APPENDIX C – WILDLIFE DOCUMENTS

IPaC RESOURCES REPORT – USFWS

OFFICIAL SPECIES LIST – USFWS

SGCN and Rare Species List – TPWD

WHAP Report – USACE

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Texas Coastal Ecological Services Field Office
17629 El Camino Real, Suite 211
Houston, TX 77058-3051
Phone: (281) 286-8282 Fax: (281) 488-5882

In Reply Refer To: July 20, 2023
Project Code: 2022-0081224
Project Name: Town Bluff/ Steinhagen MP 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 U.S. Fish and Wildlife Service (Service) field offices in Clear Lake, Corpus Christi, and Alamo, Texas, have combined administratively to form the Texas Coastal Ecological Services Field Office. All project related correspondence should be sent to the field office address listed below responsible for the county in which your project occurs:

Project Leader; U.S. Fish and Wildlife Service; 17629 El Camino Real Ste. 211; Houston, Texas 77058
Angelina, *Austin*, *Brazoria*, *Brazos*, *Chambers, Colorado, Fayette, Fort Bend, Freestone, Galveston, Grimes, Hardin, Harris, Houston, Jasper, Jefferson, Leon, Liberty, Limestone, Madison, Matagorda, Montgomery, Newton, Orange, Polk, Robertson, Sabine, San Augustine, San Jacinto, Trinity, Tyler, Walker, Waller, and Wharton.*

Assistant Field Supervisor, U.S. Fish and Wildlife Service; 4444 Corona Drive, Ste 215; Corpus Christi, Texas 78411
Aransas, Atascosa, Bee, Brooks, Calhoun, De Witt, Dimmit, Duval, Frio, Goliad, Gonzales, Hidalgo, Jackson, Jim Hogg, Jim Wells, Karnes, Kenedy, Kleberg, La Salle, Lavaca, Live Oak, Maverick, McMullen, Nueces, Refugio, San Patricio, Victoria, and Wilson.

U.S. Fish and Wildlife Service; Santa Ana National Wildlife Refuge; Attn: Texas Ecological Services Sub-Office; 3325 Green Jay Road, Alamo, Texas 78516
Cameron, Hidalgo, Starr, Webb, Willacy, and Zapata.

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as

amended (16 U.S.C. 1531 *et seq.*).

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 ECOS-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 ECOS-IPaC system by completing the same process used to receive the enclosed list.

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 sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

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 projects 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.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: http://www.fws.gov/media/endangered-species-consultation-handbook.

Non-Federal entities may consult under Sections 9 and 10 of the Act. Section 9 and Federal regulations prohibit the take of endangered and threatened species, respectively, without special exemption. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. “Harm” is further defined (50 CFR § 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. “Harass” is defined (50 CFR § 17.3) as intentional or negligent actions that create the likelihood of

injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Should the proposed project have the potential to take listed species, the Service recommends that the applicant develop a Habitat Conservation Plan and obtain a section 10(a)(1)(B) permit. The Habitat Conservation Planning Handbook is available at: https;//www.fws.gov/media/habitat-conservation-planning-and-incidental take-permit-processing-handbook.

Migratory Birds:
In addition to responsibilities to protect threatened and endangered species under the Act, there are additional responsibilities under the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA) to protect native birds from project-related impacts. Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). For more information regarding these Acts visit: https://www.fws.gov/program/migratory-birds.

The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. It is the responsibility of the project proponent to comply with these Acts by identifying potential impacts to migratory birds and eagles within applicable National Environmental Policy Act (NEPA) documents (when there is a federal nexus) or a Bird/Eagle Conservation Plan (when there is no federal nexus). Proponents should implement conservation measures to avoid or minimize the production of project-related stressors or minimize the exposure of birds and their resources to the project-related stressors. For more information on avian stressors and recommended conservation measures see https://www.fws.gov/birds/bird-enthusiasts/threats-to-birds.

In addition to MBTA and BGEPA, Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds*, obligates all Federal agencies that engage in or authorize activities that might affect migratory birds, to minimize those effects and encourage conservation measures that will improve bird populations. Executive Order 13186 provides for the protection of both migratory birds and migratory bird habitat.

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 Code 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
- 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:

Texas Coastal Ecological Services Field Office
17629 El Camino Real, Suite 211
Houston, TX 77058-3051
(281) 286-8282

PROJECT SUMMARY

Project Code: 2022-0081224
Project Name: Town Bluff/ Steinhagen MP Revision
Project Type: Land Management Plans - NWR
Project Description: The Town Bluff/Steinhagen Lake Master Plan (Jasper and Tyler 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 Town Bluff/Steinhagen Lake for the next 25 years.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@30.86734545,-94.20703874960213,14z

Counties: Jasper and Tyler counties, Texas

ENDANGERED SPECIES ACT SPECIES

There is a total of 9 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.

---

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. Your location does not overlap the critical habitat. This species only needs to be considered under the following conditions: ▪ Wind related projects within migratory route. Species profile: https://ecos.fws.gov/ecp/species/6039	Threatened
Red Knot *Calidris canutus rufa* There is **proposed** critical habitat for this species. This species only needs to be considered under the following conditions: ▪ Wind related projects within migratory route. Species profile: https://ecos.fws.gov/ecp/species/1864	Threatened
Red-cockaded Woodpecker *Picoides borealis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/7614	Endangered

REPTILES

NAME	STATUS
Alligator Snapping Turtle *Macrochelys temminckii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4658	Proposed Threatened

CLAMS

NAME	STATUS
Louisiana Pigtoe *Pleurobema riddellii* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/10233	Proposed Threatened
Texas Heelsplitter *Potamilus amphichaenus* There is **proposed** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/299	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

FLOWERING PLANTS

NAME	STATUS
Navasota Ladies-tresses *Spiranthes parksii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1570	Endangered
Texas Trailing Phlox *Phlox nivalis ssp. texensis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/4462	Endangered

CRITICAL HABITATS

There is 1 critical habitat wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Texas Heelsplitter *Potamilus amphichaenus* https://ecos.fws.gov/ecp/species/299#crithab	Proposed

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.

---

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 Kestrel *Falco sparverius paulus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/9587	Breeds Apr 1 to Aug 31
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
Brown-headed Nuthatch *Sitta pusilla* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds Mar 1 to Jul 15
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Eastern Whip-poor-will *Antrostomus vociferus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Aug 20
Kentucky Warbler *Oporornis formosus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 20 to Aug 20
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
Prairie Warbler *Dendroica discolor* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 1 to Jul 31
Prothonotary Warbler *Protonotaria citrea* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Apr 1 to Jul 31
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
Swallow-tailed Kite *Elanoides forficatus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8938	Breeds Mar 10 to Jun 30
Wood Thrush *Hylocichla mustelina* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

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.

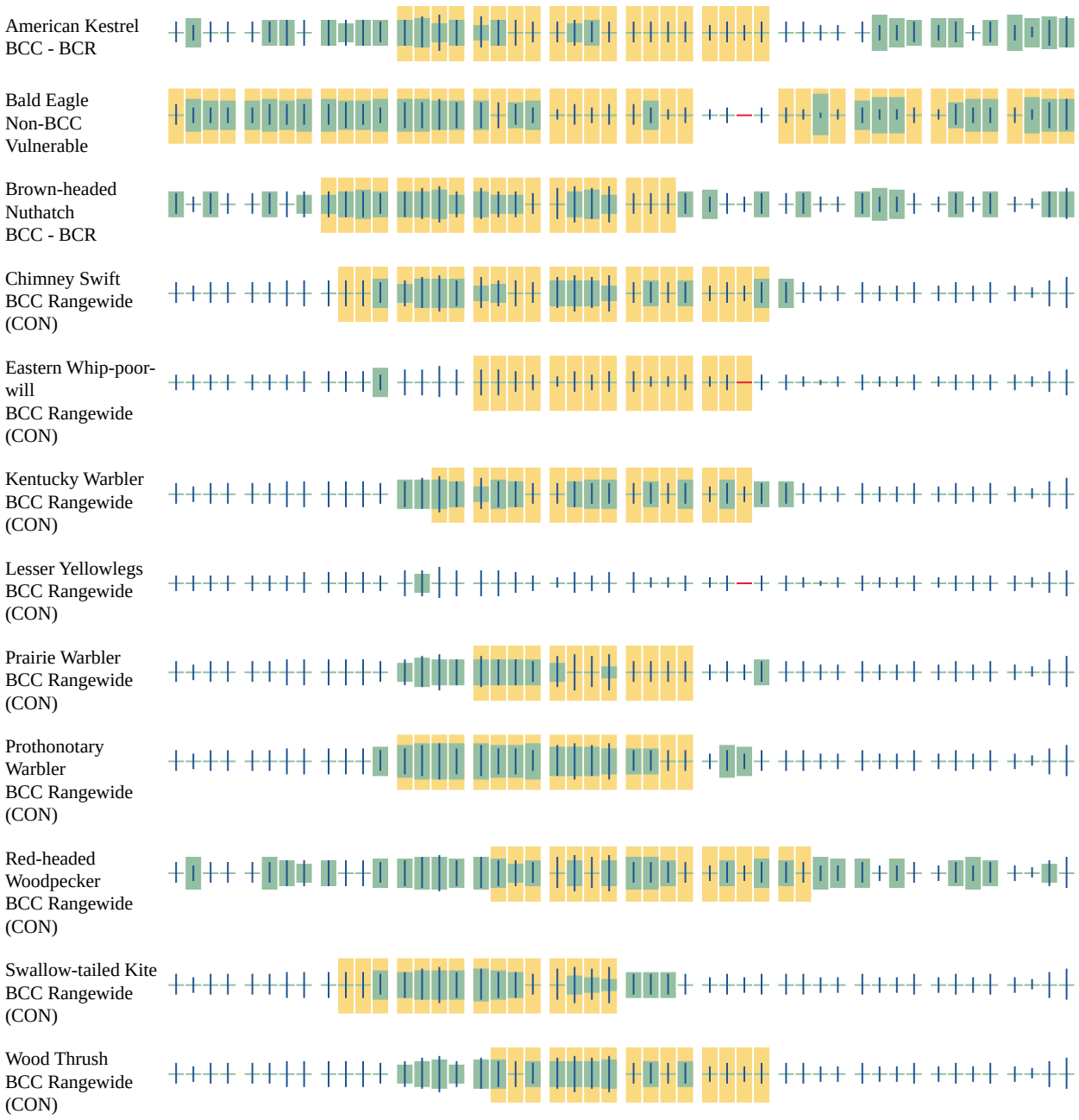
Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

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.

▪ probability of presence ▪ breeding season | survey effort – no data

SPECIES	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC



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 list of migratory birds that potentially occur 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 Rapid Avian Information Locator (RAIL) 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 or migrating in my 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 query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. 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.

RIVERINE

- R2UBH
- R4SBC
- R5UBH

FRESHWATER POND

- PUB/ABG
- PAB/UBF
- PUB/FO2Fh
- PUB/FO2F
- PUBHh
- PABHh
- PABF
- PAB/FO2F
- PUBH
- PUB/FO1Fh

FRESHWATER FORESTED/SHRUB WETLAND

- PSS1/EM1Ch
- PFO1/2Fh
- PFO2F
- PFO1Ch
- PSS1Ch
- PSS1/2F
- PSS1/FO2Fh
- PSS2/UBFh
- PFO1/2F
- PSS2F
- PSS2Fh

- PSS1Fh
- PFO1Fh
- PFO1A
- PFO2Fh
- PFO1C
- PSS1F
- PFO2/1Fh
- PFO2/UBFh
- PSS1/UBFh
- PFO1F
- PFO2/SS1Fh
- PFO1Ah
- PSS2/UBF
- PSS2/EM1Fh
- PFO2/SS2Fh
- PSS1/EM1Fh
- PFO2/SS2F

FRESHWATER EMERGENT WETLAND

- PEM1/SS2Fh
- PEM1C
- PEM1F
- PEM1/SS1C
- PEM1/SS1Fh
- PEM1/SS4Ah
- PEM1Ch
- PEM1Fh

LAKE

- L1UBHh
- L1UBGh
- L1UBH
- L2USCh

IPAC USER CONTACT INFORMATION

Agency: Department of Defense
Name: Paul Roberts
Address: 819 Taylor st RM 3A12
City: Fort Worth
State: TX
Zip: 76102-0300
Email paul.e.roberts@usace.army.mil
Phone: 8178861880

Last Update: 1/4/2023

JASPER COUNTY

AMPHIBIANS

southern crawfish frog *Lithobates areolatus areolatus*

Terrestrial and aquatic: The terrestial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairie in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S3

spotted dusky salamander *Desmognathus conanti*

This species occurs in association with aquatic habitats in forested areas. Small, clear, spring fed streams with sandy substrate bordered with ferns and moss as well as murky, stagnant water bodies in cypress swamps, baygalls, and flood plains in bottomland forests support populatio of this species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S1

Strecker's chorus frog *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Woodhouse's toad *Anaxyrus woodhousii*

Terrestrial and aquatic: A wide variety of terrestrial habitats are used by this species, including forests, grasslands, and barrier island sand dun Aquatic habitats are equally varied.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: SU

BIRDS

Bachman's sparrow *Peucaea aestivalis*

Open pine woods with scattered bushes and grassy understory in Pineywoods region, brushy or overgrown grassy hillsides, overgrown fields with thickets and brambles, grassy orchards; remnant grasslands in Post Oak Savannah region; nests on ground against grass tuft or under low shrub

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S1B

bald eagle *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3B,S3N

JASPER COUNTY

BIRDS

Franklin's gull *Leucophaeus pipixcan*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

piping plover *Charadrius melodus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2N

red-cockaded woodpecker *Dryobates borealis*

Cavity nests in older pine (60+ years); forages in younger pine (30+ years); prefers longleaf, shortleaf, and loblolly

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

Sprague's pipit *Anthus spragueii*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3N

swallow-tailed kite *Elanoides forficatus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2B

JASPER COUNTY

BIRDS

white-faced ibis *Plegadis chihi*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

wood stork *Mycteria americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: SHB,S2N

CRUSTACEANS

blackbelted crayfish *Procambarus nigrocinctus*

It occurs in moderately flowing small creeks. Found among rocks and accumulated debris.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1

FISH

american eel *Anguilla rostrata*

Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

blackspot shiner *Notropis atrocaudalis*

Occurs from the lower Brazos River to the Sabine River drainage; Red River drainage. Small to moderate size tributary streams in runs and pools over all types of substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

JASPER COUNTY

FISH

blue sucker *Cycleptus elongatus*

Blue Sucker usually inhabit rapids, riffles, runs and pools with moderate to fast current, with bottoms of exposed bedrock sometimes in combination with hard clay, sand, gravel, and boulders; generally intolerant of highly turbid conditions. Adults winter in deep pools and move upstream in spring to spawn on riffles. Current distribution in Texas includes the Red River downstream of Lake Texoma, Sabine and Neches rivers, and Colorado River downstream of Austin, Texas. May occur in other river systems (Warren et al. 2000).

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3

Mississippi silvery minnow *Hybognathus nuchalis*

Found in eastern Texas streams, from the Brazos River eastward and northward to the Red River; found in moderate current; silty, muddy, or rocky substrate. In Texas, adults likely to inhabit smaller tributary streams.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G5	State Rank: S4

paddlefish *Polyodon spathula*

Species occurred in every major river drainage from the Trinity Basin eastward, but its numbers and range had been substantially reduced by the 1950's; recently reintroduced into Big Cypress drainage upstream of Caddo Lake. Prefers large, free-flowing rivers but will frequent impoundments with access to spawning sites.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

river darter *Percina shumardi*

In Texas limited to eastern streams including Red River southward to the Neches River, and a disjunct population in the Guadalupe and San Antonio river systems east of the Balcones Escarpment. Confined to large rivers and lower parts of major tributaries; usually found in deep chutes and riffles where current is swift and bottom composed of coarse gravel or rock.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G5	State Rank: S4

Sabine shiner *Notropis sabinae*

Inhabits small streams and large rivers of eastern Texas from San Jacinto drainage northward along the Gulf Coast to the Sabine River Basin; Habitat generalist with affinities for shallow, moving water and rarely found in pools and backwater areas;
closely restricted to substrate of fine, silt free sand in small creeks and rivers having slight to moderate current.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

silverband shiner *Notropis shumardi*

In Texas, found from Red River to Lavaca River; Main channel with moderate to swift current velocities and moderate to deep depths; associated with turbid water over silt, sand, and gravel.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

western creek chubsucker *Erimyzon claviformis*

JASPER COUNTY

FISH

Eastern Texas streams from the Red River to the San Jacinto drainage. Habitat includes silt-, sand-, and gravel-bottomed pools of clear headwaters, creeks, and small rivers; often near vegetation; occasionally in lakes. Spawning occurs in river mouths or pools, riffles, lake outlets, or upstream creeks. Prefers headwaters, but seldom occurs in springs.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2S3

western sand darter *Ammocrypta clara*

Neches, Sabine, and Red River basins. Associated with substrates of course sand and fine gravels in moderate current in medium to large streams. Habit of burrowing in sand may prevent direct observations.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G3G4	State Rank: SNR

No accepted common name *Neotrichia mobilensis*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G1G2	State Rank: S1?

No accepted common name *Phylocentropus harrisi*

Lotic systems, but specifics unknown

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G1G2	State Rank: S1

Texas emerald dragonfly *Somatochlora margarita*

East Texas pineywoods; springfed creeks and bogs; small sandy forested streams with moderate current

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2

MAMMALS

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

JASPER COUNTY

MAMMALS

black bear *Ursus americanus*

Generalist. Historically found throughout Texas. In Chisos, prefers higher elevations where pinyon-oaks predominate; also occasionally sighted in desert scrub of Trans-Pecos (Black Gap Wildlife Management Area) and Edwards Plateau in juniper-oak habitat. For ssp. luteolus, bottomland hardwoods, floodplain forests, upland hardwoods with mixed pine; marsh. Bottomland hardwoods and large tracts of inaccessible forested areas.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

eastern red bat *Lasiurus borealis*

Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of "wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East, Central, and North Texas but can occur statewide.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

eastern spotted skunk *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S1S3

hoary bat *Lasiurus cinereus*

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

Louisiana black bear *Ursus americanus luteolus*

Bottomland hardwoods, floodplain forests, upland hardwoods with mixed pine; marsh. Possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5T2	State Rank: SNA

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

JASPER COUNTY

MAMMALS

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2S3

muskrat *Ondatra zibethicus*

Found in fresh or brackish marshes, lakes, ponds, swamps, and other bodies of slow-moving water. Most abundant in areas with cattail. Dens in bank burrow or conical house of vegetation in shallow vegetated water. It is primarily found in the Rio Grande near El Paso and in SE Texas in the Houston area.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

northern yellow bat *Lasiurus intermedius*

Occurs mainly along the Gulf Coast but inland specimens are not uncommon. Prefers roosting in spanish moss and in the hanging fronds of palm trees. Common where this vegtation occurs. Found near water and forages over grassy, open areas. Males usually roost solitarily, whereas females roost in groups of several individuals.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

Rafinesque's big-eared bat *Corynorhinus rafinesquii*

Historically, lowland pine and hardwood forests with large hollow trees. roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

southeastern myotis bat *Myotis austroriparius*

Caves are rare in Texas portion of range; buildings, hollow trees are probably important. Historically, lowland pine and hardwood forests with large hollow trees; associated with ecological communities near water. Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3?

swamp rabbit *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

tricolored bat *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

JASPER COUNTY

MOLLUSKS

Louisiana pigtoe *Pleurobema riddellii*

Occurs in small streams to large rivers in slow to moderate currents in substrates of clay, mud, sand, and gravel. Not known from impoundments (Howells 2010f; Randklev et al. 2013b; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G2	State Rank: S1

sandbank pocketbook *Lampsilis satura*

Occurs in small streams to large rivers in slow to moderate current in sandy mud to sand and gravel substrate. Can occur in a variety of habitats but most common in littoral habitats such as banks or backwaters or in protected areas along point bars (Randklev et al. 2013b; Randklev et al. 2014a; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic:	Global Rank: G2?	State Rank: S1

southern hickorynut *Obovaria arkansasensis*

Clay, sand, and medium sized gravel substrates with low to moderate current; Neches, Sabine, and Cypress river basins

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: GNR	State Rank: S1

Texas heelsplitter *Potamilus amphichaenus*

Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt or sand (Howells et al. 1996; Randklev et al. 2017a). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G3	State Rank: S1

Texas pigtoe *Fusconaia askewi*

Occurs in small streams to large rivers, usually in water with at least some current; not known from reservoirs. Found in a variety of habitats but most common in riffles. Inhabits various substrates though most often sand, gravel, and cobble (Howells 2010a; Randklev et al. 2013b; Randklev et al. 2014a; Troia et al 2015).[Mussel of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G2?	State Rank: S2S3

REPTILES

alligator snapping turtle *Macrochelys temminckii*

Aquatic: Perennial water bodies; rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near running water; sometimes enters brackish coastal waters. Females emerge to lay eggs close to the waters edge.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

JASPER COUNTY

REPTILES

eastern box turtle *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S3

Louisiana pine snake *Pituophis ruthveni*

Terrestrial: Deep sandy soils with large stands of well-managed long leaf pine woodlands.

Federal Status: LT State Status: T SGCN: Y
Endemic: N Global Rank: G1G2 State Rank: S1

northern scarlet snake *Cemophora coccinea*

Terrestrial: Prefers well drained soils with pine, hardwood, or mixed hardwood scrub in addition to open grassland habitats with appropriate soils.

