply landowner incentive programs for best conservation benefit	*Information and Research Needs by SGCN – **SEE ACTION SECTION*** ▪ *Black Bear see* Black Bear Management Plan 2005-2015 (need citation or website) ▪ *Rafinesque’s big-eared bat* and *Southeastern myotis*– determine potential for new roost locations ▪ *Eastern spotted skunk* – survey to determine status ▪ *Houston Toad* – survey in historic range ▪ *Texas Horned Lizards* – identify areas of suitable habitat and survey to determine status in these areas; coordinate with RIFA evaluation/survey to determine impact ▪ *Amphibian and Reptiles*: need status update on all of these, including Timber Rattlesnake, Alligator Snapping Turtle, Softshell turtles. ▪ *eastern gamagrass-switchgrass-yellow Indiangrass-Maximilian sunflower* (G1/G2) and *little bluestem-Indiangrass-big bluestem* (G1/G2) prairie types – survey and revisit database accounts to ensure data is relevant and up to date. ▪ *Painted Bunting, Scissor-tailed Flycatcher* – large % of global breeding population, need to identify and publish Best Management Practices; also evaluate STF use of urban areas (sink populations? Reasons for expansion into these areas? Management needs?) ▪ *Bachman’s Sparrow* –Increase survey efforts along western edge of range to identify boundary and suitable occupied habitat, such as within Red River County ▪ Freshwater Mussels – Continue documentation of distribution and status for all SGCN mussels, identify areas where most impacted and by what, craft management plans
	Predator control without biological standards or supporting management	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. Predator trapping and/or baiting has an adverse effect on non-target species including black bears and smaller mammals such as skunks, foxes, bobcats
	Lack of Processing *Existing* 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	In this region, primarily riparian and streamside buffer zones, wetland and wetsoil, and stormwater pollution prevention BMPs need more attention and distribution

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
Inadequate Policies, Rules, Enforcement		
Non-jurisdictional Wetlands	Loss of and impact to "non-jurisdictional" wetlands and jurisdictional wetlands on non-federal, non-state lands and projects (lack of awareness, no regulatory nexus or enforcement opportunity for protection on these sites)	private lake/stock pond construction, control structures, fill and conversion for agriculture and other development, mining: bogs, seeps, marshes, forested wetlands, and other intermittent and perennial waterways affected;
Sand and gravel mining	Lack of stormwater pollution prevention Lack of reclamation	lack of reclamation; permitting process does not adequately allow environmental review to require avoidance, minimization or mitigation of impacts to instream and stream-adjacent habitats (riparian, sand hills, and uplands); mining off of water courses do not go through TPWD review for potential natural resources impacts. Not all are required to have stormwater pollution prevention facilties or plans (acreage threshold)
Lignite and other surface mining in the region	Lack of Reclamation appropriate to the desired ecological condition of the site	lack of reclamation or reclamation that does not require native seed and plant materials in context with desired ecological condition; permitting process does not adequately allow environmental review to require avoidance, minimization or mitigation of impacts to instream and stream-adjacent habitats (riparian, sand hills, and uplands); Not all are required to have stormwater pollution prevention facilties or plans (acreage threshold)
Other Cross-Cutting Issues		
	Climate Change isolated habitats are more at risk than others: wetlands, pockets of prairie grasslands Riparian habitats and instream habitats may also be at risk	See CLIMATE CHANGE SECTION in Statewide handbook Climate change models, GIS analysis of land conversion and change overtime, species specific information, community-specific information all needed
	Economics Working Lands	See Statewide Handbook for more discussion on this issue Landowner incentives cannotcompete currently with market forces; market forces in some areas cannot support continued large ranch or timberland ownership

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*.[5]

Actions proposed for the ECPL Ecoregion (Table __) 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.

[5] 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 8. ECPL 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
Water management is a key issue in this ecoregion. Identify a coalition or natural resources advisory group to take available science-based information about impacts and instream flow needs to craft specifi recommendations (where to avoid inundation, where to improve water quality, what technologies are incompatible with natural resources goals for the region) to conserve SGCN and rare communities and priority habitats related to surface water management. 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.											
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.											
Support the establishment of east Texas groundwater conservation district(s) that align most closely with the aquifer boundaries [Carrizo-Wilcox, Trinity, Nacatoch, and Woodbine] and use areas in and out of these basins to support management for conservation, preservation, recharging, and prevention of waste of groundwater resources. Form a regional natural resources advisory group to identify key concepts and actions to incorporate fish, wildlife and recreation needs into the ground water conservation district planning process. Evaluate the effectiveness of this activity and share lessons learned in other regions which could benefit from this experience. 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.											
Conservation practice providers need to identify a suite of plant species for each priority habitat type which can be promoted with one voice to plant materials centers and commercial distributors. Engage Master Naturalists, Native Plants Society of Texas, Native Prairies Association, land trust and NGO volunteers in coordinated/targeted seed and material collection. Assess success of these programs and the use and success of the materials over time to determine if this is an effective approach or whether on-site or nearby collection on a project-by-project basis is more effective (conservation and costs).											

