APPENDIX C – WILDLIFE DOCUMENTS

IPaC Report – USFWS

SGCN List – TPWD

Rare Species Listing – TPWD

WHAP Report – USACE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
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http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

In Reply Refer To: April 27, 2022
Project Code: 2022-0036296
Project Name: Grapevine Lake Master Plan Revision

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, which may occur within the boundary of your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under section 7(a)(1) of the Act, Federal agencies are directed to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Under and 7(a)(2) and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to determine whether their actions may affect threatened and endangered species and/or designated critical habitat. A Federal action is an activity or program authorized, funded, or carried out, in whole or in part, by a Federal agency (50 CFR 402.02).

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For Federal actions other than major construction activities, the Service suggests that a biological evaluation (similar to a Biological Assessment) be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

After evaluating the potential effects of a proposed action on federally listed species, one of the following determinations should be made by the Federal agency:

1. *No effect* - the appropriate determination when a project, as proposed, is anticipated to have no effects to listed species or critical habitat. A "no effect" determination does not require section 7 consultation and no coordination or contact with the Service is necessary. However, the action agency should maintain a complete record of their evaluation, including the steps leading to the determination of affect, the qualified personnel conducting the evaluation, habitat conditions, site photographs, and any other related information.
2. *May affect, but is not likely to adversely affect* - the appropriate determination when a proposed action's anticipated effects to listed species or critical habitat are insignificant, discountable, or completely beneficial. Insignificant effects relate to the size of the impact and should never reach the scale where "take" of a listed species occurs. Discountable effects are those extremely unlikely to occur. Based on best judgment, a person would not be able to meaningfully measure, detect, or evaluate insignificant effects, or expect discountable effects to occur. This determination requires written concurrence from the Service. A biological evaluation or other supporting information justifying this determination should be submitted with a request for written concurrence.
3. *May affect, is likely to adversely affect* - the appropriate determination if any adverse effect to listed species or critical habitat may occur as a consequence of the proposed action, and the effect is not discountable or insignificant. This determination requires formal section 7 consultation.

The enclosed species list identifies threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, which may occur within the boundary of your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

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The Service has performed up-front analysis for certain project types and species in your project area. These analyses have been compiled into *determination keys*, which allows an action agency, or its designated non-federal representative, to initiate a streamlined process for determining a proposed project's potential effects on federally listed species. The determination keys can be accessed through IPaC.

The Service recommends that candidate species, proposed species, and proposed critical habitat be addressed should consultation be necessary. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found at: https://www.fws.gov/service/section-7-consultations

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (https://www.fws.gov/library/collections/bald-and-golden-eagle-management). Additionally, wind energy projects should follow the wind energy guidelines (https://www.fws.gov/media/land-based-wind-energy-guidelines) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: https://www.fws.gov/media/recommended-best-practices-communication-tower-design-siting-construction-operation. For additional information concerning migratory birds and eagle conservation plans, please contact the Service's Migratory Bird Office at 505-248-7882.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Migratory Birds
- Wetlands

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Arlington Ecological Services Field Office
2005 Ne Green Oaks Blvd
Suite 140
Arlington, TX 76006-6247
(817) 277-1100

Project Summary

Project Code: 2022-0036296
Event Code: None
Project Name: Grapevine Lake Master Plan Revision
Project Type: Land Management Plans - NWR
Project Description: The Grapevine Lake Master Plan (Denton, and Tarrant Counties, Texas) is the long-term strategic land use management document that guides the comprehensive management and development of all the project's recreational, natural, and cultural resources within the federal fee boundary. Under the guidance of ER-1130-2-550 Change 7, the Plan guides the efficient and cost-effective development, management, and use of project lands. It is a dynamic tool that provides for the responsible stewardship and sustainability of the project's resources for the benefit of present and future generations. The Plan works in tandem with the Operational Management Plan (OMP), which is the implementation tool for the resource objectives and development needs identified in the Master Plan. The Master Plan guides and articulates the USACE responsibilities pursuant to federal laws. Efforts are under way to revise the current Lake Master Plan. The Master Plan revision will update land classifications, plan for the modernization of existing parks, and inform the management of wildlife and other resource lands within USACE managed property at Grapevine Lake for the next 25 years.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@33.00443083066261,-97.13256247795107,14z

Counties: Denton and Tarrant counties, Texas

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Birds

NAME	STATUS
Piping Plover *Charadrius melodus* Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Whooping Crane *Grus americana* Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/758	Endangered

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus*	Candidate

No critical habitat has been designated for this species.
Species profile: https://ecos.fws.gov/ecp/species/9743

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
American Golden-plover *Pluvialis dominica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds elsewhere
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Sep 1 to Jul 31

NAME	BREEDING SEASON
Henslow's Sparrow *Ammodramus henslowii* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941	Breeds elsewhere
Lesser Yellowlegs *Tringa flavipes* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Red-headed Woodpecker *Melanerpes erythrocephalus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10

Probability Of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

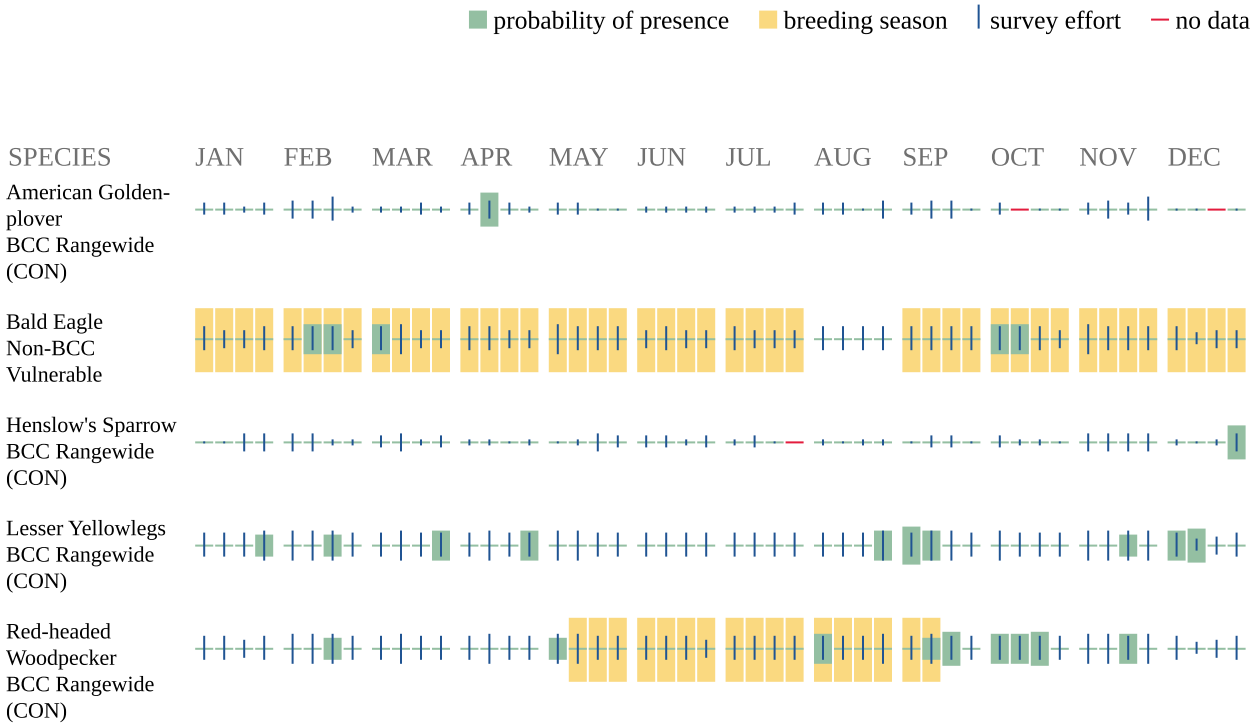
1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (▪)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the AKN Phenology Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets .

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: The Cornell Lab of Ornithology All About Birds Bird Guide, or (if you are unsuccessful in locating the bird of interest there), the Cornell Lab of Ornithology Neotropical Birds guide. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your

project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no

data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.

IPaC User Contact Information

Agency: Department of Defense
Name: Paul Roberts
Address: 819 Taylor st RM 3A12
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CROSS TIMBERS SPECIES OF GREATEST CONSERVATION NEED

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
MAMMALS						W.B. Davis and D.J. Schmidly. 1997 and 1994. Mammals of Texas (online and in print). Texas Tech University (1997) and Texas Parks and Wildlife Department (1994). http://www.nsrl.ttu.edu/tmot1/Default.htm (accessed 2011)		
Conepatus leuconotus	Hog-nosed skunk			G5	S4	Shrubland, Savanna/Open Woodland, Barren/Sparse Vegetation,		N
Dipodomys elator	Texas kangaroo rat		T	G1G2	S2	Shrubland, Agricultural	status in review	Y
Lutra canadensis	River otter			G5	S4	Riparian	Appendix II, CITES	N
Mustela frenata	Long-tailed weasel			G5	S5	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland	Statewide	N
Myotis velifer	Cave myotis			G5	S4	Caves/Karst,		N
Neovison vison	Mink			G5	S4	Riparian, Riverine, Lacustrine, Freshwater Wetland		N
Puma concolor	Mountain lion			G5	S2	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland, Riparian	Statewide	N
Spilogale putorius	Eastern spotted skunk			G4T	S4	Savanna/Open Woodland, Grassland		N
Sylvilagus aquaticus	Swamp rabbit			G5	S5	Riparian, Freshwater Wetland		N
Tadarida brasiliensis	Brazilian free-tailed bat			G5	S5	Cave/Karst, Artificial Refugia	Statewide	N
Taxidea taxus	American badger			G5	S5	Grassland, Desert scrub, Woodland, Savanna/Open Woodland, Forest		N
BIRDS						The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the American Ornithologists' Union (http://www.aou.org/).		BIRDS ONLY: instead of endemism these numbers are for taxonomic sorting
Anas acuta	Northern Pintail			G5	S3B,S5N	Lacustrine, freshwater wetland, saltwater wetland, coastal, marine	Winter	2
Colinus virginianus	Northern Bobwhite			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	deleted for CHIH	4
Tympanuchus cupido	Greater Prairie-Chicken (Interior)			G4	S1B	Grassland	Year-round	6
Meleagris gallopavo	Wild Turkey			G5	S5B	Shrubland, Savanna/Open Woodland, Forest, Riparian, Agricultural	Year-round, added *merriami* for CHIH	8
Egretta thula	Snowy Egret			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	12
Egretta caerulea	Little Blue Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	13
Butorides virescens	Green Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Cultural Aquatic	Breeding	16
Ictinia mississippiensis	Mississippi Kite			G5	S4B	Woodland, Forest, Riparian, Developed:Urban/Suburban/Rural	Breeding	20
Haliaeetus leucocephalus	Bald Eagle			G5	S3B,S3N	Riparian, Lacustrine, Freshwater Wetland, Saltwater Wetland	Year-round, added CRTB	22
Circus cyaneus	Northern Harrier			G5	S2B,S3N	Grassland, Shrubland	Year-round	23
Buteo lineatus	Red-shouldered Hawk			G5	S4B	Woodland, Forest, Riparian, Freshwater Wetland	Year-round	26
Buteo swainsoni	Swainson's Hawk			G5	S4B	Desert Scrub, Grassland, Shrubland	Breeding	28
Pluvialis dominica	American Golden-Plover			G5	S3	Grassland, Freshwater Wetland, Agricultural	Migrant	39
Sternula antillarum	Least Tern	LE*	E*	G4	S3B	Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Marine, Developed: Industrial	Year-round; subspecies *athalassos*	54
Athene cunicularia	Burrowing Owl			G4	S3B	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Year-round	63
Asio flammeus	Short-eared Owl			G5	S4N	Grassland, Shrubland, Agricultural	Winter	65
Caprimulgus carolinensis	Chuck-will's-widow			G5	S3S4B	Woodland, Forest, Riparian	Breeding	66
Melanerpes erythrocephalus	Red-headed Woodpecker			G5	S3B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	67
Tyrannus forficatus	Scissor-tailed Flycatcher			G5	S3B	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Breeding	71
Lanius ludovicianus	Loggerhead Shrike			G4	S4B	Desert Scrub, Grassland, Shrubland, Savanna/Open Woodland, Agricultural, Developed	Year-round	73
Vireo bellii	Bell's Vireo			G5	S3B	Desert scrub, Shrubland, Riparian	Breeding	74
Vireo atricapilla	Black-capped Vireo	LE	E	G3	S2B	Shrubland	Breeding	75
Poecile carolinensis	Carolina Chickadee			G5	S5B	Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	76
Anthus spragueii	Sprague's Pipit	C		G4	S3N	Barren/Sparse Vegetation, Grassland, Shrubland, Agricultural	Winter	80
*Dendroica chrysoparia**	Golden-cheeked Warbler	LE	E	G2	S2B	Woodland	Breeding; *taxonomic change likely to *Setophaga chrysoparia*	83
Aimophila cassinii	Cassin's Sparrow			G5	S4B	Grassland, Shrubland	Breeding	92
Aimophila ruficeps	Rufous-crowned Sparrow			G5	S4B	Grassland	Year-round	95
Spizella pusilla	Field Sparrow			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	96
Ammodramus savannarum	Grasshopper Sparrow			G5	S3B	Grassland, Agricultural	Year-round	97
Chondestes grammacus	Lark Sparrow			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	98
Ammodramus leconteii	Le Conte's Sparrow					Grassland	Winter	101
Zonotrichia querula	Harris's Sparrow			G5	S4	Shrubland, Agricultural	Winter	103
Calcarius mccownii	McCown's Longspur			G4	S4	Grassland, Agricultural	Winter, TBPR (northern), ECPL (northern)	104
Piranga rubra	Summer Tanager			G5	S5B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Breeding	106
Passerina ciris	Painted Bunting			G5	S4B	Shrubland, Agricultural	Breeding	107
Spiza americana	Dickcissel			G5	S4B	Grassland, Agricultural	Breeding	108
Sturnella magna	Eastern Meadowlark			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round; subspecies *lilliana* added for CHIH	109
Icterus spurius	Orchard Oriole			G5	S4B	Shrubland, Savanna/Open Woodland, Woodland, Riparian	Breeding	111
REPTILES AND AMPHIBIANS						J.E. Werler and J.R. Dixon. 2000. Texas Snakes: Identification, Distribution, and Natural History. University of Texas Press, Austin. 519 pgs. J.R. Dixon. 1987. Amphibians and Reptiles of Texas. Texas A&M University Press, College Station. 434 pp.		
Anaxyrus (Bufo) woodhousii	Woodhouse's toad			G5	SU	woodland, forest, freshwater wetland		N
Apalone mutica	smooth softshell turtle					riparian, riverine, lacustrine, freshwater wetland	added	N
Cheylydra serpentina	Common snapping turtle					riparina, riverine	added	N