Federal Status: State Status: T SGCN: Y
Endemic: N Global Rank: G5 State Rank: S4

pygmy rattlesnake *Sistrurus miliarius*

The pygmy rattlesnake occurs in a variety of wooded habitats from bottomland coastal hardwood forests to upland savannas. The species is frequently found in association with standing water.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S2S3

slender glass lizard *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S3

smooth softshell *Apalone mutica*

Aquatic: Large rivers and streams; in some areas also found in lakes and impoundments (Ernst and Barbour 1972). Usually in water with sandy or mud bottom and few aquatic plants. Often basks on sand bars and mudflats at edge of water. Eggs are laid in nests dug in high open sandbars and banks close to water, usually within 90 m of water (Fitch and Plummer 1975).

Federal Status: State Status: SGCN: Y
Endemic: N Global Rank: G5 State Rank: S3

timber (canebrake) rattlesnake *Crotalus horridus*

Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.

Federal Status: State Status: SGCN: Y

JASPER COUNTY

REPTILES

Endemic: N | Global Rank: G4 | State Rank: S4

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status: | State Status: | SGCN: Y

Endemic: N | Global Rank: G5 | State Rank: S3

western chicken turtle *Deirochelys reticularia miaria*

Aquatic and terrestrial: This species uses aquatic habitats in the late winter, spring and early summer and then terrestrial habitats the remainder of the year. Preferred aquatic habitats seem to be highly vegetated shallow wetlands with gentle slopes. Specific terrestrial habitats are not well known.

Federal Status: | State Status: | SGCN: Y

Endemic: N | Global Rank: G5T5 | State Rank: S2S3

PLANTS

Arkansas oak *Quercus arkansana*

At the Cass County location, it occurs with Quercus stellata, Q. marilandica and Q. incana in a young pine plantation on deep sandy soils; Perennial; Flowering spring

Federal Status: | State Status: | SGCN: Y

Endemic: N | Global Rank: G3 | State Rank: S1

barbed rattlesnake-root *Prenanthes barbata*

In east Texas occurs on calciphilc hardwood terraces above floodplains, and seepage slopes, often in the company of a comparatively rich herbaceous flora; elsewhere found on prairies, barrens, and open woodlands; in calcareous substrates and in sand over clay on the Weches, Fleming, and Lissie formations; flowering August-November

Federal Status: | State Status: | SGCN: Y

Endemic: N | Global Rank: G3 | State Rank: S3

bog coneflower *Rudbeckia scabrifolia*

Restricted to partial shade at the lower edges of hillside seepage bogs and associated broadleaf semi-evergreen acid seep forests; typically at the head of a spring or seep, and usually on sites underlain by the Catahoula Formation or near the Catahoula-Fleming contact; flowering June-September

Federal Status: | State Status: | SGCN: Y

Endemic: N | Global Rank: G3G4 | State Rank: S2

JASPER COUNTY

PLANTS

cypress knee sedge *Carex decomposita*

Occurs in shallow water or on baldcypress stumps and logs in wooded ponds or swamps; Perennial; Flowering/Fruiting April-May

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S1

Drummond's yellow-eyed grass *Xyris drummondii*

Wet sand or peaty sand in hillside seepage bogs; in Texas, exclusively over the Catahoula formation, elsewhere also found along contact between Willis and Bentley formations; flowering mid June-mid August, seeds developing mid-late summer and early fall

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

incised groovebur *Agrimonia incisa*

Sandy soils in dry to mesic pine or mixed pine-oak forests and forest borders; usually in fire-maintained longleaf pine savannas but also in more mesic habitats; Perennial; Flowering July-September

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

Indianola beakrush *Rhynchospora indianolensis*

Locally abundant in cattle pastures in some areas (at least during wet years), possibly becoming a management problem in such sites; Perennial; Flowering/Fruiting April-Nov

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G3Q	State Rank: S3

large beakrush *Rhynchospora macra*

Found in ombotropic quaking peat bogs; Perennial; Flowering/Fruiting Aug-Oct

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

long-sepaled false dragon-head *Physostegia longisepala*

Relatively open areas on poorly drained, acid loams on level terrain over Beaumont, Deweyville, and Montgomery formations; probably originally found in fire-maintained wetland pine savannas or in the transition zone between such flatwoods and adjacent coastal prairies, now found primarily in secondary habitats, such as wet borrow ditches along roadsides and moist areas in human-made clearings in pine woodlands; flowering early May-early July

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2

JASPER COUNTY

PLANTS

Navasota ladies'-tresses *Spiranthes parksii*

Openings in post oak woodlands in sandy loams along upland drainages or intermittent streams, often in areas with suitable hydrologic factors, such as a perched water table associated with the underlying claypan; flowering populations fluctuate widely from year to year, an individual plant does not flower every year; flowering late October-early November (-early December)

Federal Status: LE	State Status: E	SGCN: Y
Endemic: Y	Global Rank: G3	State Rank: S3

nodding yucca *Yucca cernua*

Openings in and margins of pine-hardwood forests on brownish acid clays of the Redco Series; flowering/fruiting June-November

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1	State Rank: S1

panicled indigobush *Amorpha paniculata*

A stout shrub, 3 m (9 ft) tall that grows in acid seep forests, peat bogs, wet floodplain forests, and seasonal wetlands on the edge of Saline Prairies in East Texas. It is distinguished from other Amorpha species by its fuzzy leaflets with prominent raised veins underneath, and the flower panicles, which are 8 to 16 inches long and slender, held above the foliage. Perennial; Flowering summer

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

roughleaf yellow-eyed grass *Xyris scabrifolia*

Wet sand and/or peat in acid seepage areas or hillside seepage bogs on the Catahoula formation or near the contact of the Catahoula and the Willis formations, in open areas and in partial shade of evergreen shrub thickets, often on Sphagnum hummocks; flowering late July-early September

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

scarlet catchfly *Silene subciliata*

Deep well-drained sandy soils in and along margins of fire-maintained, dry, upland, longleaf pine savannas; in fire-suppressed forests with dense understory, it is often limited to sunnier roadsides or cleared utility easements; also sparingly in moister sands on openly forested creek banks; flowering early July-October, sometimes early November

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

slender gay-feather *Liatris tenuis*

Sandy soils of fire-maintained upland longleaf pine savannas, mostly over the Catahoula Formation; flowering June-September

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

JASPER COUNTY

PLANTS

smooth indigobush *Amorpha laevigata*

Prairies, open woods and creek banks; Perennial; Flowering May-July

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3?	State Rank: S1

Sutherland hawthorn *Crataegus viridis var. glabriuscula*

In mesic soils of woods or on edge of woods, treeline/fenceline, or thicket. Above\near creeks and draws, in river bottoms. Flowering Mar-Apr; fruiting May-Oct.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T3T4	State Rank: S3

Texas screwstem *Bartonia paniculata ssp. texana*

In and around acid seeps in Pine-Oak forests on gentle slopes and baygall shrub thickets at spring heads; often on clumps of bryophytes at tree bases, on roots, and on logs; flowering September-November, can be identified in mid to late October when its in fruit

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2S3

Texas sunnybell *Schoenolirion wrightii*

Rocky barrens in the Post Oak region near College Station, with a few disjunct populations on the Catahoula Formation of southeast Texas; Perennial; Flowering March-April; Fruiting March

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

Texas trillium *Trillium texanum*

In or along the margins of hardwood forests on wet acid soils of bottoms and lower slopes, strongly associated with forested seeps and baygalls; flowering March-May

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

tiny bog button *Lachnocaulon digynum*

Wet, acid, exposed sands, sphagnum mats, and sandstone of hillside seepage bogs (hanging bogs); appears restricted to the Catahoula formation in Texas; usually among low growing graminoids; flowering and fruiting August-October

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S1

yellow fringeless orchid *Platanthera integra*

Currently known only from a few bog sites in Angelina, Jasper and Newton counties; Perennial; Flowering/Fruiting Aug

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S1

Last Update: 1/4/2023

TYLER COUNTY

AMPHIBIANS

Gulf Coast waterdog *Necturus beyeri*

This species is associated with permanent flowing water within forested habitats, from small streams to large rivers. The are frequently associated with slow moving, sandy bottomed spring fed streams with lots of aquatic habitat such as log jams and leaf litter beds.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: GNR	State Rank: S3

southern crawfish frog *Lithobates areolatus areolatus*

Terrestrial and aquatic: The terrestial habitat is primarily grassland and can vary from pasture to intact prairie; it can also include small prairies in the middle of large forested areas. Aquatic habitat is any body of water but preferred habitat is ephemeral wetlands.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4T4	State Rank: S3

spotted dusky salamander *Desmognathus conanti*

This species occurs in association with aquatic habitats in forested areas. Small, clear, spring fed streams with sandy substrate bordered with ferns and moss as well as murky, stagnant water bodies in cypress swamps, baygalls, and flood plains in bottomland forests support populations of this species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S1

Strecker's chorus frog *Pseudacris streckeri*

Terrestrial and aquatic: Wooded floodplains and flats, prairies, cultivated fields and marshes. Likes sandy substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

BIRDS

Bachman's sparrow *Peucaea aestivalis*

Open pine woods with scattered bushes and grassy understory in Pineywoods region, brushy or overgrown grassy hillsides, overgrown fields with thickets and brambles, grassy orchards; remnant grasslands in Post Oak Savannah region; nests on ground against grass tuft or under low shrub

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S1B

bald eagle *Haliaeetus leucocephalus*

Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3B,S3N

TYLER COUNTY

BIRDS

Franklin's gull *Leucophaeus pipixcan*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. This species is only a spring and fall migrant throughout Texas. It does not breed in or near Texas. Winter records are unusual consisting of one or a few individuals at a given site (especially along the Gulf coastline). During migration, these gulls fly during daylight hours but often come down to wetlands, lake shore, or islands to roost for the night.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2N

piping plover *Charadrius melodus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Beaches, sandflats, and dunes along Gulf Coast beaches and adjacent offshore islands. Also spoil islands in the Intracoastal Waterway. Based on the November 30, 1992 Section 6 Job No. 9.1, Piping Plover and Snowy Plover Winter Habitat Status Survey, algal flats appear to be the highest quality habitat. Some of the most important aspects of algal flats are their relative inaccessibility and their continuous availability throughout all tidal conditions. Sand flats often appear to be preferred over algal flats when both are available, but large portions of sand flats along the Texas coast are available only during low-very low tides and are often completely unavailable during extreme high tides or strong north winds. Beaches appear to serve as a secondary habitat to the flats associated with the primary bays, lagoons, and inter-island passes. Beaches are rarely used on the southern Texas coast, where bayside habitat is always available, and are abandoned as bayside habitats become available on the central and northern coast. However, beaches are probably a vital habitat along the central and northern coast (i.e. north of Padre Island) during periods of extreme high tides that cover the flats. Optimal site characteristics appear to be large in area, sparsely vegetated, continuously available or in close proximity to secondary habitat, and with limited human disturbance.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2N

red-cockaded woodpecker *Dryobates borealis*

Cavity nests in older pine (60+ years); forages in younger pine (30+ years); prefers longleaf, shortleaf, and loblolly

Federal Status: LE	State Status: E	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

Sprague's pipit *Anthus spragueii*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Habitat during migration and in winter consists of pastures and weedy fields (AOU 1983), including grasslands with dense herbaceous vegetation or grassy agricultural fields.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3N

swallow-tailed kite *Elanoides forficatus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2B

TYLER COUNTY

BIRDS

white-faced ibis *Plegadis chihi*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; currently confined to near-coastal rookeries in so-called hog-wallow prairies. Nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4B

wood stork *Mycteria americana*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Prefers to nest in large tracts of baldcypress (Taxodium distichum) or red mangrove (Rhizophora mangle); forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: SHB,S2N

CRUSTACEANS

Big Thicket burrowing crayfish *Fallicambarus kountzeae*

All species in the genus Fallicambarus are primary burrowers (Guiasu, 2007). It is a primary burrower with 100% of known adults and subadults collected from burrows. Small juveniles are common in open water during the cool season (Johnson, 2008).

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G2	State Rank: S3

blackbelted crayfish *Procambarus nigrocinctus*

It occurs in moderately flowing small creeks. Found among rocks and accumulated debris.

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1G2	State Rank: S1

FISH

american eel *Anguilla rostrata*

Originally found in all river systems from the Red River to the Rio Grande. Aquatic habtiats include large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans. Spawns in Sargasso Sea, larva move to coastal waters, metamorphose, and begin upstream movements. Females tend to move further upstream than males (who are often found in brackish estuaries). American Eel are habitat generalists and may be found in a broad range of habitat conditions including slow- and fast-flowing waters over many substrate types. Extirpation in upstream drainages attributed to reservoirs that impede upstream migration.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

TYLER COUNTY

FISH

blackspot shiner *Notropis atrocaudalis*

Occurs from the lower Brazos River to the Sabine River drainage; Red River drainage. Small to moderate size tributary streams in runs and pools over all types of substrates.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

blue sucker *Cycleptus elongatus*

Blue Sucker usually inhabit rapids, riffles, runs and pools with moderate to fast current, with bottoms of exposed bedrock sometimes in combination with hard clay, sand, gravel, and boulders; generally intolerant of highly turbid conditions. Adults winter in deep pools and move upstream in spring to spawn on riffles. Current distribution in Texas includes the Red River downstream of Lake Texoma, Sabine and Neches rivers, and Colorado River downstream of Austin, Texas. May occur in other river systems (Warren et al. 2000).

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3

ironcolor shiner *Notropis chalybaeus*

Found only in northeastern streams from the Sabine to the Red River with the exception of an isolated population found in the San Marcos River headwaters. Found primarily in acidic, tannin-stained, non-turbid, sluggish Coastal Plain streams and
rivers of low to moderate gradient. Occurs in aggregation, often at the upstream ends of pools, with a moderate to sluggish current and sand, mud, silt or detritus substrates. Usually associated with aquatic vegetation.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

Mississippi silvery minnow *Hybognathus nuchalis*

Found in eastern Texas streams, from the Brazos River eastward and northward to the Red River; found in moderate current; silty, muddy, or rocky substrate. In Texas, adults likely to inhabit smaller tributary streams.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G5	State Rank: S4

paddlefish *Polyodon spathula*

Species occurred in every major river drainage from the Trinity Basin eastward, but its numbers and range had been substantially reduced by the 1950's; recently reintroduced into Big Cypress drainage upstream of Caddo Lake. Prefers large, free-flowing rivers but will frequent impoundments with access to spawning sites.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

river darter *Percina shumardi*

In Texas limited to eastern streams including Red River southward to the Neches River, and a disjunct population in the Guadalupe and San Antonio river systems east of the Balcones Escarpment. Confined to large rivers and lower parts of major tributaries; usually found in deep chutes and riffles where current is swift and bottom composed of coarse gravel or rock.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G5	State Rank: S4

TYLER COUNTY

FISH

Sabine shiner *Notropis sabinae*

Inhabits small streams and large rivers of eastern Texas from San Jacinto drainage northward along the Gulf Coast to the Sabine River Basin; Habitat generalist with affinities for shallow, moving water and rarely found in pools and backwater areas;
closely restricted to substrate of fine, silt free sand in small creeks and rivers having slight to moderate current.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3

silverband shiner *Notropis shumardi*

In Texas, found from Red River to Lavaca River; Main channel with moderate to swift current velocities and moderate to deep depths; associated with turbid water over silt, sand, and gravel.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

western creek chubsucker *Erimyzon claviformis*

Eastern Texas streams from the Red River to the San Jacinto drainage. Habitat includes silt-, sand-, and gravel-bottomed pools of clear headwaters, creeks, and small rivers; often near vegetation; occasionally in lakes. Spawning occurs in river mouths or pools, riffles, lake outlets, or upstream creeks. Prefers headwaters, but seldom occurs in springs.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2S3

western sand darter *Ammocrypta clara*

Neches, Sabine, and Red River basins. Associated with substrates of course sand and fine gravels in moderate current in medium to large streams. Habit of burrowing in sand may prevent direct observations.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

INSECTS

American bumblebee *Bombus pensylvanicus*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: G3G4	State Rank: SNR

No accepted common name *Cotalpa conclamara*

Habitat description is not available at this time.

Federal Status:	State Status:	SGCN: Y
Endemic:	Global Rank: GNR	State Rank: SNR

TYLER COUNTY

INSECTS

Texas emerald dragonfly *Somatochlora margarita*

East Texas pineywoods; springfed creeks and bogs; small sandy forested streams with moderate current

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2

MAMMALS

big brown bat *Eptesicus fuscus*

Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

eastern red bat *Lasiurus borealis*

Red bats are migratory bats that are common across Texas. They are most common in the eastern and central parts of the state, due to their requirement of forests for foliage roosting. West Texas specimens are associated with forested areas (cottonwoods). Also common along the coastline. These bats are highly mobile, seasonally migratory, and practice a type of "wandering migration". Associations with specific habitat is difficult unless specific migratory stopover sites or wintering grounds are found. Likely associated with any forested area in East, Central, and North Texas but can occur statewide.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

eastern spotted skunk *Spilogale putorius*

Generalist; open fields prairies, croplands, fence rows, farmyards, forest edges & woodlands. Prefer wooded, brushy areas & tallgrass prairies. S.p. ssp. interrupta found in wooded areas and tallgrass prairies, preferring rocky canyons and outcrops when such sites are available.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S1S3

hoary bat *Lasiurus cinereus*

Hoary bats are highly migratory, high-flying bats that have been noted throughout the state. Females are known to migrate to Mexico in the winter, males tend to remain further north and may stay in Texas year-round. Commonly associated with forests (foliage roosting species) but are found in unforested parts of the state and lowland deserts. Tend to be captured over water and large, open flyways.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S4

long-tailed weasel *Mustela frenata*

Includes brushlands, fence rows, upland woods and bottomland hardwoods, forest edges & rocky desert scrub. Usually live close to water.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

TYLER COUNTY

MAMMALS

Louisiana black bear *Ursus americanus luteolus*

Bottomland hardwoods, floodplain forests, upland hardwoods with mixed pine; marsh. Possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5T2	State Rank: SNA

mountain lion *Puma concolor*

Generalist; found in a wide range of habitats statewide. Found most frequently in rugged mountains & riparian zones.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2S3

muskrat *Ondatra zibethicus*

Found in fresh or brackish marshes, lakes, ponds, swamps, and other bodies of slow-moving water. Most abundant in areas with cattail. Dens in bank burrow or conical house of vegetation in shallow vegetated water. It is primarily found in the Rio Grande near El Paso and in SE Texas in the Houston area.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

northern yellow bat *Lasiurus intermedius*

Occurs mainly along the Gulf Coast but inland specimens are not uncommon. Prefers roosting in spanish moss and in the hanging fronds of palm trees. Common where this vegtation occurs. Found near water and forages over grassy, open areas. Males usually roost solitarily, whereas females roost in groups of several individuals.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

Rafinesque's big-eared bat *Corynorhinus rafinesquii*

Historically, lowland pine and hardwood forests with large hollow trees. roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

southeastern myotis bat *Myotis austroriparius*

Caves are rare in Texas portion of range; buildings, hollow trees are probably important. Historically, lowland pine and hardwood forests with large hollow trees; associated with ecological communities near water. Roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S3?

TYLER COUNTY

MAMMALS

swamp rabbit *Sylvilagus aquaticus*

Primarily found in lowland areas near water including: cypress bogs and marshes, floodplains, creeks and rivers.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S5

tricolored bat *Perimyotis subflavus*

Forest, woodland and riparian areas are important. Caves are very important to this species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

MOLLUSKS

Louisiana pigtoe *Pleurobema riddellii*

Occurs in small streams to large rivers in slow to moderate currents in substrates of clay, mud, sand, and gravel. Not known from impoundments (Howells 2010f; Randklev et al. 2013b; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G2	State Rank: S1

sandbank pocketbook *Lampsilis satura*

Occurs in small streams to large rivers in slow to moderate current in sandy mud to sand and gravel substrate. Can occur in a variety of habitats but most common in littoral habitats such as banks or backwaters or in protected areas along point bars (Randklev et al. 2013b; Randklev et al. 2014a; Troia et al. 2015). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic:	Global Rank: G2?	State Rank: S1

southern hickorynut *Obovaria arkansasensis*

Clay, sand, and medium sized gravel substrates with low to moderate current; Neches, Sabine, and Cypress river basins

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: GNR	State Rank: S1

Texas heelsplitter *Potamilus amphichaenus*

Occurs in small streams to large rivers in standing to slow-flowing water; most common in banks, backwaters and quiet pools; adapts to some reservoirs. Often found in soft substrates such as mud, silt or sand (Howells et al. 1996; Randklev et al. 2017a). [Mussels of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G3	State Rank: S1

TYLER COUNTY

MOLLUSKS

Texas pigtoe *Fusconaia askewi*

Occurs in small streams to large rivers, usually in water with at least some current; not known from reservoirs. Found in a variety of habitats but most common in riffles. Inhabits various substrates though most often sand, gravel, and cobble (Howells 2010a; Randklev et al. 2013b; Randklev et al. 2014a; Troia et al 2015).[Mussel of Texas 2019]

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G2?	State Rank: S2S3

REPTILES

alligator snapping turtle *Macrochelys temminckii*

Aquatic: Perennial water bodies; rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near running water; sometimes enters brackish coastal waters. Females emerge to lay eggs close to the waters edge.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S2

eastern box turtle *Terrapene carolina*

Terrestrial: Eastern box turtles inhabit forests, fields, forest-brush, and forest-field ecotones. In some areas they move seasonally from fields in spring to forest in summer. They commonly enters pools of shallow water in summer. For shelter, they burrow into loose soil, debris, mud, old stump holes, or under leaf litter. They can successfully hibernate in sites that may experience subfreezing temperatures.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

Louisiana pine snake *Pituophis ruthveni*

Terrestrial: Deep sandy soils with large stands of well-managed long leaf pine woodlands.

