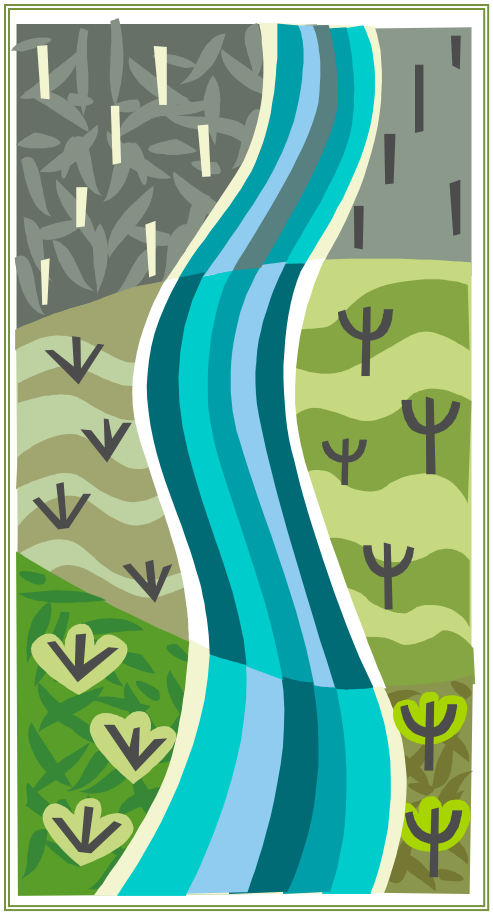

TEXAS CONSERVATION ACTION PLAN

Western Gulf Coastal Plain

DRAFT ECOREGION HANDBOOK

JUNE 2011

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

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PWD insert number when approved

Citing this document:

Texas Parks and Wildlife Department. 2011. **Texas Conservation Action Plan 2011 – 2016: Western Gulf Coastal Plain Handbook**. Editor, Wendy Connally, Texas Conservation Action Plan Coordinator. PWD insert number when approved. Austin, Texas.

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

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

SUMMARY

The Western Gulf Coastal Plain (WGCP) 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 WGCP 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 WGCP 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 WGCP 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

The Western Gulf Coastal Plains (WGCP) ecoregion, or "Pineywoods," is rich with meandering rivers and complex forests and woodlands. Lands and waters in east Texas connect us to the rest of the nation's southeastern forest ecology and make even native Texans think of something different in their mind's eye view of Texas – add wetlands, broad rivers, lakes and large trees to that vision. Shortleaf pine forest, longleaf pine savanna, bottomland hardwoods form the superstructure in this ecoregion; look deeper you'll find a treasure-trove of wildlife and fish resources in periodically flooded river edges; unique swamps, bogs, fens, springs and seeps; and spotty lush open meadows. This region of Texas has more public ownership (in entities if not in acreage) than other regions.

The 25,000 acre Trinity River National Wildlife Refuge in Liberty County contains some of the largest protected areas of bottomland hardwood forests. This Refuge also harbors floodplain canebrake areas of fairly significant size and has the largest maternity colony of Rafinesque's big-eared bats in Texas.

NOTE: 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 WGCP 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
Western Gulf Coastal Plain (WGCP)	Pineywoods	Upper West Gulf Coastal Plain (40) and West Gulf Coastal Plain (41)	Lower Brazos Lower Red Lower Trinity Sabine – Neches	Lower Mississippi JV West Gulf Coastal Plain/Oachitas BCR	Gulf Coast Plain and Ozarks	Trinity – San Jacinto (7) Deep East Texas (8) Northeast Texas (9)	South Atlantic and Gulf Slope Cash Crops, Forest, and Livestock Region: Western Coastal Plain (133B) Atlantic and Gulf Coast Lowland Forest and Crop Region: Western Gulf Coast Flatwoods (152B)	Pineywoods