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
Crotalus atrox	Western diamondback rattlesnake				S4	barren/sparse vegetation, desert scrub, grassland, shrubland, savanna, woodland, caves/karst		N
Crotalus horridus	Timber (Canebrake) Rattlesnake		T	G4	S4	woodland, forest, riparian		N
Eurycea chisolmensis	Salado Springs salamander	C		G1	S1	freshwater wetland (springs)		Y
Eurycea naufragia	Georgetown Salamander	C		G1	S1	caves and karst, freshwater wetland (springs)		Y
Graptemys versa	Texas map turtle			G4	SU	riparian, riverine		Y
Heterodon nasicus	Western hognosed snake					desert scrub, grassland, shrubland	added	N
Macrochelys temminckii	alligator snapping turtle		T	G3G4	S3	riparian, riverine, cultural aquatic	added	N
Nerodia harteri	Brazos Water Snake		T		S1	riparian, riverine, cultural aquatic		Y
Phrynosoma cornutum	Texas horned lizard		T	G4G5	S4	desert scrub, grassland, savanna		N
Pseudacris streckeri	Strecker's Chorus Frog			G5	S3	grassland, savanna, woodland, riparian, cultural aquatic, freshwater wetland		N
Sistrurus catenatus	massasauga					grassland, barren/sparse vegetation, shrubland, coastal,	added	N
Terrapene ornata	Ornate box turtle			G5	S3	grassland, barren/sparse vegetation, deset scrub, savanna, woodland		N
Thamnophis sirtalis annectans	Texas Garter Snake (Eastern/Texas/ New Mexico)			G5	S2	riparian, around lacustrine and cultural aquatic sites		Y
Trachemys scripta	Red-eared slider					riparian, riverine, lacustrine, freshwater wetland, cultural aquatic	added	N
FRESHWATER FISHES						C. Thomas, T.H. Bonner and B.G. Whiteside. 2007. Freshwater Fishes of Texas: A Field Guide. Sponsored by The River Systems Institute at Texas State University, published by Texas A&M University Press. *Editor's Note: All freshwater fishes life history information in this table was sourced directly from the online version; citations are embedded in the online version at http://www.bio.txstate.edu/~tbonner/txfishes/*	Range in Texas, as known	
Anguilla rostrata	American eel			G4	S5	streams and reservoirs in drainages connected to marine environments	mouth upstream to and including the Kiamichi River), Sabine Lake (including minor	N
Cycleptus elongatus	Blue sucker		T	G3G4	S3	large, deep rivers, and deeper zones of lakes	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Hiodon alosoides	Goldeye					large lakes; backwaters	Red River	N
Ictalurus lupus	Headwater catfish			G3	S2	clear streams and rivers with moderate gradients, deep spring runs	Guadalupe, and Colorado basins, but appears to be extirpated from these systems	N
Macryhbopsis storeriana	Silver chub					common over silt or mud, turbid water with very soft sand/silt substrate	other populations of this species, which range through the Mississippi River Basin to	N
Micropterus treculii	Guadalupe bass			G3	S3	small lentic environments; commonly taken in flowing water	of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside	Y
Notropis bairdi	Red River shiner					streambeds with widely fluctuating flows subject to high summer temperatures, high rates of evaporation,	Red River, from the mouth upstream to and including the Kiamichi River	N
Notropis oxyrhynchus	Sharpnose shiner	C		G3	S3	Moderate current velocities and depths, sand bottom	captured into the Red River drainage; introduced in Colorado River drainage	Y
Notropis potteri	Chub shiner		T	G4	S3	turbid, flowing water with silt or sand substrate; tolerant of high salinities	Brazos River, Colorado River, San Jacinto River, Trinity Rivers, and Galveston Bay	N
Polyodon spathula	Paddlefish		T	G4	S3	sized rivers, sluggish pools, backwaters, bayous, and oxbows with abundant zooplankton; large reservoirs if	eastward; currently only Red River, from the mouth upstream to and including the	N
INVERTEBRATES						www.bugguide.net – good tool for identification and taxonomic information. www.texasento.net – compilation of information on insects in Texas www.odonatacentral.org – resource for identification and distribution of damselflies and dragonflies www.butterfliesandmoths.org – resource for identification and distribution of Lepidoptera www.texasmussels.wordpress.com – resource for information on freshwater mussels in Texas Howells, R. G., R. W. Neck and H. D. Murray. 1996. Freshwater Mussels of Texas. Texas Parks and Wildlife Press, Austin.		*Editor's Note: Most karst invertebrates are likely endemic*
Amblycorypha uhleri	A katydid			G2G3*	S2?*	Savanna/Open Woodland	Terrestrial - Insects - Grasshoppers	
Arethaea ambulator	A katydid			G2G3*	S2?*	Savanna/Open Woodland	Terrestrial - Insects - Grasshoppers	
Bombus pensylvanicus	American bumblebee			GU	SU*	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Bee/Wasp/Ant	
Pleurobema riddellii	Louisiana pigtoe		T	G1G2	S1	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
Pogonomyrmex comanche	Comanche harvester ant			G2G3*	S2*	Barren/Sparse Vegetation	Terrestrial - Insect - Bee/Wasp/Ant; ecoregions added	
Potamilus amphichaenus	Texas heelsplitter		T	G1G2	S1	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
Quadrula aurea	Golden orb		T	G1	S2*	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	Y
Quadrula houstonensis	Smooth pimpleback		T	G2	S1S2*	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	Y
Quadrula mitchelli	False Spike		T	GH	SH	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
Taeniopteryx starki	Texas willowfly			G1	S1	Riparian, Riverine	Aquatic - Insects - Stoneflies	
Truncilla macrodon	Texas fawnsfoot		T	G2Q	S1*	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	Y
PLANTS						J.M. Poole, W.R. Carr, D.M. Price and J.R. Singhurst. 2007. Rare Plants of Texas. Texas A&M University Press, College Station. D.S. Correll and M.C Johnston. 1979. Manual of the Vascular Plants of Texas. The University of Texas at Dallas, Richardson. M.C. Johnston. 1990. The Vascular Plants of Texas: A List Up-dating the Manual of the Vascular Plants of Texas, 2nd Edition. Marshall C. Johnston, Austin. F.W. Gould. 1975. The Grasses of Texas. Texas A & M University Press, College Station. S.D. Jones, J.K. Wipff, and P.M. Montgomery. 1997. Vascular Plants of Texas: A Comprehensive Checklist including Synonymy; Bibliography, and Index. University of Texas Press, Austin. R.A. Vines. 2004. Trees, Shrubs and Woody Vines of the Southwest. Blackburn Press.		
Agalinis auriculata	earleaf false foxglove			G3	SH	Savanna/Open Woodland; Grrassland	Terrestrial	N
Agalinis densiflora	Osage Plains false foxglove			G3	S2	Savanna/Open Woodland - Outcrops	Terrestrial	N
Argythamnia aphoroides	Hill Country wild-mercury			G2G3	S2S3	Savanna/Open Woodland	Terrestrial	Y
Carex edwardsiana	canyon sedge			G3G4S3S4	S3S4	Woodland (slopes above Riparian)	Wetland	Y
Carex shinnersii	Shinner's sedge			G3?	S2	Grassland	Wetland	N
Clematis texensis	scarlet leather-flower			G3G4	S3S4	Woodland	Terrestrial	Y
Croton alabamensis var. texensis	Texabama croton			G3T2	S2	Woodland	Terrestrial	Y
Cuscuta exaltata	tree dodder			G3	S3	Woodland	Terrestrial	N
Dalea reverchonii	Comanche Peak prairie-clover			G2	S2	Savanna/Open Woodland; Grassland	Terrestrial	Y

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
Echinacea atrorubens	Topeka purple-coneflower			G3	S3	Savanna/Open Woodland	Terrestrial	N
Festuca versuta	Texas fescue			G3	S3	Woodland	Terrestrial	N
Gaura triangulata	prairie butterfly-weed			G3G4	S3	Grassland	Terrestrial	N
Hexalectris nitida	Glass Mountains coral-root			G3	S3	Woodland	Terrestrial	N
Ipomoea shumardiana	Shumard's morning glory			G2G3	S1	Savanna/Open Woodland	Terrestrial	N
Liatris glandulosa	glandular gay-feather			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Oenothera coryi	Cory's Evening-primrose			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Pediomelum cyphocalyx	turnip-root scurfpea			G3G4	S3S4	Grassland	Terrestrial	Y
Pediomelum reverchonii	Reverchon's curfpea			G3	S3	Grassland	Terrestrial	N
Physaria engelmannii	Engelmann's bladderpod			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Prunus minutiflora	Texas almond			G3G4	S3S4	Savanna/Open Woodland	Terrestrial	N
Schoenoplectus hallii	Hall's baby bulrush			G2G3	S1	Freshwater Wetland (ponds)	Wetland	N
Senecio quaylei	Quayle's butterweed			G1Q	S1	Savanna/Open Woodland	Terrestrial	Y
Styrax platanifolius subsp. platanifolius	sycamore-leaf snowbell			G3T3	S3	Woodland	Terrestrial	Y
Valerianella stenocarpa	bigflower cornsalad			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Yucca necopina	Glen Rose yucca			G1G2	S1S2	Savanna/Open Woodland	Terrestrial	Y

TEXAS BLACKLAND PRAIRIES SPECIES OF GREATEST CONSERVATION NEED

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
MAMMALS						W.B. Davis and D.J. Schmidly. 1997 and 1994. Mammals of Texas (online and in print). Texas Tech University (1997) and Texas Parks and Wildlife Department (1994). http://www.nsrl.ttu.edu/tmot1/Default.htm (accessed 2011)		
Blarina hylophaga plumblea	Elliot's short-tailed shrew			G5T1Q	S1	Savanna/Open Woodland		N
Geomys attwateri	Attwater's pocket gopher			G4	S4	Shrubland		Y
Lutra canadensis	River otter			G5	S4	Riparian	Appendix II, CITES	N
Mustela frenata	Long-tailed weasel			G5	S5	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland	Statewide	N
Myotis austroriparius	Southeastern myotis			G3G4	S3	Caves/Karst, Forest, Riparian		N
Myotis velifer	Cave myotis			G5	S4	Caves/Karst,		N
Puma concolor	Mountain lion			G5	S2	Forest, Woodland, Desert Scrub, Shrubland, Savanna/Open Woodland, Riparian	Statewide	N
Spilogale putorius	Eastern spotted skunk			G4T	S4	Savanna/Open Woodland, Grassland		N
Sylvilagus aquaticus	Swamp rabbit			G5	S5	Riparian, Freshwater Wetland		N
Tadarida brasiliensis	Brazilian free-tailed bat			G5	S5	Cave/Karst, Artificial Refugia	Statewide	N
Taxidea taxus	American badger			G5	S5	Grassland, Desert scrub, Woodland, Savanna/Open Woodland, Forest		N
Ursus americanus	Black bear	SAT	T	G5	S3	Forest, Woodland, Savanna/Open Woodland, Desert Scrub, Shrubland	see also Louisiana black bear; may overlap with Louisiana black bear in TBPR, ECPL	N
BIRDS						The Birds of North America Online (A. Poole, Ed.). 2005 (with current updates by species). Retrieved from The Birds of North America Online database: http://bna.birds.cornell.edu/BNA/ (accessed 2011). Supported by information from the Cornell Lab of Ornithology and the American Ornithologists' Union (http://www.aou.org/).		BIRDS ONLY: instead of endemism these numbers are for taxonomic sorting
Anas acuta	Northern Pintail			G5	S3B,S5N	Lacustrine, freshwater wetland, saltwater wetland, coastal, marine	Winter	2
Colinus virginianus	Northern Bobwhite			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	deleted for CHIH	4
Tympanuchus cupido	Greater Prairie-Chicken (Interior)			G4	S1B	Grassland	Year-round	6
Meleagris gallopavo	Wild Turkey			G5	S5B	Shrubland, Savanna/Open Woodland, Forest, Riparian, Agricultural	Year-round, added *merriami* for CHIH	8
Ixobrychus exilis	Least Bittern			G5	S4B	Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary	Breeding	11
Egretta thula	Snowy Egret			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	12
Egretta caerulea	Little Blue Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Cultural Aquatic	Breeding	13
Butorides virescens	Green Heron			G5	S5B	Riparian, Riverine, Lacustrine, Freshwater Wetland, Cultural Aquatic	Breeding	16
Mycteria americana	Wood Stork		T	G4	SHB,S2N	Riverine, Freshwater wetland	Migrant	18
Ictinia mississippiensis	Mississippi Kite			G5	S4B	Woodland, Forest, Riparian, Developed:Urban/Suburban/Rural	Breeding	20
Haliaeetus leucocephalus	Bald Eagle			G5	S3B,S3N	Riparian, Lacustrine, Freshwater Wetland, Saltwater Wetland	Year-round, added CRTB	22
Circus cyaneus	Northern Harrier			G5	S2B,S3N	Grassland, Shrubland	Year-round	23
Buteo lineatus	Red-shouldered Hawk			G5	S4B	Woodland, Forest, Riparian, Freshwater Wetland	Year-round	26
Pluvialis dominica	American Golden-Plover			G5	S3	Grassland, Freshwater Wetland, Agricultural	Migrant	39
Charadrius montanus	Mountain Plover	PT		G3	S2	Agricultural, Grassland	Winter	43
Scolopax minor	American Woodcock			G5	S2B,S3N	Woodland, Forest, Riparian	Winter (some breeding during that time)	51
Sternula antillarum	Least Tern	LE*	E*	G4	S3B	Riverine, Lacustrine, Freshwater Wetland, Saltwater Wetland, Estuary, Coastal, Marine, Developed: Industrial	Year-round; subspecies *athalassos*	54
Asio flammeus	Short-eared Owl			G5	S4N	Grassland, Shrubland, Agricultural	Winter	65
Caprimulgus carolinensis	Chuck-will's-widow			G5	S3S4B	Woodland, Forest, Riparian	Breeding	66
Melanerpes erythrocephalus	Red-headed Woodpecker			G5	S3B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	67
Dryocopus pileatus	Pileated Woodpecker			G5	S4B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	69
Tyrannus forficatus	Scissor-tailed Flycatcher			G5	S3B	Desert Scrub, Grassland, Shrubland, Agricultural, Developed	Breeding	71
Lanius ludovicianus	Loggerhead Shrike			G4	S4B	Desert Scrub, Grassland, Shrubland, Savanna/Open Woodland, Agricultural, Developed	Year-round	73
Vireo bellii	Bell's Vireo			G5	S3B	Desert scrub, Shrubland, Riparian	Breeding	74
Poecile carolinensis	Carolina Chickadee			G5	S5B	Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Year-round	76
Thryomanes bewickii (bewickii)	Bewick's Wren			G5	S5B	Shrubland, Savanna/Open Woodland, Woodland, Developed: Urban/Suburban/Rural	Year-round, red-backed form only	77
Cistothorus platensis	Sedge Wren			G5	S4	Grassland, Freshwater Wetland	Winter	78
Hylocichla mustelina	Wood Thrush			G5	S4B	Woodland, Forest, Riparian	Breeding	79
Anthus spragueii	Sprague's Pipit	C		G4	S3N	Barren/Sparse Vegetation, Grassland, Shrubland, Agricultural	Winter	80
Dendroica dominica	Yellow-throated Warbler			G5	S4B	Woodland, Forest, Riparian	Breeding	84
Protonotaria citrea	Prothonotary Warbler			G5	S3B	Woodland, Forest, Riparian, Lacustrine, Freshwater Wetland	Breeding	86
Limnothlypis swainsonii	Swainson's Warbler			G4	S3B	Woodland, Forest, Riparian	Breeding	88
Seiurus motacilla	Louisiana Waterthrush			G5	S3B	Woodland, Forest, Riparian	Breeding	89
Oporornis formosus	Kentucky Warbler			G5	S3B	Woodland, Forest	Breeding	90
Spizella pusilla	Field Sparrow			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	96
Ammodramus savannarum	Grasshopper Sparrow			G5	S3B	Grassland, Agricultural	Year-round	97
Chondestes grammacus	Lark Sparrow			G5	S4B	Grassland, Shrubland, Savanna/Open Woodland	Year-round	98
Ammodramus henslowii	Henslow's Sparrow			G4	S2S3N,SXB	Grassland, Savanna/Open Woodland	Winter	100
Ammodramus leconteii	Le Conte's Sparrow					Grassland	Winter	101
Zonotrichia querula	Harris's Sparrow			G5	S4	Shrubland, Agricultural	Winter	103
Calcarius mccownii	McCown's Longspur			G4	S4	Grassland, Agricultural	Winter, TBPR (northern), ECPL (northern)	104

CRTB RARE COMMUNITIES

Common Name	Scientific Name	G RANK	S RANK (Provisional)	ECOLOGICAL SYSTEM *added where relationship can be made at this scale*	ECOREGIONS (Note: other ecoregions are included for cross reference and conservation action coordination if needed)												Known COUNTIES	Endemic	Known PROTECTED AREAS	TERR	WETL	AQU	Comments
					CRTB	*EDPT*	*TBPR*	*ECPL*	*AZNM*	*CHIH*	*HIPL*	*SWTB*	*CGPL*	*WGCP*	*GCPM**	*STPL*							
American Sycamore - Arizona Walnut Woodland	Platanus occidentalis - Juglans major Woodland	G2G3	S3S3	Edwards Plateau Floodplain CES303.651	CRTB	EDPT											Bandera, Bell, Burnet, Comal, Gillespie, Hays, Kendall, Kinney, Kerr, Kimble, Lampasas, Real, Travis and Williamson	Y	Bull Creek and Barton Creek Parks (City of Austin), Hill Country SNA (Bandera), Kerr WMA (TPWD), Lost Maples SNA (TPWD), Love Creek Preserve (TNC) and South Llano River State Park (TPWD)		X		
Bur Oak - Shumard Oak Mixed Bottomland Forest	Quercus macrocarpa - Quercus shumardii - Chasmanthium latifolium Forest	G3?	S3?	South-Central Interior Large Floodplain CES202.705	CRTB		TBPR	ECPL									Anderson, Navarro, Red River and Tarrant	N		X			Newly described association (not in NatureServe). Probably in other North Texas counties.
Edwards Plateau Grotto	Adiantum capillus-veneris - (Thelypteris ovata var. lindheimeri, Thelypteris kunthii) Herbaceous Vegetation	G2G3	S2S3	Edwards Plateau Mesic Canyon CES303.038	CRTB	EDPT											Bandera, Bell, Bexar, Blanco, Hays, Comal, Edwards, Kendall, Medina, Kerr, Real, Travis, Uvalde, Val Verde and Williamson	Y	Balcones Canyonland Preserve (USFWS), Hamilton Pool (Travis) County Parks), Lost Maples SNA (TPWD) and Love Creek Preserve (TNC)		X		
Little Bluestem - (Yellow Indiangrass) - Tall Dropseed - Cusp Gayfeather Herbaceous Vegetation	Schizachyrium scoparium - (Sorghastrum nutans) - Sporobolus compositus var. compositus - Liatris mucronata Herbaceous Vegetation	GNR	S3	Southeastern Great Plains Tallgrass Prairie CES205.685	CRTB	EDPT											Bell, Blanco, Brown, Burnet, Callahan, Coleman, Comanche, Coryell, Eastland, Erath, Hamilton, Hays, Hill, Hood, Johnson, Lampasas, Mills, Somervell, Travis and Williamson	Y?	Fort Hood (DoD), Muse WMA (TPWD)	X			Widespread matrix vegetation, but many examples are degraded/disturbed
Mollisol Blackland Prairie	Schizachyrium scoparium - Andropogon gerardii - Sorghastrum nutans - Bifora americana Mollisol Herbaceous Vegetation	G1G2	G1G2	Texas Blackland Tallgrass Prairie CES205.684	CRTB												Cooke, Denton, Hood, Johnson, Montague, Parker, Somervell and Tarrant	Y	Cedar Hill State Park (TPWD), Bear Creek Ranch (Dixon Water Foundation)	X			This association should be defined with reference to Grand Prairie sites or split into multiple assns. Big bluestem is generally the most important nominal sp. (Eidson)
Southern Edwards Plateau Bigtooth Maple Canyon Forest	Acer grandidentatum - Quercus muehlenbergii - Quercus laceyi / Carex edwardsiana - Chaetopappa effusa Southern Edwards Plateau Forest	G2	S2	Edwards Plateau Mesic Canyon CES303.038	CRTB	EDPT											Bandera, Bell, Kendall, Kerr, Real and Uvalde	Y	Lost Maples SNA (TPWD) and Love Creek Preserve (TNC), Kronkosky Ranch (TPWD), Fort Hood (DoD), Bandera Conservation Bank	X			Also includes Acer grandidentatum - (Quercus muehlenbergii) / Carex edwardsiana Lampasas Cutplain Forest, a variant that occurs only in Bell County.
Southern Elm - Chinquapin Oak Forest	Ulmus (americana, rubra) - Quercus muehlenbergii Forest	GNR	S1S2?	Western Great Plains Floodplain CES303.678	CRTB		TBPR										Collin, Cooke, Dallas, Denton, Fannin, Grayson and Lamar	N	Caddo National Grasslands (USFS), Spring Creek Forest (City of Garland)	X			Needs better definition. Shumard oak may be a codominant sp. Probably another mesic woodland/"rich woods" association is needed in North Texas with elms, Shumard oak, redcedar in which chinquapin oak may not be present (e.g. Hunt County)