Federal Status: LT	State Status: T	SGCN: Y
Endemic: N	Global Rank: G1G2	State Rank: S1

northern scarlet snake *Cemophora coccinea*

Terrestrial: Prefers well drained soils with pine, hardwood, or mixed hardwood scrub in addition to open grassland habitats with appropriate soils.

Federal Status:	State Status: T	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S4

pygmy rattlesnake *Sistrurus miliarius*

The pygmy rattlesnake occurs in a variety of wooded habitats from bottomland coastal hardwood forests to upland savannas. The species is frequently found in association with standing water.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S2S3

TYLER COUNTY

REPTILES

slender glass lizard *Ophisaurus attenuatus*

Terrestrial: Habitats include open grassland, prairie, woodland edge, open woodland, oak savannas, longleaf pine flatwoods, scrubby areas, fallow fields, and areas near streams and ponds, often in habitats with sandy soil.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

smooth softshell *Apalone mutica*

Aquatic: Large rivers and streams; in some areas also found in lakes and impoundments (Ernst and Barbour 1972). Usually in water with sandy or mud bottom and few aquatic plants. Often basks on sand bars and mudflats at edge of water. Eggs are laid in nests dug in high open sandbars and banks close to water, usually within 90 m of water (Fitch and Plummer 1975).

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

timber (canebrake) rattlesnake *Crotalus horridus*

Terrestrial: Swamps, floodplains, upland pine and deciduous woodland, riparian zones, abandoned farmland. Limestone bluffs, sandy soil or black clay. Prefers dense ground cover, i.e. grapevines, palmetto.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G4	State Rank: S4

western box turtle *Terrapene ornata*

Terrestrial: Ornate or western box trutles inhabit prairie grassland, pasture, fields, sandhills, and open woodland. They are essentially terrestrial but sometimes enter slow, shallow streams and creek pools. For shelter, they burrow into soil (e.g., under plants such as yucca) (Converse et al. 2002) or enter burrows made by other species.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5	State Rank: S3

western chicken turtle *Deirochelys reticularia miaria*

Aquatic and terrestrial: This species uses aquatic habitats in the late winter, spring and early summer and then terrestrial habitats the remainder of the year. Preferred aquatic habitats seem to be highly vegetated shallow wetlands with gentle slopes. Specific terrestrial habitats are not well known.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G5T5	State Rank: S2S3

PLANTS

barbed rattlesnake-root *Prenanthes barbata*

In east Texas occurs on calciphilc hardwood terraces above floodplains, and seepage slopes, often in the company of a comparatively rich herbaceous flora; elsewhere found on prairies, barrens, and open woodlands; in calcareous substrates and in sand over clay on the Weches, Fleming, and Lissie formations; flowering August-November

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

TYLER COUNTY

PLANTS

Chapman's orchid *Platanthera chapmanii*

In Texas, appears restricted to wetland pine savannas and savanna swales in hillside seepage bogs, two very restricted and declining habitats in the State; flowering July-August

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2	State Rank: S1

Drummond's yellow-eyed grass *Xyris drummondii*

Wet sand or peaty sand in hillside seepage bogs; in Texas, exclusively over the Catahoula formation, elsewhere also found along contact between Willis and Bentley formations; flowering mid June-mid August, seeds developing mid-late summer and early fall

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

large beakrush *Rhynchospora macra*

Found in ombotropic quaking peat bogs; Perennial; Flowering/Fruiting Aug-Oct

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S2

long-sepaled false dragon-head *Physostegia longisepala*

Relatively open areas on poorly drained, acid loams on level terrain over Beaumont, Deweyville, and Montgomery formations; probably originally found in fire-maintained wetland pine savannas or in the transition zone between such flatwoods and adjacent coastal prairies, now found primarily in secondary habitats, such as wet borrow ditches along roadsides and moist areas in human-made clearings in pine woodlands; flowering early May-early July

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2

Mohlenbrock's sedge *Cyperus grayioides*

Deep sand and sandy loam in dry, almost barren openings in upland longleaf pine savannas, mixed pine-oak forests, and post oak woodlands; Occurs primarily in deep, periodically disturbed sandy soils in open areas maintained by factors such as wind, erosion, or fire. This species does not occur in shaded areas or in areas of high competition with other herbaceous species. Habitats include remnant sand prairies, sandy fields, sand blow outs, sandhill woodlands, pine barrens, and open barrens in which the slope is sufficient to produce sand erosion. May also occur in areas where the soils have been disturbed by logging or road construction; Perennial

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3G4	State Rank: S3S4

Navasota false foxglove *Agalinis navasotensis*

Relatively sparsely vegetated, shallow, sandy soils on calcareous sandstone outcrops of the Oakville Formation, with associated surrounding species more typical of Edwards Plateau, than Post Oak Savanna or Blackland Prairie; also, Catahoula Formation barrens in pine savanna; Annual; Flowering September-October

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G1	State Rank: S1

Oklahoma grass pink *Calopogon oklahomensis*

TYLER COUNTY

PLANTS

Mesic, acidic, sandy to loamy prairies, pine savannas, oak woodlands, edges of bogs, and frequently mowed meadows (Goldman, Magrath & Catling 2002). Flowering March-July.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2	State Rank: S1S2

panicled indigobush *Amorpha paniculata*

A stout shrub, 3 m (9 ft) tall that grows in acid seep forests, peat bogs, wet floodplain forests, and seasonal wetlands on the edge of Saline Prairies in East Texas. It is distinguished from other Amorpha species by its fuzzy leaflets with prominent raised veins underneath, and the flower panicles, which are 8 to 16 inches long and slender, held above the foliage. Perennial; Flowering summer

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

scarlet catchfly *Silene subciliata*

Deep well-drained sandy soils in and along margins of fire-maintained, dry, upland, longleaf pine savannas; in fire-suppressed forests with dense understory, it is often limited to sunnier roadsides or cleared utility easements; also sparingly in moister sands on openly forested creek banks; flowering early July-October, sometimes early November

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

slender gay-feather *Liatris tenuis*

Sandy soils of fire-maintained upland longleaf pine savannas, mostly over the Catahoula Formation; flowering June-September

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

Southern lady's-slipper *Cypripedium kentuckiense*

Primarily restricted to calciphilic hardwood slope forests, mesic ravines, hardwood terraces above floodplains, and seepage slopes; flowering late March-May

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S1

Texas ladies'-tresses *Spiranthes brevilabris*

Sandy soils in moist prairies, incl. blackland/Fleming prairies, calcareous prairie pockets surrounded by pines, pine-hardwood forest, open pinelands, wetland pine savannahs/flatwoods, and dry to moist fields, meadows, and roadsides. Delicate, nearly ephemeral orchid, producing winter rosettes, flowers Feb-Apr. Historically endemic to SE coastal plain.

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G1G2	State Rank: S1

TYLER COUNTY

PLANTS

Texas screwstem *Bartonia paniculata ssp. texana*

In and around acid seeps in Pine-Oak forests on gentle slopes and baygall shrub thickets at spring heads; often on clumps of bryophytes at tree bases, on roots, and on logs; flowering September-November, can be identified in mid to late October when its in fruit

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G2G3	State Rank: S2S3

Texas sunnybell *Schoenolirion wrightii*

Rocky barrens in the Post Oak region near College Station, with a few disjunct populations on the Catahoula Formation of southeast Texas; Perennial; Flowering March-April; Fruiting March

Federal Status:	State Status:	SGCN: Y
Endemic: N	Global Rank: G3	State Rank: S3

Texas trailing phlox *Phlox nivalis ssp. texensis*

Relatively open fire-maintained pine or pine-hardwood forests on soils with a deep, sandy surface layer and clayey subsurface layers; flowering late March-early April (-May)

Federal Status: LE	State Status: E	SGCN: Y
Endemic: Y	Global Rank: G4T2	State Rank: S2

white firewheel *Gaillardia aestivalis var. winkleri*

Open pine-oak woodlands and farkleberry sandhills in deep, loose, well-drained whitish sands; flowering late spring (May-June) and sporadically through early fall

Federal Status:	State Status:	SGCN: Y
Endemic: Y	Global Rank: G5T2	State Rank: S2

Wildlife Habitat Appraisal Procedure (Whap)
Summary Report
Town Bluff Lake Master Plan

Jasper And Tyler Counties, Texas

October 2022

US Army Corps
of Engineers ®
Fort Worth District

This page intentionally left blank

Table of Contents

Introduction 2
Study Area 8
Methodology 10
Existing Wildlife Habitat 12
Results and Discussion 13
References 20
Attachment A: Town Bluff Project WHAP Results Summary 21
Attachment B: Town Bluff WHAP Point Photographs 34

List of Tables

Table 1. Cover Types and Maximum Total Scores 12
Table 2. Survey Points per Habitat Type 13
Table 3. Average, Minimum, and Maximum Scores per Habitat Type 13
Table 4. Average Site Potential, Successional Stage, and Uniqueness and Relative Abundance Scores per Habitat Type 14

List of Figures

Figure 1. Distribution of WHAP Points and Their Associated Scores Within the Southern Area of Town Bluff Project. 3
Figure 2. Distribution of WHAP Points and Their Associated Scores Within the Central Area of Town Bluff Project. 4
Figure 3. Distribution of WHAP Points and Their Associated Scores Located in the East Central Area of Town Bluff Project. 5
Figure 4. Distribution of WHAP Points and Their Associated Scores Located in the North Central Area of Town Bluff Project. 6
Figure 5. Distribution of WHAP Points and Their Associated Scores Located in the West Central Area of Town Bluff Project. 7
Figure 6. Town Bluff Project Vicinity Map 9
Figure 7. All Sites with Maxed Out Site Potential 16
Figure 8. All Sites with Maxed Out Successional Stage 17
Figure 9. All Sites with Maxed Out Uniqueness and Relative Abundance 18

Introduction

Habitat assessments were conducted at Town Bluff Project on October 17-20, 2022 using Texas Parks and Wildlife Department's (TPWD) Wildlife Habitat Appraisal Procedure ([WHAP] TPWD 1995). WHAP survey point locations were based on points believed or known to have various habitat types and features based on aerial imagery from existing Geographical Information Systems (GIS) data as well as from local knowledge of the area. A total of 102 WHAP points were surveyed, all located on U.S. Army Corps of Engineers (USACE) fee property (Figures 1-5).

The purpose of this report is to describe wildlife habitat quality within the USACE Town Bluff Lake fee property. This report has been prepared by the USACE Regional Planning and Environmental Center to assist land classification designations for the 2023 Town Bluff Lake Master Plan Revision process.

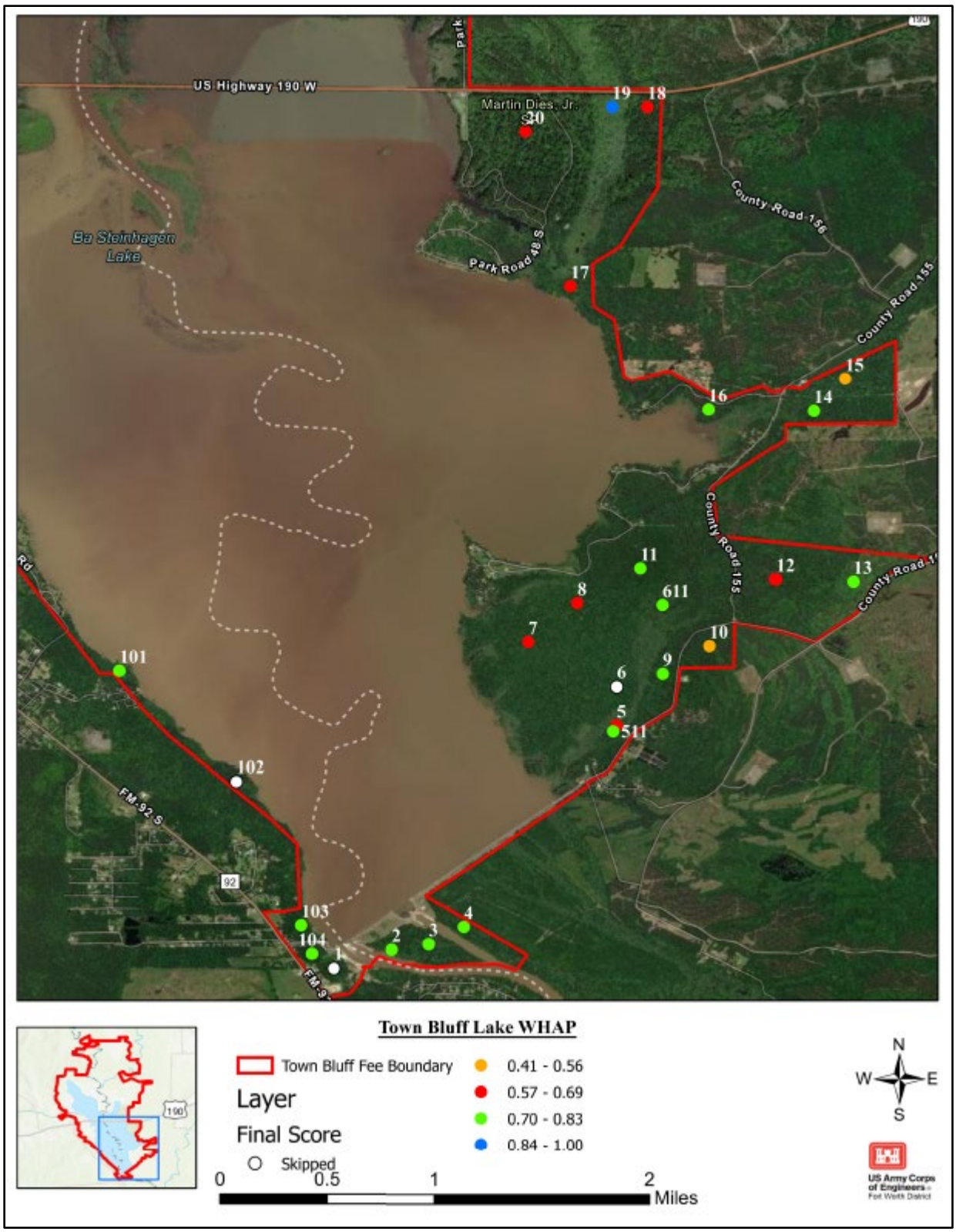


Figure 1. Distribution of WHAP Points and Their Associated Scores Within the Southern Area of Town Bluff Project.

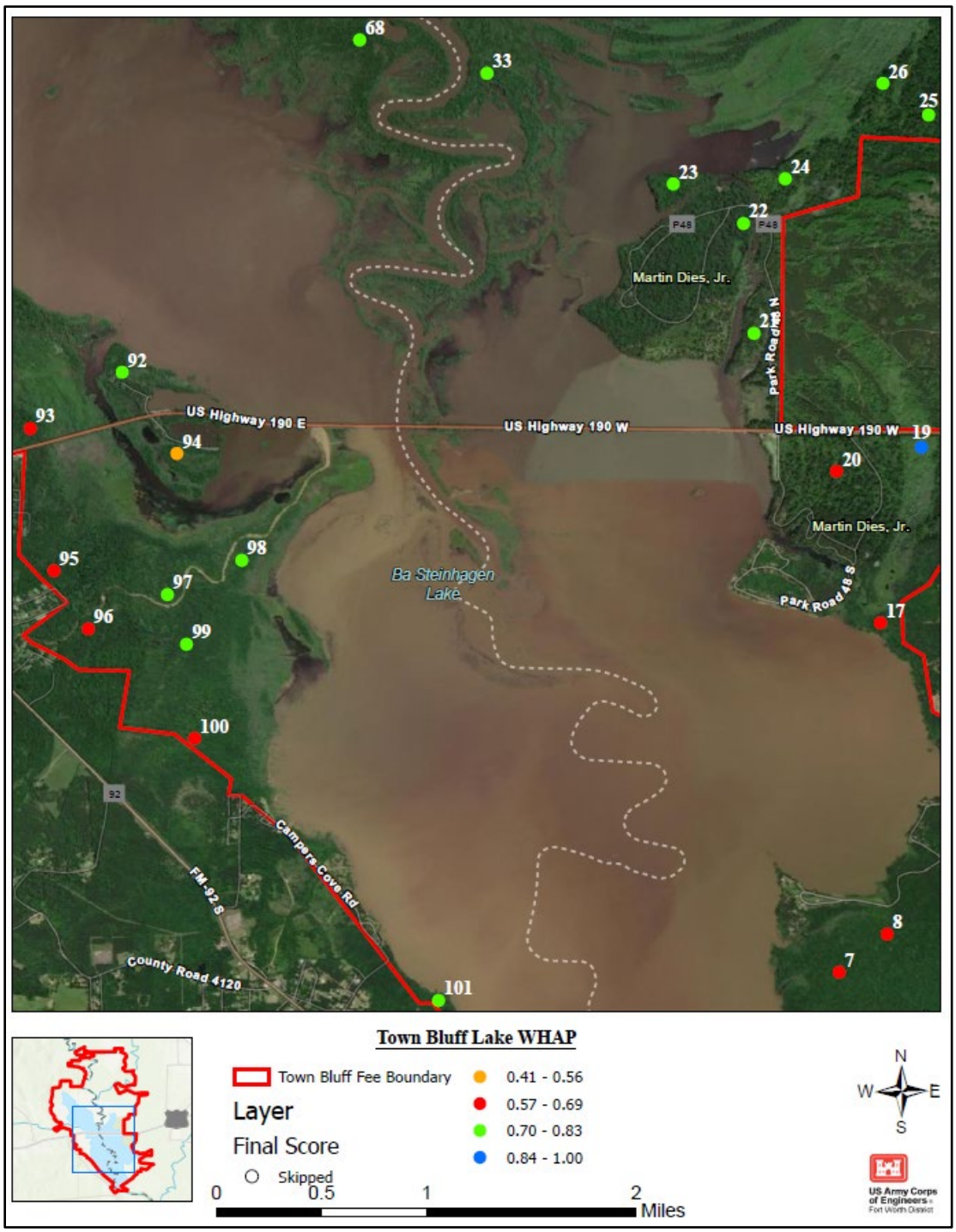


Figure 2. Distribution of WHAP Points and Their Associated Scores Within the Central Area of Town Bluff Project.

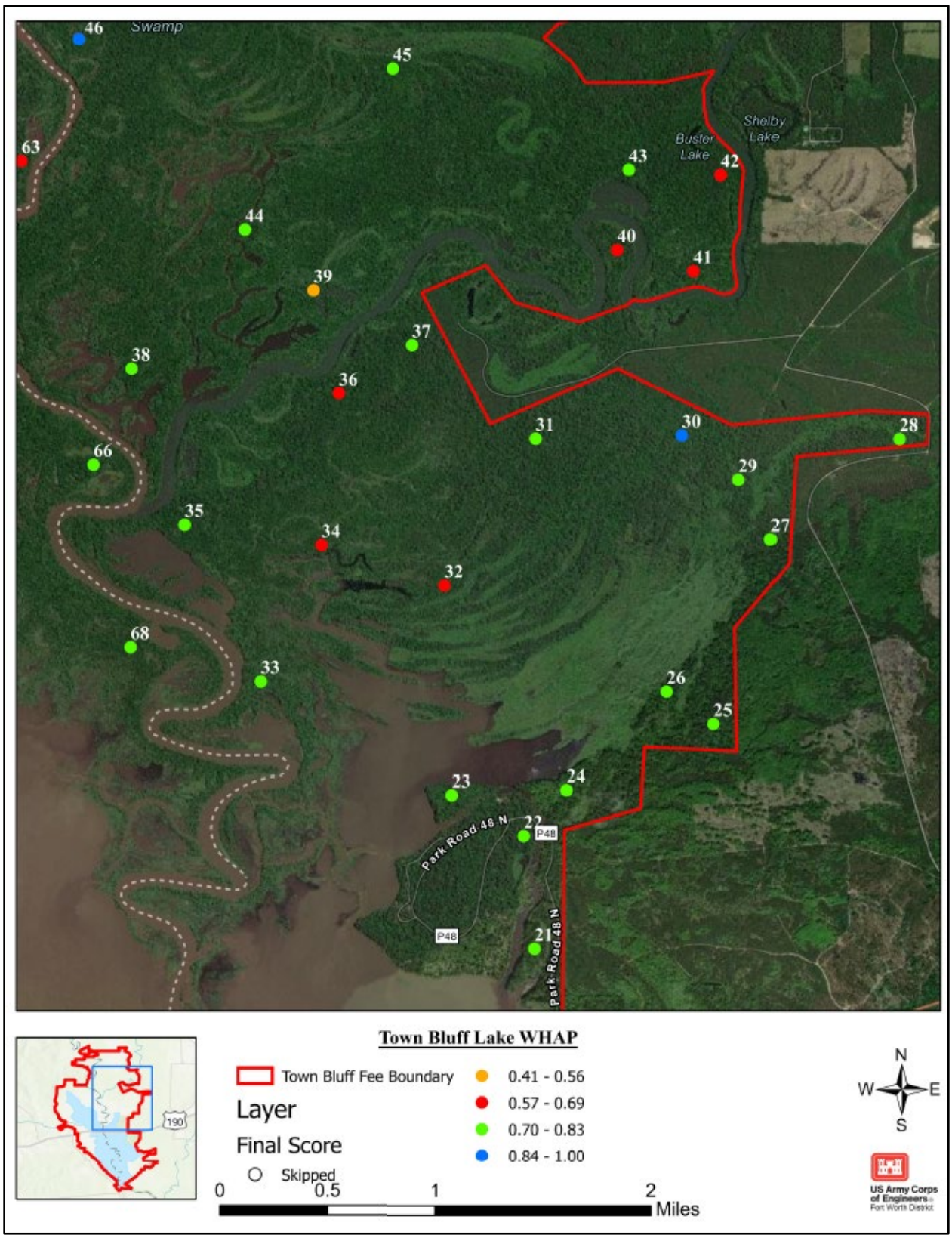


Figure 3. Distribution of WHAP Points and Their Associated Scores Located in the East Central Area of Town Bluff Project.