Figure 1. WGCP Ecoregion with County Boundaries

Western Gulf Coastal Plain ecoregion in yellow

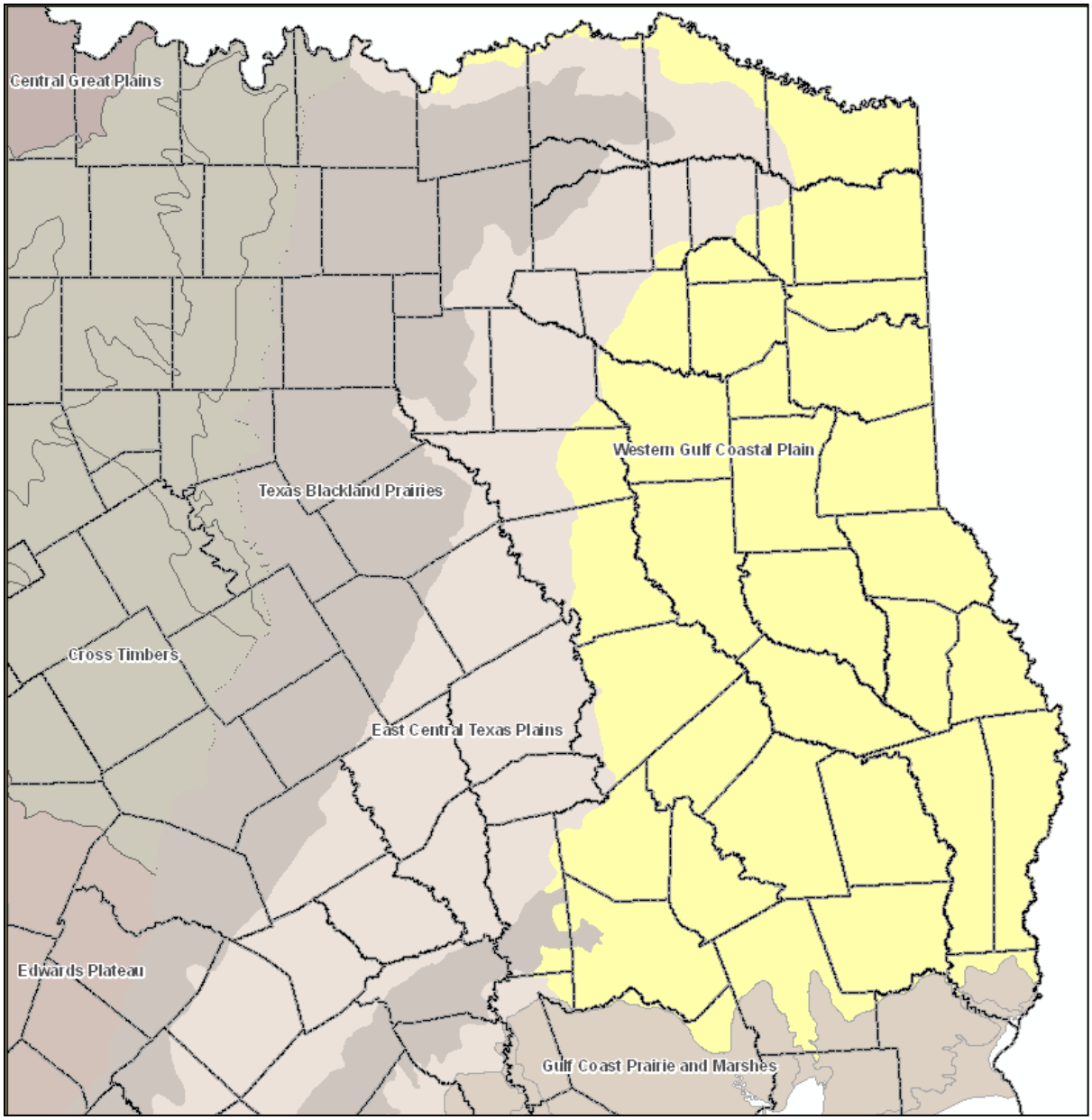


Table 2. WGCP EDUs with Ecologically Signifcant Stream Segments and Reservoirs

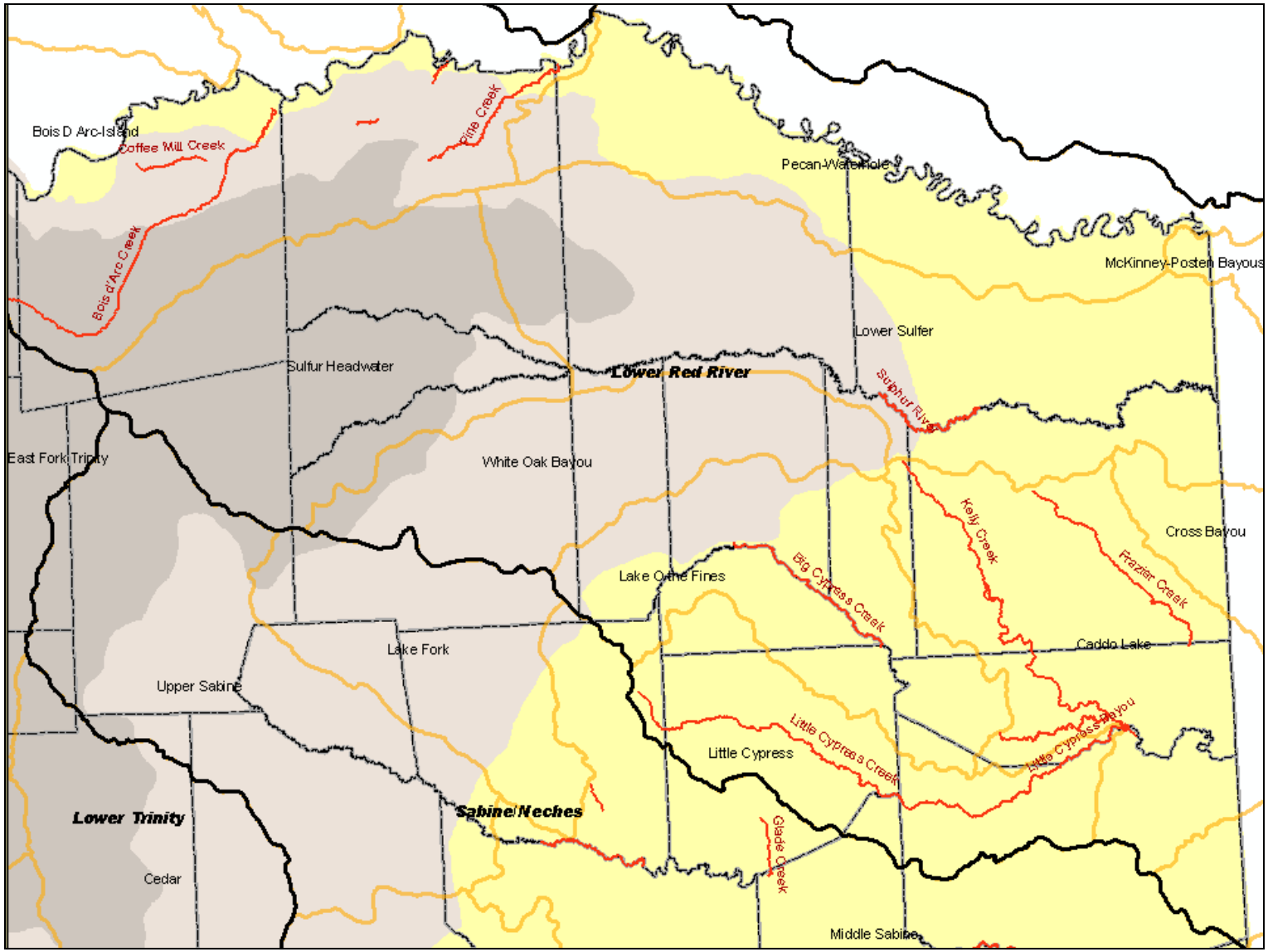
ECOLOGICAL DRAINAGE UNIT SubBasin (HUC 8)	*Ecologically Significant Stream Segment TPWD 2002, w/updates 2005*	Lakes and Reservoirs
LOWER RED RIVER		
Bois d'Arc - Island	Sanders Creek, Pine Creek	
Lower Sulphur	Sulphur Creek	Wright Patman Lake
Pecan - Waterhole		
Lake O' the Pines	Big Cypress Creek	Lake Cypress Springs, Lake Bob Sandlin, Lake Monticello, Welsh Reservoir, Ellison Creek Reservoir, Johnson Creek Reservoir, Lake O' the Pines
McKinney - Posten Bayou		
Caddo Lake	Kelly Creek, Frazier Creek	Caddo Lake
Cross Bayou		
Little Cypress	Little Cypress Bayou	Lake Gilmer
SABINE - NECHES		
Upper Sabine		
Lake Fork		
Upper Neches	Neches River, San Pedro Creek, Austin Branch, Bowles Creek	Lake Athens, Lake Palestine, Lake Jacksonville
Middle Sabine	Little Sandy Creek, Sabine River, Irons Bayou	Lake Winsboro, Lake Hawkins, Lake Gladewater, Eastman Lakes, Brandy Branch Cooling Pond, Lake Cherokee, Martin Lake, Lake Murvaul, Toledo Bend Reservoir
Toledo Bend		Toledo Bend Reservoir
Lower Sabine	Sabine River, White Oak Creek, Trout Creek, Cypress Creek	
Upper Angelina	Mud Creek, Alazan Bayou, Angelina River	Lake Tyler, Lake Tyler East, Lake Striker, Lake Nacogdoches
Lower Angelina	Attoyac River, West Creek, Red Branch Angelina River, Angelina River downstream of Rayburn	Pinkston Reservoir, Lake Kurth, Sam Rayburn Reservoir
Middle Neches	Neches River, Sandy Creek, Hickory Creek, Heger Creek, South Fork Cochino Bayou, Cochino Bayou, Boggy Slough, Hackberry Creek, Alabama Creek, Lynch Creek, Piney Creek	
Lower Neches	Neches River	B.A. Steinhagen Lake

ECOLOGICAL DRAINAGE UNIT SubBasin (HUC 8) *(Sabine – Neches EDU continued)*	*Ecologically Significant Stream Segment TPWD 2002, w/updates 2005*	**Lakes and Reservoirs**
Village	Big Sandy Creek, Turkey Creek, Village Creek, Little Beech Creek, Beech Creek	
Pine Island Bayou	Pine Island Bayou, Little Pine Island Bayou	
LOWER TRINITY		
West Fork San Jacinto	Lake Creek, East Sandy Creek	Lake Conroe, Lake Houston
Lower Trinity - Kickapoo	Trinity Creek, Nelson Creek, Harmon Creek, Henry Lake Branch, Double Lake Branch, Big Creek, Menard Creek	Lake Livingston
Lower Trinity - Tehuacana		Houston County Lake
Spring		
East Fork San Jacinto	East Fork San Jacinto, Winters Bayou, Caney Creek, Luce Bayou	Lake Houston
Lower Trinity	Trinity River	

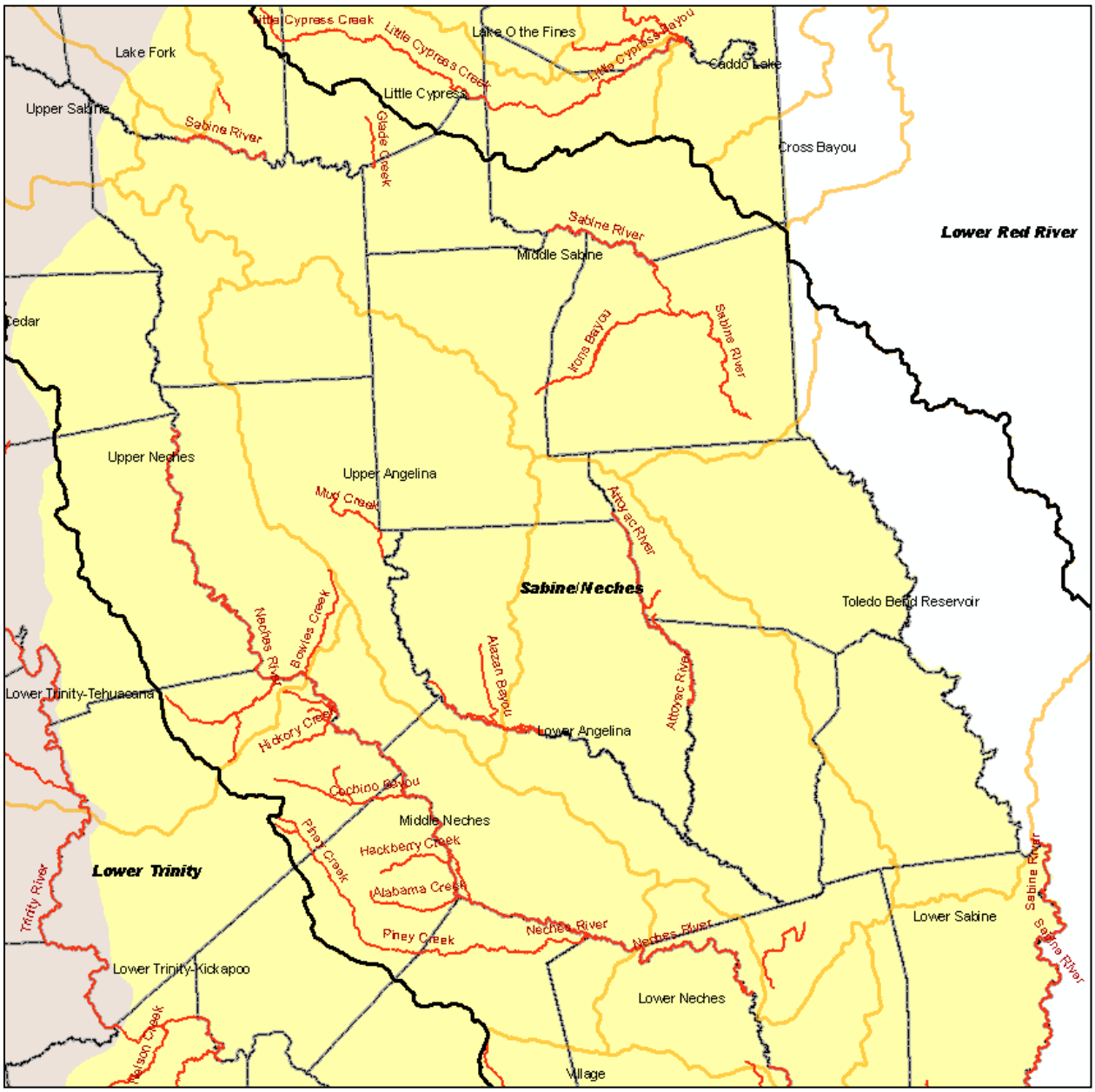
Note: Ecologically Significant Stream Segments and Reservoirs which occur in the Subbasin (HUC 8) but not in the ECOREGION are not included in this table. There may be other significant stream resources mentioned in the Priority Habitats section

Figure 2. WGCP EDUs, HUC 8s, and ESSS – 3 maps

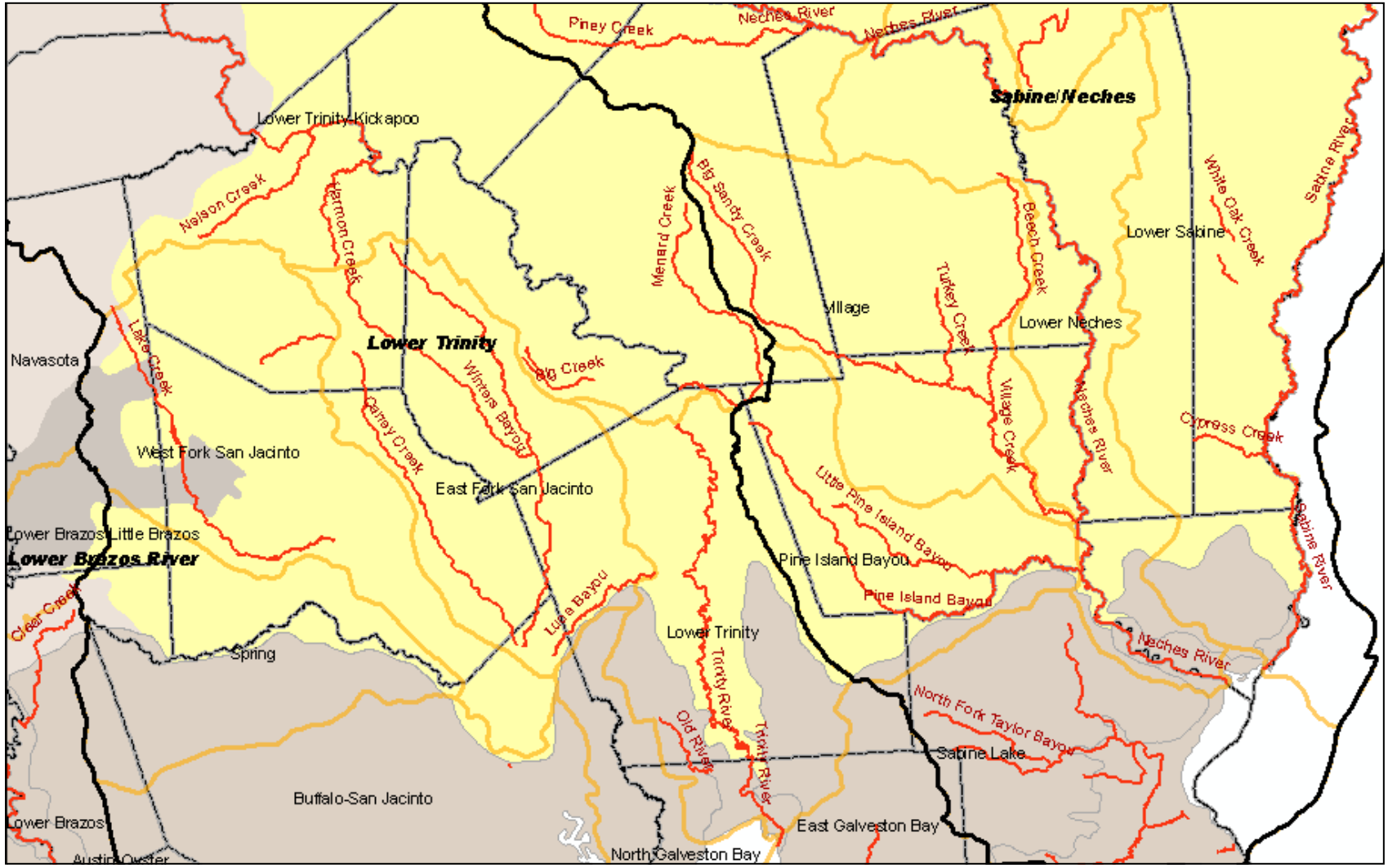
Lower Red River EDU black outline (Sabine Neches continued next page), HUC 8s orange outline, ESSS red lines