TBPR RARE COMMUNITIES

Common Name	Scientific Name	G RANK	S RANK (Provisional)	ECOLOGICAL SYSTEM *added where relationship can be made at this scale*	ECOREGIONS (Note: other ecoregions are included for cross reference and conservation action coordination if needed)											Known COUNTIES	Endemic	Known PROTECTED AREAS	TERR	WETL	AQU	Comments
					TBPR	*ECPL*	*CRTB*	*EDPT*	*WGCP*	*CGPL*	*GCPM*	*STPL*	*AZNM*	*CHIH*	*HIPL*	*SWTB*							
Bur Oak - Shumard Oak Mixed Bottomland Forest	Quercus macrocarpa - Quercus shumardii - Chasmanthium latifolium Forest	G3?	S3?	South-Central Interior Large Floodplain CES202.705	TBPR	ECPL	CRTB										Anderson, Navarro, Red River and Tarrant	N		X			Newly described association (not in NatureServe). Probably in other North Texas counties.
Eastern Gammagrass - (Switchgrass) Floodplain Herbaceous Vegetation	Tripsacum dactyloides - (Panicum virgatum) Herbaceous Vegetation	G1	S1	Texas Blackland Tallgrass Prairie CES205.684	TBPR	ECPL			WGCP								Austin, Delta, Franklin, Hopkins, Hunt, Smith, Titus and Tyler	Y?	Cowleech Prairie (TNC)		X		Newly defined association including prairies dominated by lowland gammagrass in frequently flooded bottomlands of E Tx. In examples in the upper Sabine watershed, P. virgatum is unimportant or absent. Though widely distributed, examples are rare and small in spatial extent. This community is unrelated to the Tripsacum dactyloides - Panicum virgatum - Sorghastrum nutans - Helianthus maximiliani Herbaceous Assn. and the gammagrass may be genetically distinct.
Eastern Gammagrass - Switchgrass - Yellow Indiangrass - Michaelmas-daisy Herbaceous Vegetation	Tripsacum dactyloides - Panicum virgatum - Sorghastrum nutans - Helianthus maximiliani Herbaceous Vegetation	G1	S1	Texas Blackland Tallgrass Prairie CES205.684	TBPR												Collin, Dallas, Delta, Fannin, Hunt, and Lamar	N	Clymer Meadow Preserve and Mathews Prairie (TNC), Parkhill Prairie (Collin County)	X			Needs better definition. Both T. dactyloides and P. virgatum have upland and lowland variants; this community includes sites which occur in an upland context. NatureServe description lists forbs such as H. maximiliani, Aster ericoides, Acacia angustissima var. hirta etc. which are broadly indicative of Tx blackland prairies; but high quality examples are better characterized by occurrence of "conservative" spps. such as Eryngium yuccifolium, Silphium spp. and other Helianthus spps. Existing remnants are diverse and variable.
Silveus' Dropseed - Longspike Tridens Herbaceous Vegetation	Sporobolus silveanus - Tridens strictus Herbaceous Vegetation	G1G2	S1S2	Texas Blackland Tallgrass Prairie CES205.684	TBPR												Bowie, Fannin, Franklin, Hopkins, Lamar, Rains and Titus	Y?	Tridens Prairie (TNC), Gambill Goose Refuge (City of Paris)	X			May not be distinct from the Sporobolus silveanus - Carex meadii Herbaceous Vegetation. G1G2 is probably appropriate combined rank.
Silveus' Dropseed - Mead's Sedge Herbaceous Vegetation	Sporobolus silveanus - Carex meadii Herbaceous Vegetation	G1	S1	Texas Blackland Tallgrass Prairie CES205.684	TBPR												Bowie, Fannin, Franklin, Hopkins, Lamar, Rains and Titus	Y?	Tridens Prairie (TNC), Gambill Goose Refuge (City of Paris)	X			
Southern Elm - Chinquapin Oak Forest	Ulmus (americana, rubra) - Quercus muehlenbergii Forest	GNR	S1S2?	Western Great Plains Floodplain CES303.678	TBPR		CRTB										Collin, Cooke, Dallas, Denton, Fannin, Grayson and Lamar	N	Caddo National Grasslands (USFS), Spring Creek Forest (City of Garland)	X			Needs better definition. Shumard oak may be a codominant sp. Probably another mesic woodland/"rich woods" association is needed in North Texas with elms, Shumard oak, redcedar in which chinquapin oak may not be present (e.g. Hunt County)
Upper West Gulf Coastal Plain Dry Calcareous (Blackland) Prairie	Schizachyrium scoparium - Sporobolus compositus - Fimbristylis puberula var. puberula Wooded Herbaceous Vegetation	G1G2	S1S2	West Gulf Coastal Plain Northern Calcareous Prairie CES203.377	TBPR												Fannin and Hunt	N	Caddo National Grasslands (USFS)	X			
Vertisol Blackland Prairie	Schizachyrium scoparium - Sorghastrum nutans - Andropogon gerardii - Bifora americana Vertisol Herbaceous Vegetation	G1G2	S1S2	Texas Blackland Tallgrass Prairie CES205.684	TBPR												Austin, Bastrop, Bell, Brazos, Burleson, Collin, Colorado, Dallas, Delta, Ellis, Fannin, Falls, Fayette, Franklin, Freestone, Grayson, Grimes, Hill, Hunt, Kaufman, Lavaca, Lee, Limestone, McLennan, Milam, Navarro, Robertson, Rockwall, Titus, Travis, Washington and Williamson	Y	Leonhardt Prairie (TNC), Kachina Prairie (Tx Land Conservancy easement), Peters Prairie and Riesel Prairie (NPAT)	X			Broadly defined; further definition might be warranted. Remnants are typically small and isolated. Examples in the Fayette Prairie subregion may include Paspalum plicatulum as a codominant and have other affinities with coastal prairies.

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
Calcarius pictus	Smith's Longspur					Grassland, Agricultural	Winter	105
Piranga rubra	Summer Tanager			G5	S5B	Savanna/Open Woodland, Woodland, Forest, Riparian, Developed: Urban/Suburban/Rural	Breeding	106
Passerina ciris	Painted Bunting			G5	S4B	Shrubland, Agricultural	Breeding	107
Spiza americana	Dickcissel			G5	S4B	Grassland, Agricultural	Breeding	108
Sturnella magna	Eastern Meadowlark			G5	S5B	Grassland, Shrubland, Savanna/Open Woodland	Year-round; subspecies *lilliana* added for CHIH	109
Euphagus carolinus	Rusty Blackbird			G4	S3	Woodland, Forest, Riparian, Lacustrine, Freshwater Wetland	Winter	110
Icterus spurius	Orchard Oriole			G5	S4B	Shrubland, Savanna/Open Woodland, Woodland, Riparian	Breeding	111
REPTILES AND AMPHIBIANS						J.E. Werler and J.R. Dixon. 2000. Texas Snakes: Identification, Distribution, and Natural History. University of Texas Press, Austin. 519 pgs. J.R. Dixon. 1987. Amphibians and Reptiles of Texas. Texas A&M University Press, College Station. 434 pp.		
Anaxyrus (Bufo) woodhousii	Woodhouse's toad			G5	SU	woodland, forest, freshwater wetland		N
Apalone mutica	smooth softshell turtle					riparian, riverine, lacustrine, freshwater wetland	added	N
Apalone spinifera	spiny softshell turtle					riparian, riverine, lacustrine, freshwater wetland	added, not AZNM	N
Cheylydra serpentina	Common snapping turtle					riparina, riverine	added	N
Crotalus atrox	Western diamondback rattlesnake				S4	barren/sparse vegetation, desert scrub, grassland, shrubland, savanna, woodland, caves/karst		N
Crotalus horridus	Timber (Canebrake) Rattlesnake		T	G4	S4	woodland, forest, riparian		N
Graptemys caglei	Cagle's map turtle		T	G3	S1	riparian, riverine		Y
Graptemys versa	Texas map turtle			G4	SU	riparian, riverine		Y
Heterodon nasicus	Western hognosed snake					desert scrub, grassland, shrubland	added	N
Macrochelys temminckii	alligator snapping turtle		T	G3G4	S3	riparian, riverine, cultural aquatic	added	N
Ophisaurus attenuatus	western slender glass lizard					grassland, savanna	added	N
Phrynosoma cornutum	Texas horned lizard		T	G4G5	S4	desert scrub, grassland, savanna		N
Pseudacris streckeri	Strecker's Chorus Frog			G5	S3	grassland, savanna, woodland, riparian, cultural aquatic, freshwater wetland		N
Sistrurus catenatus	massasauga					grassland, barren/sparse vegetation, shrubland, coastal,	added	N
Terrapene carolina	Eastern box turtle			G5	S3	grasslands, savanna, woodland		N
Terrapene ornata	Ornate box turtle			G5	S3	grassland, barren/sparse vegetation, deset scrub, savanna, woodland		N
Thamnophis sirtalis annectans	Texas Garter Snake (Eastern/Texas/ New Mexico)			G5	S2	riparian, around lacustrine and cultural aquatic sites		Y
Trachemys scripta	Red-eared slider					riparian, riverine, lacustrine, freshwater wetland, cultural aquatic	added	N
FRESHWATER FISHES						C. Thomas, T.H. Bonner and B.G. Whiteside. 2007. Freshwater Fishes of Texas: A Field Guide. Sponsored by The River Systems Institute at Texas State University, published by Texas A&M University Press. *Editor's Note: All freshwater fishes life history information in this table was sourced directly from the online version; citations are embedded in the online version at http://www.bio.txstate.edu/~tbonner/txfishes/*	Range in Texas, as known	
Anguilla rostrata	American eel			G4	S5	streams and reservoirs in drainages connected to marine environments	mouth upstream to and including the Kiamichi River), Sabine Lake (including minor	N
Atractosteus spatula	alligator gar					channel snag, pool-snag complex, pool-edge, and pool-vegetation habitat	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Cycleptus elongatus	Blue sucker		T	G3G4	S3	large, deep rivers, and deeper zones of lakes	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Etheostoma fonticola	Fountain darter	LE	E	G1	S1	usually in dense beds of *Vallisneria, Elodia, Ludwigia* and other aquatic plants; substrate normally mucky	Note: original population in the Comal River extirpated in mid-1950's when Comal Springs	Y
Macryhbopsis storeriana	Silver chub					common over silt or mud, turbid water with very soft sand/silt substrate	other populations of this species, which range through the Mississippi River Basin to	N
Micropterus treculii	Guadalupe bass			G3	S3	small lentic environments; commonly taken in flowing water	of the Brazos, Colorado, Guadalupe, and San Antonio basins; species also found outside of	Y
Notropis atrocaudalis	Blackspot shiner					backwater and swiftest currents	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Notropis bairdi	Red River shiner					streambeds with widely fluctuating flows subject to high summer temperatures, high rates of evaporation,	Red River, from the mouth upstream to and including the Kiamichi River	N
Notropis buccula	Small eye shiner	C		G2Q	S2	broad condition tolerances (turbidity, salinity, oxygen).	Brazos River; historically as far south as Hempstead (Waller County)	Y
Notropis chalybaeus	Ironcolor shiner					Plain streams and rivers of low to moderate gradient; often at the upstream ends of pools, with a moderate to	(including minor coastal drainages west to Galveston Bay), San Antonio Bay (including	N
Notropis oxyrhynchus	Sharpnose shiner	C		G3	S3	Moderate current velocities and depths, sand bottom	captured into the Red River drainage; introduced in Colorado River drainage	Y
Notropis potteri	Chub shiner		T	G4	S3	turbid, flowing water with silt or sand substrate; tolerant of high salinities	Brazos River, Colorado River, San Jacinto River, Trinity Rivers, and Galveston Bay	N
Notropis shumardi	Silverband shiner					channel with moderate to swift current velocities and moderate to deep depths; associated with turbid water	(including minor coastal drainages west to Galveston Bay), Galveston Bay (including	N
Percina apristis	Guadalupe darter					collections from the clearest waters tributary to the Guadalupe, namely spring heads and the main river west	from the headwaters of the Blanco and the entirety of the San Antonio River	Y
Polyodon spathula	Paddlefish		T	G4	S3	sized rivers, sluggish pools, backwaters, bayous, and oxbows with abundant zooplankton; large reservoirs if	eastward; currently only Red River, from the mouth upstream to and including the	N
Satan eurystomus	Widemouth blindcat		T	G1	S1	Karst: Subterranean waters	(Edwards Limestone, Lower Cretaceous) in the vicinity of San Antonio (Bexar County)	Y
Trogloglanis pattersoni	Toothless blindcat		T	G1	S1	Karst: Subterranean waters	(Edwards Limestone, Lower Cretaceous) in the vicinity of San Antonio (Bexar County)	Y
INVERTEBRATES						www.bugguide.net – good tool for identification and taxonomic information. www.texasento.net – compilation of information on insects in Texas www.odonatacentral.org – resource for identification and distribution of damselflies and dragonflies www.butterfliesandmoths.org – resource for identification and distribution of Lepidoptera www.texasmussels.wordpress.com – resource for information on freshwater mussels in Texas Howells, R. G., R. W. Neck and H. D. Murray. 1996. Freshwater Mussels of Texas. Texas Parks and Wildlife Press, Austin		
Bombus pensylvanicus	American bumblebee			GU	SU*	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Bee/Wasp/Ant	
Chimarra holzenthali	Holzenthal's Philopotamid caddisfly			G1G2	S1	Riparian, Riverine	Aquatic - Insects - Caddisflies; added TBPR, ECPL	
Cotinis boylei	A scarab beetle			G2*	S2*	Grassland, Shrubland, Woodland	Terrestrial - Insect - Beetles	
Nicrophorus americanus	American Burying Beetle	LE		G1	S1	Grassland, Savanna/Open Woodland	Terrestrial - Insect - Beetles	
Potamilus amphichaenus	Texas heelsplitter		T	G1G2	S1	Riverine	Aquatic - Freshwater - Mollusks; new state rank and threatened state status	
Procambarus regalis	Regal burrowing crayfish			G2G3	S2?*	Freshwater Wetland, Grassland	Aquatic - Crustaceans - Crayfish	

Scientific Name	Common Name	Status		Abundance Ranking		General Habitat Type(s) in Texas These are VERY broad habitat types as a starting place State of the practice resources are listed in each taxa line for more detailed information	Other Notes	Endemic in Texas
		Federal	State	Global	State			
Procambarus steigmani	Parkhill prairie crayfish			G1G2	S1S2*	Freshwater Wetland, Grassland	Aquatic - Crustaceans - Crayfish	
Pseudocentroptiloides morihari	A mayfly			G2G3	S2?*	Riverine, Riparian	Aquatic - Insects - Mayflies	
Sphinx eremitoides	Sage sphinx			G1G2	S1?*	Grassland	Terrestrial - Insect - Butterflies/Moths	
Susperatus tonkawa	A mayfly			G1	S1*	Riparian, Riverine	Aquatic - Insects - Mayflies	
PLANTS						J.M. Poole, W.R. Carr, D.M. Price and J.R. Singhurst. 2007. Rare Plants of Texas. Texas A&M University Press, College Station. D.S. Correll and M.C Johnston. 1979. Manual of the Vascular Plants of Texas. The University of Texas at Dallas, Richardson. M.C. Johnston. 1990. The Vascular Plants of Texas: A List Up-dating the Manual of the Vascular Plants of Texas, 2nd Edition. Marshall C. Johnston, Austin. F.W. Gould. 1975. The Grasses of Texas. Texas A & M University Press, College Station. S.D. Jones, J.K. Wipff, and P.M. Montgomery. 1997. Vascular Plants of Texas: A Comprehensive Checklist including Synonymy; Bibliography, and Index. University of Texas Press, Austin. R.A. Vines. 2004. Trees, Shrubs and Woody Vines of the Southwest. Blackburn Press.		
Agalinis densiflora	Osage Plains false foxglove			G3	S2	Savanna/Open Woodland - Outcrops	Terrestrial	N
Astragalus reflexus	Texas milk vetch			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Calopogon oklahomensis	Oklahoma grass pink			G3	S1S2	Savanna/Open Woodland; Grassland; Freshwater Wetland	Terrestrial	N
Carex edwardsiana	canyon sedge			G3G4S3S4	S3S4	Woodland (slopes above Riparian)	Wetland	Y
Carex shinnersii	Shinner's sedge			G3?	S2	Grassland	Wetland	N
Crataegus dallasiana	Dallas hawthorn			G3Q	S3	Riparian (creeks in the Blackland Prairie)	Terrestrial	Y
Cuscuta exaltata	tree dodder			G3	S3	Woodland	Terrestrial	N
Dalea hallii	Hall's prairie-clover			G3	S3	Savanna/Open Woodland; Grassland	Terrestrial	Y
Echinacea atrorubens	Topeka purple-coneflower			G3	S3	Savanna/Open Woodland	Terrestrial	N
Hexalectris nitida	Glass Mountains coral-root			G3	S3	Woodland	Terrestrial	N
Hexalectris warnockii	Warnock's coral-root			G2G3	S2	Woodland	Terrestrial	N
Hymenoxys pygmea	Pygmy prairie dawn			G1	S1	Barren/Sparse Vegetation with Grassland matrix (saline prairie)	currently being described	Y
Liatris glandulosa	glandular gay-feather			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Paronychia setacea	bristle nailwort			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Phlox oklahomensis	Oklahoma phlox			G3	SH	Savanna/Open Woodland	Terrestrial	N
Physaria engelmannii	Engelmann's bladderpod			G3	S3	Savanna/Open Woodland	Terrestrial	Y
Polygonella parksii	Parks' jointweed			G2	S2	Savanna/Open Woodland (sandhills); Grassland	Terrestrial	Y
Prunus texana	Texas peachbush			G3G4	S3S4	Savanna/Open Woodland; Grassland	Terrestrial	Y
Thalictrum texanum	Texas meadow-rue			G2	S2	Savanna/Open Woodland; Riparian (bottomland forest)	Terrestrial	Y
Zizania texana	Texas wild rice	LE	E	G1	S1	Riverine (spring-fed, clear, thermally constant, moderate current, sand to gravel substrate)	Aquatic	Y

WILDLIFE HABITAT APPRAISAL PROCEDURE (WHAP)
SUMMARY REPORT GRAPEVINE LAKE MASTER PLAN

TARRANT and DENTON COUNTIES, TEXAS

August 2020

US Army Corps
of Engineers®
Fort Worth District

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1. Introduction

Habitat assessments were conducted at Grapevine Lake on June 22-25, 2020 using Texas Parks and Wildlife Department's (TPWD) Wildlife Habitat Appraisal Procedure (WHAP) (TPWD 1995). WHAP survey point locations were based on areas believed or known to have various habitat types and features. Aerial imagery from existing Geographical Information Systems (GIS) data as well as from local knowledge of the area were utilized to gain an understanding of the project area. A total of 56 WHAP points were surveyed, all within U.S. Army Corps of Engineers (USACE) fee boundary property (see Figures 1, 2, and 3 below).