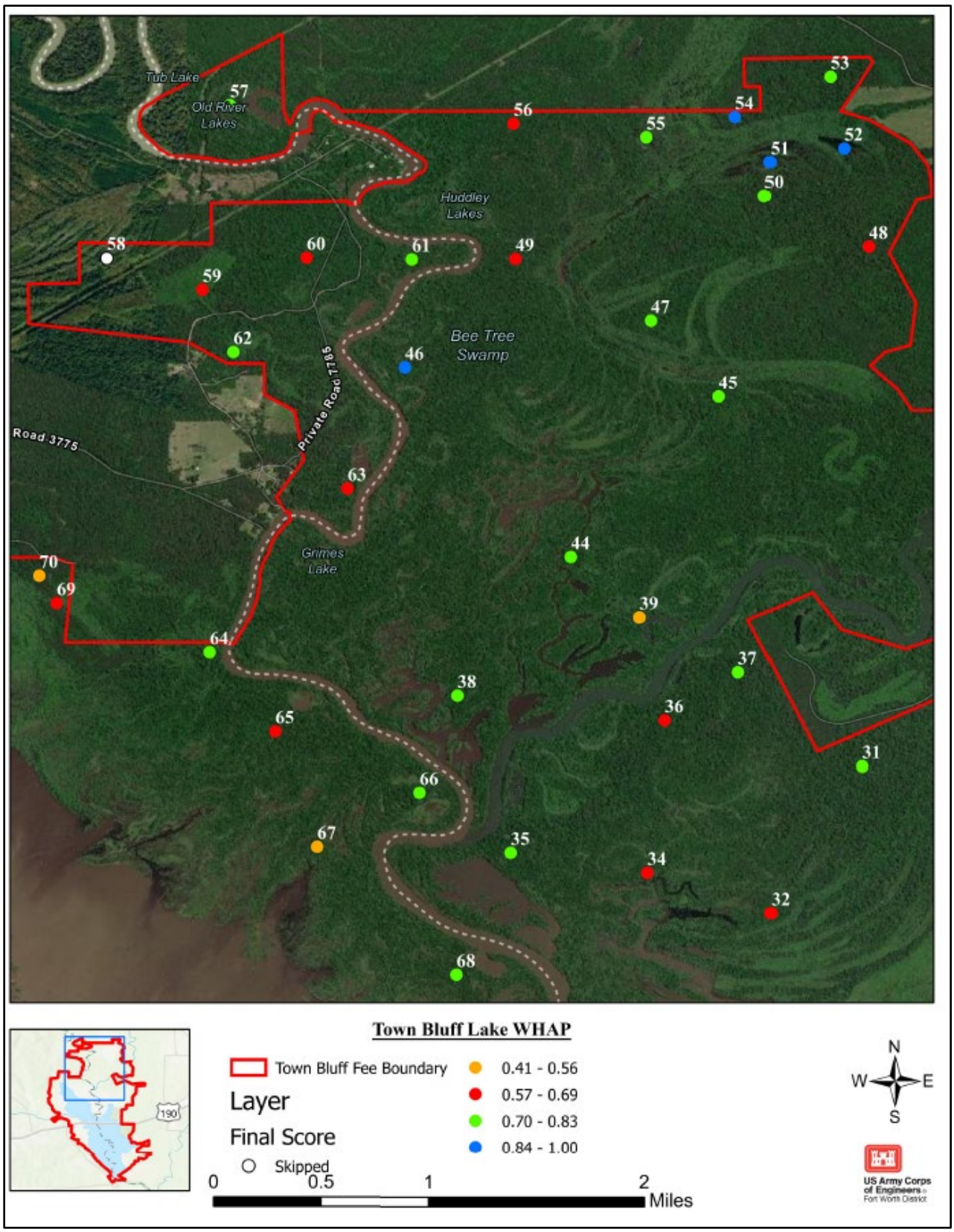


Figure 4. Distribution of WHAP Points and Their Associated Scores Located in the North Central Area of Town Bluff Project.

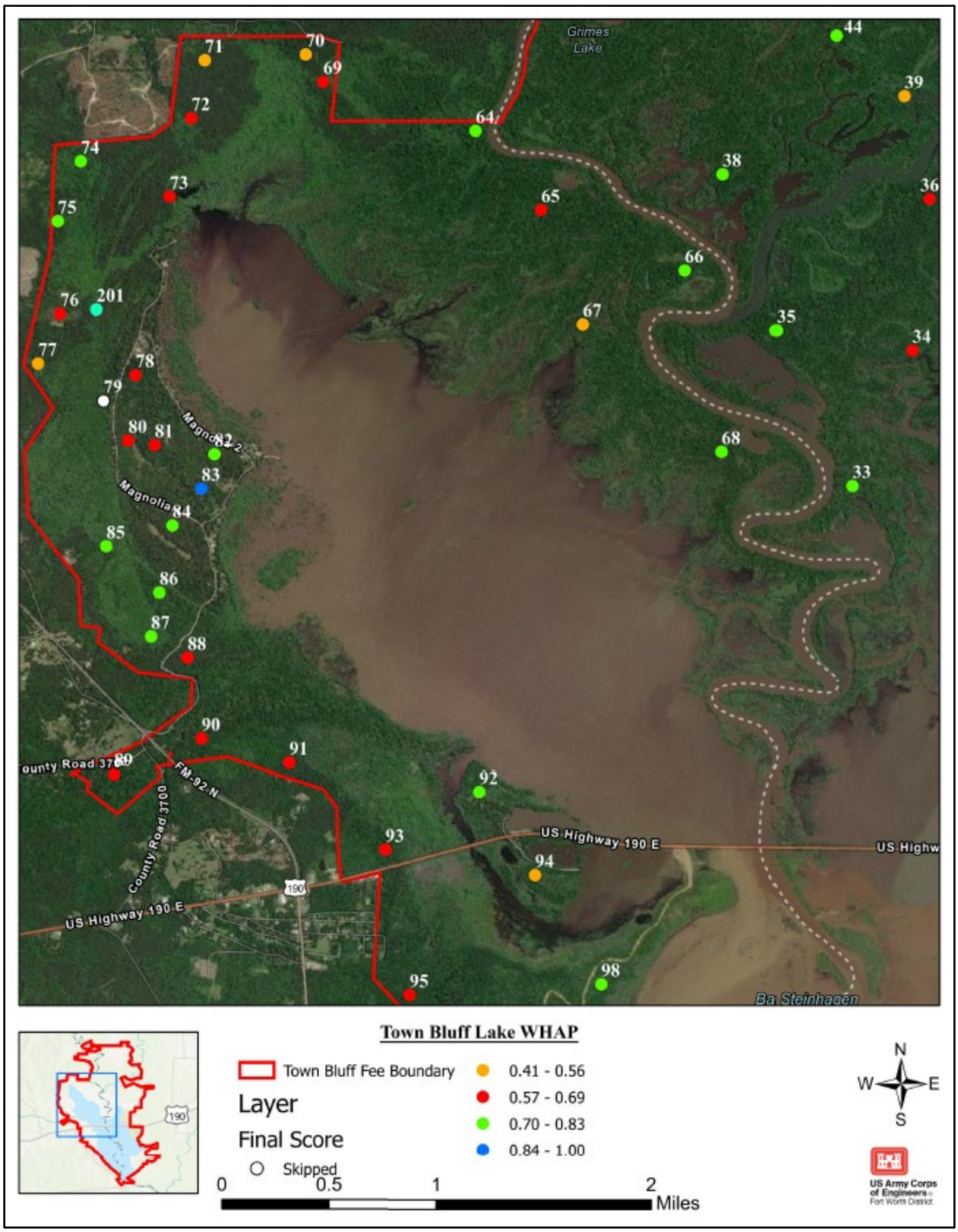


Figure 5. Distribution of WHAP Points and Their Associated Scores Located in the West Central Area of Town Bluff Project.

Study Area

USACE fee owned property at Town Bluff Lake, approximately 21,360 acres, is located just west of Jasper, Texas in the southeastern portion of Texas as displayed in Figure 6 below. More specifically, the lake is an impoundment on the Neches River located within the Southcentral Plains ecoregion primarily between the cities of Jasper and Woodville, Texas. The confluence of the Angelina and Neches River is located approximately 12 miles upstream of the impoundment and is included in fee property

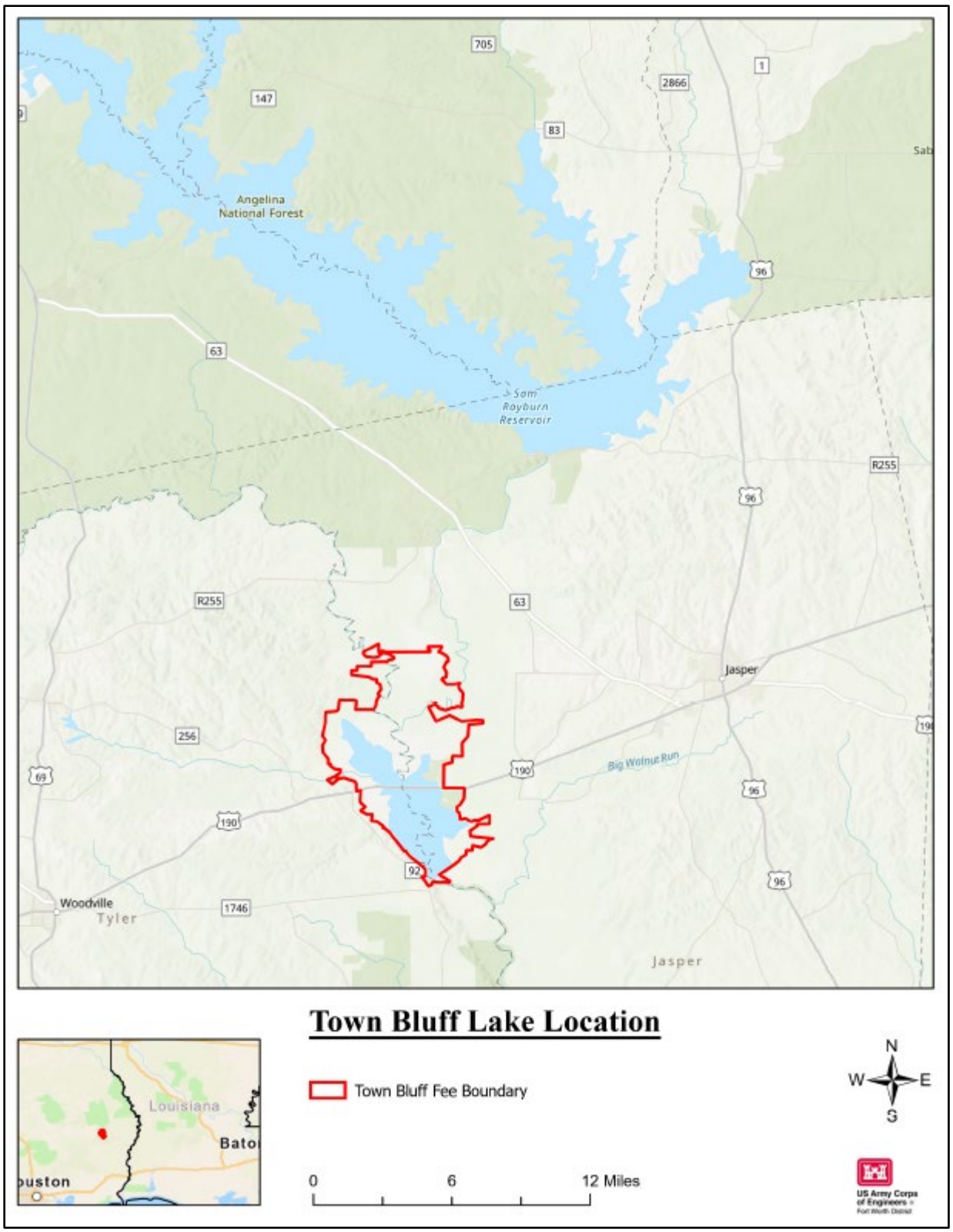


Figure 6. Town Bluff Project Vicinity Map

Methodology

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. The scores for each site can be found in Attachment A. 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 but overall is very useful for assessing forested wildlife habitat throughout the state.

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

Since the WHAP was designed and more applicable to bottomland forested habitat types, 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 and potentially can be undervalued. 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 three 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 (CN) 1	CN 2	CN 3	CN 4	CN 5	CN 6	CN 7	CN 7B	Maximum Total Score
Swamp	0.25	0.20	0.20	0.20	NA	0.05	0.10	NA	**1.00**
Riparian /BHF	0.25	0.20	0.20	0.15	0.05	0.05	0.05	0.05	**1.00**
Upland Forest	0.12	0.20	0.20	0.15	0.05	0.05	0.05	0.05	**0.87**
Grassland	0.12	0.12	0.20	0.0	0.04	0.01	0.05	0.05	**0.59**

Riparian/BHF habitats can achieve the maximum score, therefore, no normalization of scores were made for that habitat type. 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 riparian/BHF habitat was not normalized because it already can achieve the maximum score. 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.

Existing Wildlife Habitat

Town Bluff Project lies within the central part of the Floodplain and Low Terraces ecoregion (Level IV) (Environmental Protection Agency [EPA], 2023). The common tree species are: water oak (*Quercus nigra*), willow oak (*Quercus phellos*), sweetgum (*Liquidambar styraciflue*), blackgum (*Nyssa aquatica*), elm sp. (*Ulmus sp.*), red maple (*Acer rubrum*), southern red oak (*Quercas falcata*), swamp chestnut oak (*Quercus michauxii*), and loblolly pine (*Pinus taeda*). Flooded areas are typically dominated by bald cypress (*Taxodium distichum*) and blackgum.

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
Grassland	4
Riparian/BHF	52
Swamp	9
Upland Forest	37
Total Points Surveyed	**102**

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: Town Bluff Project WHAP Summary Results of this report.

Riparian/BHF (52 sampled) and upland forest (37 sampled) were the most abundant habitat types surveyed. Riparian/BHF scores ranged from 0.51 to 0.83 while upland forest scores ranged from 0.87 to 0.41. The lower minimum scores, especially for these normally drier habitats than the surrounding wetter habitats, may be partly due to recent drought that was going on at Town Bluff Project during the survey, thus potentially leading to reduced plant diversity. Lack of rain at higher elevations in almost certainly led to mortality of the typically upland species of herbaceous plant growth. This certainly affected survey metrics within the upland areas that rely on the frequent rains that are normal for the region.

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
Grassland	0.94	1.00	**0.81**
Riparian/BHF	0.69	0.83	**0.51**
Swamp	0.77	0.89	**0.64**
Upland Forest	**0.68**	**0.87**	**0.41**

Figures 1-5 show the range of total scores for all points surveyed (102 sampled) as well as 5 additional points that were skipped due to inaccessibility. Skipped points show a total score of 0 these figures. Overall, grassland exhibited the highest average total score (0.94) with riparian/BHF and upland forest habitats exhibiting average total score of 0.69 and 0.68, respectively. With such a close margin, these two habitats are equal in value, which supports the assumption that normalizing scores in evaluating habitat types on an equal basis.

Seven sites received a score of 0.84 or above, indicating higher quality habitat in comparison to other sites sampled. Three of the seven sites were grassland sites (sites 51. 52, and 54) and received a higher score mainly due to the presence of saline soils, which provides a higher site potential than what is typical for grasslands. However, saline soils inhibit woody growth otherwise these grassland areas may have become Riparian/ BHF habitat.

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 4 shows 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
Grassland	0.09	0.12	0.15
Riparian/BHF	0.19	0.20	0.12
Swamp	0.24	0.12	0.14
Upland Forest	0.13	0.20	0.11

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. The predominate thick soil surface layer that is common within Town Bluff Project is the main factor that upland forest sites scored so high in average site potential. WHAP sites with maximum site potential are shown in Figure 7.

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 over time 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 growth and development.

The Uniqueness and Relative Abundance component takes into consideration the rarity of a habitat or vegetative community and its abundance in the region. Current and past agricultural and forestry practices have significantly influenced the region's remaining habitat composition. Figure 9 displays the areas with the maxed out Uniqueness and Relative Abundance criteria.

In total, 3 points (51, 52, and 54) surveyed received a score over 0.90 indicating high quality habitat in comparison to all the other points. All these points were found grassland habitat, and they all had maxed scores for site potential.