Northern portion of Sabine – Neches EDU black outline (Lower Trinity and lower Sabine –Neches on next page) black outline, HUC 8s orange outline, ESSS red lines



Lower Trinity and lower Sabine-Neches EDUs black outline, HUC 8s orange outline, ESSS red lines



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

RARE SPECIES AND COMMUNITIES

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

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

- Mammals
- Reptiles and Amphibians
- Invertebrates
- Plant Communities
- Birds
- Freshwater Fishes
- Plants

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. WGCP 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					
Blarina carolinensis	Southern short-tailed shrew			G5N5	S4
Corynorhinus rafinesquii	Rafinesque's big-eared bat		T	G3G4	S3
Lutra canadensis	River otter			G5	S4
Mustela frenata	Long-tailed weasel			G5	S5
Myotis austroriparius	Southeastern myotis			G3G4	S3
Puma concolor	Mountain lion			G5	S2
Spilogale putorius	Eastern spotted skunk			G4T	S4
Sylvilagus aquaticus	Swamp rabbit			G5	S5
Tadarida brasiliensis	Brazilian free-tailed bat			G5	S5
Ursus americanus luteolus	Louisiana black bear	LT	T	G5T3	SNA
BIRDS					
Anas acuta	Northern Pintail			G5	S3B,S5N
Colinus virginianus	Northern Bobwhite			G5	S4B
Meleagris gallopavo	Wild Turkey			G5	S5B
Ixobrychus exilis	Least Bittern			G5	S4B
Egretta thula	Snowy Egret			G5	S5B
Egretta caerulea	Little Blue Heron			G5	S5B
Egretta tricolor	Tricolored Heron			G5	S5B
Butorides virescens	Green Heron			G5	S5B
Plegadis chihi	White-faced Ibis		T	G5	S4B
Mycteria americana	Wood Stork		T	G4	SHB,S2N
Elanoides forficatus	Swallow-tailed Kite		T	G5	S2B
Ictinia mississippiensis	Mississippi Kite			G5	S4B
Haliaeetus leucocephalus	Bald Eagle			G5	S3B,S3N
Circus cyaneus	Northern Harrier			G5	S2B,S3N
Buteo lineatus	Red-shouldered Hawk			G5	S4B
Falco sparverius	American Kestrel			G5	S4B
Rallus elegans	King Rail			G4	S3B
Pluvialis dominica	American Golden-Plover			G5	S3
Scolopax minor	American Woodcock			G5	S2B,S3N
Caprimulgus carolinensis	Chuck-will's-widow			G5	S3S4B
Melanerpes erythrocephalus	Red-headed Woodpecker			G5	S3B

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
Picoides borealis	Red-cockaded Woodpecker	LE	E	G3	S2B
Dryocopus pileatus	Pileated Woodpecker			G5	S4B
Tyrannus forficatus	Scissor-tailed Flycatcher			G5	S3B
Lanius ludovicianus	Loggerhead Shrike			G4	S4B
Poecile carolinensis	Carolina Chickadee			G5	S5B
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
Protonotaria citrea	Prothonotary Warbler			G5	S3B
Helmitheros vermivorum	Worm-eating 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
Spizella pusilla	Field Sparrow			G5	S5B
Ammodramus savannarum	Grasshopper Sparrow			G5	S3B
Chondestes grammacus	Lark Sparrow			G5	S4B
Ammodramus henslowii	Henslow's Sparrow			G4	S2S3N,SXB
Ammodramus leconteii	Le Conte's Sparrow				
Piranga rubra	Summer Tanager			G5	S5B
Passerina ciris	Painted Bunting			G5	S4B
Spiza americana	Dickcissel			G5	S4B
Sturnella magna	Eastern Meadowlark			G5	S5B
Euphagus carolinus	Rusty Blackbird			G4	S3
Icterus spurius	Orchard Oriole			G5	S4B
REPTILES & AMPHIBIANS					
Apalone mutica	smooth softshell turtle				
Apalone spinifera	spiny softshell turtle				
Cemophora coccinea copei	Northern Scarlet Snake		T	G5T5	S3
Cheylydra serpentina	Common snapping turtle				
Crotalus horridus	Timber (Canebrake) Rattlesnake		T	G4	S4
Desmognathus auriculatus	Southern dusky salamander				S1
Lithobates areolatus (Rana areolata)	Crawfish frog				SU
Macrochelys temminckii	alligator snapping turtle		T	G3G4	S3

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
Ophisaurus attenuatus	western slender glass lizard				
Pituophis ruthveni	Louisiana pine snake	C	T	G5T3	
Pseudacris fouquettei (triseriata/feriarum)	Cajun chorus frog				SU
Pseudacris streckeri	Strecker's Chorus Frog			G5	S3
Terrapene carolina	Eastern box turtle			G5	S3
Terrapene ornata	Ornate box turtle			G5	S3
Trachemys scripta	Red-eared slider				
FRESHWATER FISHES					
Ammocrypta clara	Western sand darter				
Anguilla rostrata	American eel			G4	S5
Atractosteus spatula	alligator gar				
Cycleptus elongatus	Blue sucker		T	G3G4	S3
Erimyzon oblongus	Creek chubsucker		T	G5	S2S3
Etheostoma radiosum	Orangebelly darter				
Hiodon alosoides	Goldeye				
Notropis atrocaudalis	Blackspot shiner				
Notropis bairdi	Red River shiner				
Notropis chalybaeus	Ironcolor shiner				
Notropis maculatus	Taillight shiner				
Notropis potteri	Chub shiner		T	G4	S3
Notropis sabinae	Sabine shiner				
Notropis shumardi	Silverband shiner				
Percina maculata	Blackside darter		T	G5	S1
Polyodon spathula	Paddlefish		T	G4	S3
Pteronotropis hubbsi	Bluehead shiner		T	G3	S1
Scaphirhynchus platorynchus	Shovelnose sturgeon		T	G4	S2
INVERTEBRATES					
Arkansia wheeleri	Ouachita rock pocketbook	LE		G1	SH*
Bombus pensylvanicus	American bumblebee			GU	SU*
Cheumatopsyche morsei	A caddisfly			G1G3	S1
Chimarra holzenthali	Holzenthal's Philopotamid caddisfly			G1G2	S1
Cisthene conjuncta	A lichen moth			G1Q	S1Q*
Fallicambarus houstonensis	Houston burrowing crayfish			G2G3*	S2S3*
Fallicambarus kountzeae	Big Thicket burrowing crayfish			G2	S2*

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
Faxonella blairi	Blair's fencing crayfish			G2	S2*
Fusconaia askewi	Texas pigtoe		T	G2G3	S2S3*
Fusconaia lananensis	Triangle pigtoe		T	G1Q	S1
Hydroptila ouachita	A caddisfly			G1G2	S1
Isoperla sagittata	Arrowhead Stripetail			G1	S1*
Lampsilis satura	Sandbank pocketbook		T	G2	S1
Neotrichia mobilensis	A caddisfly			G1G2	S1?*
Obovaria jacksoniana	Southern hickorynut		T	G2	S1*
Orconectes maletae	Kisatchie painted crayfish			G2	S2*
Phylocentropus harrisi	A caddisfly			G1G2	S1
Pleurobema riddellii	Louisiana pigtoe		T	G1G2	S1
Pogonomyrmex comanche	Comanche harvester ant			G2G3*	S2*
Potamilus amphichaenus	Texas heelsplitter		T	G1G2	S1
Procambarus brazoriensis	Brazoria crayfish			G1	S1
Procambarus nechesae	Neches crayfish			G2	S1S2
Procambarus nigrocinctus	Blackbelted crayfish			G1G2	S1
Somatochlora magarita	Texas emerald			G2	S2
Sparbarus coushatta	A mayfly			G1G2	S1?*
Tricorythodes curvatus	A mayfly			G1G3	S2?*
PLANTS					
Agalinis navasotensis	Navasota false foxglove			G1	S1
Agrimonia incisa	incised groovebur			G3	S3
Amorpha laevigata	smooth indigobush			G3	S1
Amorpha paniculata	panicled indigobush			G2G3	S2
Astragalus reflexus	Texas milk vetch			G3	S3
Bartonia texana	Texas screwstem			G2	S2
Calopogon oklahomensis	Oklahoma grass pink			G3	S1S2
Carex decomposita	cypress knee sedge			G3	S1
Clematis carrizoanus	Carrizo sands leather-flower			G2	S2
Coreopsis intermedia	goldenwave tickseed			G3	S3
Crataegus anamesa	Fort Bend hawthorn			G3Q	S3
Crataegus nananixonii	Nixon's dwarf hawthorn			G1	S1
Crataegus stenosepala	narrow-sepal hawthorn			G3Q	S3
Crataegus warneri	Warner's hawthorn			G3Q	S3
Cuscuta attenuata	marsh-elder dodder			G3	S2
Cyperus grayioides	Mohlenbrock's sedge			G3G4	S3S4