The purpose of this report is to describe wildlife habitat quality within the USACE Grapevine Lake fee owned property in Tarrant and Denton Counties, Texas. This report is being prepared by the USACE Regional Planning and Environmental Center to provide habitat quality information and inform land classifications as part of the Grapevine Lake Master Plan revision process.

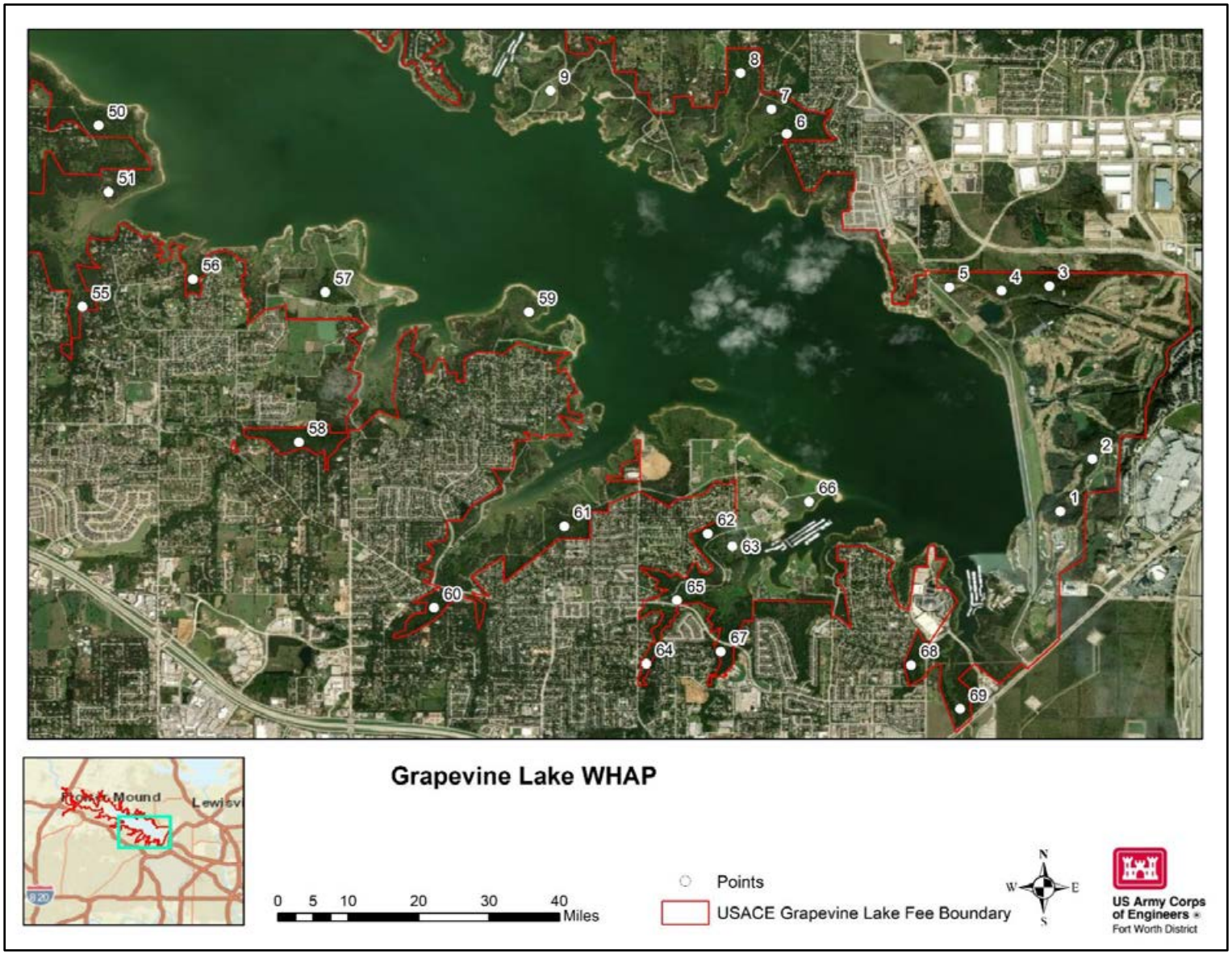

Figure 1. Distribution of WHAP Points within the Fee Owned Boundary at Grapevine Lake

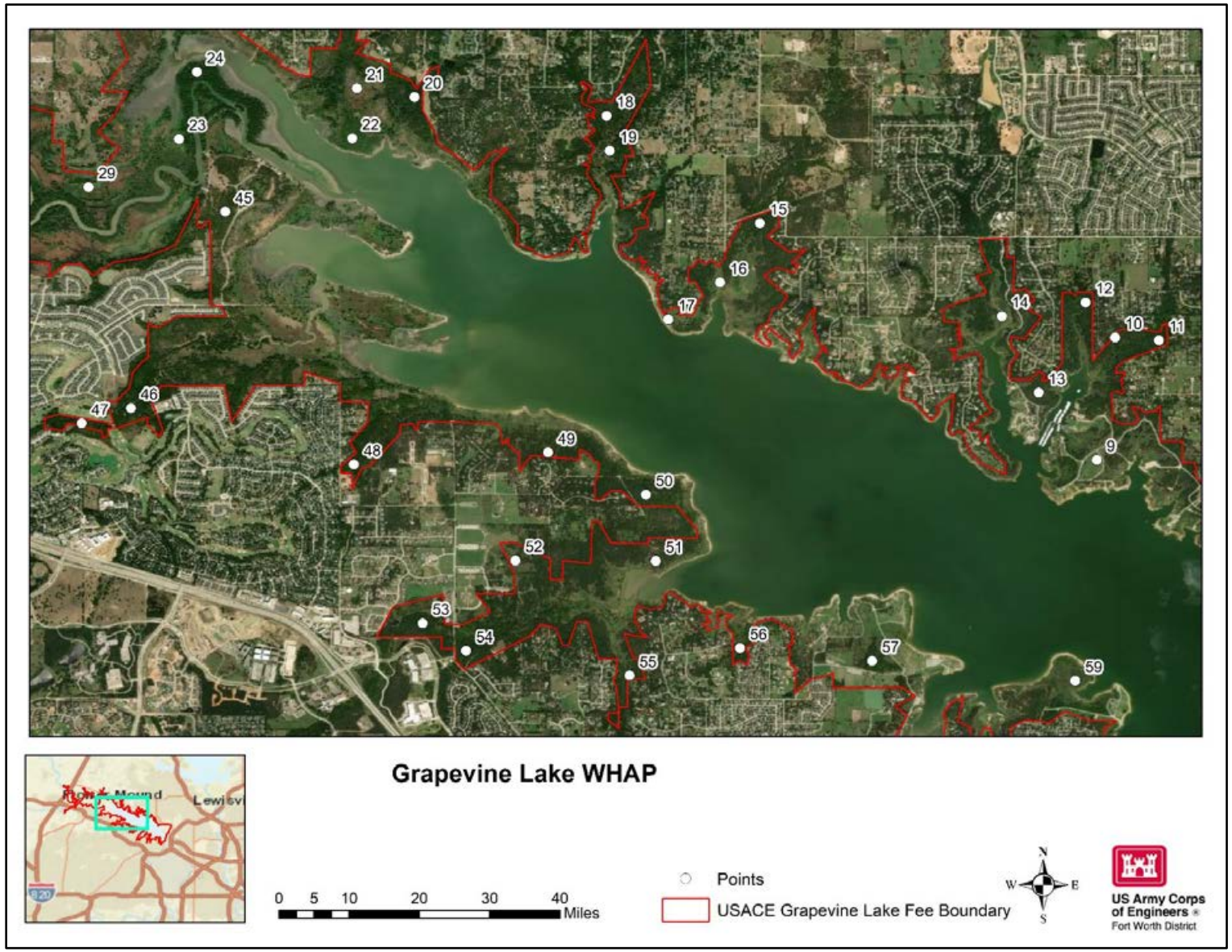

Figure 2. Distribution of WHAP Points within the Fee Owned Boundary at Grapevine Lake

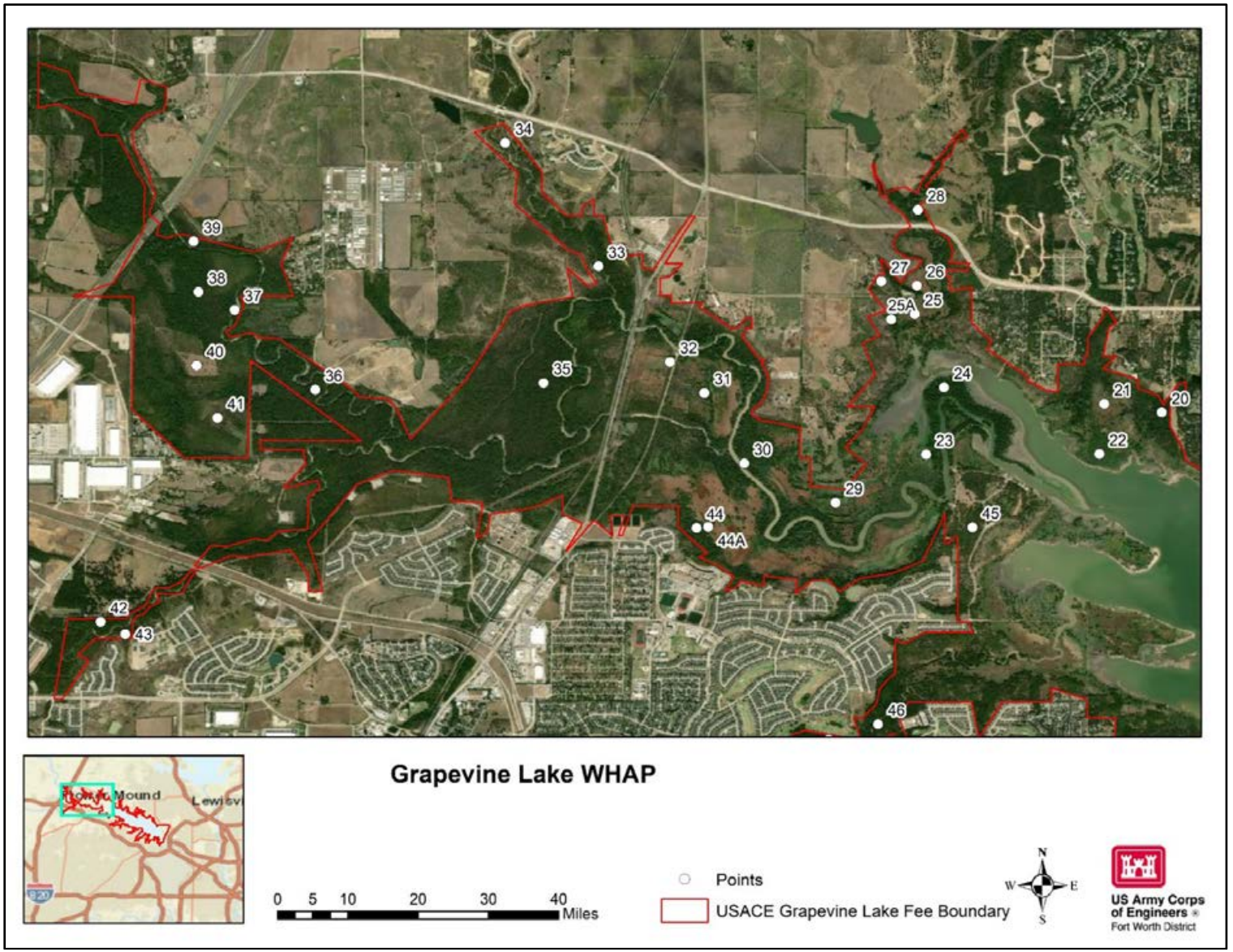

Figure 3. Distribution of WHAP Points within the Fee Owned Boundary at Grapevine Lake

2. Study Area

USACE fee owned property at Grapevine Lake, approximately 15,663 acres, is located within the Dallas/Fort Worth (DFW) metroplex in north central Texas. More specifically, the lake sits primarily between the cities of Fort Worth and Dallas, Texas within the Cross Timbers and in the Texas Blackland ecoregions as seen in Figure 4 below. The lake is located at river mile (RM) 11.7 on the Denton Creek of the Trinity River. Denton Creek has two principal tributaries, Elizabeth Creek and Oliver Creek. Sweetwater Creek and Dry Valley Creeks are the next two largest tributaries of the Denton Creek. Sweetwater Creek is a right bank tributary and Dry Valley Creek is the major left bank tributary. Downstream of the Grapevine Lake dam, Denton Creek meanders through numerous low water dams until its confluence with the Elm Fork of the Trinity River.

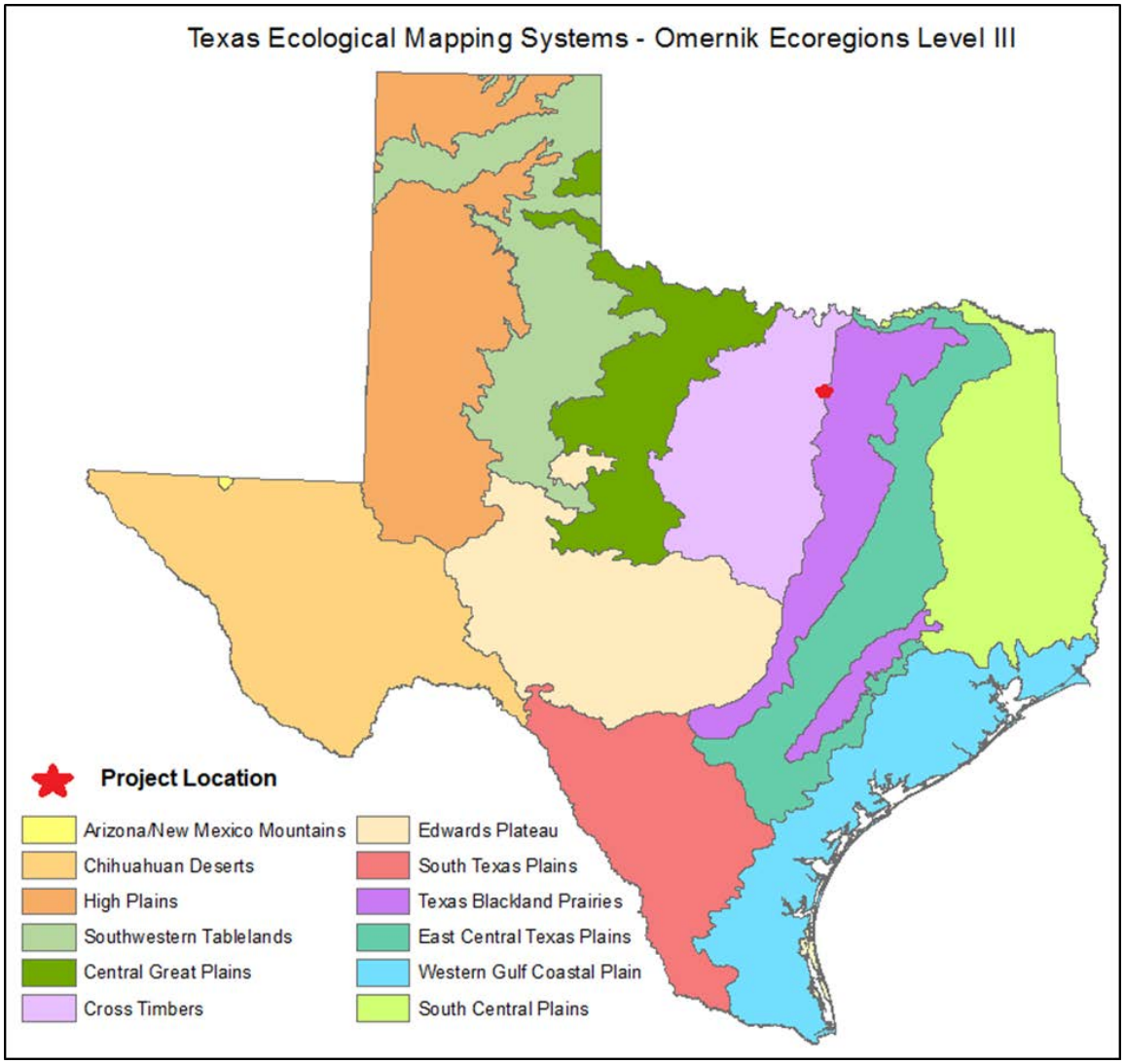

Figure 4 Ecoregions of Texas and Where Grapevine Lake Falls Within. TPWD (2019)

3. Methodology

The WHAP requires evaluating representative sites of each cover type present within an area of interest. For this project, a search area of 0.1 acre (circle with radius of 37.2 feet) was used at each WHAP site to compile a list of plant species occurring at each site and to complete the Biological Components Field Evaluation Form (TPWD 1995). Field data collected on the form at each WHAP site included the following components:

1. Site Potential
2. Temporal Development of Existing Successional Stage
3. Uniqueness and Relative Abundance
4. Vegetation Species Diversity
5. Vertical Vegetation Stratification
6. Additional Structural Diversity
7. Condition of Existing Vegetation

The TPWD developed the WHAP to allow a qualitative, holistic evaluation of wildlife habitat for particular tracts of land statewide without imposing significant time requirements in regard to field work and compilation of data (TPWD 1995). The WHAP was not designed to evaluate habitat quality in relation to specific wildlife species.