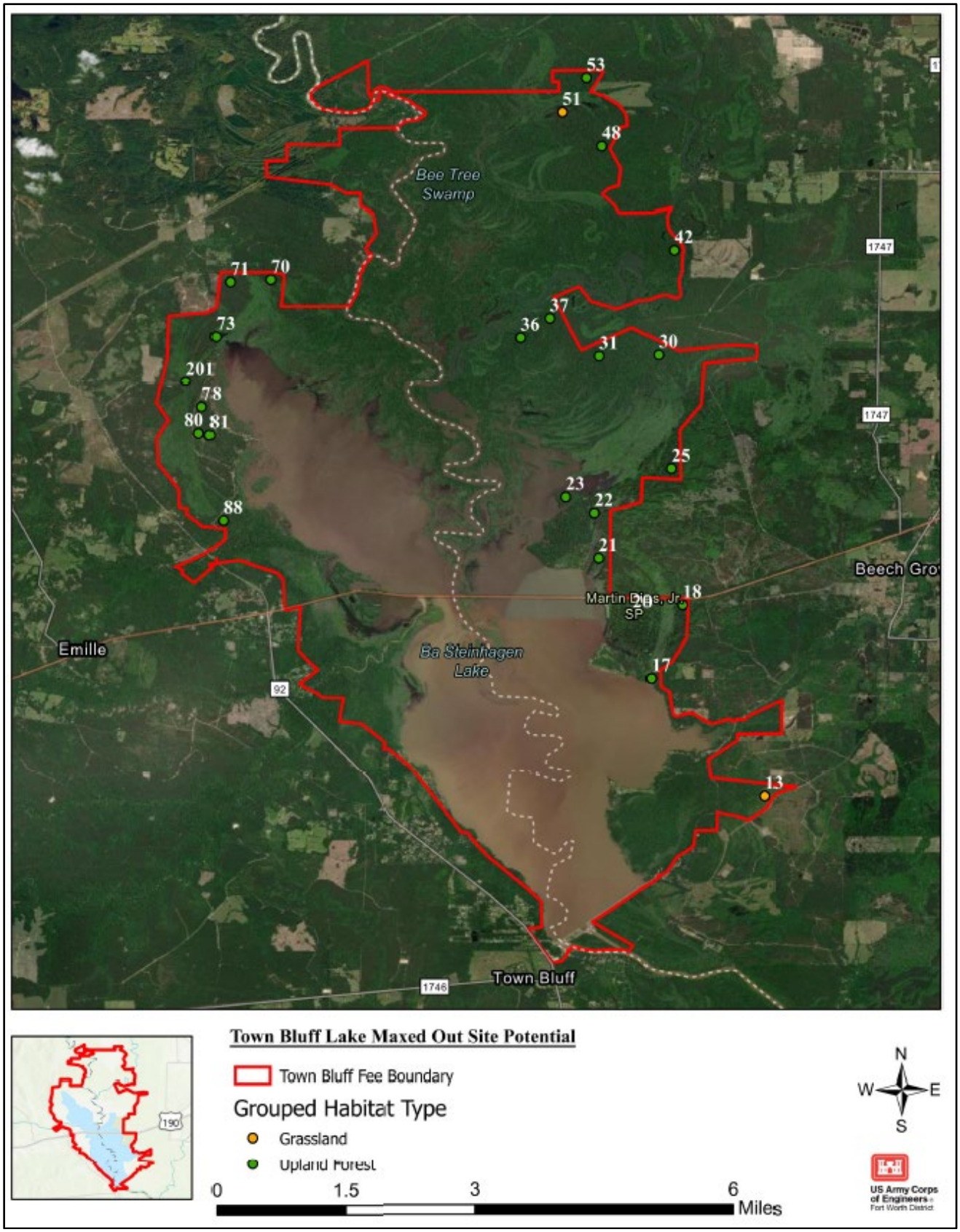


Figure 7. All Sites with Maxed Out Site Potential

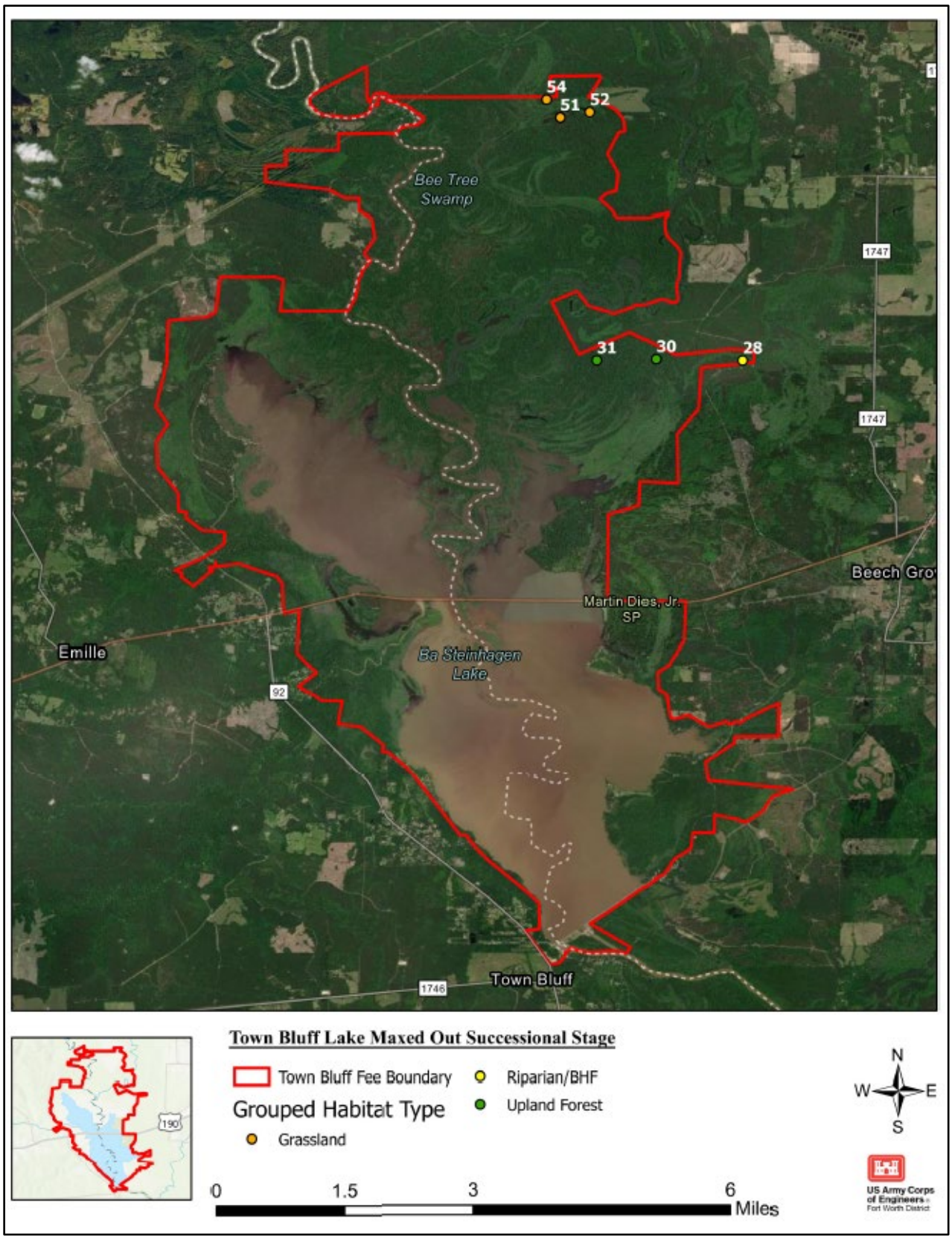


Figure 8. All Sites with Maxed Out Successional Stage

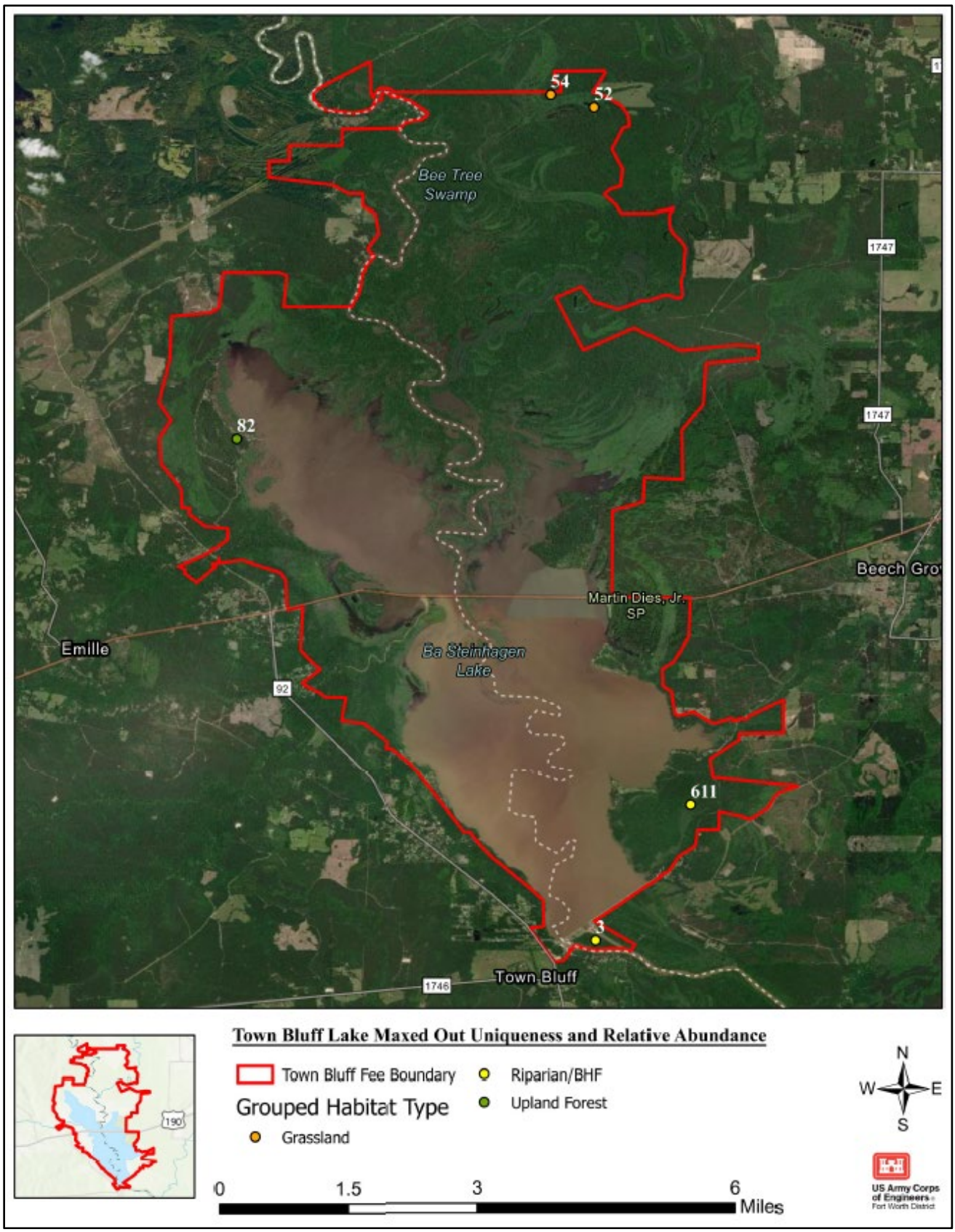


Figure 9. All Sites with Maxed Out Uniqueness and Relative Abundance.

Recommendations

Even with unplanned disturbances and without any management or passive management, there are several areas supporting valuable wildlife habitat existing on fee-owned property at Town Bluff Lake. USACE and TWPD (both Wildlife and State Parks Divisions) managed areas also represent proven effectiveness in maintaining quality wildlife habitat at the project.

When comparing overall high total WHAP scores between (0.84-1.00) (Figures 1-5) to Maximum Site Potential scores (Figure 7), no one area of the project was identified as to having these two components, but rather two individual points in upland forest habitat types scattered around the project (points 30, and 51). These sites are close to or have reached their maximum habitat potential. Most, if not all these areas likely require no management actions to reach their potential, but rather protection or passive management.

Likewise, sites with low WHAP scores that also have low site potential have likely reached their habitat potential; however minimal it might be. Management actions to improve these sites will likely achieve minimal results.

Conversely, areas with relatively low total WHAP scores between 0.41 – 0.56, but high Site Potential scores have the greatest potential for improvement. Management actions targeting native species diversity through habitat manipulation (e.g. prescribed fire, invasive species control, etc.) will likely result in more diverse, higher quality wildlife habitat. None of the points surveyed meet this criterion.

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 Town Bluff Lake Master Plan revision will consider WHAP scores when making land classification decisions.

References

Elliott, Lee F., David D. Diamond, C. Diane True, Clayton F. Blodgett, Dyan Pursell, Duane German, and Amie Treuer-Kuehn. 2014. Ecological Mapping Systems of Texas: Summary Report. Texas Parks & Wildlife Department, Austin, Texas.

Environmental Protection Agency (EPA). 2023. Ecoregion Download Files by State - Region 6-Texas. Retrieved from https://www.epa.gov/eco-research/ecoregion-download-files-state-region-6

Texas Parks and Wildlife Department (TPWD). 1995. Wildlife Habitat Appraisal Procedure (WHAP). Last revised January 12, 1995. Retrieved from https://tpwd.texas.gov/publications/pwdpubs/media/pwd_rp_w7000_0145.pdf

TPWD. 2020. Landscape Ecology Program: Ecological Mapping Systems. Retrieved from https://tpwd.texas.gov/landwater/land/programs/landscape-ecology/ems/