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
Cypripedium kentuckiense	Southern lady's-slipper			G3	S1
Echinacea atrorubens	Topeka purple-coneflower			G3	S3
Eriocaulon koernickianum	small-headed pipewort			G2	S1
Gaillardia aestivalis var. winkleri	white firewheel			G5T2	S2
Geocarpon minimum	earth fruit	LT	T	G2	S1
Hibiscus dasycalyx	Neches River rose-mallow	C		G1	S1
Lachnocaulon digynum	tiny bog button			G3	S1
Leavenworthia texana	Texas golden gladecress	C		G1	S1
Liatris tenuis	slender gay-feather			G3	S3
Paronychia setacea	bristle nailwort			G3	S3
Phlox nivalis subsp. texensis	Texas trailing phlox	LE	E	G4T2	S2
Physaria pallida	white bladderpod	LE	E	G1	S1
Physostegia longisepala	long-sepaled false dragon-head			G2G3	S2
Platanthera chapmanii	Chapman's orchid			G2	S1
Platanthera integra	yellow fringeless orchid			G3G4	S1
Prenanthes barbata	barbed rattlesnake-root			G3	S3
Quercus arkansana	Arkansas oak			G3	S1
Quercus boyntonii	Boynton's oak			G1	SH
Rhododon ciliatus	Texas sandmint			G3	S3
Rhynchospora macra	large beakrush			G3	S2
Schoenolirion wrightii	Texas sunnybell			G3	S3
Silene subciliata	scarlet catchfly			G3	S3
Spiranthes brevilabris var. brevilabris	Texas ladies'-tresses orchid			G1T1	S1
Spiranthes longilabris	giant spiral ladies'-tresses			G3	S1
Spiranthes parksii	Navasota ladies'-tresses	LE	E	G3	S3
Streptanthus maculatus subsp. maculatus	clasping twistflower			G3T2T3	S2
Symphyotrichum puniceum var. scabricaule	rough-stem aster			G5T2	S2
Thalictrum arkansanum	Arkansas meadow-rue			G2Q	S2
Trillium texanum	Texas trillium			G2	S2
Triphora trianthophora var. texensis	Texas three-birds orchid			G3G4T1Q	S1
Xyris chapmanii	Chapman's yellow-eyed grass			G2	S2
Xyris drummondii	Drummond's yellow-eyed grass			G3	S2

Scientific Name	Common Name	Status		Abundance Ranking	
		Federal	State	Global	State
Xyris scabrifolia	roughleaf yellow-eyed grass			G3	S2
Yucca cernua	nodding yucca			G1	S1

Table 4. WGCP 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
G2G3	S2	West Gulf Coastal Plain Seepage Slope Shrub Thicket	(Magnolia virginiana) / Ilex coriacea - Morella caroliniensis Shrubland	West Gulf Coastal Plain Seepage Swamp and Baygall CES203.372	Angelina, Jasper, Newton, Sabine, and Tyler	N	Angelina National Forest (USFS), Little Rocky Preserve (TNC), Sabine National Forest (USFS), and Upland Island Wilderness Area (USFS)
G2	S2	West Gulf Coastal Plain Xeric Post Oak Woodland	(Pinus palustris) - Quercus stellata - Quercus incana / Tetragonotheca ludoviciana Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Angelina, Hardin, Jasper, Newton, Polk, Sabine, San Augustine, Shelby, and Tyler	N	Angelina National Forest (USFS)
G2	S2	West Gulf Coastal Plain Dry Post Oak Woodland	(Pinus palustris) - Quercus stellata - Quercus marilandica - Carya texana / Tragia urens Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Angelina, Hardin, Jasper, Newton, Polk, Sabine, San Augustine, Shelby, and Tyler	N	Upland Island, Angelina NF (USFS), Sabine NF (USFS), and Upland Island Wilderness Area (USFS)
G1G2	S1S2	West Gulf Coastal Plain Catahoula Sandstone Glade	(Pinus palustris) / Schizachyrium scoparium - Bigelowia nuttallii / Cladonia spp. Herbaceous Vegetation	West Gulf Coastal Plain Catahoula Barrens CES203.364	Angelina, Jasper, Newton, Polk, Sabine, and Tyler	N	Angelina NF (USFS), Big Thicket National Park (NPS), and little Rocky Preserve (TNC)
G2	S1	Upper West Gulf Coastal Plain Xeric Sand Barrens	(Quercus incana) / Schizachyrium scoparium - Bouteloua hirsuta - Dalea villosa var. grisea - Selaginella arenicola ssp. riddellii Xeric Sand Barrens Woodland	West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland CES203.056	Cass and Marion	N	No documented protected areas
G1	S1	Western Mayhaw Pond	(Quercus laurifolia) / Crataegus opaca - Crataegus viridis Forest	West Gulf Coastal Plain Nonriverine Wet Hardwood Flatwoods CES203.548	Angelina and Polk	N	Middle Neches River mitigation tract (TxDOT)
G2	S1S2	West Gulf Coastal Plain Intermediate Flatwoods Pond	Aristida palustris - Panicum virgatum - Eriocaulon compressum - Eleocharis equisetoides Herbaceous Vegetation	West Gulf Coastal Plain Flatwoods Pond CES203.547	Hardin, Jasper, Newton, and Tyler	N	Sandylands Preserve (TNC)
G2G3	S1	West Gulf Coastal Plain Shallow Flatwoods Pond	Aristida palustris - Panicum virgatum - Eriocaulon decangulare var. decangulare - Rhynchospora elliottii Herbaceous Vegetation	West Gulf Coastal Plain Flatwoods Pond CES203.547	Jasper and Newton	N	No documented protected areas
G2	S1	Floodplain Canebrake	Arundinaria gigantea ssp. gigantea Shrubland	South-Central Interior Large Floodplain CES202.705	Bowie, Cass, Jasper, Shelby	N	White Oak Creek WMA (TPWD)
G1	S1	Coastal Plain Inland Wet Salt Barrens	Baccharis halimifolia - Crataegus berberifolia / Eleocharis sp. - Tridens strictus - Euthamia leptocephala Shrubland	South-Central Saline Glade CES203.291	Ft. Bend, Harris, and Trinity,	N	Addicks/Barker Reservoir (COE), Davy Crockett NF (USFS), and Katy Prairie Preserve (KPC)
G1	S1	West Gulf Coastal Plain Salt Glade	Bigelowia nuttallii - Aristida dichotoma - Houstonia rosea / Cladonia spp. Herbaceous Vegetation	West Gulf Coastal Plain Catahoula Barrens CES203.364	Anderson, Harrison, and Panola	N	Caddo Lake SP (TPWD)

Global Rank	State Rank	COMMON_NAME	GLOBAL_NAME	ECOLOGICAL SYSTEM_NAME	KNOWN COUNTIES	Endemic	KNOWN PROTECTED AREAS
G1	S1	East Texas Catahoula Barrens	Bigelowia nuttallii - Krameria lanceolata - Aristida dichotoma - Sporobolus silveanus Herbaceous Vegetation	West Gulf Coastal Plain Catahoula Barrens CES203.364	Angelina, Jasper, Newton, and Tyler	Y	Angelina NF (USFS), Little Rocky Preserve (TNC)
G1	S1	West Gulf Coastal Plain Calcareous Small Stream Bottomland Forest	Celtis laevigata - Gleditsia triacanthos - Sapindus saponaria var. drummondii / Lithospermum tuberosum - Carex willdenowii Forest	West Gulf Coastal Plain Southern Calcareous Prairie CES203.379	Houston	N	No protected areas; Boggy Slough (Temple Inland lands)
G2	S1	West Gulf Coastal Plain Prairie Shrub Thicket	Crataegus spathulata - Cornus drummondii - Berchemia scandens Shrubland	West Gulf Coastal Plain Southern Calcareous Prairie CES203.379	Jasper, Newton, Polk, San Jancinto, Tyler, and Walker	N	No documented protected areas
G2	S2	West Gulf Coastal Plain Beech - Magnolia Forest	Fagus grandifolia - Magnolia grandiflora - Quercus alba / Carpinus caroliniana - Ostrya virginiana - Ilex opaca var. opaca Forest	Fagus grandifolia - Quercus alba / Acer (barbatum, leucoderme) / Solidago auriculata Forest	Angelina, Hardin, Jasper, Jefferson, Liberty, Montgomery, Newton, Polk, San Augustine, Sabine, Shelby, San Jancinto, Tyler, and Walker	N	Alabama and Coushatta Indian Reservation (BIA), Angelina NF (USFS), Big Thicket NP (NPS), Sabine NF (USFS), Little Rocky Preserve (TNC), Martin Dies SP (TPWD), Sam Houston NF (USFS), Sandy lands Preserve (TNC), and Village Creek SP (TPWD).
G2G3	S1	West Gulf Coastal Plain Streamhead Forest	Fagus grandifolia - Magnolia virginiana - (Pinus palustris) / Chasmanthium sessiliflorum Sandhill Streamhead Forest	West Gulf Coastal Plain Mesic Hardwood Forest CES203.280	Newton	N	No documented protected areas
G2G3	S1S2	West Gulf Coastal Plain Beech - White Oak Forest (Subcalcareous Type)	Fagus grandifolia - Quercus alba / Acer (barbatum, leucoderme) / Solidago auriculata Forest	West Gulf Coastal Plain Mesic Hardwood Forest CES203.280	Nacogdoches, Sabine, San Augustine, and Shelby	N	Indian Mounds Wilderness Area (USFS) and Sabine National Forest (USFS)
G2G3	S1	West Gulf Coastal Plain Calcareous Mixed Hardwood Forest	Fraxinus americana - Celtis laevigata - Nyssa sylvatica - Quercus shumardii - Ulmus americana Forest	West Gulf Coastal Plain Mesic Hardwood Forest CES203.280	Nacogdoches, Sabine, and San Augustine,	N	No documented protected areas
G2G3	S2	West Gulf Coastal Plain Carolina Ash Swamp	Fraxinus caroliniana Seasonally Flooded Forest	West Gulf Coastal Plain Nonriverine Wet Hardwood Flatwoods CES203.548	Angelina, Chambers, Hardin, Jasper, Jefferson, Liberty, Montgomery, Newton, Orange, and Sabine	N	Middle Neches River mitigation tract (TxDOT), Sabine National Forest, and Trinity River National Wildlife Refuge (USFWS)
G2	S1	Osage-orange - Common Persimmon / Fowl Mannagrass - (Cherokee Sedge) Woodland	Maclura pomifera - Diospyros virginiana / Glyceria striata - (Carex cherokeensis) Woodland	West Gulf Coastal Plain Small Stream and River Forest CES203.487	Red River	N	No documented protected areas
G1	S1	Texas Upper West Gulf Coastal Plain Southern Magnolia Forest	Magnolia grandiflora / Prunus caroliniana - Carpinus caroliniana / Arundinaria gigantea Forest	West Gulf Coastal Plain Mesic Hardwood Forest CES203.280	Liberty, Montgomery, San Jancinto, and Walker	N	Sam Houston NF (USFS) and Trinity River NWR (USFWS)?
G2	S1	West Gulf Coastal Plain High Terrace Wooded Flatwoods Pond	Nyssa biflora - Crataegus opaca - (Fraxinus caroliniana) / Rhynchospora mixta Woodland	West Gulf Coastal Plain Flatwoods Pond CES203.547	Galveston, Hardin, Jasper, Montgomery, and Orange	N	Angelina NF (USFS), Big Thicket National Preserve (NPS), Martin Dies Jr. State Park