The WHAP is based on the following assumptions:

1. Vegetation structure including species composition and physiognomy is itself sufficient to define the habitat suitability for wildlife;
2. A positive relationship exists between vegetation diversity and wildlife species diversity;
3. Vegetation composition and primary productivity directly influence population densities of wildlife species.

As designed, the WHAP is intended to be used for the following applications:

1. Evaluating impacts upon wildlife populations from specific development project alternatives.
2. Establishing baseline data prior to anticipated or proposed changes in habitat conditions for specific areas.
3. Comparing tracts of land that are candidates for land acquisition or mitigation.
4. Evaluating general habitat quality and wildlife management potential for tracts of land over large geographical areas, including wildlife planning units.

At each site, a 1/10th acre plot was evaluated and points were assigned to all applicable components based on field conditions. A habitat quality score, where values range from 0.0 (low quality) to 1.0 (high quality), was then calculated for each site by adding together all points and multiplying by 0.01. Habitat quality was then determined for all sites within the same habitat type. Photographs were taken at each site and are included as Attachment B.

The WHAP protocol can be used to assess a wide range of habitats; however, it was originally developed to assess and develop mitigation requirements for loss of bottomland hardwoods and other aquatic habitats. Scores can yield higher results for

these habitats based on how the scoring is allotted to each WHAP habitat component. Upland forest and grassland habitat types cannot reach a score indicative of high quality habitat, although they may exhibit high quality features. Subsequently, high quality upland habitat may not be identified or can be overlooked.

Grasslands, in particular, fall into this category. The Site Potential component has a maximum score of 0.25 points and allocates more points based on higher hydrologic connectivity. In order to receive the highest score for this component, the area must exhibit at least one of the following: periodically support predominately hydrophytic vegetation, have predominately undrained hydric soil and supports or is capable of supporting hydrophytic vegetation, and/or is saturated with water or covered by shallow water during 1-2 months of the growing season each year. In a grassland setting, when conditions become conducive to hydrophytic plant growth, a successional shift from a grassland to herbaceous wetlands, swamps, or riparian forest is likely to occur. Therefore, grasslands would almost always be limited to a maximum score of 0.12 points (uplands with thick surface layers).

Similarly, grasslands would be limited to a maximum of 0.12 points for the Temporal Development of Existing Successional Stage component, whereas other forested habitats could receive the full 0.25 points.

High value grasslands may not have any woody vegetation, nor vegetation that is more than 12 feet tall, and very little additional structural components. To account for this, total scores for areas categorized as grasslands do not reflect the Vegetation Species Diversity component and makes the maximum score for Vertical Vegetation Stratification component as a value of 4 and Additional Structural Diversity component as 1.

These components regularly exclude grassland habitat from receiving the maximum score of 1.00 on the WHAP point scale. In order to identify the maximum score each habitat type can receive, USACE environmental staff scored each criteria given ideal conditions for riparian/bottomland hardwood forest (BHF), upland forest (includes all non-riparian/BHF forests), grassland, and marsh habitats. The maximum value scores, shown in Table 1, were then used to normalize scores for habitats that are prevented from reaching the maximum WHAP score. This is primarily due to arbitrary low scores in the two WHAP components described above. Normalizing habitat scores will identify high quality habitat that would otherwise not be detected.

Table 1. Cover Types and Maximum Total Scores

Cover Type	Component Number								Maximum Total Score
	1	2	3	4	5	6	7	7B	
Marsh	25	20	20	20	NA	5	10	NA	1.00
Riparian/BHF	25	20	20	15	5	5	5	5	1.00

Upland Forest	12	20	20	15	5	5	5	5	0.87
Grassland	12	12	20	0	4	1	5	5	0.59

Marsh, and riparian/BHF habitats can achieve the maximum score, therefore, no normalization of scores were made for these habitat types. Upland forests and grasslands, however, can only reach within 0.13 and 0.41 points of the maximum WHAP score, even in ideal conditions.

To evaluate all habitat types on an even scoring basis, upland forest and grassland scores were normalized by dividing their original scores by the maximum possible score for their respective habitat types. For example, if a grassland site received an initial score of 0.42, it would be divided by the maximum total points a grassland site can receive, 0.59. The normalized total score used for further analysis for the grassland site would be 0.75.

This adjustment allows habitat type scores to be analyzed and compared to their corresponding habitat type maximum total score. Rather than, for instance, a grassland being evaluated on a bottomland hardwood scoring scale.

All WHAP scores analyzed and discussed from here forward reflect the normalized total scores. As mentioned above, marsh, and riparian/BHF habitats were not normalized because they can already achieve maximum scores. Grassland scores were normalized by dividing initial scores by 0.59, while all upland forest scores were normalized by dividing the initial score by 0.87.

4. Habitat

Using TPWD's Texas Ecological Mapping Systems (TPWD 2020), Grapevine Lake lies within the Cross Timbers and Texas Blackland ecoregions. The most common habitat types include marsh, riparian/BHF, upland forest, and grassland (Elliot, 2014). Table 2 displays all habitats surveyed and the number of points surveyed within each respective habitat type.

Table 2. Survey Points per Habitat Type

Habitat Type	Points Surveyed
Marsh	1
Riparian/BHF	23
Upland Forest	27
Grassland	5
Total Points Surveyed	56

Elliot (2014) provided general habitat type descriptions and associated vegetation communities for the Ecological Systems Classification and Mapping Project in support of the Comprehensive Wildlife Conservation Strategy for the Texas Parks and Wildlife Department. These descriptions were meant to be broad and depict typical vegetative assemblages across vast areas as the observable vegetation communities can vary based on local conditions.

Historically, tallgrass prairies consisting of little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardi*), yellow Indiangrass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), eastern gamagrass (*Tripsacum dactyloides*) and many forbs, such as asters (*Aster spp*.), clovers (*Trifolium spp*.), and black-eyed susan (*Rudbeckia hirta*) dominated the region. Before nearly all of the prairie was developed, bison (Bison bison) and pronghorn (*Antilocapra americana*), greater prairie chickens (*Tympanuchus cupido*), and even ocelot (*Leopardus pardalis*) utilized this area. Only an estimated 5,000 widely scattered acres in small tracts remain of the original 12 million acres of the region, or less than one-tenth of one percent of remaining prairie. Riparian hardwoods, primarily bur oak (*Quercus macrocarpa*), Shumard oak (*Quercus shumardii*), sugar hackberry (*Celtis laevigata*), elm (*Ulmus spec*.), ash (*Fraxinus* spec.), eastern cottonwood (*Populus deltoides*), and pecan (*Carya illinoinensis*), meander this prairie. The headwaters of several east Texas rivers begin in the Blackland Prairie region. In addition, the Trinity, Brazos and Colorado Rivers, and many tributaries of nearly every major system feeding the Gulf of Mexico, originate in or cross the Blackland Prairies (TPWD, 2012B).

Early settlers found the Cross Timbers' woodlands thick and impenetrable. Dominated by post (*Quercus stellate*) and blackjack oak (*Quercus marilandica*), these woodlands were often cleared for farming. Those few remaining woodland tracts can contain trees reaching 200-500 years old. Today juniper (*Juniperus spp*.) and yaupon (*Ilex vomitoria*) are a more abundant component of the Cross Timbers, pockets of prairie are spread throughout agriculture, oil and gas, and urban use areas (TPWD, 2012A). The ecoregion is characterized by moderate but sporadic rainfall. Typical vegetation that can be found in the Cross Timbers include: post oa*k,* blackjack oak*,* black hickory *(Carya texana),* bitternut hickory *(Carya cordiformis),* dwarf chinkapin oak *(Quercus prinoides),* cedar elm *(Ulmus crassifolia)*, oak (*Quercus spp),* little bluestem, sumac *(Rhus spp),* eastern red cedar (*Juniperus virginiana),* ashe juniper *(Juniperus ashei)* and honey mesquite (*Prosopis glandulosa).*

Figure 5 displays the distribution of habitat types within the USACE boundary at Grapevine Lake. For analysis purposes, habitat types were pooled into one of four categories: marsh, riparian/BHF, upland forest, and grasslands.

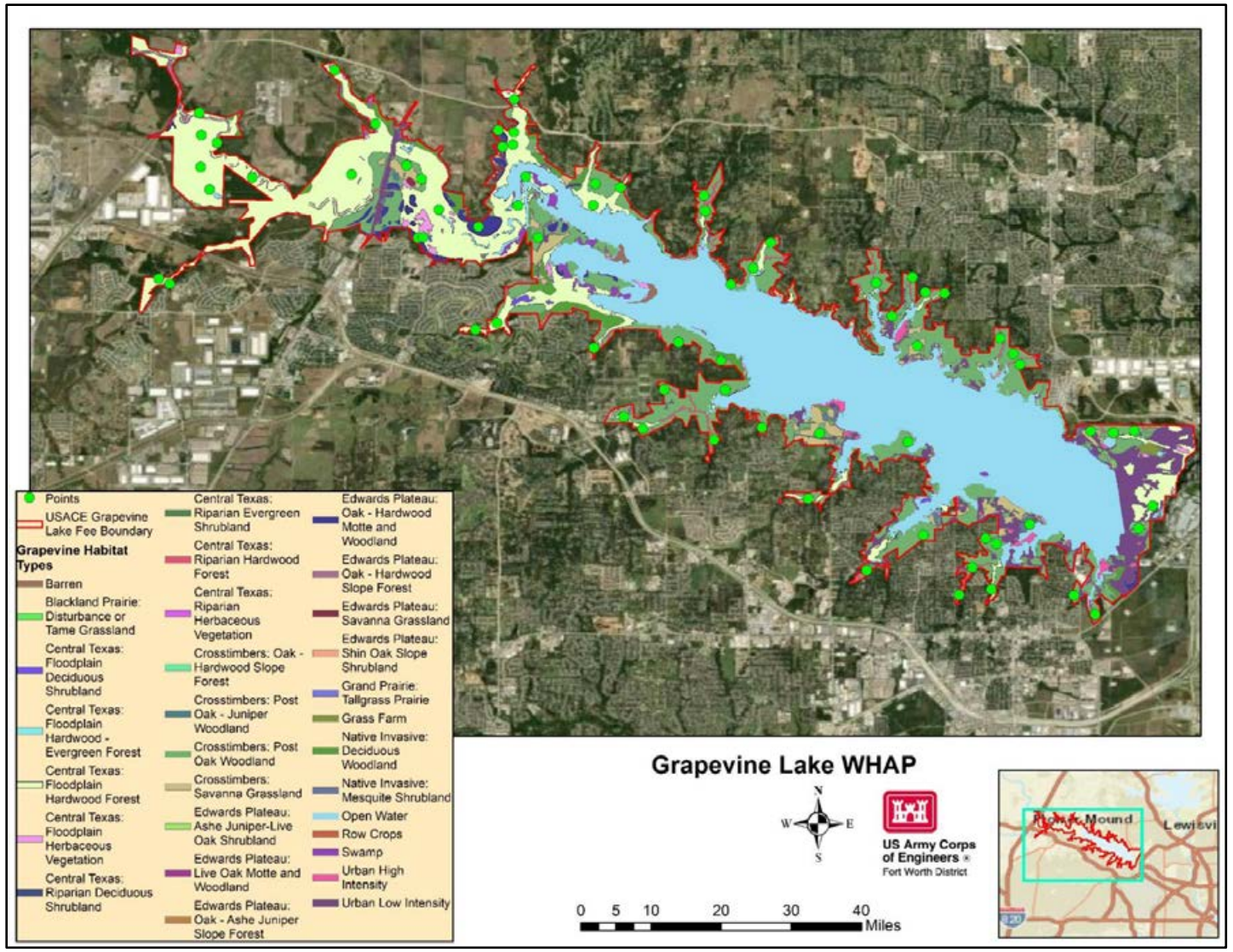

Figure 5. Distribution of Habitat Types within the Fee Owned Boundary at Grapevine Lake

5. Results and Discussion

The total habitat score for each point surveyed is a representation of multiple habitat attributes including vegetative diversity and structure, site soil potential, successional stage, and uniqueness of that habitat across the landscape. Data analysis highlights are discussed below, while detailed data for each point surveyed can be found in Attachment A: Grapevine Lake WHAP Summary Results of this report.

Upland forest (27 sampled) and riparian/BHF (23 sampled) were the most abundant habitat types surveyed. Upland forest scores ranged from 0.48 to 0.77 while riparian/BHF scores ranged from 0.47 to 0.90. The lower minimum scores, especially for these normally drier upland habitats, may be partly due to long-term flooding that occurred at Grapevine Lake in recent years, thus leading to reduced plant diversity. Flooding at lower elevations in the flood pool of Grapevine Lake almost certainly led to mortality of the typically upland species of herbaceous plant growth. This certainly affected survey metrics within the inundated areas. Long-term flooding of federal lands is a routine occurrence at typical USACE lakes having a primary mission of flood risk reduction.

The average, maximum, and minimum total scores observed for each habitat type surveyed are shown in Table 3.

Table 3. Average, Minimum, and Maximum Scores per Habitat Type

Habitat Type	Average Total Score	Maximum Total Score	Minimum Total Score
Marsh	0.82	0.82	0.82
Riparian/BHF	0.65	0.90	0.47
Upland Forest	0.61	0.77	0.48
Grassland	0.79	0.92	0.64

Figures 6, 7, and 8 show the range of total scores for all points surveyed (56 sampled) as well as the 13 additional points that were skipped due to inaccessibility or multiple points occurring in the same area. Skipped points show a total score of 0 in Figures 6,7, and 8. Overall, grassland and upland forest habitats exhibited the highest average total score (0.80 and 0.65), marsh was excluded because there was only one point classified under this habitat condition. The difference between Upland Forest and Riparian/BHF is that the Average Total Score is 0.04. With such a close margin, these two habitats are equal in value. This could be attributed to the fact they scored on average very similar values for all the scoring components.

Figure 6. Total Score Range for All Points Surveyed on the Western Boundary of Grapevine Lake

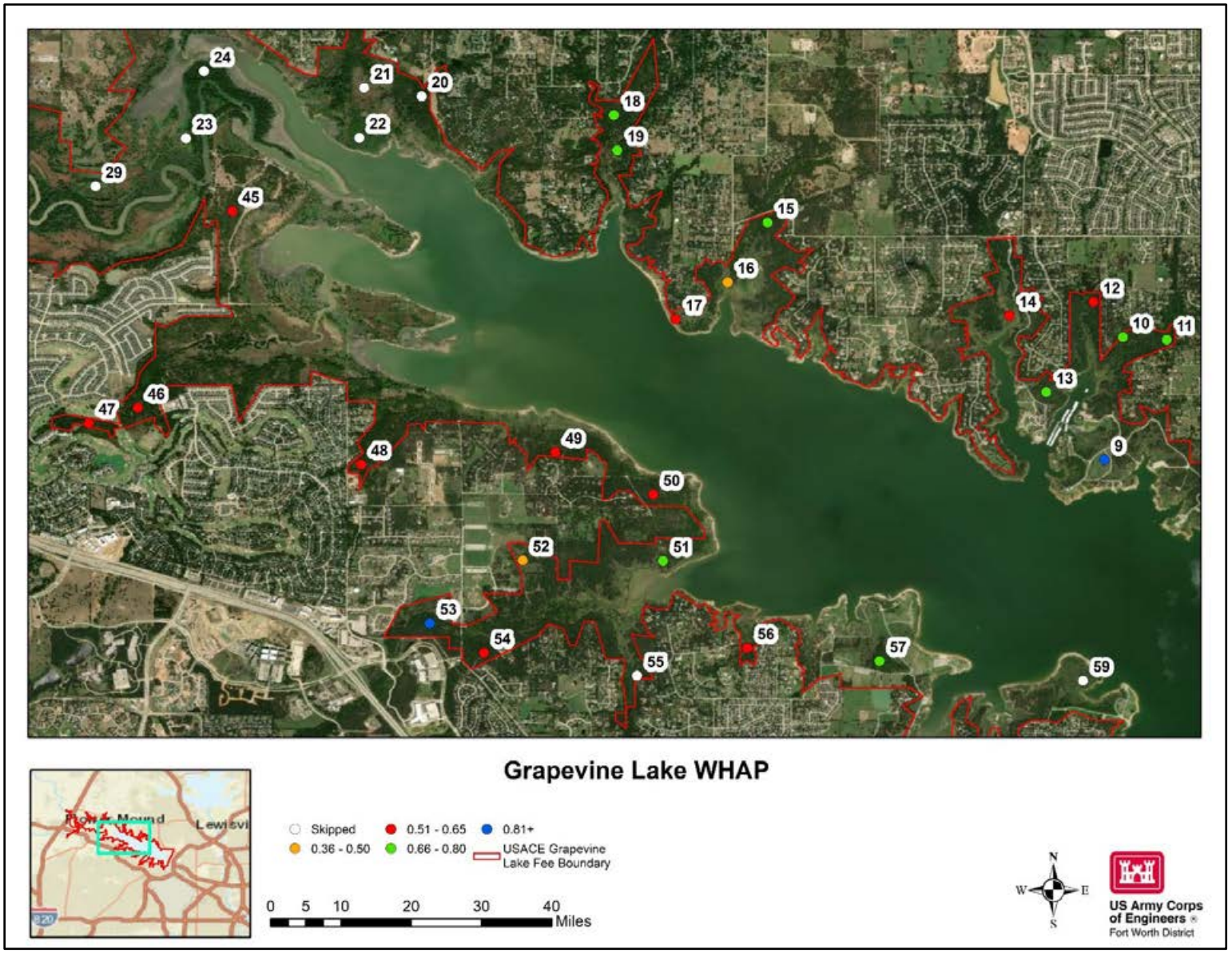

Figure 7. Total Score Range for All Points Surveyed within the Center of Grapevine Lake