Attachment A: Town Bluff Project WHAP Results Summary

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
1	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	0.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2	Riparian/BHF	20	12	NA	15	5	5	NA	NA	4	5	3	1	NA	NA	70	0.7	0.70	0.70	American holly, decidious holly, yaupon holly, swamp privet, muscadine, hackberry, poison ivy, Chinese privet, smilax sp., Chinese tallow, trumpet vine, buckwheat vine,	NA	willow oak, water oak,	pecan,	sugar maple, American elm, water elm	bald cypress,	NA	sweetgum,	inland seaoats, snakeroot, sedge sp., carex sp., rosette grass,	NA
3	Riparian/BHF	25	12	NA	20	4	5	NA	NA	4	5	3	3	NA	NA	81	0.81	0.81	0.81	Chinese tallow, decidious tallow, trumpet creeper, dewberry, muscadine, red mulberry, peppervine, tupello, buckwheat vine,	NA	nutall oak, water oak	NA	NA	loblolly pine, bald cypress,	NA	Japanese climbing fern, sweetgum, tupelo,	snakeroot, Sebastian bush, inland seaoats, panicum sp., carex sp., smartweed, St. Andrew cross, fleabane	NA
4	Upland Forest	12	12	NA	15	5	7	NA	NA	4	5	3	3	NA	NA	66	0.66	0.76	0.76	American holly, smilax sp., possum hawholly, poison ivy, rubus sp., muscadine,yaupon holly, smilax sp., Chinese tallow, Chinaberry, American beautyberry, silverbell, Chinese privet, cherry laurel, black cherry, buckwheat vine,	NA	water oak, red oak, willow oak,	ironwood	NA	eastern redcedar	NA	tupelo, fern sp.,	unknown x2, rosette grass, sedge x2,	NA
5	Upland Forest	20	6	NA	10	3	3	NA	NA	3	3	5	1	NA	NA	54	0.54	0.62	0.62	Chinese tallow, southern magnolia,	NA	NA	American beech	NA	NA	NA	tupelo, sweetgum	carex sp., false salmon seal,	NA
6	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	0.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
7	Riparian/BHF	20	12	NA	10	3	5	NA	NA	5	5	3	1	NA	NA	64	0.64	0.64	0.64	Chinese tallow, yaupon holly, rubus sp.,	NA	water oak, willow oak	water hickory	American elm, red maple	NA	NA	sabel palmetto, sweetgum,	carex sp x2,	NA
8	Riparian/BHF	20	12	NA	10	4	5	NA	NA	5	5	3	3	NA	NA	67	0.67	0.67	0.67	American holly, yaupon holly, Chinese tallow, Caroline holly, grapevine sp., poison ivy, southern magnolia, smilax sp.,	NA	NA	mockernut hickory, ironwood,	white ash	NA	NA	sabel palmetto, sweetgum, resurrection fern, pokeweed	switchcane,inland seaoats, marsh fleabane, day flower	NA
9	Riparian/BHF	25	12	NA	15	5	1	NA	NA	5	3	5	3	NA	NA	74	0.74	0.74	0.74	Chinese tallow, buckwheat vine,	NA	NA	water hickory	NA	NA	NA	tupelo,	swamp smartweed, cottonmouth grass, wild sea oats, carex sp., goose grass	NA
10	Riparian/BHF	20	12	NA	10	2	3	NA	NA	4	1	3	1	NA	NA	56	0.56	0.56	0.56	American holly, yaupon holly, Carolina holly, smilax, sweetbay	NA	NA	NA	NA	loblolly pine	NA	tupelo, sabel palmetto,	carex sp.,	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
11	Riparian/BHF	20	12	NA	15	5	5	NA	NA	4	5	3	1	NA	NA	70	0.7	0.70	0.70	American beautyberry, parsley hawthorn, persimmon, yaupon holly, Chinese tallow, hawthorn sp., southern magnolia, buckwheat vine,	NA	willow oak	NA	green ash, slippery elm	loblolly pine,	NA	sweetgum,	carex sp x2	NA
12	Riparian/BHF	20	12	NA	10	6	5	NA	NA	4	3	3	1	NA	NA	64	0.64	0.64	0.64	American holly, Carolina holly, southern magnolia	NA	white oak, willow oak	ironwood,	green ash,	loblolly pine	NA	sabel palmetto, tupelo, sweetgum,	carex sp.,	NA
13	Grassland	12	3	NA	10	6	5	NA	NA	5	1	3	3	NA	NA	48	0.48	0.81	0.81	Chinese tallow, blackberry, yaupon holly, blueberry, southern dewberry, American holly,	NA	water oak, willow oak	wax myrtle,	green ash	loblolly pine	NA	sweetgum,	marsh fleabane, little bluestem, boneset, clustered beaksedge, woollygrass, unknown herb, dog fennel	NA
14	Riparian/BHF	20	12	NA	15	7	7	NA	NA	4	1	3	5	NA	NA	74	0.74	0.74	0.74	Chinese tallow, poison ivy, American holly, American beautyberry, smilax sp., grapevine, trumpet creeper,	tick clover,	white oak, water oak,	water hickory, ironwood,	slippery elm	loblolly pine, bald cypress	NA	fern sp x3,	Sebastian bush, chasmanthium sp., marsh fleabane, American dayflower, tick, lizard tail, St. John wort, smartweed, carex sp., cottonmouth grass	tributary to sandy creek
15	Riparian/BHF	12	6	NA	10	5	5	NA	NA	4	1	3	5	NA	NA	51	0.51	0.51	0.51	American holly, smilax sp., yaupon holly, grapevine sp., poison ivy, chinese tallow, southern magnolia	NA	NA	ironwood	American elm,	bald cypress	NA	sweetgum, Japanese climbing fern, lady ferm,	carex sp., chasmanthium sp, beggars tick, American dayflower, inland sea oats, unknown forb	sandy creek
16	Swamp	20	12	NA	15	5	NA	10	NA	5	3	3	5	NA	NA	78	0.78	0.78	0.78	grapevine, yaupon holly, Chinese tallow, smilax sp., pawpaw, American beautyberry, Caroline laurel cherry,	NA	water oak, white oak	ironwood	NA	loblolly pine, bald cypress	NA	sweetgum, salvania, eastern mosquito	chain weed, lizard tail, carex sp., beak sedge, duck potato, switchcane	NA
17	Upland Forest	12	12	NA	15	6	5	NA	NA	4	0	3	0	NA	NA	57	0.57	0.66	0.66	yaupon holly, cherry laurel, American holly, smilax sp., Carolina buckthorn, grapevine, Chinese tallow, southern	NA	white oak,	American beech,	American elm, red maple,	loblolly pine,	NA	sweetgum,	Sebastian bush, chasmanthium sp.,	NA
18	Upland Forest	12	12	NA	10	4	3	NA	NA	4	5	3	1	NA	NA	54	0.54	0.62	0.62	yaupon holly, grapevine, sweetleaf, southern magnolia, trumpet creeper	NA	black oak,	NA	NA	loblolly pine,	NA	tupelo, sweetgum,	dicanthelium sp.,	NA
19	Swamp	25	12	NA	15	5	NA	15	NA	4	5	3	5	NA	NA	89	0.89	0.89	0.89	Chinese tallow, climbing hempvine,	NA	nutall oak,	NA	red maple, green ash	bald cypress	NA	sabel palmetto, chain fern,	cardinal flower, marsh ladies tresses, lizards tail, poinsettia, carex sp., catchfly, grass sp., smart weed, St. Johns wort, pennywort, chasmanthium sp., sagittaria sp., false nettle, cottonmouth grass, juncus sp.,	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
20	Upland Forest	12	6	NA	10	5	5	NA	NA	4	1	3	3	NA	NA	49	0.49	0.56	0.56	Chinese tallow, American holly, southern magnolia, trumpet creeper,	NA	willow oak, swamp chestnut oak,	mockernut hickory, ironwood,	red maple, American elm, white ash	NA	NA	tupelo,	carex sp., chasmanthium sp.,switchcane,	NA
21	Upland Forest	12	12	NA	15	6	7	NA	NA	4	5	3	1	NA	NA	65	0.65	0.75	0.75	southern magnolia, dogwood, yaupon holly, American holly, muscadine, smilax sp., American beautyberry, Carolina buckthorn, unknown berry, sweet leaf, Chinese tallow, alder sp, black cherry , red mulberry, vine sp, hawthorn sp x3, buckwheat vine,	NA	white oak, water oak, oak sp.,	hickory sp., wax myrtle,	winged elm, red maple,	loblolly pine, bald cypress	NA	sweetgum,	Sebastian bush, chasmanthium sp., sedge sp.,	NA
22	Upland Forest	12	12	NA	15	6	7	NA	NA	4	5	3	3	NA	NA	67	0.67	0.77	0.77	crossvine, poison ivy, American beautyberry, southern magnolia, yaupon holly, muscadine, silverbell, sweet leaf, smilax sp., devil walking stick, American holly, Chinese tallow, Chinese privet, chinaberry, Virginia creeper, pawpaw, rubus sp., passion vine,	NA	water oak,	beech, ironwood, hickory sp.,	sugar maple, American elm	loblolly pine,	NA	sabel palmetto, sweetgum, tupelo,	Sebastian bush, unknown x2, false nettle, sedge sp., dog fennel, rosette grass	NA
23	Upland Forest	12	12	NA	15	5	7	NA	NA	4	3	3	1	NA	NA	62	0.62	0.71	0.71	southern magnolia, Chinaberry, sweetleaf, yaupon holly, smilax sp., muscadine, alder sp., crossvine, buckwheat vine,	NA	red oak, oak sp.,	hickory sp.,	sugar maple, white ash, American elm,	NA	NA	Spanish moss,	chasmanthium sp., rosette grass	NA
24	Riparian/BHF	20	12	NA	15	6	7	NA	NA	5	5	3	5	NA	NA	78	0.78	0.78	0.78	American holly, smilax sp., crossvine, devil walking stick, yaupon holly, Virginia creeper, muscadine, American beautyberry, southern magnolia, Chinese tallow,	NA	oak sp., water oak	ironwood, wax myrtle	green ash, American elm, Florida maple, winged elm, red maple,	bald cypress, loblolly pine	NA	sabel palmetto, tupelo, sweetgum,	vaccinum sp., chasmanthium sp., switchgrass, fern x2, sedge x3, lizard tail, rosette grass, false nettle	NA
25	Upland Forest	12	12	NA	15	6	7	NA	NA	5	3	**5**	3	NA	NA	68	0.68	0.78	0.78	southern magnolia, American holly, American beautyberry, yaupon holly, fetterbush, muscadine, poison ivy, Chinese tallow, crossvine, smilax sp., muscadine, poison ivy,climbing hempvine, Chinese tallow, crossvine, smilax sp	NA	red oak, oak sp., water oak,	beech, ironwood, hickory sp.,	Florida maple, red maple,	loblolly pine,bald cypress	NA	resurrection fern, Japenese climbing fern, sabel palmetto, fern sp.,	unknown sp, chasmanthium sp., fleabane, lizard tail, switchcane, rosette grass, grass sp.,	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
26	Riparian/BHF	20	12	NA	15	6	7	NA	NA	5	5	3	5	NA	NA	78	0.78	0.78	0.78	southern magnolia,persimmon, swamp tupello, American holly, muscadine, parsley hawthorn, yaupon holly, vaccinium, crossvine, Chinese tallow, partidge berry, American beautyberry, smilax sp.,	NA	water oak	hickory sp., beech, wax myrtle,	Florida maple, red maple, eastern hophorn, red maple, ash sp.,	loblolly pine, bald cypress	NA	tupelo, sabel palmetto,	Sebastian bush, switch cane, chasmanthium sp., grass sp x2, sedge sp x3, pennywort	NA
27	Riparian/BHF	20	12	NA	15	6	7	NA	NA	5	3	3	5	NA	NA	76	0.76	0.76	0.76	parsley hawthorn, American holly, hawthorn sp., crossvine, yaupon holly, American beautyberry, smilax sp x2, silverbell, trumpet creeper, rubus sp., poison ivy, muscadine,	NA	red oak, willow oak, oak sp., water oak,	hickory sp., ironwood	winged elm, maple sp.,	loblolly pine, bald cypress	NA	tupelo, sweetgum, fern sp,	Sebastian bush, unknown sp x2, sedge sp x3, chasmanthium sp., switchcane, rosette grass, grass sp., inland woodland oats	NA
28	Riparian/BHF	20	20	NA	15	6	7	NA	NA	5	5		5	NA	NA	83	0.83	0.83	0.83	American holly, rattan vine, Chinese tallow, hawthorn sp., yaupon holly, smilax sp., crossvine, dewberry, poison ivy, pepper vine, Chinese privet, Virginia sweetspire, buckwheat vine	NA	water oak, swamp chestnut oak	wax myrtle, ironwood,	winged elm, red maple, green ash, American elm,	bald cypress, loblolly pine	NA	sweetgum, Japanese climbing fern, fern sp x2,	Sebastian bush, unknown sp x 3, switch cane, sedge sp., chasmanthium sp., grass sp., smart weed, dog fennel, rosette grass, oxalis sp., violet sp.,	NA
29	Riparian/BHF	20	12	NA	15	5	7	NA	NA	5	5	3	5	NA	NA	77	0.77	0.77	0.77	Chinese tallow, American holly, black cherry, smilax sp, possumhaw, American beauty berry, trumpet creeper,	NA	oak sp., white oak, water oak,	ironwood,hickory sp.,	American elm, red maple, hophorn, elm sp., Florida maple, red maple,	NA	NA	sweetgum, tupelo, palmetto,	unknown sp x5, switch sedge, sedge sp x6, violet sp., chasmanthium sp x 2, snailseed, smartweed, lizard tail, unknown grass	NA
30	Upland Forest	12	20	NA	10	7	7	NA	NA	5	5	3	5	NA	NA	74	0.74	0.85	0.85	muscadine, Chinese tallow, smilax sp., hawthorn sp., buckthorn bully, trumpet creeper, American beautyberry, poison ivy, vaccinium sp., yaupon holly,	legume sp., water locust	water oak, swamp chestnut oak, laurel oak, red oak	shagbark hickory, ironwood	green ash, American elm,	loblolly pine, bald cypress	NA	tupelo, sweetgum, spanish moss, fern sp.,	Sebastian bush, unknown sp x 2, sedge sp x2 , switch cane, smartweed, chasmanthium sp., juncus sp., grass sp.,	NA
31	Upland Forest	12	20	NA	10	6	7	NA	NA	5	5	3	3	NA	NA	71	0.71	0.82	0.82	muscadine, silverbell, yaupon holly, crossvine, American beautyberry, sweetleaf, smilax spx2, buckwheat vine,	NA	oak sp.,white oak, water oak, red oak,	shagbark hickory, ironwood	maple sp., winged elm, ash sp.,	loblolly pine,	NA	tupelo, sweetgum, fern sp x3,	switch cane, chasmanthium sp., sedge sp., rosette grass	NA
32	Riparian/BHF	20	6	NA	10	6	5	NA	NA	10	5	5	1	NA	NA	68	0.68	0.68	0.68	silverbell, yaupon holly, muscadine, rubus sp., smilax sp., American holly	NA	water oak,	hickory sp., ironwood,	toothache tree, winged elm,	loblolly pine,	NA	sweetgum, fern sp.,	bunch grass	NA
33	Swamp	25	12	NA		6	NA	15	NA	5	3	3	3	NA	NA	72	0.72	0.72	0.72	Chinese tallow, American holly, poison ivy, peppervine, trumpet creeper, American holly, rattan vine, yaupon holly, rubus sp., elder berry	NA	water oak,	NA	red maple,	bald cypress	American sycamore,	Japanese climbing fern, fern sp., sweetgum	alligator sp., common salvania, camphor weed, lizard tail, bunch grass	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
34	Riparian/BHF	20	6	NA	10	5	5	NA	NA	5	5	5	5	NA	NA	66	0.66	0.66	0.66	Chinese tallow, persimmon, smilax sp., rattan vine	NA	willow oak, water oak,	NA	red maple,	bald cypress,	NA	sweetgum, fern sp.,	rye grass, camphor weed, bunch grass, sedge sp., lizard tail	NA
35	Riparian/BHF	25	12	NA	15	4	5	NA	NA	4	5	5	0	NA	NA	75	0.75	0.75	0.75	persimmon, Chinese tallow, trumpet creeper, rattan vine	NA	overcup oak, water oak, willow oak	hickory sp., pecan,	American elm, ash sp.,	NA	NA	NA	NA	NA
36	Upland Forest	12	12	NA	10	4	5	NA	NA	5	3	3	1	NA	NA	55	0.55	0.63	0.63	yaupon holly, American holly, muscadine, American beauty berry, smilax sp, peppervine, unknown woody	NA	NA	ironwood	green ash, American elm,	NA	NA	sweetgum,	giant cane, poke weed, rush sp	NA
37	Upland Forest	12	12	NA	10	6	5	NA	NA	5	5	3	3	NA	NA	61	0.61	0.70	0.70	parsley hawthorn, smilax sp x 2, American holly, possumhaw holly, Chinese tallow, trumpet creeper, American beautyberry, crossvine, hawthorn sp., yaupon holly, muscadine, poison ivy, persimmon, buckwheat vine,	NA	willow oak, red oak, oak sp., water oak,	hickory sp., ironwood,	American elm, winged elm, red maple,	loblolly pine	NA	sweetgum, tupelo, grape fern, resurrection fern, fern sp.,	Sebastian bush, unknown x1, chasmanthium sp., American aster, rosette grass, sedge sp., switch cane,	NA
38	Swamp	25	6	NA	10	6	NA	15	NA	5	5	3	3	NA	NA	78	0.78	0.78	0.78	Chinese tallow, Persimmon, decidious holly, rattan vine	locust sp.,	water oak, swamp chestnut oak, nutall oak	NA	American elm,	bald cypress	NA	sweetgum, tupelo	camphorweed, dogfennel, paspalum sp., panicum sp., unknown herb	NA
39	Riparian/BHF	12	12	NA	10	4	3	NA	NA	4	3	3	0	NA	NA	51	0.51	0.51	0.51	American holly, muscadine, unknown vine, silverbell	NA	cherrybark oak,	ironwood	NA	NA	NA	sweetgum, tupelo,	unknown herb	NA
40	Riparian/BHF	12	12	NA	10	7	7	NA	NA	4	5	5	1	NA	NA	63	0.63	0.63	0.63	American holly, Carolina luaurel cherry, yaupon holly, summer grape, muscadine, unknown woody x 2, poison ivy, American beautyberry, smilax sp., sweatleaf	NA	water oak,	ironwood	American elm,	loblolly pine,	sycamore,	sweetgum, fern sp.,	paspalum sp.	NA
41	Riparian/BHF	20	12	NA	10	5	5	NA	NA	4	3	3	1	NA	NA	63	0.63	0.63	0.63	American holly, yaupon holly, sweet leaf, muscadine, smilax sp., American beautyberry, unknown tree x 2	NA	cherrybark oak,	ironwood,	green ash, American elm,	NA	NA	sweetgum, tupelo,	paspalum sp.,	NA
42	Upland Forest	12	6	NA	10	2	7	NA	NA	5	3	3	1	NA	NA	49	0.49	0.56	0.56	yaupon holly, American holly, smilax sp., American beautyberry, pawpaw, decidious holly, muscadine, silverbell, poison ivy,	NA	water oak, white oak, red oak,	ironwood	red maple,	loblolly pine,	NA	tupelo, sweetgum,	chasmmanthium sp., rosette grass, sedge sp.,	NA
43	Riparian/BHF	20	12	NA	15	5	5	NA	NA	4	3	5	1	NA	NA	70	0.7	0.70	0.70	sweet leaf, American holly, crossvine, black cherry,	NA	swamp chestnut oak, water oak, decidious oak	pecan,	red maple,	NA	NA	tupelo, fern sp.,	giant cane, giant cane	NA
44	Riparian/BHF	20	12	NA	15	6	7	NA	NA	5	5	3	5	NA	NA	78	0.78	0.78	0.78	Chinese tallow, trumpet creeper, decidious holly, persimmon, American holly, unknown vine, trumpet creeper,	NA	swamp chestnut oak, willow oak, overcup oak,	ironwood,	green ash,	bald cypress,	NA	sweetgum, tupelo, Spanish moss	unknown grass, rush sp., lizard tail, fennel sp., wire grass, purple tridens, camphorweed, panicum sp., unbrella sedge, sedge sp	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
45	Riparian/BHF	20	12	NA	15	6	5	NA	NA	4	5	3	1	NA	NA	71	0.71	0.71	0.71	Chinese tallow, decidious holly, American holly,	NA	swamp chestnut oak, willow oak, water oak	ironwood,	NA	loblolly pine	NA	tupelo,sweetgum,	wire grass, unknown grass sp. X 2, southern pokeweed,	NA
46	Swamp	25	12	NA	15	6	NA	15	NA	4	5	3	1	NA	NA	86	0.86	0.86	0.86	smilax sp., Chinese tallow, trumpet creeper, unknown woody	NA	overcup oak,	pecan, ironwood,	slippery elm, American elm	bald cypress,	NA	sweetgum	paspalum sp.,	NA
47	Riparian/BHF	20	12	NA	15	5	5	NA	NA	5	5	3	1	NA	NA	71	0.71	0.71	0.71	Chinese tallow, yaupon holly, American holly, sweetleaf, muscadine, smilax sp., blueberry	NA	swamp chestnut oak, water oak,	ironwood,	toothache tree, red maple	NA	NA	tupelo, sweetgum,	wire grass	NA
48	Upland Forest	12	6	NA	10	6	7	NA	NA	4	3	3	1	NA	NA	52	0.52	0.60	0.60	American holly, silverbell, muscadine, yaupon holly, decidious holly, American hornbeam, Chinese tallow, vaccinium sp., rubus sp., smilax sp., American beautyberry, crossvine, pidgeon berry, buckwheat vine	NA	swamp chestnut oak, water oak, red oak, white oak,	hickory sp., ironwood,	winged elm, red maple	loblolly pine,	NA	sweetgum, tupelo, sabel palmetto, fern sp., sedge sp.,	chasmmanthium sp., rosette grass	NA
49	Riparian/BHF	20	12	NA	10	4	7	NA	NA	5	5	3	1	NA	NA	67	0.67	0.67	0.67	yaupon holly, muscadine, trumpet creeper, smilax x 2, decidious holly, hawthorn sp., unknown vine	NA	overcup oak, willow oak, water oak, swamp chestnut oak	NA	cedar elm, green ash,	NA	NA	sabel palmetto	paspalum sp.,	NA
50	Riparian/BHF	20	12	NA	15	8	7	NA	NA	4	5	3	1	NA	NA	75	0.75	0.75	0.75	sweetleaf, Chinese tallow, vaccinium sp., muscadine, American holly, silverbell, smilax sp., yaupon holly, American beautyberry, parsley Hawthorn, buckwheat vine, crossvine, hackberry, boneset	honey locust,	water oak, post oak, swamp chestnut oak, white oak,	hickory sp, ironwood	red maple,	loblolly pine,	baccharis sp.,	tupelo, sweetgum, sabel palmetto, fern sp.,	chasmanthium sp., rosette grass, sedge sp.,	NA
51	Grassland	12	12	NA	10	6	5	NA	NA	5	3	3	5	NA	NA	61	0.61	1.03	1.00	hawthorn sp., smilax sp., buckwheat vine	mimosa sp., honey locust, sesbania	post oak, red oak,	NA	cedar elm, ash sp.,	bald cypress	NA	sabel palmetto,	unknown herb x 3, long tridens, American aster, sedge sp., wooly croton, bermuda grass, swamp milkweed, rosette grass,	NA
52	Grassland	7	12	NA	20	6	5	NA	NA	3	3	3	5	NA	NA	64	0.64	1.08	1.00	hawthorn sp., gum bumelia, smilax sp.,	mimosa sp., honey locust	water oak	NA	cedar elm, ash sp., winged elm	loblolly pine,	NA	sabel palmetto, Spanish moss, unknown fern,	dogbane, unknown forb x 2, long tridens, sesbania sp., American Aster sp., wooly croton, bermuda grass, rosette grass, tridens x2, sedge sp., coreopsis sp., sneeze weed, panicum sp.,	NA
53	Upland Forest	12	12	NA	10	6	7	NA	NA	5	3	3	5	NA	NA	63	0.63	0.72	0.72	American holly, possumhaw holly, yaupon holly, American beautyberry, black cherry, vaccinium sp., pawpaw, sweet leaf, muscadine, parsley hawthorn, crossvine, smilax sp.,	NA	water oak, white oak, post oak, swamp chestnut oak,	hickory, wax myrtle, ironwood	winged elm, red maple	loblolly pine,	NA	tupelo	Sebastian bush, unknown x3, chasmanthium sp., sedge sp., rosette grass, angelpod,	NA
54	Grassland	7	12	NA	20	6	3	NA	NA	3	1	0	3	NA	NA	55	0.55	0.93	0.93	yaupon holly, smilax sp.,	honey locust, mimosa sp.,	post oak,	NA	cedar elm,	loblolly pine, eastern red cedar,	NA	Spanish moss,	unknown forb, sneeze weed, wooly croton, long tridens, American aster, little bluestem, bermuda grass, golden rod, sedge sp., rosette grass, panic grass	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
55	Riparian/BHF	20	12	NA	15	7	7	NA	NA	5	5	3	5	NA	NA	79	0.79	0.79	0.79	yaupon holly, hawthorn sp., parsley hawthorn, American Beautyberry, rusty blackhaw, yaupon holly, possumhaw, American holly, muscadine, smilax sp.,	honey locust,	post oak, water oak	hickory sp.,	cedar elm, winged elm	loblolly pine, eastern red cedar,	NA	sabel palmetto, sweetgum, resurection fern	Sebastian bush, fleabane sp., sedge sp., goldenrod, ragweed, rosette grass, oxalis sp., American aster, sneeze weed, long tridens	NA
56	Riparian/BHF	20	6	NA	10	7	7	NA	NA	5	5	3	5	NA	NA	68	0.68	0.68	0.68	Chinese tallow, smilax sp., elderberry, rubus sp., peppervine, buckwheat vine,	honey locust,	willow oak, post oak, southern red oak,	NA	green ash, American elm, slippery elm	loblolly pine,	baccharis sp.,	sabel palmetto, sweetgum,	dog fennel, smartweed, sedge sp x2, juncus sp., goldenrod, sesbania sp., croton sp., panicum sp., long tridens, unknown herb	NA
57	Riparian/BHF	20	12	NA	15	6	7	NA	NA	4	5	3	3	NA	NA	75	0.75	0.75	0.75	American holly, muscadine, yaupon holly, smilax sp., possum hawholly, crossvine, rusty blackhaw, silverbell, parsley hawthorn, buckwheat vine,	NA	overcup oak, water oak, swamp chestnut oak	hickory sp., ironwood,	winged elm, Florida maple,	bald cypress,	NA	tupelo, sweetgum, buttonbush,	Sebastian bush, switchcane, inland seaoats, seaoats sp., sedge sp., unknown dicot,	NA
58	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	0.00	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
59	Swamp	25	12	NA	15	2	NA	NA	NA	3	1	3	3	NA	NA	64	0.64	0.64	0.64	Chinese tallow,	NA	NA	NA	NA	bald cypress	NA	tupelo,	St. John Wort, false nettle	NA
60	Riparian/BHF	20	6	NA	10	5	5	NA	NA	5	5	3	3	NA	NA	62	0.62	0.62	0.62	American holly, yaupon holly, Chinese tallow, sweet leaf, smilax sp., deciduous holly, sweet bay,	honey locust	water oak, willow oak, swamp chestnut oak,	NA	green ash,	NA	NA	tupelo, sweetgum,	carex sp., switchcane, fleabane, unknown herb, carex bushii	NA
61	Riparian/BHF	20	12	NA	15	6	7	NA	NA	4	5	3	5	NA	NA	77	0.77	0.77	0.77	American Holly, trumpet creeper, buckwheat vine,muscadine, Chinese tallow, smilax sp., yaupon holly, pepper vine, sweet leaf,	NA	water oak,	pecan, ironwood,	NA	bald cypress,	American sycamore,	sweetgum	fern sp., St. John Wort, panicum sp., marsh fleabane, false nettle, carex sp., licorice weed, unknown herb,	NA
62	Riparian/BHF	20	12	NA	10	6	7	NA	NA	5	5	3	3	NA	NA	71	0.71	0.71	0.71	muscadine, Virginia creeper, smilax sp., American beautyberry, crossvine, trumpet vine, peppervine, highbush blueberry	NA	swamp chestnut oak, water oak	ironwood	red maple, sweet bay, white ash,	loblolly pine, bald cypress	NA	tupelo, sweetgum,	carex sp x 2, grass sp., Sebastian bush, dogbane	NA
63	Swamp	25	12	NA	15	2	NA	6	NA	4	3	0	1	NA	NA	68	0.68	0.68	0.68	unknown berry,	NA	NA	NA	NA	bald cypress	NA	buttonbush, salvinia	marsh pennywort	NA
64	Riparian/BHF	20	12	NA	15	6	7	NA	NA	4	3	3	1	NA	NA	71	0.71	0.71	0.71	American holly, Carolina Laurel cherry, black cherry, yaupon holly, silverbell, poison ivy, unknown vine, muscadine, mulberry, smilax, sweetleaf, laurel cherry	NA	water oak,	American beech,	green ash, river birch	NA	sycamore,	tupelo,	paspalum sp., bunch grass	NA
65	Riparian/BHF	20	12	NA	10	5	7	NA	NA	5	3	3	1	NA	NA	66	0.66	0.66	0.66	decidious holly, American holly, parsley hawthorn, sparkleberry, sweetleaf, smilax sp., muscadine	NA	water oak, willow oak, cherry bark oak, swamp chestnut oak,	ironwood, wax myrtle,	NA	bald cypress,	NA	sweetgum,tupelo	giant cane,	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
66	Riparian/BHF	20	12	NA	10	5	7	NA	NA	5	5	5	3	NA	NA	72	0.72	0.72	0.72	decidious holly, smilax sp., buckwheat vine, muscadine, poison ivy, trumpet creeper, yaupon holly, American holly, summer grape, Chinese tallow, persimmon, buckwheat vine, Carolina Jasmine,	NA	swamp chestnut oak, water oak, red oak, willow oak,	ironwood,shagbark hickory, ironwood,	winged elm, American elm,	NA	NA	sweetgum, occidentalis, sabel palmetto,	rosette grass, aster sp., switchcane, primrose, rosette grass	NA
67	Riparian/BHF	12	6	NA	10	5	7	NA	NA	5	5	3	1	NA	NA	54	0.54	0.54	0.54	Chinese tallow, decidious holly, muscadine, summer grape, American holly, crossvine, smilax sp., poison ivy, silverbell, peppervine,	NA	water oak, cherry bark oak,	ironwood, wax myrtle,	American elm, maple sp.,	NA	NA	sweetgum,	camphorweed, bunch grass, flea bane	NA
68	Riparian/BHF	20	12	NA	15	5	7	NA	NA	4	3	3	1	NA	NA	70	0.7	0.70	0.70	Chinese tallow, persimmon, decidious holly, trumpet creeper, persimmon, muscadine, rattan vine, rubus sp.,	NA	water oak, swamp chestnut oak,	pecan, ironwood,	American elm, red maple,	NA	NA	sweetgum, tupelo,	camphorweed,	NA
69	Riparian/BHF	20	12	NA	15	5	5	NA	NA	5	1	3	3	NA	NA	69	0.69	0.69	0.69	yaupon holly, American holly, buckwheat vine, rubus sp., grapevine, American beautyberry	NA	NA	NA	green ash, red maple	loblolly pine, bald cypress	NA	tupelo, sweetgum,	salvania, smartweed, lizard tail, herb sp., cottonmouth grass	NA
70	Upland Forest	12	6	NA	5	5	5	NA	NA	4	1	5	0	NA	NA	43	0.43	0.49	0.49	yaupon holly, American beautyberry, sugarberry, smilax sp., grapevine, southern magnolia	NA	willow oak, water oak,	NA	winged elm, elm sp.,	loblolly pine,	NA	tupelo,	NA	NA
71	Upland Forest	12	6	NA	5	3	3	NA	NA	3	1	3	0	NA	NA	36	0.36	0.41	0.41	American beautyberry, yaupon holly, grapevine, American holly, sweetleaf, yellow jessamine	NA	water oak,	NA	NA	loblolly pine,	NA	NA	NA	NA
72	Riparian/BHF	20	6	NA	10	5	7	NA	NA	5	1	3	5	NA	NA	62	0.62	0.62	0.62	American beautyberry, American holly, Chinese tallow, grapevine, poison ivy, yaupon holly, smilax sp., Chinese privet, coral berry, alder sp x 2,	NA	NA	wax myrtle,	red maple,	NA	American sycamore,	tupelo, sweetgum, chain fern,	western ragweed, false nettle, boneset, carex sp., dog fennel, false mint, aster sp., juncus sp., lizards tail, chasmanthium sp.,	NA
73	Upland Forest	12	6	NA	10	6	7	NA	NA	4	5	3	0	NA	NA	53	0.53	0.61	0.61	muscadine, American beautyberry, yaupon holly, American holly, silverbell, summer grape, crossvine, sweet leaf, smilax sp.,	NA	water oak,	ironwood, wax myrtle	devil walking stick	loblolly pine,	NA	sweetgum, tupelo,	chasmanthium sp., vaccinum sp., witch hazel,	NA
74	Swamp	25	6	NA	10	4	NA	10	NA	4	5	3	5	NA	NA	72	0.72	0.72	0.72	Chinese tallow, American holly, American Beautyberry, decidious holly, yaupon holly, possumhaw holly, crossvine, southern magnolia,	NA	swamp chestnut oak, water oak	ironwood,	red maple,	loblolly pine	NA	tupelo, sweetgum,	lizard tail, boneset, carex sp x 2, woolly grass, switch grass, dog fennel, dropseed, St. Andrew cross, dog bane, laxleaf yellowedeyed grass	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
75	Riparian/BHF	20	12	NA	10	6	7	NA	NA	5	5	3	5	NA	NA	73	0.73	0.73	0.73	yaupon holly, American holly, decidious holly, Chinese tallow, crossvine, Virginia creeper, southern magnolia,	NA	swamp chestnut oak, water oak, willow oak	wax myrtle,	red maple, white ash	loblolly pine	NA	tupelo, sweetgum, fern sp x2,	boneset, switchgrass, dog fennel, carex sp x2, thourough wort,	NA
76	Upland Forest	7	5	NA	15	6	5	NA	NA	4	5	3	5	NA	NA	55	0.55	0.63	0.63	Chinese tallow, muscadine, dew berry, crossvine, yaupon holly, possumhaw holly, peppervine, paw paw, winged sumac	NA	water oak, willow oak,	wax myrtle,	NA	long leaf pine	NA	sweetgum,	purple false foxglove, brushy bluestem, rosinweed, threeseed croton, dog fennel, panicum sp., camphorweed, switchgrass, St. Andrew Cross, horse nettle, nutsedge sp., narrow leaved milkwort	NA
77	Upland Forest	7	3	NA	5	7	5	NA	NA	5	5	3	5	NA	NA	45	0.45	0.52	0.52	American beauty berry, yaupon holly, decidious holly, American holly, dew berry	touch me not	water oak,	beech,	red maple	loblolly pine	NA	sweetgum,	Cherokee sedge, vasey grass, golden rod, unknown herb, licorice weed, purple falseglove, boneset, dog fennel, fern sp., wild violet, carex sp.,	NA
78	Upland Forest	12	12	NA	10	6	5	NA	NA	5	5	3	1	NA	NA	59	0.59	0.68	0.68	yaupon holly, American holly, American beautyberry, poison ivy, muscadine, cherry laurel, smilax sp., southern magnolia	NA	water oak,	ironwood, beech,	sugar maple,	loblolly pine	NA	sweetgum,	carex sp.,	NA
79	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	skipped	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
80	Upland Forest	12	6	NA	15	6	7	NA	NA	4	5	3	0	NA	NA	58	0.58	0.67	0.67	dewberry, American Beautyberry, yaupon holl, smilax sp., hackberry, American holly, muscadine, sweet bay, southern magnolia,	NA	red oak, water oak, oak sp.,	NA	toothache tree	long leaf pine	NA	sweet gum	NA	NA
81	Upland Forest	12	12	NA	10	5	5	NA	NA	4	5	3	0	NA	NA	56	0.56	0.64	0.64	cherry laurel, yaupon holly, sweet bay, American Beautyberry, rattan vine, smilax sp., American holly, muscadine, paw paw, southern magnolia	NA	swamp chestnut oak,	ironwood, beech,	NA	NA	NA	sweet gum	NA	NA
82	Upland Forest	20	6	NA	20	5	7	NA	NA	5	5	3	1	NA	NA	72	0.72	0.83	0.83	cherry laurel, smilax sp., decidious holly, buckwheat vine, American holly, swamp privet, American beauty berry, southern magnolia	NA	red oak sp x 3, swamp chestnut oak	ironwood, beech,	toothache tree,	NA	NA	sweet gum, Japanese climbing fern	NA	NA
83	Upland Forest	20	12	NA	15	6	7	NA	NA	5	5	5	1	NA	NA	76	0.76	0.87	0.87	yaupon holly, muscadine, buckwheat vine, smilax sp., American holly, American hornbeam, Carolina Cherry Laurel, American beauty berry, paw paw, southern magnolia	NA	water oak, willow oak,	mockernut hickory, beech	American elm,	loblolly pine	NA	sweetgum,	carax sp.,	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
84	Upland Forest	20	6	NA	10	7	7	NA	NA	4	5	3	3	NA	NA	65	0.65	0.75	0.75	American beautyberry, yaupon holly, poison ivy, smilax sp., deciduous holly, American holly, muscadine, dew berry, hackberry, southern magnolia	three flower ticktreefoil	water oak, swamp chestnut oak, red oak,	mockernut hickory, ironwood,	cedar elm,	loblolly pine	NA	sweetgum, Japanese climbing fern,	jumpseed, carax sp., panicum sp., grass sp.	NA
85	Upland Forest	20	6	NA	10	6	7	NA	NA	4	5	3	1	NA	NA	62	0.62	0.71	0.71	American holly, southern magnolia, paw paw, yaupon holly, ratten vine, muscadine, crossvine, silverbell, smilax sp.,	NA	white oak, water oak, swamp chestnut oak,	ironwood,	sugar maple,	loblolly pine	NA	sweetgum	jumpseed, carex sp., panicum sp.,	NA
86	Upland Forest	20	6	NA	10	7	7	NA	NA	4	5	3	3	NA	NA	65	0.65	0.75	0.75	American beautyberry, smilax sp., American holly, Chinese tallow, muscadine, poison ivy, buckwheat vine, southern magnolia, silverbell,	eastern redbud,	turkey oak, swamp chestnut oak	ironwood,	sugar maple, green ash, slippery elm,	loblolly pine	NA	sweetgum, sabel palmetto, fern sp.,	carex sp., cut grass, switch cane,	NA
87	Swamp	25	12	NA	15	3	NA	10	NA	4	5	3	5	NA	NA	82	0.82	0.82	0.82	inkberry, American beautyberry, Chinese tallow, Virginia creeper	NA	NA	NA	NA	bald cypress,	NA	tupelo, sabel palmetto,	carex sp., grass sp x 2, switch grass, snake root, swamp lilly, jump seed, unknown shrub	NA
88	Upland Forest	12	6	NA	10	6	7	NA	NA	3	5	3	5	NA	NA	57	0.57	0.66	0.66	American beautyberry, Chinese tallow, dew berry, Virginia creeper, muscadine, poison ivy, smilax sp., southern magnolia,	NA	white oak, water oak,	ironwood, wax myrtle	NA	loblolly pine	American sycamore,	sabel palmetto, sweetgum	dog fennel, switch cane, variable flatsedge, small spike false nettle, carex sp., dog bane, dotted smartweed, bone set, jump seed	NA
89	Upland Forest	7	6	NA	10	6	7	NA	NA	3	5	3	5	NA	NA	52	0.52	0.60	0.60	smilax sp., dewberry, yaupon holly, poison ivy, American holly, crossvine, spice bush, hackberry, southern magnolia, buckwheat vine,	NA	swamp white oak, swamp chestnut oak, water oak,	ironwood,	sugar maple, white ash,	loblolly pine,	NA	sabel palmetto, sweetgum,	St. Andrew cross, unknown plant, inland sea oats, liquorice weed, jump seed, geranium sp., hen's eye	NA
90	Riparian/BHF	12	12	NA	10	5	7	NA	NA	4	5	3	5	NA	NA	63	0.63	0.63	0.63	poison ivy, crossvine, parsley hawthorn, peppervine, smilax sp., trumpet creeper, sugar berry, yaupon holly, American holly, swamp privet	NA	swamp chestnut oak, water oak, black oak, southern red oak,	ironwood, hickory sp.,	sugar maple, elm sp., white ash, American elm,	NA	NA	sweetgum, fern,	inland seaoats, cardinal flower, tall elephant foot, jumpseed, dichanthium sp., St. Andrew cross, panicum sp., herb sp x 2,	NA
91	Upland Forest	12	6	NA	10	5	7	NA	NA	5	5	3	5	NA	NA	58	0.58	0.67	0.67	American holly, poison ivy, yaupon holly, dew berry, American beauty berry, smilax sp., peppervine, farkle berry, possumhaw, hackberry, trumpet creeper, Carolina coralberry, Virginia creeper,	NA	swamp chestnut oak, southern red oak,	ironwood,	sugar maple, green ash, cedar elm,	eastern redcedar	NA	sabel palmetto, sweet gum	St. Andrew cross, jumpseed, carex sp x2, Atlantic pidgeon wings, herb x2, wood sorrel sp.,	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
92	Riparian/BHF	20	12	NA	10	5	7	NA	NA	5	5	3	5	NA	NA	72	0.72	0.72	0.72	muscadine, poison ivy, silverbell, yaupon holly, peppervine, pawpaw, American beautyberry, sweetleaf, American holly, Chinese tallow, blackberry, Virginia creeper, smilax sp., buckwheat vine, climbing hempvine	NA	water oak, willow oak, oak sp.,	ironwood, hickory x2, wax myrtle,	American elm, red maple,	loblolly pine, bald cypress,	NA	sweetgum, sabel palmetto, tupelo	unknown x2, chasmanthium sp., sedge x3, rosette grass, false nettle, grass x2,	NA
93	Upland Forest	12	5	NA	10	5	7	NA	NA	4	5	3	5	NA	NA	56	0.56	0.64	0.64	dewberry, American holly, yaupon holly, American beautyberry, poison ivy, mulberry, buckwheat vine, smilax sp., Carolina cherry laurel, devil walking stick, muscadine, peppervine, milkvine, climbing nightshade	NA	water oak, swamp chestnut oak,	ironwood, hickory sp.,	elm sp., green ash,	NA	NA	sabel palmetto, sweet gum, fern sp x2,	yellow passionflower, Scribners panicum, care3x sp., wood sorrell, Virginia copperleaf, St. Andrew cross, avens sp.,	NA
94	Riparian/BHF	20	6	NA	5	6	7	NA	NA	4	1	3	3	NA	NA	55	0.55	0.55	0.55	yaupon holly, Chinese tallow, American holly, poison ivy, sweet leaf, southern arrowwood, southern magnolia, buckwheat vine,	sericea lespedeza	water oak,	wax myrtle, ironwood,	red maple,	NA	NA	sabel palmetto, tupelo, sweetgum, chain fern	chasmanthium sp., lizard tail, juncus sp.,	NA
95	Riparian/BHF	20	6	NA	10	5	5	NA	NA	5	3	3	3	NA	NA	60	0.6	0.60	0.60	poison ivy, smilax sp., American beautyberry, trumpet creeper, rubus sp., Chinese privet, buckwheat vine,	NA	swamp chestnut oak, willow oak,	shagbark hickory, ironwood	green ash, winged elm,	NA	NA	sabel palmetto,	switchcane, carex sp., yeatesia sp.,	NA
96	Riparian/BHF	12	12	NA	15	4	5	NA	NA	5	3	3	3	NA	NA	62	0.62	0.62	0.62	sugarberry, trumpet creeper, smilax sp., yaupon holly, Virginia creeper, trifoliate orange	NA	NA	mockernut hickory, ironwood,	sugar maple, American elm,	NA	NA	sabel palmetto, sweetgum,	carex sp., inland seaoats, slim tridens, chasmanthium sp., unknown sp.,	NA
97	Riparian/BHF	20	12	NA	10	7	7	NA	NA	5	5	3	1	NA	NA	70	0.7	0.70	0.70	American holly, sugarberry, poison ivy, Chinese tallow, smilax sp., rubus sp., muscadine, smilax sp., laurel cherry, climbing hempvine, laurel cherry, Virginia creeper, swamp privet,	NA	wateroak, cherrybark oak, swamp chestnut oak,	ironwood,	winged elm, green ash, red maple, American elm,	bald cypress,	American sycamore,	sabel palmetto, sweetgum,	rosette grass, chasmanthium sp., sedge sp., wire grass, unknown herb, yellow passion flower	NA
98	Riparian/BHF	20	12	NA	15	4	7	NA	NA	5	5	3	3	NA	NA	74	0.74	0.74	0.74	Chinese tallow, poison ivy, sugar berry, persimmon, swamp privet, buckwheat vine, yaupon holly, trumpet creeper, sugar berry, rubus sp., muscadine, smilax sp., Chinese privet, rattan vine, peppervine, buckwheat vine	NA	NA	NA	red maple, green ash, American elm,	bald cypress,	NA	sabal palmetto, sweetgum, Japanese climbing fern	panic grass, aster sp., switchcane, orchid, sedge sp., thistle sp., unknown herb	NA