Global Rank	State Rank	COMMON_NAME	GLOBAL_NAME	ECOLOGICAL SYSTEM_NAME	KNOWN COUNTIES	Endemic	KNOWN PROTECTED AREAS
G2	S2	West Gulf Coastal Plain Herbaceous Flatwoods Pond	Panicum hemitomon - Eriocaulon compressum - Rhynchospora corniculata Herbaceous Vegetation	West Gulf Coastal Plain Flatwoods Pond CES203.547	Hardin, Jasper, Jefferson, Newton, and Tyler	N	No documented protected areas
G1G2	S1S2	West Gulf Coastal Plain Quaternary Sand Ridge Flatwoods Pond	Panicum hemitomon - Ludwigia sphaerocarpa Herbaceous Vegetation	West Gulf Coastal Plain Flatwoods Pond CES203.547	Hardin, Jasper, Newton, Tyler, Sabine	Y	Sabine National Forest (USFS), Campbell Group, and Hancock Forest Management
G2	S2	West Gulf Coastal Subxeric Shortleaf Pine-Oak Woodland	Pinus echinata - (Pinus taeda) - Quercus (margarettiae, stellata, falcata) - Carya texana Woodland	West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland CES203.056	Cass, Camp, Franklin, Harrison, Marion, Morris, Smith, Upshur, and Wood	N	Atlanta SRA (TPWD), Caddo Lake SP (TPWD), Daingerfield SP (TPWD), Davy Crockett NF (USFS), Tyler SP (TPWD), and Sheffs Woods Preserve (TNC)
G2G3	S2	West Gulf Coastal Plain Shortleaf - Loblolly - Mixed Oak Forest	Pinus echinata - Pinus taeda - Quercus (alba, falcata, stellata) Forest	West Gulf Coastal Plain Pine-Hardwood Forest CES203.378	Anderson, Bowie, Camp, Cass, Cherokee, Gregg, Harrison. Henderson, Marion, Nacogdoches, Panola, Rusk, Shelby, Smith, and Upshur	N	Atlanta SRA (TPWD), Brinkle Lake (City of Texarkana), Daingerfield SP (TPWD), Lake Bob Sandlin SP (TPWD), Lake of the Pines (COE), Lenox Woods Preserve (TNC), Martin Creek SRA (TPWD), Sabine National Forest (USFS), Tyler State Park, Wright Patman Lake (COE)
G1G2	S1S2	West Gulf Coastal Plain Calcareous Pine - Oak Woodland	Pinus echinata - Pinus taeda - Quercus stellata / Juniperus virginiana var. virginiana / Cornus drummondii Woodland	West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland CES203.056	Anderson and Houston	N	Davey Crocket National Forest (USFS) and Ivy's Preserve (TLC)
G1	S1	West Gulf Coastal Plain Xeric Upland Shortleaf Pine - Oak Woodland	Pinus echinata - Quercus (incana, stellata, margarettiae) / Cnidoscolus texanus Woodland	West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland CES203.056	Houston, Nacogdoches, San Augustine, and Smith	N	Sabine NF (USFS),
G2G3	S2	West Gulf Coastal Plain Shortleaf Pine - Oak Rich Mesic Forest	Pinus echinata - Quercus alba / Viburnum (dentatum, acerifolium) Forest	West Gulf Coastal Plain Pine-Hardwood Forest CES203.378	Grimes, Hardin, Jasper, Liberty, Montgomery, Newton, Polk, Sabine, San Augustine, San Jancinto, Tyler, and Walker	N	Angelina National Forest (USFS), Camp Allen (private camp), Huntsville State Park, and Sam Houston NF (USFS)
G2	S2	West Gulf Coastal Plain Shortleaf Pine - Post Oak Woodland	Pinus echinata - Quercus stellata - Quercus falcata - Carya texana Woodland	West Gulf Coastal Plain Pine-Hardwood Forest CES203.378	Anderson, Bowie, Camp, Cass, Cherokee, Freestone, Greg, Harrison, Henderson, Leon, Marion, Morris, Panola, Red River, Rusk, Smith, Titus, Upshur, Wood, and Van Zandt	N	Atlanta SRA (TPWD), Caddo Lake WMA (TPWD), Caddo Lake NWR (USFWS), Daingerfield SO (TPWD), Lake Bob Sandlin SP (TPWD), Lake Wright Patman (COE), Tyler SP (TPWD)
G2	S?	West Gulf Coastal Plain Xeric Stream Terrace Shortleaf Pine Woodland	Pinus echinata / Quercus incana / Selaginella arenicola ssp. riddellii Woodland	West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland CES203.056	*Potentially in eastern Texas*	N	No documented protected areas
G1G2	S1S2	West Gulf Coastal Plain Fire-Infrequent Xeric Sandhill	Pinus palustris - Pinus (echinata, taeda) - Quercus (incana, margarettiae) / Schizachyrium scoparium Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Hardin, Newton, and Tyler	N	Sandylands Preserve (TNC), Big Thicket National Park (NPS), and Village Creek State Park (TPWD)

Global Rank	State Rank	COMMON_NAME	GLOBAL_NAME	ECOLOGICAL SYSTEM_NAME	KNOWN COUNTIES	Endemic	KNOWN PROTECTED AREAS
G1	S1	Texas Upper West Gulf Coastal Plain Longleaf Pine Woodland	Pinus palustris - Pinus (echinata, taeda) Upper West Gulf Coastal Plain Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Houston, Panola (?), Sabine, and Shelby	N	No documented protected areas
G2G3	S1	West Gulf Coastal Plain Wet Longleaf Pine Savanna (High Terraces Type)	Pinus palustris / Eryngium integrifolium - Rhynchospora spp. - (Ctenium aromaticum) Woodland	West Gulf Coastal Plain Wet Longleaf Pine Savanna and Flatwoods CES203.191	Jasper and Newton	N	No documented protected areas
G2G3	S1	West Gulf Coastal Plain Xeric Longleaf Pine Sandhill	Pinus palustris / Quercus incana - Quercus margarettiae / Vaccinium arboreum / Cnidoscolus texanus - Stylisma pickeringii var. pattersonii Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Angelina, Hardin, Jasper, Newton, Sabine, and Tyler	N	Angelina National Forest, Big Thicket National Park (NPS), Sandylands Preserve (TNC) and Upland Island Wilderness Area (USFS)
G2G3	S1	West Gulf Coastal Plain Subxeric Longleaf Pine Sandhill	Pinus palustris / Quercus incana / Schizachyrium scoparium - Croton argyranthemus Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Hardin, Newton, and Tyler	N	Angelina National Forest, Big Thicket National Park (NPS), Sandylands Preserve (TNC) and Upland Island Wilderness Area (USFS)
G1	S1	Western Upland Longleaf Pine Forest (Stream Terrace Sandy Woodland Type)	Pinus palustris / Quercus incana / Schizachyrium scoparium - Liatris elegans - Opuntia humifusa var. humifusa Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Angelina, Hardin, Jasper, Newton, Polk, Sabine, San Augustine, Shelby, and Tyler	N	Angelina NF (USFS), Sandylands Preserve (TNC), Big Thicket National Park (NPS), and Village Creek State Park (TPWD)
G2	S1	West Gulf Coastal Plain Clayey Longleaf Pine Woodland (Dry Type)	Pinus palustris / Quercus marilandica / Ilex vomitoria / Schizachyrium scoparium Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Hardin, Newton, and Tyler	N	Big Thicket NP (NPS) and Sandylands Preserve (TNC)
G2	S1	West Gulf Coastal Plain Clayey Longleaf Pine Woodland (Moist Type)	Pinus palustris / Quercus marilandica / Panicum virgatum Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Walker	N	No documented protected areas
G1	S1	West Gulf Coastal Plain Calcareous Clay Longleaf Pine Glade	Pinus palustris / Quercus marilandica / Schizachyrium scoparium - Silphium laciniatum - Ruellia humilis Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Angelina and Jasper	N	Angelina and Sabine NF (USFS),
G1	S1	Louisiana Longleaf Pine Fleming Glade	Pinus palustris / Quercus marilandica / Schizachyrium tenerum - Muhlenbergia expansa - Bigelowia nuttallii - Packera obovata Woodland	West Gulf Coastal Plain Southern Calcareous Prairie CES203.379	Angelina and Jasper	N	Angelina and Sabine NF (USFS),
G2G3	S1	Western Wet Longleaf Pine Savanna (Prairie Terraces Acidic Silt Loam Type)	Pinus palustris / Rhynchospora elliottii - Lobelia flaccidifolia - Platanthera nivea - (Helenium drummondii) Woodland	West Gulf Coastal Plain Wet Longleaf Pine Savanna and Flatwoods CES203.191	Hardin, Jasper, Newton, Orange, and Tyler	N	Big Thicket National Park (NPS) and Sandylands Preserve (TNC)
G2G3	S1S2	West Gulf Coastal Plain Mesic Upland Longleaf Pine Woodland	Pinus palustris / Schizachyrium scoparium - Liatris pycnostachya Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Angelina, Jasper, Newton, Sabine, and Tyler	N	Angelina National Forest (USFS), Sabine National Forest (USFS), and Upland Island Wilderness Area (USFS)
G2G3	S1	West Gulf Coastal Plain Dry-Mesic Upland Longleaf Pine Woodland	Pinus palustris / Schizachyrium scoparium - Rudbeckia grandiflora var. alismifolia Woodland	West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland CES203.293	Angelina, Jasper, Newton, Sabine, and Tyler	N	Angelina National Forest (USFS), Sabine National Forest (USFS), and Upland Island Wilderness Area