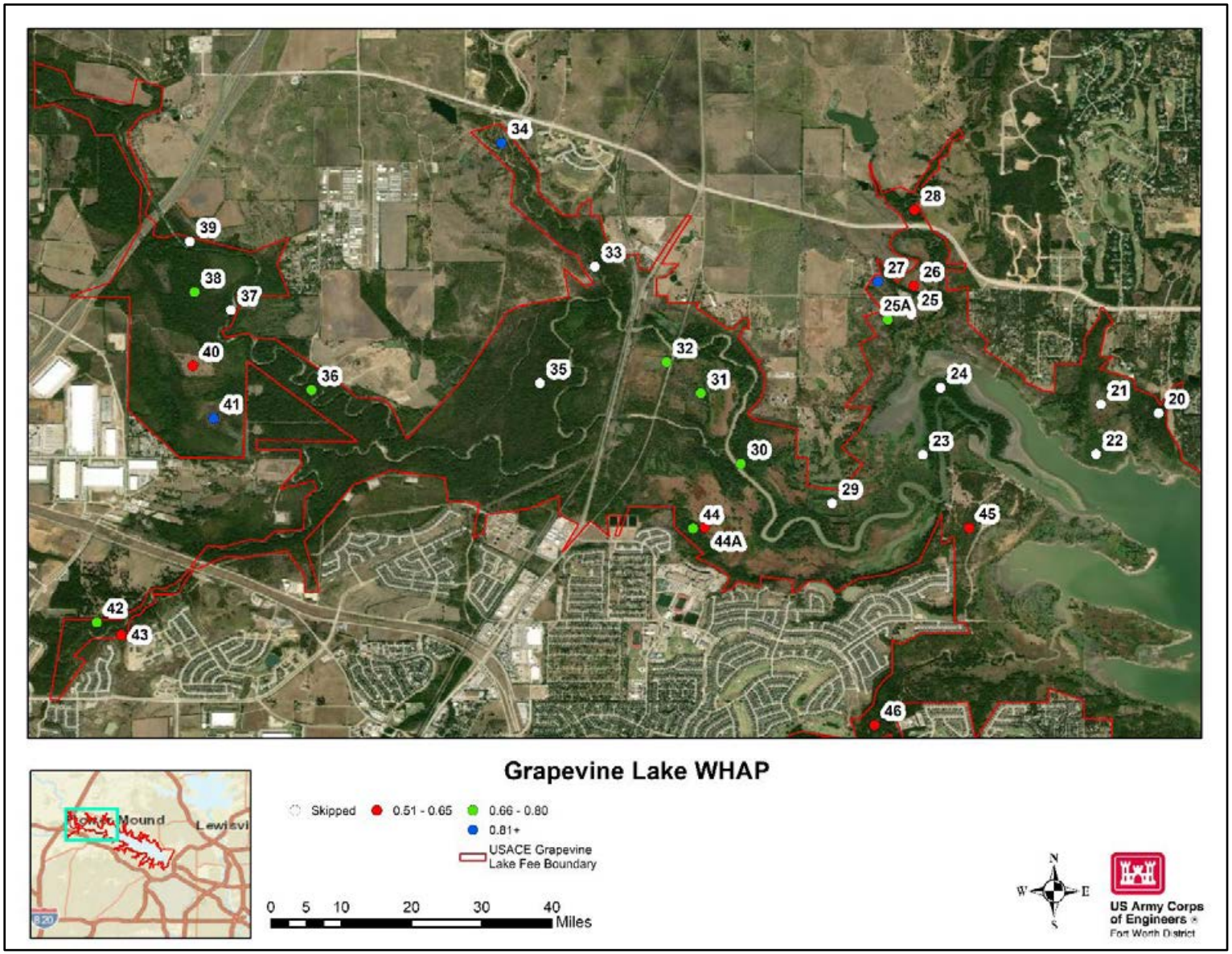

Figure 8. Total Score Range for All Points Surveyed on the Eastern Boundary of Grapevine Lake

Beyond vegetative diversity, the three major metrics within the WHAP scoring criteria that allocate points are for site potential, successional stage, and uniqueness and relative abundance. Table 4shows these metrics' average score per habitat type.

Table 4. Average Site Potential, Successional Stage, and Uniqueness and Relative Abundance Scores per Habitat Type

Habitat Type	Average Site Potential	Average Successional Stage	Average Uniqueness and Relative Abundance
Marsh	25.00	10.00	15.00
Riparian/BHF	20.65	10.00	11.25
Upland Forest	10.89	8.22	10.00
Grassland	12.00	9.20	9.00

Site potential allocates more points based on soil substrates characteristics and hydrologic connectivity that can support hydrophytic habitats, such as marshes, swamps, and bottomland hardwood forests that are often considered to be higher quality, more diverse habitat. This allows areas to score higher even though a recent disturbance, such as fire or flood, may have removed most of the vegetation. Areas scoring high in site potential but low in other metrics can be targeted for management efforts as these areas' vegetation community response should be favorable, thus increasing habitat value.

Successional stage refers to the age of the vegetative community. Older, mature forests and climax prairies, score higher than younger pole stands or disturbed grasslands because they provide more diverse forage, cover, and niche habitats. These scores are expected to increase across the habitats, except in areas that may not have the soil types to support hydrophytic vegetation or are flooded frequently enough to limit upland forest or grassland growth and development.

Uniqueness and Relative Abundance takes into consideration the rarity of a habitat or vegetative community and its abundance in the region. Ongoing urban expansion has significantly influenced the region's remaining habitat composition. Few large, contiguous patches of habitat remain within the DFW metroplex.

Grapevine Lake and the surrounding terrestrial habitat represents one of the remaining patches that have become less abundant across the region. As urban development continues, the remaining habitat at Grapevine Lake will likely increase in overall wildlife value and uniqueness. Figure 9 displays the areas with the maxed out Uniqueness and Relative Abundance criteria. Based on this figure, one area was identified as having the most unique and rare habitats, land west SGSA Bob Jones Softball Fields in Southlake, Texas.

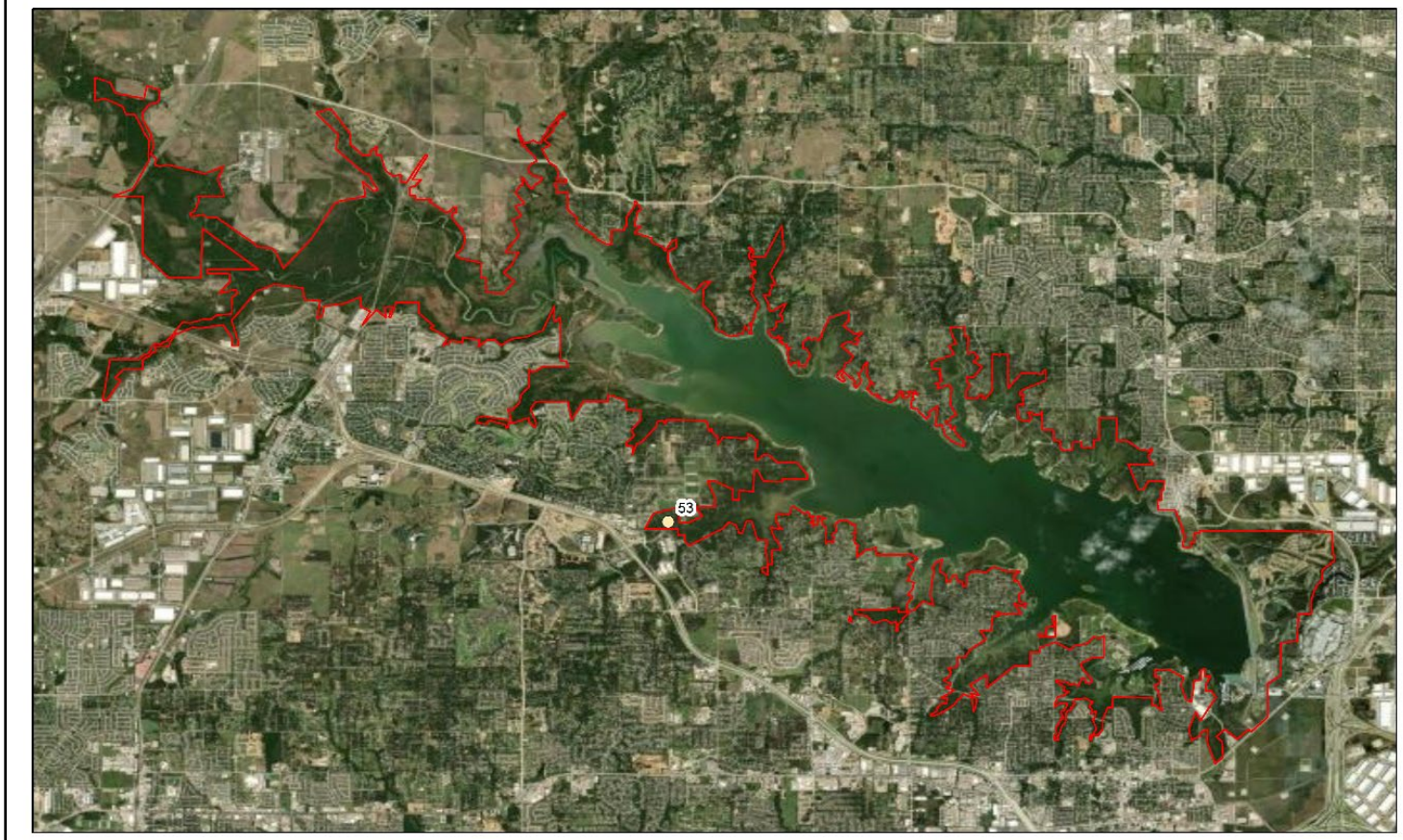

Figure 9. All Sites with Maxed Out Uniqueness and Relative Abundance

The drastic drainage patterns of Grapevine Lake has a major impact on individual point final scores and habitat occurrence, which can be seen with points 53 & 54, 4 & 3, 7 & 8, and 42 & 43. These points are close to one another but because one point lies within an area that floods more than another from a nearby stream, it gets a higher site potential score than the one that is out of the flood zone. However; if the flooding is infrequent and inconsistent, like what is seen in points 44A, 40, and 63, then mature vegetative communities will never have the opportunity to be established.

In total, three points (27, 34, and 53) surveyed received a score over 0.90 indicating very high quality habitat (Figure 10). Points 27 and 34 represent grassland habitat while point 53 represents riparian habitat. All three received the maximum scores for site potential and successional stage criteria which can also be seen in Figures 11 and 12.

In summary, combining the WHAP analytical analysis, continued urban development, and spatial distribution of higher scoring points, three areas were identified as having higher quality in relation to the remaining lands administered by USACE at Grapevine Lake. The two areas include land west of Trophy Club Park, and land around Twin Coves Marina. However; if Figures 6,7, and 8 WHAP Total Scores are compared to Figure 11 WHAP Maxed Out Site Potential, the areas around the golf course, and between Denton Creek and Schooling Rd in Roanoke, Texas have the greatest potential for improvement.