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
Initiate a short-leaf pine savanna restoration initiative similar to long leaf pine alliance to identify suitable ecologically functional areas for restoration efforts, project partners, and potential plant resources. Create a longterm implementation plan with multiple partners – USFWS Partners Program, NRCS Farm Bill programs, The Nature Cnservancy, local land trusts. Include a monitoring plan in the implementation to determine effectiveness of the efforts and any adaptive management avenues for the future											
Form multi-partner working group(s) to establish scientifically sound best management practices for **prescribed fire application** 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 SGCN/rare communities experts to identify concerns, barriers, and solutions. Explore the barriers to applying this tool on private lands and make recommendations to overcome these barriers (policy? Targeted outreach? Technical workshops?). Identify <u>key</u> SGCN from a variety of taxa and rare communities to monitor to determine effectiveness of the applied practices.										
Form multi-partner working group(s) to establish scientifically sound best management practices for **chemical/mechanical brush control** for the ecoregion and specific watersheds. Work with brush control technical experts and SGCN/rare communities experts to identify concerns, barriers, and solutions. Identify <u>key</u> SGCN from a variety of taxa and rare communities to monitor to determine effectiveness of the applied practices.											
Form multi-partner working group(s) to establish scientifically sound best management practices for **riparian restoration**, 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). Work with riparian restoration technical experts and SGCN/rare communities experts to identify concerns, barriers, and solutions. Identify <u>key</u> SGCN from a variety of taxa and rare communities to monitor to determine effectiveness of the applied practices											

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
Work with the Native Prairies Association's ongoing current effort to identify scientifically sound best management practices for **different types of prairie restoration**, 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). Work with prairie restoration technical experts and SGCN/rare communities experts to identify concerns, barriers, and solutions. Identify <u>key</u> SGCN from a variety of taxa and rare communities to monitor to determine effectiveness of the applied practices											
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 collegest to collect the information most needed at the PRACTICAL level for management and conservation improvement on the ground.											
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, other …											
Using the Texas Ecological Systems data and local conservation service provider knowledge, identify at the ecoregion level priority habitats which are relatively connected of high enough value to develop conservation initiatives to keep them connected and productive. Include an assessment of existing public lands to determine ecological and conservation function needs (buffer, management changes, adjacent land use threats). Work with willing landowners and land trusts *especially adjacent to and in corridors between* well-managed public lands to restore and manage oak – prairie matrix, bottomland hardwood, shortleaf pine savanna, and riparian communities in large single-ownership or smaller acreage cooperatives – opportunities to connect/improve historically fragmented management											

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
Conservation easements and landowner incentive programs are good instruments for landowner participation in this region. Landowners with intact grasslands or grasslands with restoration potential for little investment (especially those contiguous to NGO and Land Trust preserves for prairie preservation, public lands employing prairie conservation practices, sites mapped by the Native Prairies Association as intact and restored remnants), willing to manage for prairie and grassland species conservation, willing to manage streamside vegetation as riparian buffer along Ecologically Significant Stream Segments (and to their headwaters), and/or with any of the rare wetland communities 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. Streamside management zones need to be mandated for anyone receiving government subsidies for agriculture. Previously removed streamside vegetation should be restored and buffered. Promote SMZs on all cooperator lands. Identify areas to improve. See also Statewide/Multi-region handbook – Actions section)											
Many SGCN in this region lack distribution and POPULATION status information; 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. *Species-specific needs (several of these may be tied to other actions in this list, review for connectivity)* *Black Bear see* Black Bear Management Plan 2005-2015 (need citation, website?) *Rafinesque's big-eared bat* and *Southeastern myotis*– continue monitoring roosts and identify new roosts. Support long-term conservation of bottomland hardwoods. Increase awareness among forest managers and owners. Promote BMPs for species among stakeholders. Retain large hollow trees, such as blackgum and water tupelos. Identify protect roosts in artificial structures. Support WRP and similar programs. Perform hardwood restoration. *Eastern spotted skunk* – determine status *Houston Toad* – Continue release at suitable sites and monitor survival. Develop BMPs for raise and release. Identify new conservation lands for release. Implement long-term conservation within critical habitat areas. Work with Farm Bill to implement beneficial practices on suitable lands.											