Global Rank	State Rank	COMMON_NAME	GLOBAL_NAME	ECOLOGICAL SYSTEM_NAME	KNOWN COUNTIES	Endemic	KNOWN PROTECTED AREAS
							(USFS)
G2	S1	Western Upland Longleaf Pine Forest (Messer Pimple Mound Type)	Pinus palustris / Schizachyrium scoparium - Schizachyrium tenerum - Silphium gracile Woodland	West Gulf Coastal Plain Wet Longleaf Pine Savanna and Flatwoods CES203.191	Angelina, Hardin, Jasper, and Tyler	N	Big Thicket National Park (NPS), Sandylands Preserve (TNC), and Village Creek State Park (TPWD)
G1	S1	Western Wet Longleaf Pine Savanna (Prairie Terraces Sodic Silt Loam Type)	Pinus palustris / Sporobolus silveanus - Muhlenbergia capillaris - Chaetopappa asteroides Woodland	West Gulf Coastal Plain Wet Longleaf Pine Savanna and Flatwoods CES203.191	Newton and Orange	N	No documented protected areas
G2G3	S1S2	West Gulf Coastal Plain Subcalcareous Pine - Hardwood Slope and Stream Bottom Forest	Pinus taeda - (Pinus echinata) - Quercus alba - Carya alba / Acer barbatum - (Acer leucoderme) Forest	West Gulf Coastal Plain Pine-Hardwood Forest CES203.378	Nacogdoches, Sabine, San Augustine, and Shelby	N	Indian Mounds Wilderness Area (USFS) and Sabine National Forest (USFS)
G1	S1	Neches Bluff Pine/ Swamp Chestnut Oak Forest	Pinus taeda - (Pinus echinata) / Quercus michauxii / Thaspium barbinode Forest	West Gulf Coastal Plain Pine-Hardwood Forest CES203.378	Houston and Trinity	Y	Davy Crockett NF (USFS), Boggy Slough (Temple Inland lands)
G2G3	S1S2	West Gulf Coastal Plain Upland Loblolly Pine - Post Oak Forest/Woodland	Pinus taeda - Quercus stellata / Crataegus spp. Woodland	West Gulf Coastal Plain Pine-Hardwood Flatwoods CES203.278	Houston, San Augustine, and Trinity	N	Sabine National Forest
G2	S1	Upper West Gulf Coastal Plain Xeric Sandhill Complex (Mixed Oak Type)	Quercus (incana, margarettiae, arkansana) - (Pinus echinata) / Schizachyrium scoparium Woodland	West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland CES203.056	Cass and Marion	N	No documented protected areas
G1	S1	Texas Upper West Gulf Coastal Plain Hardwood Slope Forest	Quercus alba - Quercus hemisphaerica / Prunus caroliniana - Persea borbonia - Viburnum acerifolium Forest	West Gulf Coastal Plain Mesic Hardwood Forest CES203.280	San Jancinto	Y	Sam Houston NF
G1G2	S1S2	Upper West Gulf Coastal Plain Subcalcareous White Oak - Dwarf Palmetto Forest	Quercus alba - Quercus nigra / Ostrya virginiana / Sabal minor Forest	West Gulf Coastal Plain Mesic Hardwood Forest CES203.280	San Jancinto and Walker	N	Sam Houston National Forest (USFS)
G2	S1S2	West Gulf Coastal Plain Subcalcareous White Oak Forest	Quercus alba / Acer leucoderme - Ostrya virginiana / Solidago auriculata Forest	West Gulf Coastal Plain Mesic Hardwood Forest CES203.280	Nacogdoches, Sabine, San Augustine, and Shelby	N	Sabine National Forest (USFS)
G2	S1	Upper West Gulf Coastal Plain Xeric Sandhill Complex (Arkansas Oak Type)	Quercus arkansana - Quercus incana / Selaginella arenicola ssp. riddellii Woodland	West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland CES203.056	Cass and Marion	N	No documented protected areas
G2G3	S2S3	Upper West Gulf Coastal Plain Diamondleaf Oak Flatwoods Forest	Quercus laurifolia - Quercus phellos - Quercus nigra / Viburnum dentatum - (Sebastiania fruticosa) / Carex glaucescens Upper West Gulf Flatwoods Forest	West Gulf Coastal Plain Nonriverine Wet Hardwood Flatwoods CES203.548	Angelina, Hardin, Jasper, Newton, Polk, San Jancinto, and Tyler	N	Angelina National Forest (USFS), Sam Houston National Forest (USFS), and Winters Bayou Preserve (TLC)
G2G3	S1	Red River Pimplemound Terrace Depression Oak Forest	Quercus lyrata - Quercus phellos - Ulmus americana / Rhynchospora spp. Forest	West Gulf Coastal Plain Nonriverine Wet Hardwood Flatwoods CES203.548	Bowie, Harrison, Marion, and Red River	N	No documented protected areas
G2G3	S2S3	Upper West Gulf Coastal Plain Circumneutral Water Oak - Willow Oak Floodplain Forest	Quercus nigra - Quercus phellos / Carya myristiciformis - Sabal minor / Carex cherokeensis Forest	: West Gulf Coastal Plain Small Stream and River Forest CES203.487	Angelina, Jasper, San Jancinto, and Walker	Y	Angelina National Forest (USFS) and Sam Houston

Global Rank	State Rank	COMMON_NAME	GLOBAL_NAME	ECOLOGICAL SYSTEM_NAME	KNOWN COUNTIES	Endemic	KNOWN PROTECTED AREAS
							National Forest (USFS)
G2G3	S2S3	West Gulf Coastal Plain Rich Bottomland	Quercus pagoda / Ulmus crassifolia - Celtis laevigata / Carex cherokeensis Forest	West Gulf Coastal Plain Small Stream and River Forest CES203.487	San Jancinto, and Walker	Y	Sam Houston National Forest (USFS)
G2G3	S2	Caddo Lake Bottomland Oak Flat	Quercus phellos - (Quercus lyrata) / Carex joorii - Saccharum baldwinii Floodplain Forest	West Gulf Coastal Plain Large River Floodplain Forest CES203.488	Harrison and Marion	N	Caddo Lake WMA (TPWD) and Caddo Lake NWR (USFWS)
G2G3	S2S3	West Gulf Coastal Plain Oak / Dwarf Palmetto Rich Bottomland Forest	Quercus phellos - Quercus nigra / Sabal minor - Sebastiania fruticosa Forest	West Gulf Coastal Plain Large River Floodplain Forest CES203.488	Angelina, Jasper, San Jancinto, Wood, and Walker	N	Angelina National Forest (USFS), Little Sandy NWR (USFWS), Middle Neches River mitigation tract (TxDOT), Old Sabine Bottom WMA (TPWD), Sam Houston National Forest (USFS), and Winters Bayou Preserve (TLC)
G1	S1	Upper West Gulf Coastal Plain Mesic Calcareous Woodland	Quercus shumardii - Carya myristiciformis - (Quercus muehlenbergii) / Carex cherokeensis - Sorghastrum nutans Woodland	West Gulf Coastal Plain Northern Calcareous Prairie CES203.377	Bowie County	N	Brinkle Lake Park (City of Texarkana)
G1	S1	East Texas Catahoula Barrens Post Oak Woodland	Quercus stellata - Carya texana - (Pinus palustris) / Chasmanthium sessiliflorum - Ranunculus fascicularis Woodland	West Gulf Coastal Plain Catahoula Barrens CES203.364	Angelina and Jasper	Y	Angelina NF and Upland Island Wilderness Area (USFS)
G2G3	S2S3	West Gulf Coastal Plain Post Oak - Loblolly Flatwoods	Quercus stellata - Pinus taeda Flatwoods Depression Forest	West Gulf Coastal Plain Pine-Hardwood Flatwoods CES203.278	Bowie, Harrison, Marion, and Red River	N	Caddo Lake WMA (TPWD) and Caddo Lake NWR (USFWS)
G2G3	S2S3	West Gulf Coastal Plain Seepage Bog	Sarracenia alata - Rhynchospora gracilenta - Rudbeckia scabrifolia - Schoenolirion croceum Herbaceous Vegetation	West Gulf Coastal Plain Herbaceous Seep and Bog CES203.194	Angelina, Jasper, Newton, Sabine, and Tyler	N	Angelina National Forest (USFS), Little Rocky Preserve (TNC), Sabine National Forest (USFS), and Upland Island Wilderness Area (USFS)
G1G2	S1S2	Morse Clay Calcareous Prairie	Schizachyrium scoparium - Marshallia caespitosa - Nemastylis geminiflora Herbaceous Vegetation	West Gulf Coastal Plain Southern Calcareous Prairie CES203.379	Bowie and Red River	N	No documented protected areas
G1	S1	West Gulf Coastal Plain Fleming Calcareous Prairie	Schizachyrium scoparium - Rudbeckia missouriensis - Grindelia lanceolata - (Liatris mucronata) Herbaceous Vegetation	West Gulf Coastal Plain Southern Calcareous Prairie CES203.379	Jasper, Newton, Polk, San Jancinto, Tyler, and Walker	N	Spencer Family (GRP easement), Campbell Group, Hancock Forest Management, and Weyerhasuer Timber Corp.
G1	S1	Weches Glades	Sedum pulchellum - Clinopodium arkansanum - Sporobolus vaginiflorus Herbaceous Vegetation	West Gulf Coastal Plain Weches Glade CES203.277	Nacogdoches, Sabine, and San Augustine	Y	No documented protected areas
G2	S1	West Gulf Coastal Plain Wet Flatwoods Pond Forest	Taxodium distichum - Nyssa biflora - Magnolia virginiana - Acer rubrum Forest	West Gulf Coastal Plain Nonriverine Wet Hardwood Flatwoods CES203.548	Newton and Orange	N	No documented protected areas

Global Rank	State Rank	COMMON_NAME	GLOBAL_NAME	ECOLOGICAL SYSTEM_NAME	KNOWN COUNTIES	Endemic	KNOWN PROTECTED AREAS
G2G3	S1	West Gulf Coastal Plain Bald-cypress Pondshore	Taxodium distichum West Gulf Coastal Plain Lakeshore Woodland		Angelina and Jasper	N	Angelina National Forest (USFS)
G2G3	S2S3	Upper West Gulf Coastal Plain Circumneutral Cedar Elm Floodplain Forest	Ulmus crassifolia - Celtis laevigata - (Ulmus rubra) / Carex digitalis - Geum canadense Forest	West Gulf Coastal Plain Small Stream and River Forest CES203.487	Anderson, Freestone, Houston, Leon, Madison, San Jancinto, Trinity, and Walker	N	Sam Houston National Forest (USFS)
G1	S1	Possum Haw Baygall	Viburnum nudum var. nudum - Morella cerifera - Smilax laurifolia Shrubland	West Gulf Coastal Plain Seepage Swamp and Baygall CES203.372	Angelina, Jasper, Newton, Polk, and Tyler	Y	No documented protected areas

PRIORITY HABITATS

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

Broad habitat categories were developed to organize all ecoregional handbooks.