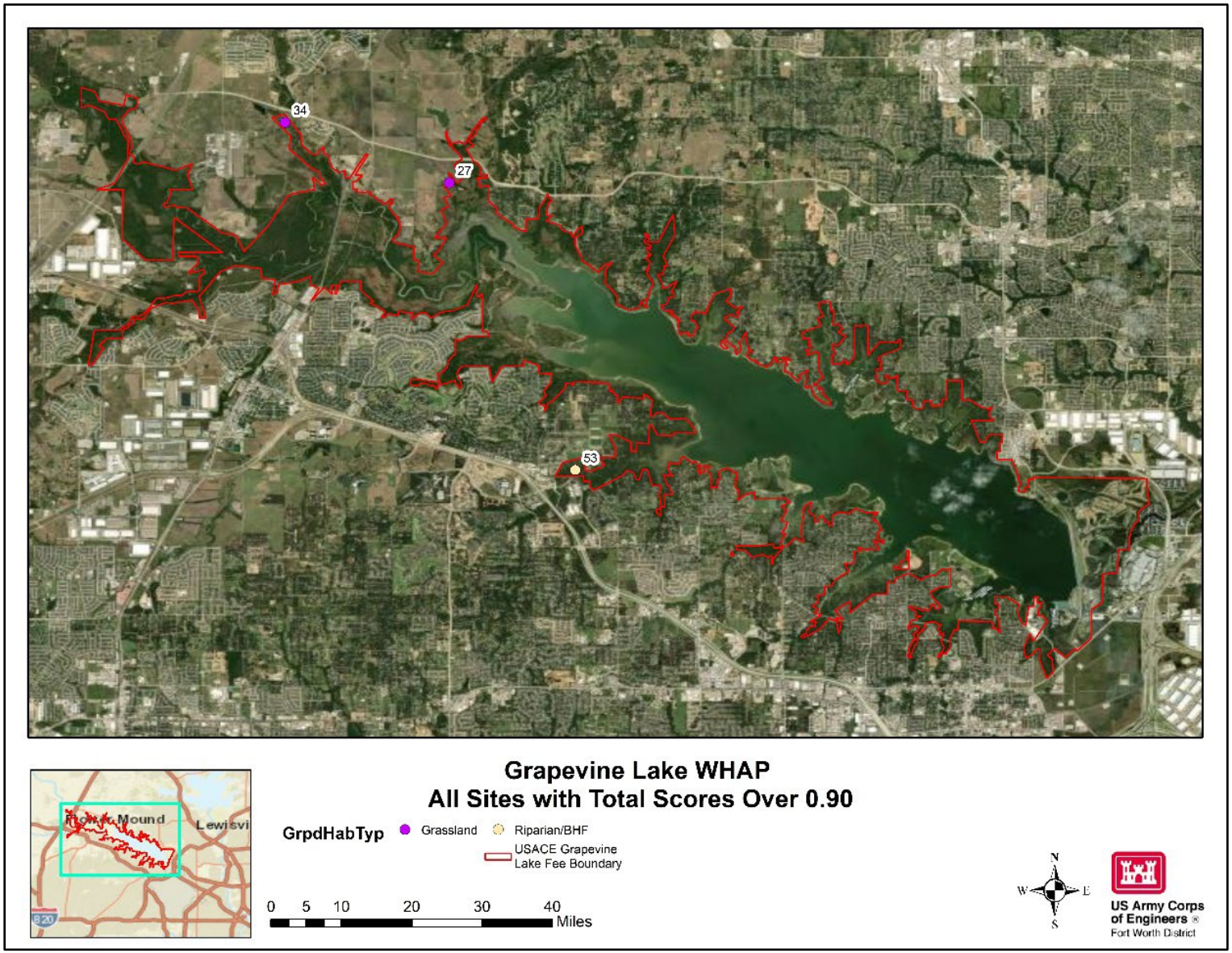

Figure 10. All Sites with Total Scores over 0.90

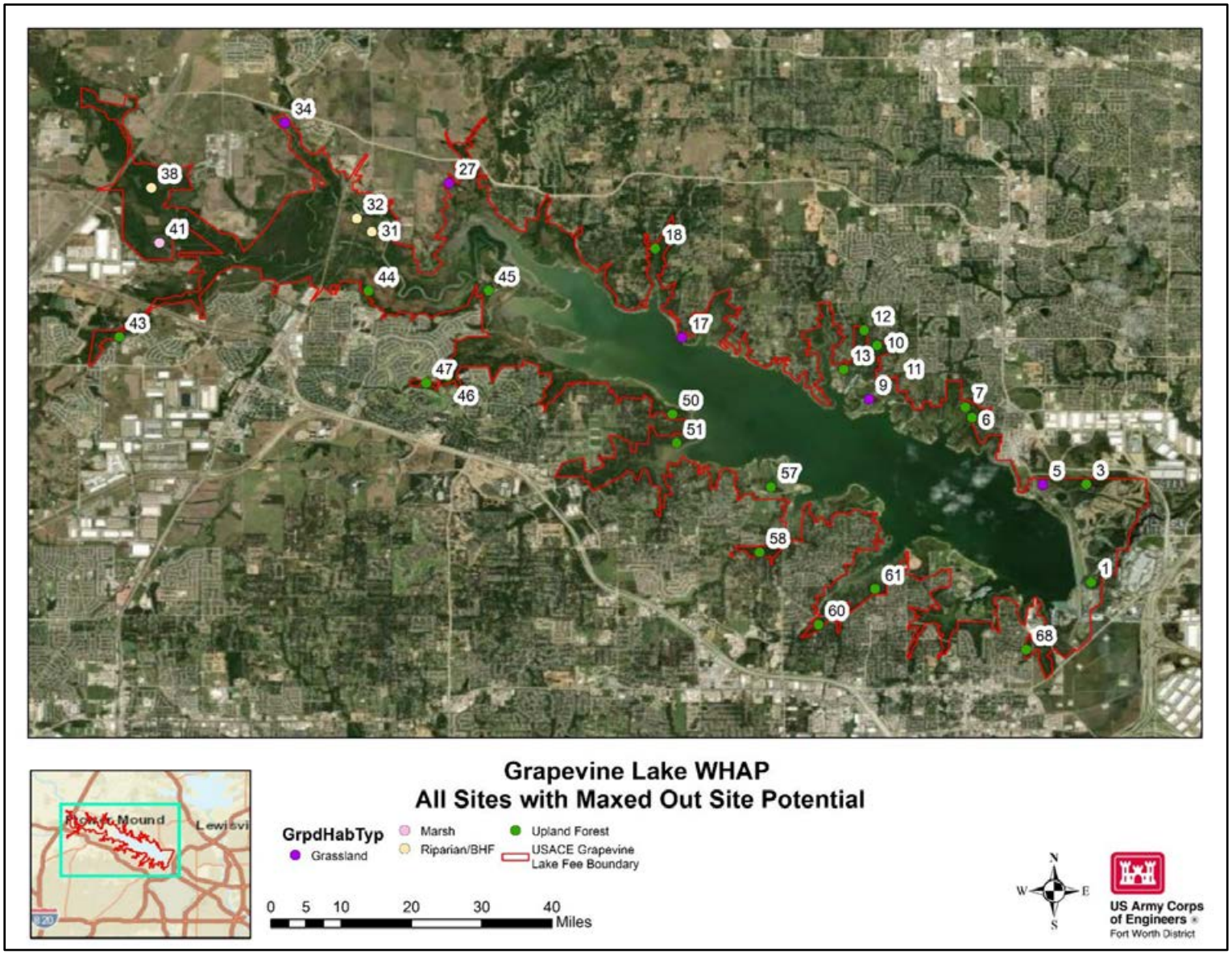

Figure 11. All Sites with Maxed Out Site Potential

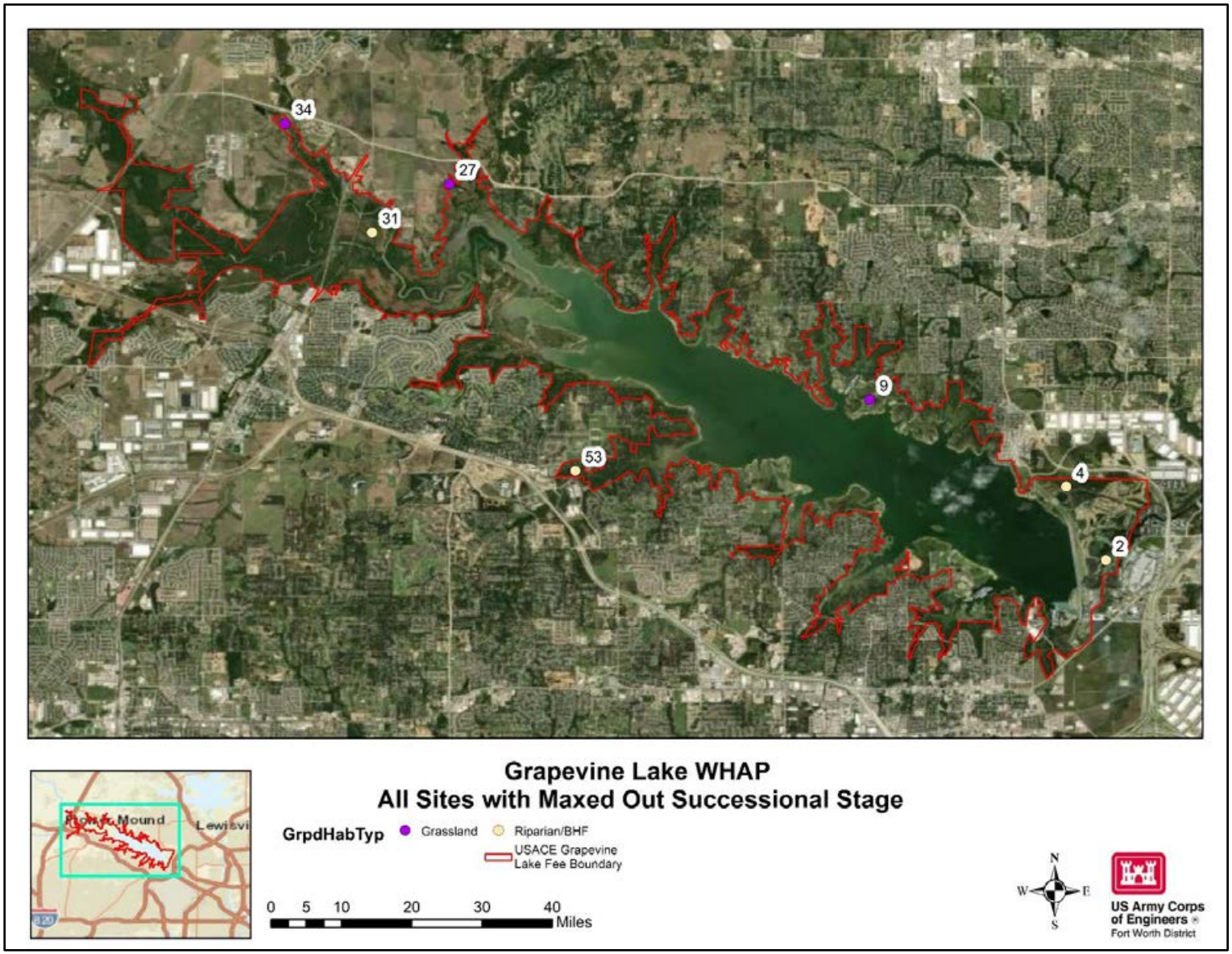

Figure 42. All Sites with Maxed Out Successional Stage

6. Recommendations

Even with planned and unplanned disturbances, there are numerous areas of valuable wildlife habitat remaining on USACE fee owned property at Grapevine Lake.

Overall, habitat management has proven effective in maintaining medium- to high-quality wildlife habitat on USACE lands at Grapevine Lake.

Based on the results of the WHAP survey efforts, areas to consider for Wildlife Management or Environmentally Sensitive Areas land classifications include those areas with highest maximum scores. The planning team for the Grapevine Lake Master Plan revision will take into account the WHAP scores when making land classification decision.

7. References

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Attachment A: Grapevine Lake WHAP Results Summary

Point Number	Habitat Type	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
1	Upland Forest	0.59	Smilax spec., Coral Berry, Gum Bumelia, Mulberry	NA	Post Oak	NA	Cedar Elm, Texas Ash	Eastern Redcedar	NA	NA	spec., Wood Sorrel, Dandelion	NA
2	Riparian /BHF	0.79	Smilax spec.x 2, Grape Vine, Chinaberry, Mulberry, Sugarberry, Poison Ivy, Carolina Buckthorn	NA	Shumard Oak,	NA	Green Ash, Box Elder, American Elm	NA	American Sycamore	Cottonwood	Virginia Wild Rye, Beggar's-lice, Cyperus spec.,	NA
3	Upland Forest	0.51	Privet, Smilax, Coral Berry, Grape Vine	NA	Post Oak	NA	Ash, Cedar Elm	NA	NA	Prickly Pear	Carex spec., Scribner Panicum, Aster spec., Hairy Pinweed, Ruellia	Thick Smilax
4	Riparian /BHF	0.82	Hackberry, Privet, Mulberry, Grape Vine, Virginia Creeper,	NA	Post Oak, Shumard Oak	NA	Green Ash,	Eastern Redcedar	NA	NA	Inland Sea Oats, Beggar's-lice, Wild Lettuce, Virginia Wild Rye, Fern	NA
5	Grassland	0.64	Bradford Pear, Virginia Creeper,	NA	Post Oak	NA	Cedar Elm	NA	NA	NA	Beebalm, Black Eyed Susan, Pinweed, Vervain, Camphorweed, Canary Grass, Meadow Pink, Western Ragweed, Texas Winter Grass, Threeawn	NA
6	Upland Forest	0.69	Dewberry, Smilax spec, Coral Berry, Yaupon Holly, Hackberry	Mimosa spec., Eve's Necklace	Post Oak	NA	Cedar Elm	NA	NA	NA	Giant Ragweed, Carex spec., Inland Sea Oats, Parsley spec.,	NA
7	Upland Forest	0.67	Smilax spec., Chineses Privet, Hackberry, Dewberry	NA	Post Oak, Blackjack Oak	Black Hickory	American El	Eastern Redcedar	NA	NA	Wood Sorrel, Wild Onion, Wild Lettuce, Virginia Wild Rye, Sedge Spec., Carex spec., Scribner Panicum, Parsley, Germander	NA
8	Riparian /BHF	0.65	Poison Ivy, Smilax spec., De	Honey Locus	NA	Pecan	American El	NA	NA	NA	Allium spec., Cypress spec.	NA
9	Grassland	0.85	Sensitive Briar,	NA	NA	NA	NA	NA	NA	NA	Aster spec., Little Barley, Cyperus spec., Black Eyed Susan, American Basketflower, Beebalm, Western Ragweed, Green Milkweed, Germander, Threeawn, Indian Blanket, unknown herb, Indian Blacket, Gay Feather, Skeletonplant, Sawleaf Daisy, Camphor Weed, Vervain, Frogfruit, Snow on the Prairie, Scribner Panicum, Vervain, King Ranch	NA
10	Upland Forest	0.69	Chinese Privet, Mulberry, Smilax spec., Dewberry, Gum Bumelia, Virginia Creeper,	NA	Post Oak	NA	Cedar Elm,	NA	NA	NA	Carex spec., Beggar's-lice, Virginia Wild Rye, Inland Sea Oats	NA
11	Upland Forest	0.66	Poison Ivy, Smilax spec. X 2, Coral Berry, Gum Bumelia, Mexican Plum, Virginia Creeper,	NA	Post Oak, Blackjack Oak	NA	Cedar Elm, Ash	Eastern Redcedar	NA	NA	Helianthus spec., Virginia Wild Rye, Carex spec., Beggar's-lice, Wood Sorrel, Scribner Panicum,	NA
12	Upland Forest	0.61	Smilax spec., Mulberry, Chinese Privet, Coral Berry, Gum Bumelia, Carolina Buckthorn, Nandina, Virginia Creeper,	NA	Post Oak	NA	Ash, Cedar Elm, American Elm	Eastern Redcedar	NA	NA	Carex spec., Beggar's-lice, Purple Top, Wild Lettuce	NA

Point Number	Habitat Type	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
13	Upland Forest	0.66	Mexican Plum, Coral Berry, Gum Bumelia, Smilax spec	NA	Blackjack Oak, Post Oak	Black Hickory	Ash, Cedar Elm	NA	NA	NA	Carex, Helianthus spec., Scribners Panicum, Woodsorrel, Virginia Wild Rye, Silver Bluestem, Wild Lettuce, Inland Sea Oats	NA
14	Upland Forest	0.63	Smilax spec., Poison Ivy, Grape Vine, Yaupon	NA	Post Oak	NA	Ash, Cedar Elm, American Elm	NA	NA	NA	Inland Sea Oats, Canadian Wild Rye, Carex Spec., Beebalm, Germander, Beggar's-lice, Sedge spec., Parsley spec.,	NA
15	Riparian /BHF	0.66	Smilax spec. X 2, Hackberry, Poison Ivy, Passion Vine, Virginia Creeper,	Fourvalve Mimosa	Post Oak	Black Hickory	American Elm, Cedar Elm, Ash	NA	NA	NA	Germander, Virginia Wild Rye, Carex spec., Inland Sea Oats, Phyllanthus spec., Beggar's-lice, Johnson Grass,	NA
16	Riparian /BHF	0.50	Smilax spec., Dewberry, Passion Vine	NA	NA	NA	NA	NA	NA	Buttonbush	Queen Anne's Lace, Butterfly Pea, Klein Grass, Kleingrass, Texas Dandelion, Blue Eyed Susan, Johnson Grass, Grassleaf Rush, Croton spec., Germander, Western Ragweed, Heller's Rosette Grass	NA
17	Grassland	0.64	Soapberry, Wild Grape,Privet, Smilax	NA	NA	NA	NA	NA	NA	NA	Woodsorrel, Poinsettia, Germander, Beebalm, Mexican Hat, Virginia Wild Rye, Texas Bull Nettle, Rescue Grass, Day Flower	NA
18	Upland Forest	0.77	Gum Bumelia,Yaupon, Soapberry, Smilax spec., Hackberry, Poison Ivy, Passion Vine	NA	NA	NA	Ash, Cedar Elm, American Elm	NA	NA	Cottonwood	Carex spec., Parsley spec., Germander, Woodsorrel, Day Flower, Inland Sea Oats, Beggar's-lice, Scribner Panicum, Virginia Wild Rye, Giant Ragweed	NA
19	Riparian /BHF	0.66	Dewberry, Smilax, Wild Grape, Pasision Vine	Honey Locust, Mimosa	NA	Black Hickory	American Elm	NA	NA	Cottonwood	Carex spec., Cockleburr, Cyperus spec	NA
20	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
21	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
22	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
23	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
24	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
25	with 25a	0.00	replaced with 25a	replaced with 25a	replaced w	replaced w	replaced wit	replaced with	replaced with 2	replaced with 25	replaced with 25a	replaced with 25a
25A	Riparian /BHF	0.70	Mustang Grape, Muscadine Grape, Smilax Spec., China Berry, Poison Ivy, Tooth Ache Tree, Passion Vine, Blackgum, Gum Bumelia, Virginia Creeper,	Honey Locust	NA	Pecan	Cedar Elm	NA	NA	Buttonbush,	Virginia Wild Rye, Basketflower, Ragweed, Carex Spec., Wild Parsley, Germander, Rescue Grass, Fiddle Dcok, Giant Ragweed, Beggar's-lice	Recreational through, creek nearby
26	Riparian /BHF	0.54	Balloon Vine	Black Locust, Sensitive Pea	NA	NA	NA	NA	NA	Buttonbush	Giant Ragweed, Cockleburr, Johnson Grass, unknown herb	Periodically flooded,saw a fawn, extensive invasives

Point Number	Habitat Type	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
27	Grassland	0.92	Smilax spec., unknown berrry, Blackgum	Sensitive Pea,Honey Locust	NA	NA	Green Ash, Cedar Elm	Eastern Redcedar	NA	Prickly Pear	Blanket, Little Bluestem, Texas Star, Western Ragweed, Germander, Common Yarrow, Indian Paintbrush, Scutellaria, Aster Spec., Rescue Grass, Wild Petunia, Oneseed Croton, Trailing Krameria, Blazing Star, Japanese Brome, Drummond Skullcap,	NA
28	Riparian /BHF	0.61	Hackberry, Poison Ivy, Poison Oak, Mustang Grape, Smilax spec., Chinese Privet, Dewberry, Gum Bumelia, Blackgum, Virginia Creeper,	Black Locust	Southern Red Oak	Pecan	American Elm, White Ash	NA	NA	NA	Virginia Wild Rye, Smilax spec., Beggar's-lice, Carex spec., unknown herb	NA
29	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	NA
30	Riparian /BHF	0.67	Hackberry, Yaupon, Dewberry, Smilax spec, Trumpet Vine	Honey Locust	NA	Pecan	Green Ash, Cedar Elm, American Elm,	NA	NA	Buttonbush, Cottonwood	Cyperus spec., Cocklebur, Germander, Giant Ragweed, Carex spec., Smartweed	NA
31	Riparian /BHF	0.76	NA	NA	NA	NA	Green Ash, Box Elder, American	NA	NA	Cottonwood	Cockleburr, unknown forb, Carex Spec.,	NA
32	Riparian /BHF	0.66	Smilax spec., Wild Grape, Hackberry, Dewberry, Soapberry	Honey Locust	NA	Black Walnut	Green Ash, Cedar Elm, American Elm,	NA	NA	Buttonbush	Sumpweed, Johnson Grass, Trumpet Vine, Carex spec., Mexican Hat, Cockleburr, Potato Vine, Bermuda Grass, Frogfruit, Paspalum spec., Setaria spec.,	NA
33	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
34	Grassland	0.90	NA	Honey Locust, Sensitive Briar	NA	NA	Cedar Elm	NA	NA	Prickly, Pear Cactus Buttonbush	Noseburn, Japanese Brome, Verbena Spec, Western Ragweed, unknown herb x 2, Japanese Brome, Carex sp., Basketflower, Beebalm, Silverleaf Nightshade, Virginia Wild Rye, Fleabane, Wood Sorrel, Texas Aster, Texas Speargrass, Maximilian Sunflower, Vervain, Snow on the Prairie	NA
35	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
36	Riparian /BHF	0.69	Chinaberry, Chinese Privet, Hackberry, Poison Ivy, Smilax spec. x2, Mulberry, Poison Oak, American Beautyberry, Gum Bumelia, Blackgum, Virginia Creeper,	NA	Bur Oak	Pecan	Green Ash, Cedar Elm	NA	NA	NA	Canadian Wild Rye, Inland Sea Oats, Verbena, Pokeweed, Roge Palnt, Vetch	Privet heavy
37	combined into 38	0.00	combined into 38	combined into 38	combined into 38	combined into 38	combined into 38	combined into 38	combined into 38	combined into 38	combined into 38	combined into 38