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
Continue monitoring known and identify new locations. Survey more private lands. Cooperative efforts. *Texas Horned Lizards* – raise awareness of beneficial native ants. Combat indiscriminate use of pesticides and buildup within ecosystems. Support native prairie restoration and long-term conservation efforts in areas of suitable habitat. Identify existing populations. Identify expansive suitable habitats under conservation for release and on landowner cooperators. *Amphibian and Reptiles*: Survey private landowner cooperators to update data sets and monitor populations. *Timber Rattlesnake*: Limit road construction near and within suitable habitats. Utilize strategies similar to black bear and bottomland hardwood bat spp. for habitat conservation. Implement awareness campaign to landowners and public lands in occupied habitat. Limit human related mortality. Increase data gathering. *Alligator Snapping Turtle* – Status determination and key locations. Raise awareness among outdoor users. *eastern gamagrass-switchgrass-yellow Indiangrass-Maximilian sunflower* (G1/G2) and *little bluestem-Indiangrass-big bluestem* (G1/G2) prairie types – Monitor and update sightings. Revisit database accounts to ensure data is relevant and up to date. Promote long-term conservation. Harvest seeds and utilize for local restorations and/or send to plant materials centers for field trials and increasing production. *Painted Buntings* – large % of global breeding population. I feel that most of breeding habitat has either too much brush or not enough brush. Individuals are found within dense growth along drainages and edges, but appear to prefer diverse woody mottes made of multiple woody vines, shrubs, trees that offer structural diversity from the ground up. A snag for a singing perch in the middle is the cherry on top. Intensive farming and grazing. Pesticide use around ag areas. Increase SMZs within pasturelands. *Scissor-tailed Flycatcher* – large % of global breeding population. I have concern about these birds utilizing commercial and residential lands. I commonly observe individuals foraging around gas stations and other areas where toxins or pesticide use is common. Individuals could be in sink habitats. Pesticide use around ag areas. Increase fencerows, SMZs, scattered brush within pasturelands. *Bachman's Sparrow* – short-leaf pine savanna restoration in northeast Texas could increase suitable habitat. Start iniative similar to longleaf alliance. Build off Lennox woods project area. Increase use of prescribed burns on											

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private lands. Increase survey efforts along western edge of range to identify boundary and suitable occupied habitat, such as within Red River County. Promote BMPs within forest management agencies and industries. *Northern Bobwhite, Dickcissel, Eastern Meadowlark, LeConte's Sparrow, Short-eared Owl, Loggerhead Shrike, Northern Harrier, Swainson's Hawk, Henslows Sparrow* – Time is of the essence. Prairie restoration, conservation and mangement. Promote rotational grazing, fallow fields, delay haying on some fields until after breeding season. *Interior Least Tern* – new reservoirs could be engineered to provide small island habitat at varying reservoirs levels. The islands would surface during lower water levels in the summer so that they would be devoid of vegetation. *Swainson's Warbler, Kentucky Warbler, Louisiana Waterthrush, Prothonotary Warbler* – Reduce water consumption in the urban areas that leads to destruction of bottomland hardwoods for reservoir development. Identify high priority conservation areas for bottomland hardwoods. More conservation lands protecting intact bottomland hardwoods are needed in northeast Texas. Promote BMPs for this habitat among agencies and cooperators. Freshwater Mussels – Additional distribution and habitat requirements information are needed to identify instream flow standards, recommendations for water conservation areas, sites to protect from reservoir development, outreach and activities to prevent zebra mussel spread, greater water quality protections in mussel watersheds to prevent pollution and sedimentation											
Form a working group with adjacent Texas Blackland Prairie and Gulf Coastal Prairies and Marshes aquatic and terrestrial ecologists to identify river rehabilitation goals in/adjacent to undammed stretches below last impoundment to the estuaries to evaluate/implement instream flow recommendations; improve the quality, timing, and seasonality of releases, improve riparian restoration, and increase connectivity to improve resilience to climate											
Climate change models and effects on isolated habitats, riparian areas, and springs/groundwater resources											

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
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											
Determine market values that are driving agricultural conversion (biofuels? crop prices?), livestock production, hunting and other recreation, and land subdivision 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.											
Work with private landowners and conservation partners to minimize feral hog populations through hunting and trapping (aerial shooting is not a good technique in this area given the amount of closed canopy). Provide technical guidance and educational programs about the impact and management of feral hogs to benefit ground nesting birds, small mammals, aquatic species. Evaluate technical guidance programs with effectiveness measures.											
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											

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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