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

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

Table 5. WGCP Priority Habitats

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

GENERAL HABITAT TYPES	WESTERN GULF COASTAL PLAIN (WGCP) also called "Pineywoods"	WGCP 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' Western Gulf Coastal Plain. NatureServe Central Databases. Arlington, VA. U.S.A. Data current as of 08 October 2009.*
Barren/Sparse Vegetation		
Desert Scrub		
Grassland	prairies within the forest mosaic	East-Central Texas Plains Xeric Sandyland Texas Blackland Tallgrass Prairie West Gulf Coastal Plain Southern Calcareous Prairie
Shrubland		
Savanna/Open Woodland	Longleaf pine savanna (both upland and wetland savanna types)	West Gulf Coastal Plain Stream Terrace Sandyland Longleaf Pine Woodland East-Central Texas Plains Post Oak Savanna and Woodland West Gulf Coastal Plain Upland Longleaf Pine Forest and Woodland South-Central Saline Glade West Gulf Coastal Plain Catahoula Barrens West Gulf Coastal Plain Weches Glade West Gulf Coastal Plain Pine-Hardwood Flatwoods (mixed upland and wetland)
Woodland	Pine-oak woodlands	West Gulf Coastal Plain Sandhill Oak and Shortleaf Pine Forest and Woodland

GENERAL HABITAT TYPES	WESTERN GULF COASTAL PLAIN (WGCP) also called "Pineywoods"	WGCP Ecological Systems
Forest *See also* Riparian *and* Wetlands	ravine and side-slope forests pine forests mesic mixed hardwood forest types; beech-magnolia forest; beech-white oak forests	West Gulf Coastal Plain Mesic Hardwood Forest West Gulf Coastal Plain Pine-Hardwood Forest
Riparian	periodically flooded or subirrigated intact floodplain of Lower Red, Sabine-Neches (incl headwaters), Lower Trinity rivers and tributaries primarily mature bottomland hardwoods mature woody wetlands (see also Freshwater Wetland)	Red River Large Floodplain Forest West Gulf Coastal Plain Large River Floodplain Forest West Gulf Coastal Plain Nonriverine Wet Hardwood Flatwoods West Gulf Coastal Plain Small Stream and River Forest West Gulf Coastal Plain Wet Longleaf Pine Savanna and Flatwoods

GENERAL HABITAT TYPES	WESTERN GULF COASTAL PLAIN (WGCP) also called "Pineywoods"	WGCP Ecological Systems
Riverine	Instream habitats of the watersheds which intersect this ecoregion (see Figure 2) Ecologically Significant Stream Segments - Sanders Creek, Pine Creek, Sulphur Creek, Big Cypress Creek, Kelly Creek, Frazier Creek, Little Cypress Bayou, Neches River, San Pedro Creek, Austin Branch, Bowles Creek, Little Sandy Creek, Sabine River, Irons Bayou, White Oak Creek, Trout Creek, Cypress Creek, Mud Creek, Alazan Bayou, Angelina River, Attoyac River, West Creek, Red Branch Angelina River, Angelina downstream of Rayburn Reservoir, Sandy Creek, Hickory Creek, Heger Creek, South Fork Cochino Bayou, Cochino Bayou, Boggy Slough, Hackberry Creek, Alabama Creek, Lynch Creek, Piney Creek, Big Sandy Creek, Turkey Creek, Village Creek, Little Beech Creek, Beech Creek, Pine Island Bayou, Little Pine Island Bayou, Lake Creek, East Sandy Creek, Trinity Creek, Nelson Creek, Harmon Creek, Henry Lake Branch, Double Lake Branch, Big Creek, Menard Creek, East Fork San Jacinto, Winters Bayou, Caney Creek, Luce Bayou, Trinity River	NA
Lacustrine *See also* Cultural Aquatic	Caddo Lake oxbows associated with the Trinity river systems	West Gulf Coastal Plain Seepage Swamp and Baygall West Gulf Coastal Plain Flatwoods Pond

GENERAL HABITAT TYPES	WESTERN GULF COASTAL PLAIN (WGCP) also called "Pineywoods"	WGCP Ecological Systems
Freshwater Wetland	Oxbows Swamps Baygalls seeps and springs flatwoods ponds open bogs	West Gulf Coastal Plain Herbaceous Seep and Bog
Aquifer	Carrizo – Wilcox (outcrop) Carrizo – Wilcox (suboutcrop)	NA
CULTURAL TYPES	*habitats in this column must support SGCN or rare communities to be considered in this plan*	
Agricultural	Managed timber lands – public and private, large and small	NA
Developed		NA
Urban/Suburban/Rural	*Most urban and developed areas in this region have a large forested component, unless they are associated with agricultural (pastureland) communities, wehre forested lands have been cleared for livestock production and not replanted*	NA
Cultural Aquatic	Reservoirs: Wright Patman, Cypress Springs, Bob Sandlin, Monticello, Welsh, Ellison, Johnson Creek, Lake O' the Pines, Caddo, Gilmer, Athens, Palestine, Jacksonville, Winsboro, Hawkins, Gladewater, Eastman, Brandy Branch, Cherokee, Martin, Murvaul, Toledo Bend, Tyler, Tyler East, Striker, Nacogdoches, Pinkston, Kurth, Sam Rayburn, B.A. Steinhagen, Conroe, Houston, Livingston, Houston County, Houston	NA

Texas shares its border with four states – New Mexico, Oklahoma, Arkansas, and Louisiana. WGCP shares a its eastern border with Arkansas and Louisiana. Table 6 identifies habitat priorities which have been identified in the both adjacent states' Wildlife Action Plans which may be adjacent to the WGCP. 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 WGCP 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 – Arkansas and Louisiana

Adjacent States	Ecoregions Shared with Texas	Habitat Priorities Shared with Texas[4]
Arkansas (AR)	Western Gulf Coastal Plain	oak-hickory-pine forest bottomland forests ephemeral and perennial tributaries and mainstem of the Red River, and associated riparian zones and floodplains TX – AR HUC 8 at moderate risk: Cross Bayou TX – AR HUC 8 at high risk: McKinney-Posten Bayous TX – AR HUC 8 at very high risk: Lower Sulphur
Louisiana (LA)	Western Gulf Coastal Plain Gulf Coast Prairies and Marshes	oak-hickory-pine forest bottomland forests swamps, seeps, bogs, other wetlands dry sandhill woodlands hardwood slope forests mixed hardwood – pine forests longleaf pine savanna prairies, glades and barrens cypress and cypress-tupelo swamp ephemeral and perennial tributaries and mainstem of the Sabine River, and associated riparian zones and floodplains TX – LA HUC 8 at moderate risk: Cross Bayou, Bayou Pierre, TX – LA HUC 8 at high risk: Middle Sabine

[4] Priorities were determined by reviewing the states' Action Plans online (http://www.wildlifearkansas.com/strategy.html and http://www.wlf.louisiana.gov/wildlife/wildlife-action-plan-details) 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 WGCP 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. WGCP Priority Issues Affecting Conservation

Table formatted for 11" x 17", landscape orientation

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	Chinese tallow, Chinese privet, and Japanese honeysuckle, trifoliate orange are most serious threats water hyacinth and giant salvinia - Sam Rayburn, Toledo Bend, Pinkston, Timpson reservoirs	Rapidly displacing species and invading natural communities - across region but especially bottomlands and riparian zones; many infestations are difficult to detect with traditional methods given the canopy cover of the region Aquatic infestations create potential for anoxic conditions, detrimental to fishes, aquatic invertebrates, freshwater mussels, and other water-dependent life downstream of these infestations
Non-native Animal	FERAL HOGS Red Imported Fire Ants Introduced fishes Zebra mussels Raspberry Crazy Ants?	Feral hogs decimate important and fragile habitats (e.g. springs, seeps, riparian areas, bogs, fens, wetlands), degrade instream water quality, and decrease hardwood seedling viability (rooted up, eaten) Within streams, nonnative species compete with natives, and are a predation risk (e.g. small mouth bass are voracious non-native predators) Zebra mussels have been detected in which waterways in this ecoregion and are a potential significant threat to native freshwater mussels, several of which are already listed byt the state as threatened RIFA are a reproductive menace to all ground-nesting and some shrub-nesting birds, including BCVI, small mammals, reptiles and amphibians; RIFA will invade and destroy/eat a nest of eggs and/or young
Native Problematic	Lack of fire (is this the only cause?) allows yaupon to thicketize in longleaf, shortleaf, and oak-pine savanna Toxic algal blooms? Brown-headed cowbird	Invasive native brush are a significant threat to savanna-dependent birds, reptiles and others Toxic algal blooms in what water body in this ecoregion may adversely impact what SGCN directly in this region? Brown-headed Cowbirds are brood parasites on (list SGCN in this ecoregion) bird species
Pests, Parasites, Pathogens		
Pests		
Parasites		
Pathogens	White-nose syndrome (WNS)	It's unknown yet whether WNS is a credible threat to cavity roosting bats (such as Rafinesque's big-eared bat); therefore, to be conservative, it's in this Plan as a potential issue. WNS is a fungal infection that adversely affects hibernating bats and is frequently fatal.
Power Development and Transmission		
Hydro (Dam and Reservoir)	See **Water Development** section below	
Biofuels	Eucalyptus Other "whole tree" utilization plantations	Eucalyptus is highly invasive and is being planted for biofuel production in lieu of other more native (or naturalized) timber/woody "crops" Whole tree utilization favors fast-growing, short rotation and typically only to a certain point (not even a period as long as pulp production); shorter period, more intensive management, less viability as a natural system for native wildlife Many of these biofuel sites are not using timber management accepted Best Management Practices for riparian conservation or minimal ground disturbance
Transmission	Similar to oil and gas pipelines, long wide corridors are cut through forested areas, including wetlands of all types and swales, creating a highly fragmented open landscape adjacent to a closed canopy forest	Edge effects favor invasive, predatory, and nest parasitic species, adversely impacting interior forest species. Line Rights of Way are maintained in a low shrub to open grassland condition; however, frequently these swaths are non-native and/or barren ground adversely impacting plant and animal communities, seasonal and daily movements of interior forest species, and the quality and function of wetlands crossed. Without forest cover protection, wetland communities are exposed to aquatic invasives, evaporative drying, and eroded adjacent soils which affects water quality and sedimentation rate in the wetland.
Distribution		
Oil and Natural Gas Production and Delivery		

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
Seismic exploration		
Traditional extraction site development and operation, including pumping and pad sites, gathering stations, transmission/delivery facilities (distribution lines, roadway	The expanding of existing right of ways AND construction of new pipelines is a constant issue in this region as it is a producer and also lies between coasal production sites and other delivery points. Broad and long unforested corridors are typically not replanted or maintained in native vegetation.	Aside from the edge effect swath through interior forested habitats [advantageous for brown-headed cowbirds (a nest parasite) and other predators], off-road vehicle trespass and allowed use which creates soil erosion (damages vegetation and water quality), open areas are vectors for invasive grass species (Bahia, Bermuda) introductions to the system, and hydrologic changes in recharge and runoff which prevents adjacent wetlands and bottomlands from functioning as they should
Hydraulic fracturing ("fracking") or "shale gas" extraction	East Texas is underlain by shale gas deposits, although not to the same extent as the Cross Timbers.	This resource extraction is potentially very harmful to the quantity and quality of the Carrizo-Wilcox aquifers and perched water table resources which support area springs, seeps, bogs, fens, subirrigated riparian zones, rivers, streams and other wetlands.
Lack of Reclamation		
Mining		
Sand and Gravel - upland and riverine		
Lignite	Lignite mining: footprint of mining operations and lack of reclamation	Dewatering streams, damming streams, inadequate stormwater controls which contribute excess sediment and chemicals to local waters, vegetation clearing in a large scale way, complete loss of wetlands, no reclamation to native vegetation with native seed or plant sources; hydrology, soil chemistry/horizon, and invasive species change the vegetation community potential to recover
Communications Infrastructure		
Cell and other communication towers		
Transportation		
road and bridge construction (new)	The I-69 Corridor (no longer considered the TransTexas/I-69 Corridor) is still planned as an improvement/upgrade of regional highways and potentially new sections to interstate capacity; it remains a potentially major impact to regional resources in and adjacent to National and State forests, sensitive river crossings, bottomlands and other wetlands.	
right of way maintenance		
Timber Production & Management		
Timber Plantations – large and small, public and private	short rotation of some stands and certain kinds of herbicide and/or mechanical understory treatments Conversion of hardwood to pine Lack of application of best management practices or lack of sufficient BMPs	Limited utility for many mature stand-dependent species Conversion reduces utility for many pine-hardwood system and bottomland hardwood system dependent species; is prevalent surrounding Trinity River Refuge and is creating an island of discontinuous habitat (not useful for all dependent species) Primarily lack of BMPs sufficient to protect riparian function and instream habitat quality and/or lack of application of existing BMPs in riparian areas
Land & Water Mgmt: FARM		
Land & Water Mgmt: RANCH		