Point Number	Habitat Type	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
38	Riparian /BHF	0.77	Chinaberry, Coral Berry, Smilax X 2, Chinese Privet, Yaupon Holly, Osage Orange, Mexican Plum, Gum Bumelia, Blackgum, Virginia Creeper,	Eastern Redbud, Legume spec.,	NA	Pecan,	Green Ash, Cedar Elm,	NA	NA	NA	Virginia Wild Rye, Inland Sea Oats, Snakeroot,	NA
39	combined into 37	0.00	combined into 38	combined into 38	combined i	combined	combined in	combined into	combined into 3	combined into 38	combined into 38	combined into 38
40	Riparian /BHF	0.63	Poison Ivy, Hackberry,	Black Locust, Legume spec. x2, Honey Locust	Shumard Oak, Southern Red Oak	Pecan, Pignut Hickory, Chinkapin Oak	Cedar Elm,	Eastern Redcedar	NA	NA	Gumweed, Indian Hemp, Johnson Grass, Beggar's-lice, Standing Cypress, Indian Blanket, Texas Thistle, Yarrow, Virginia Wild Rye, Texas Prairie Parsley, Basketflower, Ironweed, Beebalm, Ironweed, Aster spec. x 2, Carex spec., Antelope Horn, Tick Trefoil,	Former mitigation site
41	Marsh	0.82	Hackberry, Privet spec.,	Black Locust	NA	NA	Cedar Elm,	NA	NA	Willow spec., Buttonbush	Pickerelweed, Cockleburr, Nutsedge, Water Hyssop, Rumex spec., Giant Ragweed, Texas Thistle, Alligator Weed, Ironweed, Gumweed	Wetland mitigation site
42	Riparian /BHF	0.71	Smilax spec. x2 , Virginia Creeper, Roughleaf Dogwood, Dewberry, Soapberry, Chinaberry, Coral Vine	NA	Red Oak	Pecan,	American Elm, Ash, Cedar Elm,	NA	NA	NA	Inland Sea Oats, Canadian Wild Rye, Frost Weed, Sedgw spec., Golden Rod, Pokeweed	NA
43	Upland Forest	0.64	Coral Berry, Privet, Box Elder, Possumhaw Holly, Smilax spec., unknown berry, Roughleaf Dogwood, Hackberry, American Beautyberry, China Berry, Virginia Creeper,	Honey Locust, Sensitive Briar	NA	NA	Green Ash, Cedar Elm	Eastern Redcedar	NA	Prickly Pear	Little Bluestem, Carex spec., Inland Sea Oats, Sow Thistle, Indian Blanket, Texas Aster, Threeseed Croton	NA
44	Upland Forest	0.67	Roughleaf Dogwood, Poison Sumac, Smilax spec., Muscadine, Poison Ivy, Osage Orange, Gum Bumelia	Sensitive Briar, Deer Pea,	Southern Red Oak, Shumard Oak,	Pecan	Green Ash, Cedar Elm, American Elm,	Eastern Redcedar	NA	Prickly Pear,	Maximilian Sunflower, Texas Aster, Wild Plantain, Threeseed Croton, Cnidoscolus spec., grass spec., Netted Chain Fern	NA
44A	Riparian /BHF	0.58	Chinese Privet, Balloon Vine	Black Locust	NA	NA	Green Ash, Cedar Elm	NA	NA	Willow Sp, Cottonwood, Buttonbush	Cockleburr, Carex spec., Morning Glory, Smartweed	Old mitigation site
45	Upland Forest	0.62	Dewberry, Smilax spec, Virginia Creeper,	Lespedeza, Sensitive Briar	NA	NA	Green Ash, Cedar Elm	Eastern Redcedar	NA	Buttonbush	Queen Anne's Lace, Germander, Coreopsis, Texas Star, Texas Aster, Wild Parsley, Thistles Spec., Beggar's-lice, Scribner Panicum, St John Wart, Sedge spec., Threeseed Croton	close to disk golf course

Point Number	Habitat Type	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
46	Upland Forest	0.55	2, Mustang Grape, Decidious Holly, Osage Orange, Soap Berry, Roughleaf Dogwood, Passion Vine, Virginia Creeper,	NA	NA	Mockernut, Pecan	Cedar Elm, American Elm	Eastern Redcedar	NA	NA	Sedge spec., Inland Sea Oats,	NA
47	Upland Forest	0.59	Privet, Tallow, Smilax, Hackberry, Sorrelvine, Virginia Creeper,	Eastern Redbud	NA	NA	Cedar Elm, Ash	Eastern Redcedar	NA	NA	Elbow Bush, Soapberry, Inland Sea Oats, Sedge spec., Germander, Virginia Wild Rye, Oxalis	NA
48	Riparian /BHF	0.62	Coral Berry, Smilax spec., Yaupon Holly, Privet, Honeysuckle, Hackberry, Mustang Grape, Mulberry, Heavenly Bamboo,	Honey Locust	White Oak	Walnut	Ash, Cedar Elm	NA	NA	NA	Virginia Wild Rye, Sedge, Snakeroot, Germander, Sunflower	NA
49	Riparian /BHF	0.59	Smilax spec.	Honey Locust,	NA	NA	Cedar Elm, Green Ash	NA	NA	Buttonbush	Germander, Scribner Panicum, Cockleburr, Scirpus spec., Threeawn, Cyperus spec., unknown herb, Carex spec., Bermuda grass	NA
50	Upland Forest	0.64	Smilax, Poison Sumac, Poison Ivy, Coral Berry, Dew Berry, Virginia Creeper, Gum Bumelia	NA	Blackjack Oak, Post Oak	NA	Ash, Cedar Elm	Eastern Redcedar	NA	Moss	Elbow Bush, Yarrow, Sedge Spec., Unknown Grass, Virginia Wild Rye, Sporobolus spec.,	NA
51	Upland Forest	0.68	Smilax spec., Yaupon, Gum Bumelia, Wild Grape, Hackberry, Dewberry, Passion Vine	NA	Post Oak	NA	Cedar Elm	Eastern Redcedar	NA	NA	Scribner Panicum, Juncus spec., Canadian Wild Rye, Carex spec., Boneset, Inland Sea Oats, Beggar's-lice, Germander, Helianthus spec., Aster spec., Wild Parsley, Beebalm, Butterfly Pea	NA
52	Upland Forest	0.48	Gum Bumelia,	Honey Mesquite	White Oak	NA	Cedar Elm	Eastern Redcedar	NA	NA	Croton spec, Antelope Horn, Meadow Pink, Brome spec., Hedgenettle, Thistle spec., Western Ragweed, Catclaw Mimosa, Rosette Grass	NA
53	Riparian /BHF	0.90	Privet, American Beautyberry, Mulberry, Yaupon, Dewberry, Hackberry, Coral Berry, Basswood, Virginia Creeper,	Eastern Redbud, Honey Locust	Post Oak, Blackjack Oak	Pecan,	American Elm, Cedar Elm,	Eastern Redcedar	NA	NA	Virginia Wild Rye, Nandina, Sedge Spec., Black Snakeroot, American Pokeweed, Panicum spec., Angel Pod, Frostweed	NA
54	Upland Forest	0.51	Poison Ivy, Smilax spec., Coral Berry, Passion Vine, Peppervine, Viburnum spec., Hawthorne, Nandina, Virginia Creeper,	Eastern Redbud	Post Oak	Chinese Pistache	Cedar Elm, Ash	Eastern Redcedar	NA	NA	Inland Sea Oats, Sun Flower, Sedge Spec., Germander, Snake Root, Green Dragon, Milk Weed, Bed Straw, Fern	NA
55	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
56	Upland Forest	0.55	Smilax spec. X 2, Gum Bumelia, Hackberry, Mulberry, Passion Vine, Hackberry, Privet, Pokeweed	Honey Locust	NA	NA	NA	NA	NA	NA	Grass, Germander, Canadian Wild Rye, Bermuda Grass, Oxalis, Sedge spec., Prickly Lettuce, Croton spec., Boneset	NA

Point Number	Habitat Type	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
57	Upland Forest	0.66	Hackberry, Smilax Spec.X 2, Laurel Cherry , Poison Ivy, Gum Bumelia, Yaupon Holly,	Eastern Redbud, Honey Locust, Eve's Necklace	Post Oak	Pecan	Cedar Elm	NA	NA	NA	Sedge. Virginia Wild Rye, Snakeroot	NA
58	Upland Forest	0.69	Red Mulberry, Smilax spec X 2, Coral Berry, Soapberry, Gum Bumelia, Hackberry, Privot, Passion Vine, Coralberry, Virginia Creeper,	Honey Mesquite	White Oak	Pecan	American Elm, Cedar Elm	NA	NA	NA	Snakeroot, Germander, Sedge spec., Inland Sea Oats, Virginia Wild Rye, Frostweed, Rosette Grass, Prostrate Sandmat	NA
59	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
60	Upland Forest	0.64	Mulberry, Poison Ivy, Coral Berry, Smilax, Blackgum, Muscadine Grape, Soap Berry, Possumhaw Holly, Dewberry, Passion Vine, Virginia Creeper,	Eastern Redbud	Post Oak, Willow Oak	NA	Cedar Elm, American Elm	Eastern Redcedar	NA	NA	Beggar's-lice, Milkweed, Hedge Parsley, Sedge spec., Rosette Grass, Snakeroot	NA
61	Upland Forest	0.61	Smilax spec, Heavenly Bamboo, Coral Berry, Soapberry, Poison Ivy, Gum Bumelia, Virginia Creeper,	NA	Post Oak, Willow Oak	Chinese Pistache	Cedar Elm, Ash	Eastern Redcedar,	NA	NA	Heavenly Bamboo, Inland Sea Oats, Sedge spec., Black Eyed Susan, Germander, Yarrow, Oxalis, Croton spec., Rosette Grass, Canadian Wild Rye	NA
62	Upland Forest	0.51	Gum Bumelia, American Holly, Possumhaw Holly, Privet, Soapberry,	Mesquite, Unknown Legume	NA	Post Oak, Chinese Pistache	Ash, Cedar Elm	Eastern Redcedar	NA	Prickly Pear Cactus, Moss	Sedge spec., Little Bluestem, Fern, Plantain, Loosestrife, 2 unknowns, Rosette Grass	NA
63	Riparian /BHF	0.48	Smilax spec.X 2, Passionvine, Dewberry	Honey Locust	NA	NA	NA	NA	NA	Buttonbush	Panicum spec., Boneset, Native Cucumber, Curley	NA
64	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
65	Riparian /BHF	0.53	Smilax spec. x 2, Persimmon, Purple Passion Flower, Possumhaw Holly, Dewberry, Poison Ivy, Hackberry, Trumpet Vine	NA	NA	Pecan,	Cedar Elm,	NA	NA	Cottonwood, Buttonbush	Cockleburr, Oxalis spec., Prostrate Sandmat, Aster spec., Wild Rye, Germander	NA

Point Number	Habitat Type	Final Score	Berry Drupe	Legume Pod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
66	Riparian /BHF	0.47	Smilax spec. x 2, unknown berrry, Dewberry, Button Bush	NA	NA	NA	NA	NA	NA	Buttonbush	Cockleburr, Button Weed, Water Clover, Partridge Pea, Frogfruit, Ragweed, Bermuda Grass, Sedge Spec	NA
67	skipped	0.00	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped
68	Upland Forest	0.61	Poison Ivy, Coral Berry, Hackberry, Spicebush, Privet spec. X2, Toothache Tree, Passionvine, Smilax spec, Woolly Dutchman's Pipe, Virginia Creeper,	NA	NA	Post Oak, Chinese Pistache	Cedar Elm	Eastern Redcedar	NA	NA	Sedge spec., Beggar's-lice, Oxalis spec.,	NA
69	Upland Forest	0.48	Soapberry, Virginia Creeper, Privet X 2, Osage Orange, Smilax spec., Coral Berry, Gum Bumelia	NA	NA	NA	Cedar Elm	NA	NA	Moss	Carex spec., Canadian Wild Rye, Herb Geranium, Ground Ivy, Ground Ivy, Noseburn, Oxalis	NA

Attachment B: Grapevine Lake WHAP Point Photographs

Grapevine Lake #: 1

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 2

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 3

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 4

Facing North

Facing East

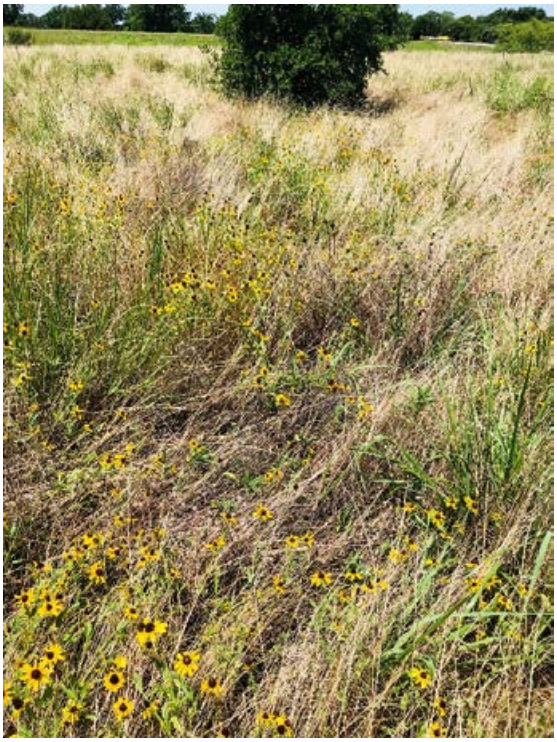
Facing South

Grapevine Lake #: 5

Facing North

Facing East

Facing West



Facing South

Grapevine Lake #: 6

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 7

Facing North

Facing East

Grapevine Lake #: 8

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 9

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 10

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 11

Facing North

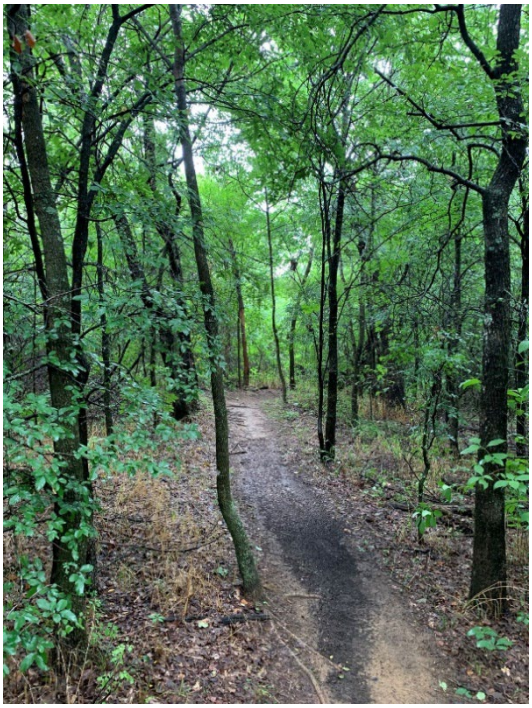
Facing East

Facing West

Facing South

Grapevine Lake #: 12

Facing North



Facing East

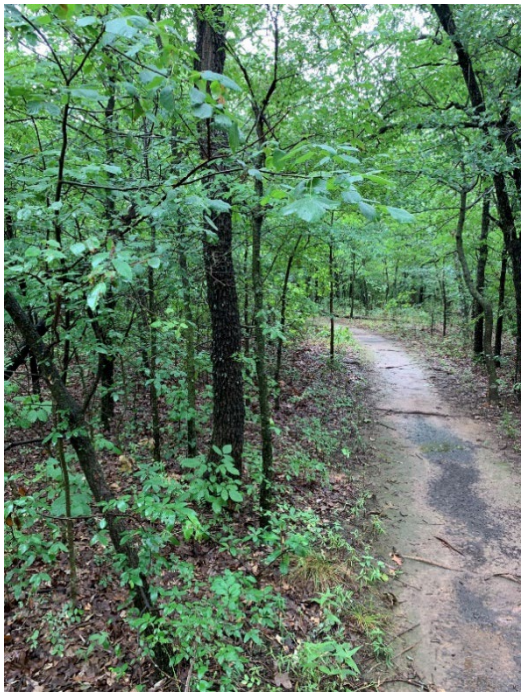
Facing West

Facing South

Grapevine Lake #: 13

Facing North

Facing East



Facing West

Facing South

Grapevine Lake #: 14

Facing North

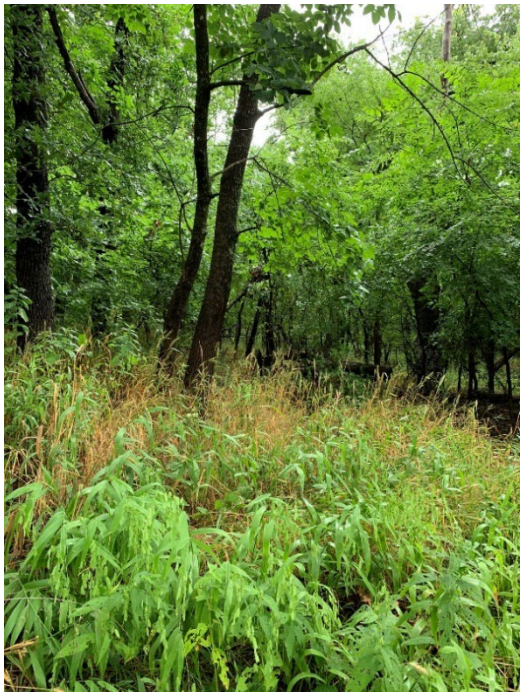
Facing East

Facing West

Facing South

Grapevine Lake #: 15

Facing North



Facing East

Facing West

Facing South

Grapevine Lake #: 16

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 17

Facing North

Facing East

Facing West

Facing South

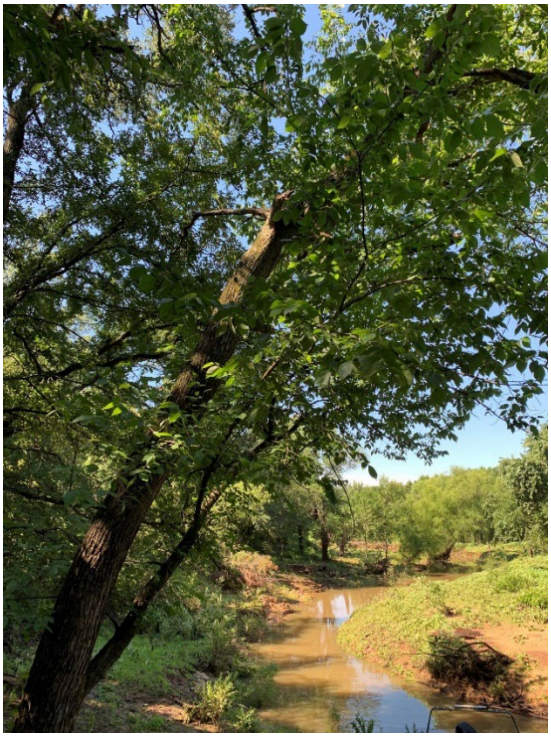
Grapevine Lake #: 18

Facing North

Facing East

Facing West

Facing South



Grapevine Lake #: 19

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 25A

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 26

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 27

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 28

Facing North

Facing East

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Facing South

Grapevine Lake #: 30

Facing North

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Grapevine Lake #: 31

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Grapevine Lake #: 32

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Grapevine Lake #: 34

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Grapevine Lake #: 36

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Grapevine Lake #: 38

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Grapevine Lake #: 40

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Grapevine Lake #: 41

Grapevine Lake #: 42

Facing North

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Facing South

Grapevine Lake #: 44

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 44a

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 45

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 46

Facing North

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Grapevine Lake #: 66

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Facing West

Facing South

Grapevine Lake #: 68

Facing North

Facing East

Facing West

Facing South

Grapevine Lake #: 69

Facing North

Facing East

Facing West

Facing South