Point Number	Grouped Habitat Type	1) Site Potential	2) Successional Stage	Marsh Successional Stage	3)Uniqueness and Relative Abundance	4A)Diversity of Woody Species	4B)Number of Woody Species	Swamp Diversity of Veg	Marsh Diversity of Veg	5) Vertical Stratification	6) Additional Structural Diversity	7A) Condition of Woody Vegetation	7B) Herbaceous Vegetation	Cropland Condition	Marsh Condition	Total Score before readjustment	Converted to Decimal	Total Score with Adjustment	Final Score	Berry Drupe	LegumePod	Acorn	Nut Nutlike	Samara	Cone	Achene	All Others	Herbaceous Species	Notes
99	Riparian/BHF	20	12	NA	15	6	7	NA	NA	5	5	3	3	NA	NA	76	0.76	0.76	0.76	yaupon holly, parsley hawthorn, poison ivy, swamp privet, deciduous holly, hackberry, smilax sp., crossvine, buckwheat vine, muscadine, rubus sp., Chinese privet,	honey locust,	cherrybark oak, swamp chestnut oak, white oak, willow oak, water oak, overcup oak, red oak, laurel oak	hickory sp.,	green ash, American elm, winged elm,	NA	NA	sabel palmetto, blackwillow,	switch cane, chasmanthium sp., rosette grass, Caroline Jasmine, yellow passion flower, giant cane, bunch grass,	NA
100	Upland Forest	12	12	NA	10	2	5	NA	NA	5	1	3	1	NA	NA	51	0.51	0.59	0.59	rubus sp., sugar berry, poison ivy, yougon holly, Chinese privet, buckwheat vine, smilax sp., trumpet creeper, grapevine,	NA	NA	NA	NA	NA	NA	sabel palmetto, cottonwood, sweetgum, wood fern	nandina, dog fennel, chasmanthium sp.,	NA
101	Riparian/BHF	20	12	NA	15	7	7	NA	NA	5	5	3	5	NA	NA	79	0.79	0.79	0.79	southern magnolia, hawthorn, arrowwood, peppervine, rust blackhaw, sugarberry, poison ivy, yaupon holly, Chinese privet, American beautyberry, rubus sp., crossvine, sweet leaf, cherry laurel, Caroline Jasmine, buckwheat vine,	mimosa,	red oak, water oak,	hickory, ironwood,	Florida maple,winged elm, green ash, red maple,	NA	American sycamore,	tupelo, cottonwood, black willow, sabel palmetto, sweetgum, fern sp x2,	unknown x5, sedge sp x 2, dayflower, chasmanthium sp., jumpseed, switch cane, rosette grass, giant ragweed, goldenrod x2, bidens sp.,	NA
102	skipped	skipped	skipped	skipped	skipped	skipped	skipped	NA	NA	skipped	skipped	skipped	skipped	NA	NA	skipped	skipped	skipped	0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
103	Upland Forest	12	12	NA	15	6	7	NA	NA	5	3	1	1	NA	NA	62	0.62	0.71	0.71	southern magnolia,smilax sp., American beautyberry, papaw, muscadine, cherry laurel, yaupon holly, sweet leaf, American holly, devil walking stick, mulberry, sweetleaf,	NA	white oak,	blackwalnut, American beech, ironwood	speckled alder,	loblolly pine	NA	sweetgum, tupelo, fern sp.,	NA	NA
104	Upland Forest	12	12	NA	15	7	7	NA	NA	4	5	3	1	NA	NA	66	0.66	0.76	0.76	hackberry, American holly, yaupon holly, muscadine, glossy privet, American beautyberry, red mulberry, devil walking stick, poison ivy, laurel cherry, Chinese privet, smilax sp	eastern redbud,	NA	ironwood	white ash, sugar maple, elm sp.,	eastern red cedar,	American sycamore,	sweetgum, cottonwood, fern sp.,	switchcane, angel pod, rosette grass, sedge sp.,	NA
201	Upland Forest	12	12	NA	10	6	7	NA	NA	4	5	3	5	NA	NA	64	0.64	0.74	0.74	yaupon holly, muscadine, Chinese tallow, American beautyberry, Virginia creeper,, smilax sp., dew berry, American holly, crossvine, farkleberry, southern magnolia, red bay,	NA	water oak, swamp chestnut oak,	wax myrtle,	red maple, sugar maple,	loblolly pine,	NA	tupelo, sweetgum,	boneset, dog fennel, unknown grass, beak sedge, scribner panicum, St. Andrew cross, cutgrass, dichanthium annulatum	NA
5A	Riparian/BHF	20	12	NA	15	4	5	NA	NA	5	3	5	3	NA	NA	72	0.72	0.72	0.72	American holly, poison ivy, mustang grape, yaupon holly, smilax, Chinese tallow, southern magnolia	NA	swamp chestnut oak,	NA	winged elm, white ash,	NA	NA	sabel palmetto, sweetgum,	switchcane, woodland oats, carex sp., rumex sp	NA
6A	Riparian/BHF	25	12	NA	20	4	3	NA	NA	4	3	3	3	NA	NA	77	0.77	0.77	0.77	sweet pepperbush, Chinese tallow,	NA	NA	wax myrtle,	NA	bald cypress,	NA	tupelo,	saint johnswort, lizards tail, beaked rush, carex sp, swamp smartweed	NA

Attachment B: Town Bluff WHAP Point Photographs

Town Bluff Project #2	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #3	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #4	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #5A	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #5	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #6A	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #7	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #8	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #9	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #10	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #11	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #12	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #13	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #14	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #15	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #16	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #17	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #18	
Facing North	Facing East
	
Facing West	Facing South
	

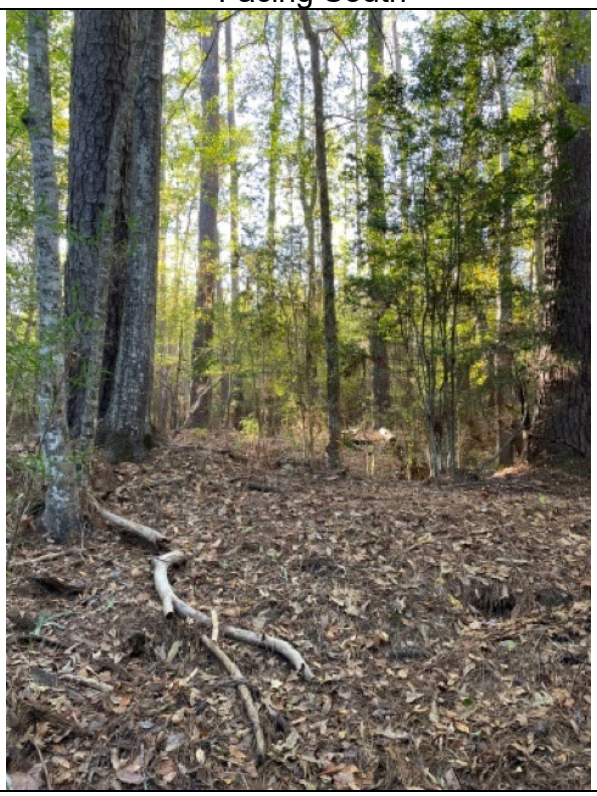
Town Bluff Project #19	
Facing North	Facing East
	
Facing West	Facing South
	

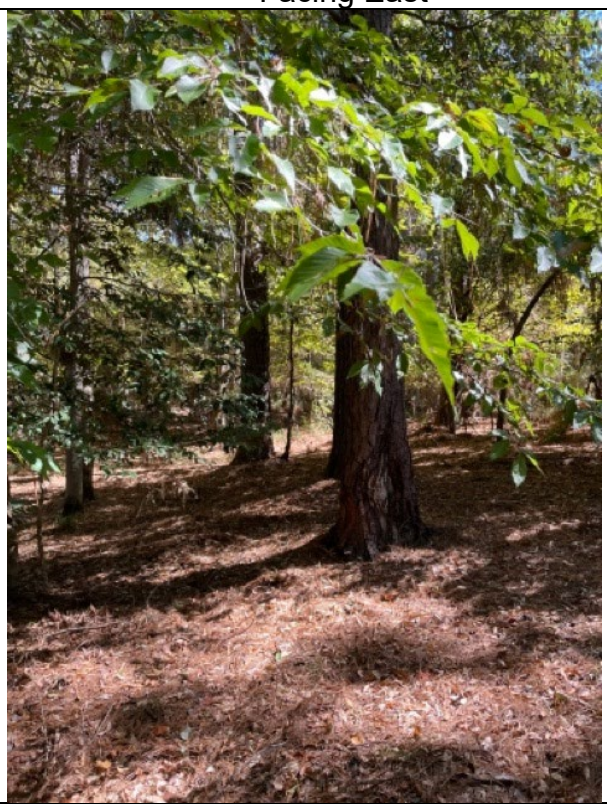
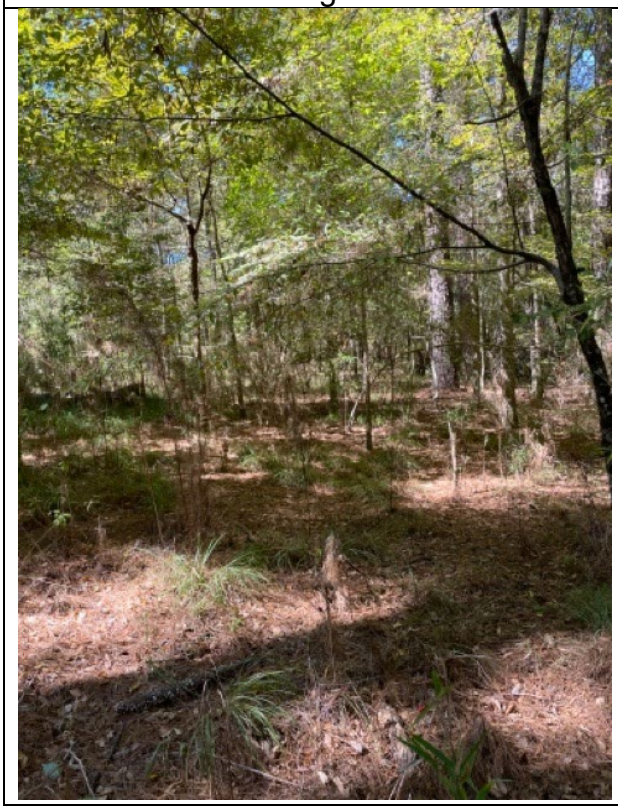
Town Bluff Project #20	
Facing North	Facing East
	