General Issue	Ecoregion Issue Identified in Workshops (2010) and Surveys (2011)	Description of Adverse Effects Identified in Workshops (2010) and Surveys (2011)
Land & Water Mgmt: Municipal		
Lack of Zoning and Planning	Urban and emerging urban areas See also **Water Development**	
Land & Water Mgmt: Conservation & Recreation		
Inadequate/Inappropriate Management	See Surface Water Planning	
Inappropriate Recreational Uses	ORVs in sensitive river bottoms, bottomland hardwood stands, wetland areas, and utility corridros	Physical removal of vegetation, clearing, soil erosion
Lack of connectivity between public lands managed for conservation	With a great deal of public land in this region, there are opportunities for better connectivity for wide-ranging wildlife and those SGCN which would benefit from contiguous mature upland and riparian forest	
Lack of long-range conservation planning and cohesive land conservation/management strategies in each ecoregion	Cohesive land management for conservation could be beneficial to many of the land managers in the area, especially with reduced budgets and staff	
Water Development, Management and Distribution		
Surface Water Planning	Current regional and groundwater planning processes do not include the needs of regional or local fish and wildlife resources at the same coordination or allocation level as other uses. Nearly all water "owned" by downstream users and land/water resources managers lack any control of these resources even if the water flows “through” their sites. Many of the new construction proposed dams to serve urban water needs in and outside of the region (e.g. interbasin transfers to Dallas, Houston) are on some of the most unique, intact, and/or potentially restorable rivers in east Texas, important to many aquatic and riparian SGCN and communities.	See also Statewide Issues handbook for more discussion on this issue and the actions to address it.
Reservoir Construction and Operation	BA Steinhagen, Toledo Bend, Sam Rayburn, Lake Livingston have flood control, irrigation contracts and/or hydropower operations which require them to release waters at periods that do not coincide with natural flood period or intensity.	Lake Livingston have changed historic hydrological regimes of the Lower Trinity River; slow changes occurring to habitat and bayous on the Refuge and points downstream, but more study is needed. There are current plans to divert an additional 400 million gallons of water per day (Luce Bayou project) on top of the over one billion gallons per day already diverted to Houston for use. “Normal” flooding regimes needed for paddlefish reproduction and other SGCN dispersals are not occurring as in the past. Lack of system-appropriate flooding also related to scouring, bank erosion, decreased “natural” nutrient and sediment loads to estuaries, changes in water chemistry (oxygen, salinity, other) and suitability for some species
Groundwater Planning and Distribution		
Other Water Source Developments and Technologies		
Lack of Information & Resources		

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, Guidelines or Enforcement		
	Insufficiently regulated turtle harvesting continues to decimate domestic turtle populatiosn for food and other product export out of state	
	Unmonitoried or abandoned trot-lines for fishing, especially those with non-degradable hooks	Unmonitored or abandoned trot lines for fishing are potentially an “attractive nuisance” to alligator snapping turtles, which are in decline, and other aquatic SGCN. Trinity River Refuge staff have removed thousands of feet of these lines from the Trinity River, noting that many had stainless steel hooks with varying species decomposing on those lines.
Other Cross-Cutting Issues		
Climate Change	Carbon sequestration needed to offset the effects of climate change and airquality non-attainment in the region (perhaps the state)	

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 WGCP 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. WGCP 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
Strategically identify areas where currently managed public conservation properties (Big Thicket National Preserve, National Forests adjacent to Longleaf Ridge) could benefit from public-private conservation easements to incentivize conservation (purchase of development rights,conservation easements, longterm set asides, or …) action on private lands. Beyond buffering, connect for sound ecological reasons the over ½ million acres of federal, state, county, city, and mitigation banks already protected to varying degrees in the Pineywoods. Conservation of lands owned by timber management investment companies (TIMOs) and REITs - with emphasis on protecting rare/threatened communities and species - methods: protection of US Forest Service inholdings, buffer Big Thicket, easements or fee simple using Forest Legacy Program or other funding sources											
Identify all necessary criteria for designation of Neches Wild and Scenic River, even if not officially pursued; use the criteria to establish private lands incentive program to participate in conservation of this important site. Identify SGCN which would serve as keystone monitoring species for this area and establish a longterm monitoring program to determine how the incentives affect SGCN status improvement.											
Restoration of longleaf pine savannas (upland and wetland)											
In-reservoir habitat enhancement/conservation (for what SGCN?)											
Carbon sequestration efforts in this region can go hand in hand with desired ecological condition: – Trinity River Refuge has planted over 60,000 native bare-root seedlings to assist in carbon sequestration efforts and conversion of farm/ranch lands back to a somewhat functional bottomland hardwood forest. This approach could be explored further in other areas and programs (Farm Bill) to provide landowner incentives for bottomland hardwood, longleaf pine and shortleaf pine savanna											
Research and practical application of techniques for invasive plant management/control (including biological controls), with a focus on the "worst infestation" – giant salvinia (herbicides, salvinia weevils, water level manipulations, targeted public outreach regarding transport on boat trailers etc) on giant salvinia issues (effects on ecosystems, prevent transport via boat trailers) Giant salvinia transport via boat trailers is a huge issue. Must have LE staff enforcing existing laws and inplementing tickets/fines.											

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
Document findings for the current comprehensive alligator gar research and apply to management/recovery plan (timeline?).											
Provide voluntary guidelines, targeted effective outreach, and monitor implementation related to marking and removal of abandoned trot-lines; if voluntary ineffective, craft rule similar to the one for crab trap removal in Trinity Bay. Anyone should be able to remove those trot-lines, not just law enforcement folks.											
Identify ecologically-based (functional, beneficial to a suite of SGCN and rare communities) forlandowner incentive program focus on the following: longleaf pine savanna, shortleaf pine savanna, bottomland hardwoods, isolated natural wetlands. Incentive should include monitoring component of several taxa to determine the effectiveness of such program to improve the status and sustainability of key SGCN and rare communities. Document the progress of these programs to contribute to longterm and/or permanent conservation objectives in this region.											
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 savanna sites Identify key suites of SGCN and rare communities for each savanna type which can be monitored to assess the prescription's effects on species sustainability. Work with Rx fire technical experts AND rare species experts to identify concerns, barriers, and solutions. Document the BMPs and share with other land managers in the region. Identify effectiveness measures for the prescriptive fire as well as the outreach to others.											

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
Form multi-partner working group(s) to establish scientifically sound best management practices for **riparian, bottomland hardwood, and pine savanna 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) Identify key suites of SGCN and rare communities (not all that may occur in the type) for each restoration type which can be monitored to assess the prescription's effects on species sustainability. Work with system experts AND rare species experts to identify concerns, barriers, and solutions. Document the BMPs and share with other land managers in the region. Identify effectiveness measures for the restoration as well as the outreach to others.											
Create a multi-disciplinary/multi-agency and organization ecology committee to identify three to five years of highest priority research projects (actual projects, not just concepts) that can be rolled out to universities and colleges to collect the information most needed at the PRACTICAL level for management and conservation improvement on the ground.											
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 …											
Work with willing landowners *especially adjacent to and in corridors between* well-managed public lands to restore and manage forest communities in large single-ownership or smaller acreage cooperatives – opportunities to connect/improve historically fragmented management											
Work with ___ who across state borders in and emerging urban areas of the region in the at-risk HUC 12 watersheds identified in the National Fish Habitat Action Plan to identify specific measures that can be implemented and establish monitoring to determine if outreach and coordination with planning entities is effective											

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
Information Needs (Specific) ▪ Mapping the most invasive species in the region, to determine priority areas for control and restoration ▪ Presence and status of the following species (why? Are these particular indicators in their habitats? Are they highly threatened? Are they good monitoring indicators for particular habitat health?): o • Research on effects of managed flows (dam releases) to the major waterways in this ecoregion, including sediment dynamics and water quality to what management or recommendation end – be specific											
Convene a working group of conservation practitioners and mine developers to identify Best Management Practices for siting, developing, and reclamation of mine sites in the region. Use the Effectiveness Measures for planning to determine if the efforts improve SGCN and rare community conservation and resiliency over time (especially reduce impacts to wetlands and other waters).											
Climate change models and effects on various seral stages of forested lands											
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											
Identify key State Transportation Plan partners and Texas Department of Transportation project managers for the I-69 Corridor development. Work together as a conservation community to identify the top concerns and solutions to those issues to present to TXDOT and Regional Transportation Authorities who will make decisions about routing, design (culverts and bridge placement, design for passage, and revegetation), construction, and mitigation for sensitive resources impacts. Timeline? By when?											
Determine market values that are driving timber production, hunting and other recreation, and land sales in this region. Craft a recommendation to landowner incentive program providers that can be used to index conservation practice incentives in ecoregion. Monitor whether this approach was effective to change the conservation program values AND landowner participation in those programs before & after the change.											

Conservation Action	Direct Mgmt of Natural Resources	Species Restoration	Creation of New Habitat	Acquisition, Easement, or Lease	Land Use Planning	Training, Technical Assistance	Data Collection, Analysis, Management	Conservation Area Designation	Education, Targeted Outreach	Environm Review	Mgmt Planning
Work with private landowners and conservation partners to minimize feral hog populations through hunting and trapping (aerial methods not as effective in eastern forests as in open western lands). Provide technical guidance and educational programs about the impact and management of feral hogs to benefit ground nesting birds, small mammals, aquatic species. Document the effectiveness of such outreach programs – do they make a difference to stocking or hunting?											
Where wildlife and fisheries management are not the primary objective and where timber production is the primary objective, refer landowners to partners who can assist them with best management practices											
Species Restoration: ▪											

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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