Facing West	Facing South
	

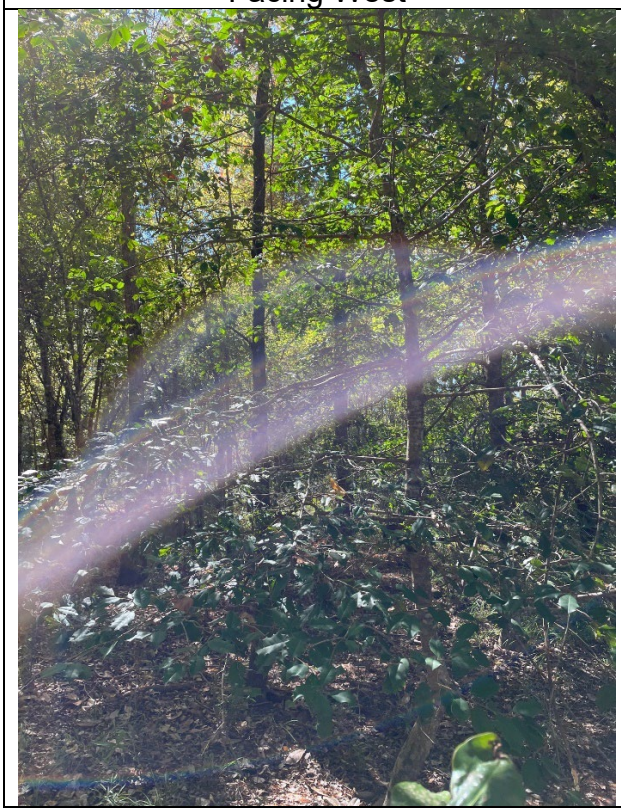
Town Bluff Project #21	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #22	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #23	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #24	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #25	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #26	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #27	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #28	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #29	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #30	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #31	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #32	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project # 33	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #34	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #35	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #36	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #37	
	Facing East
	

Town Bluff Project #38	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #39	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #40	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #41	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #42	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #43	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #44	
Facing North	Facing East
	
Facing West	Facing South
	

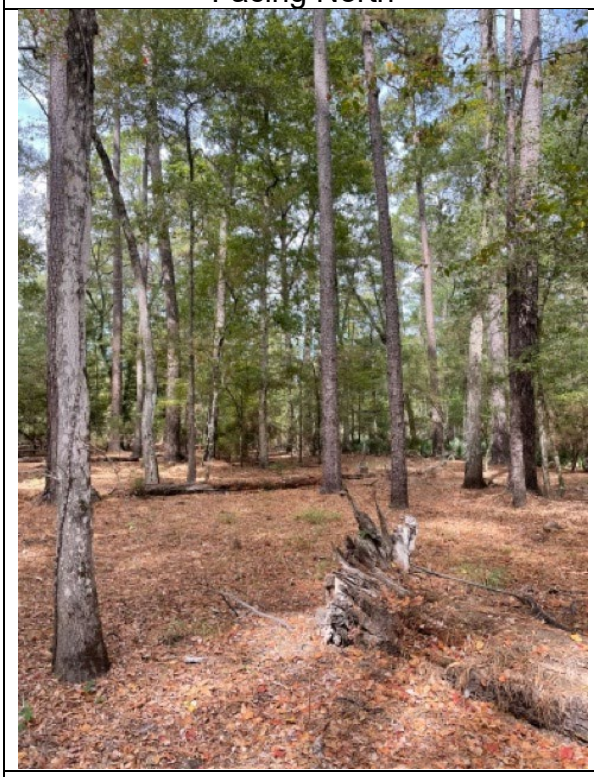
Town Bluff Project #45	
Facing North	Facing East
	
Facing West	Facing South
	

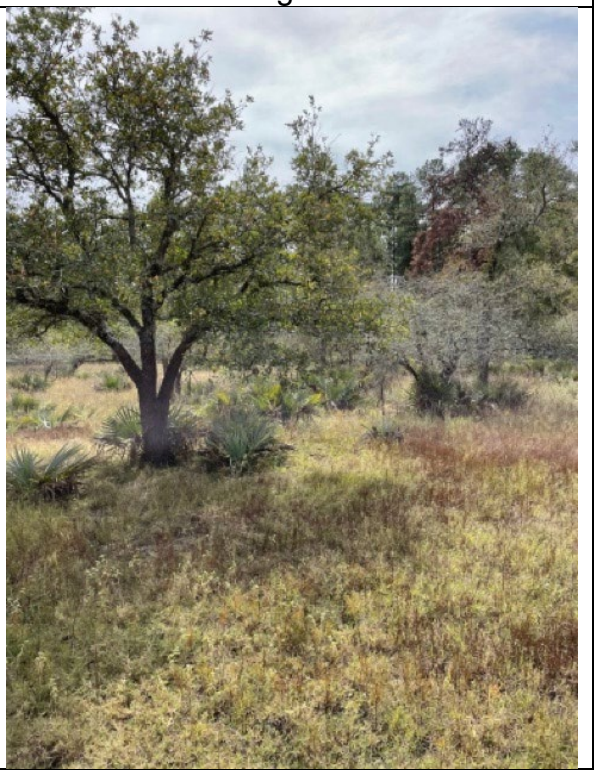
Town Bluff Project #46	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #47	
Facing North	Facing East
	
Facing West	Facing South
	

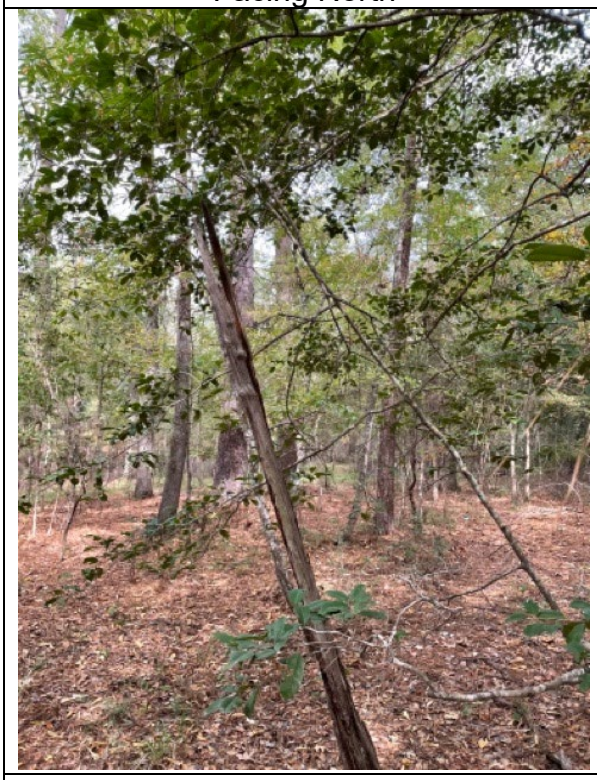
Town Bluff Project #48	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #49	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #50	
Facing North	Facing East
	
Facing West	Facing South
	

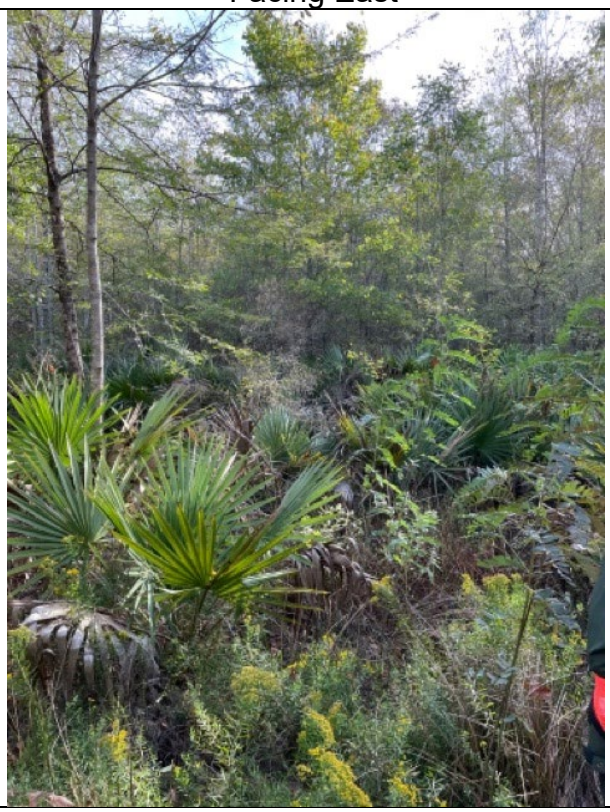
Town Bluff Project #51	
Facing North	Facing East
	
Facing West	Facing South
	

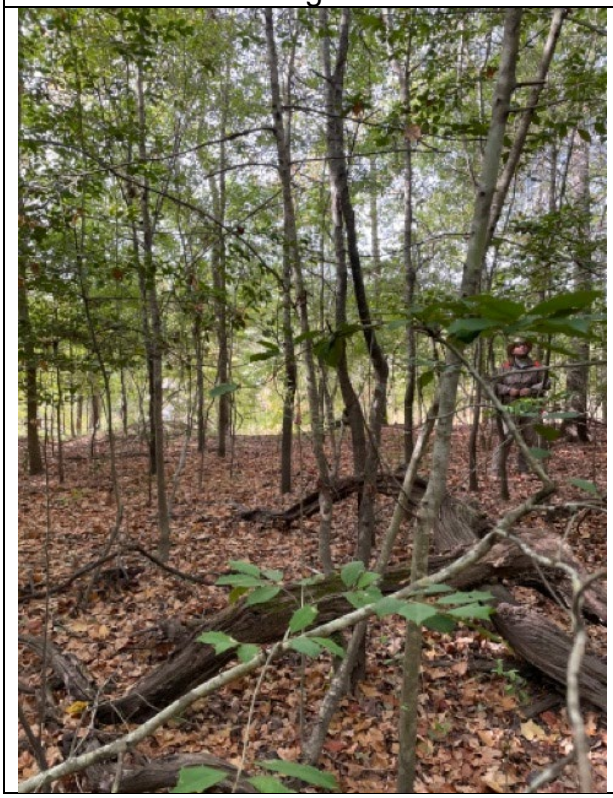
Town Bluff Project #52	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #53	
Facing North	Facing East
	
Facing West	Facing South
	

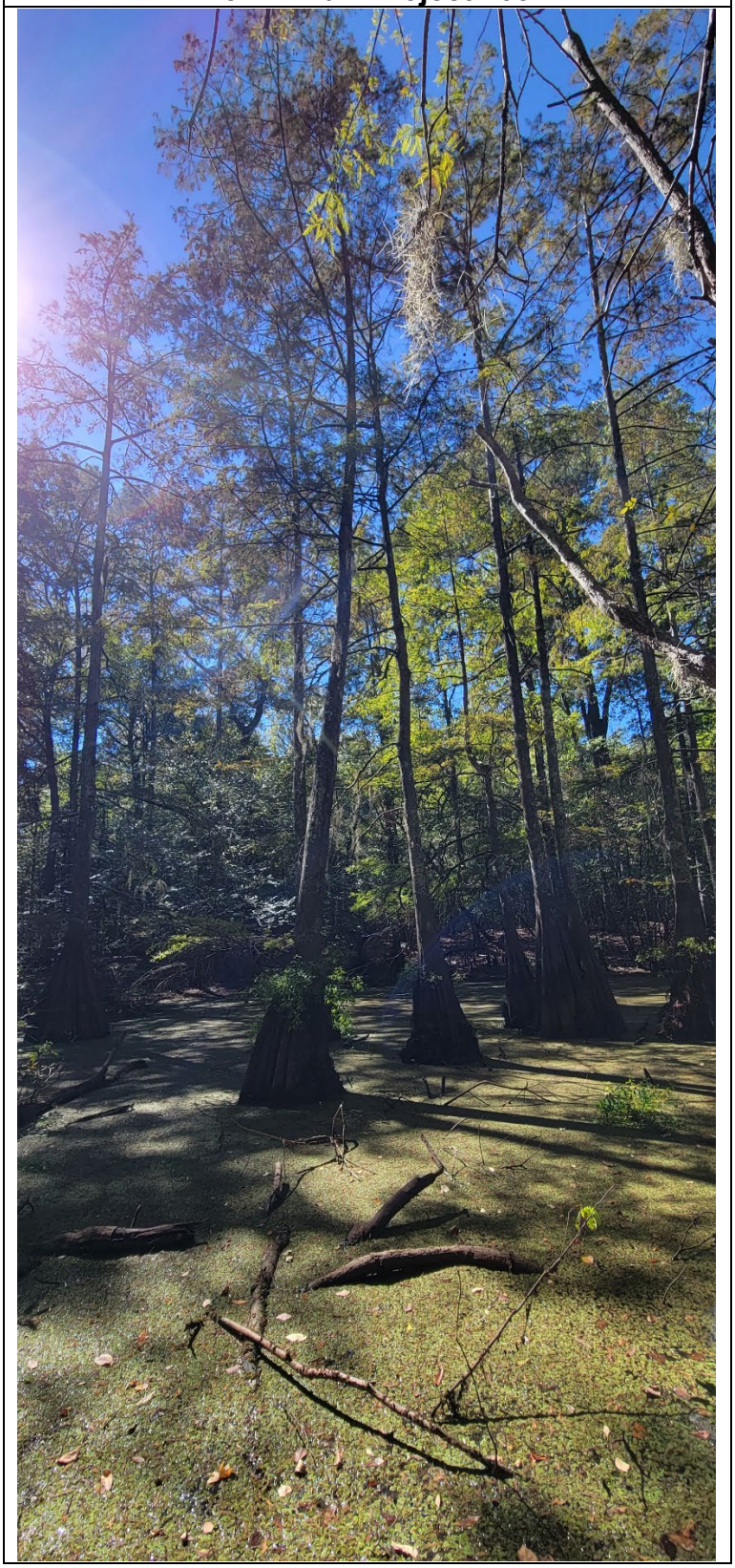
Town Bluff Project #54	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #55	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #56	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #57	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #63



Town Bluff Project #64	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #65	
Facing North	Facing East
	
Facing West	Facing South
	

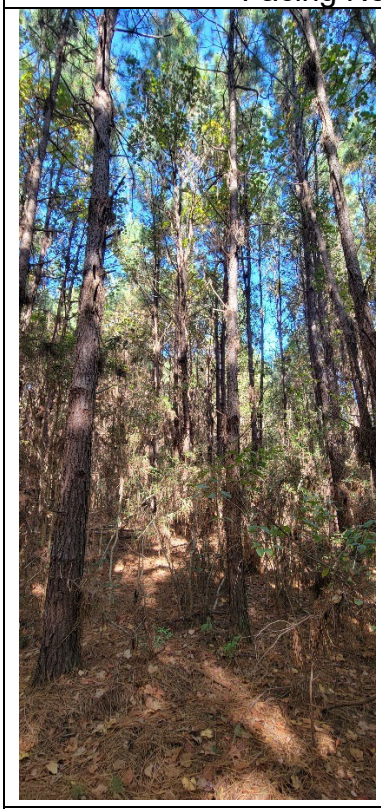
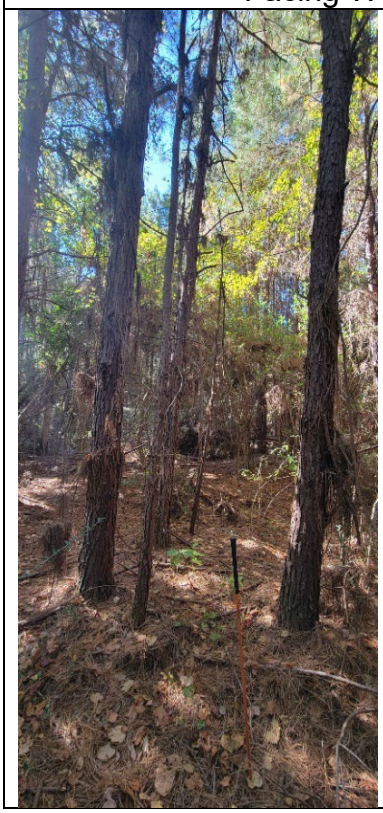
Town Bluff Project #66	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #67	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #68	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #71	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #72	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #73	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #74	
Facing North	Facing East
	
	Facing South
	

Town Bluff Project #75	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #76	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #77	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #78	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #80	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #81	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #82	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #83	
Facing North	Facing East
	
Facing West	Facing South
	

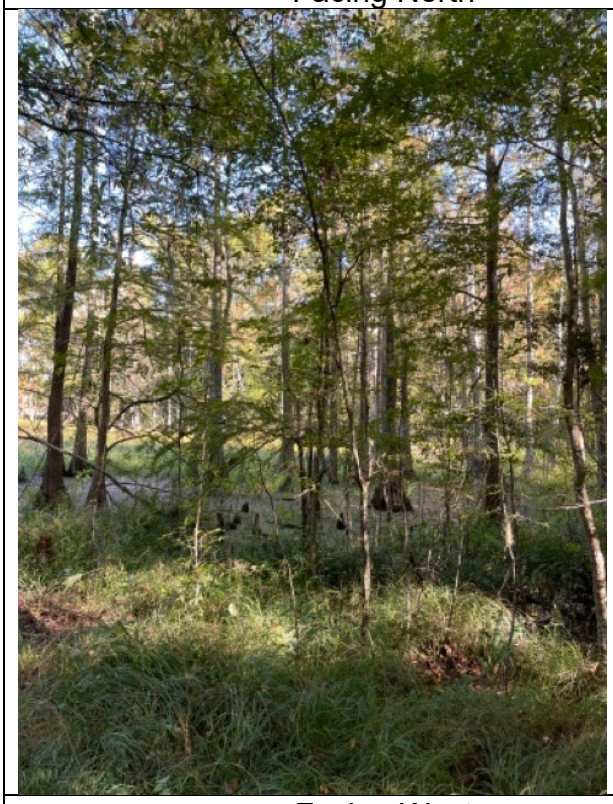
Town Bluff Project #84	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #85	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #86	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #87	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #88	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #92	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #94	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #95	
Facing North	Facing East
	
Facing West	Facing South
	

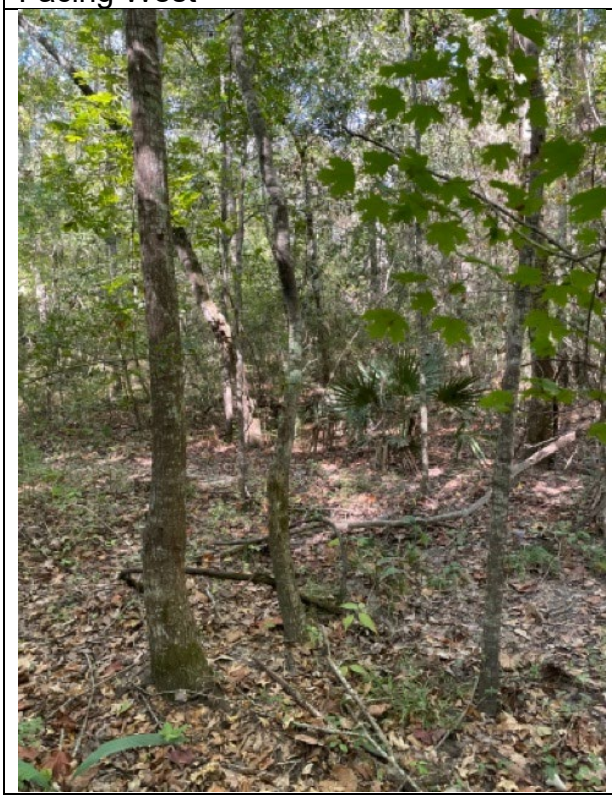
Town Bluff Project #96	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #97	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #98	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #99	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #100	
Facing North	Facing East
	
Facing West	Facing South

Town Bluff Project #101	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #103	
Facing North	Facing East
	
Facing West	Facing South
	

Town Bluff Project #104	
Facing North	Facing East
	
Facing West	Facing South