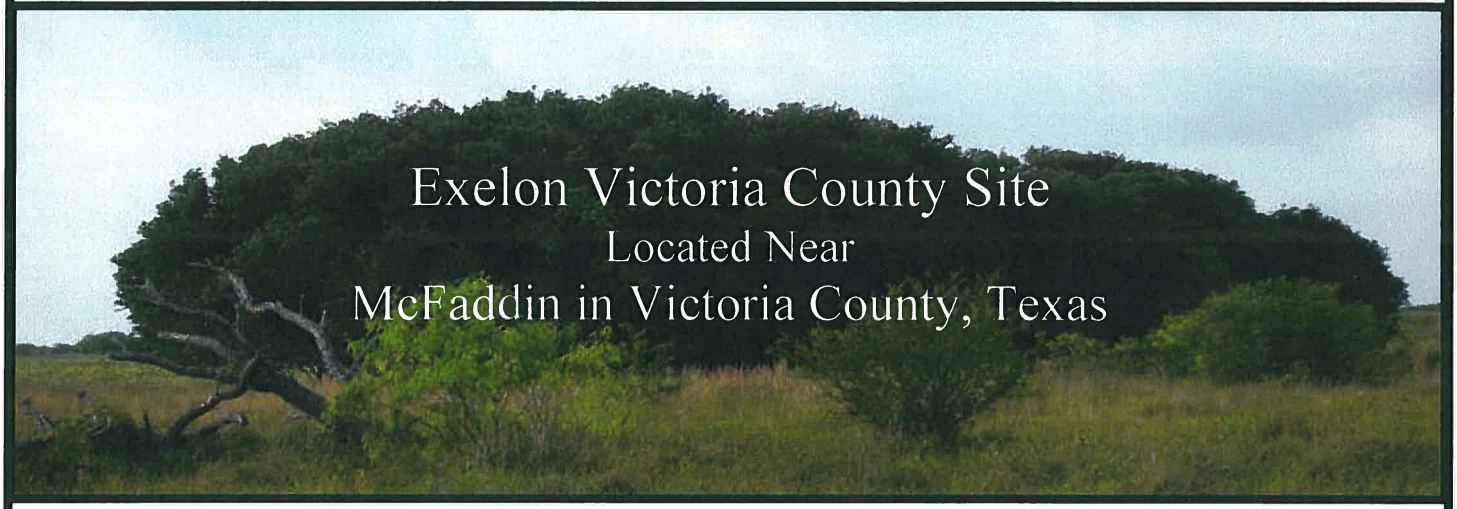
# HERPETOLOGICAL
## AND
# SMALL MAMMAL SURVEY




Prepared for:

**Tetra Tech NUS**

900 Clear Trail Ridge
Aiken, South Carolina 29803

Prepared by:

BIO-WEST, Inc.
1018 Frost Street.
Rosenberg, TX 77471

June 2008

# HERPETOLOGICAL
## AND
# SMALL MAMMAL SURVEY

## Exelon Victoria County Site
Located Near
## McFaddin in Victoria County, Texas

Prepared for:
Tetra Tech NUS
900 Clear Trail Ridge
Aiken, South Carolina 29803

Prepared by:
BIO-WEST, Inc.
1018 Frost Street.
Rosenberg, TX 77471

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# TABLE OF CONTENTS

# Contents

## Tables



## Figures

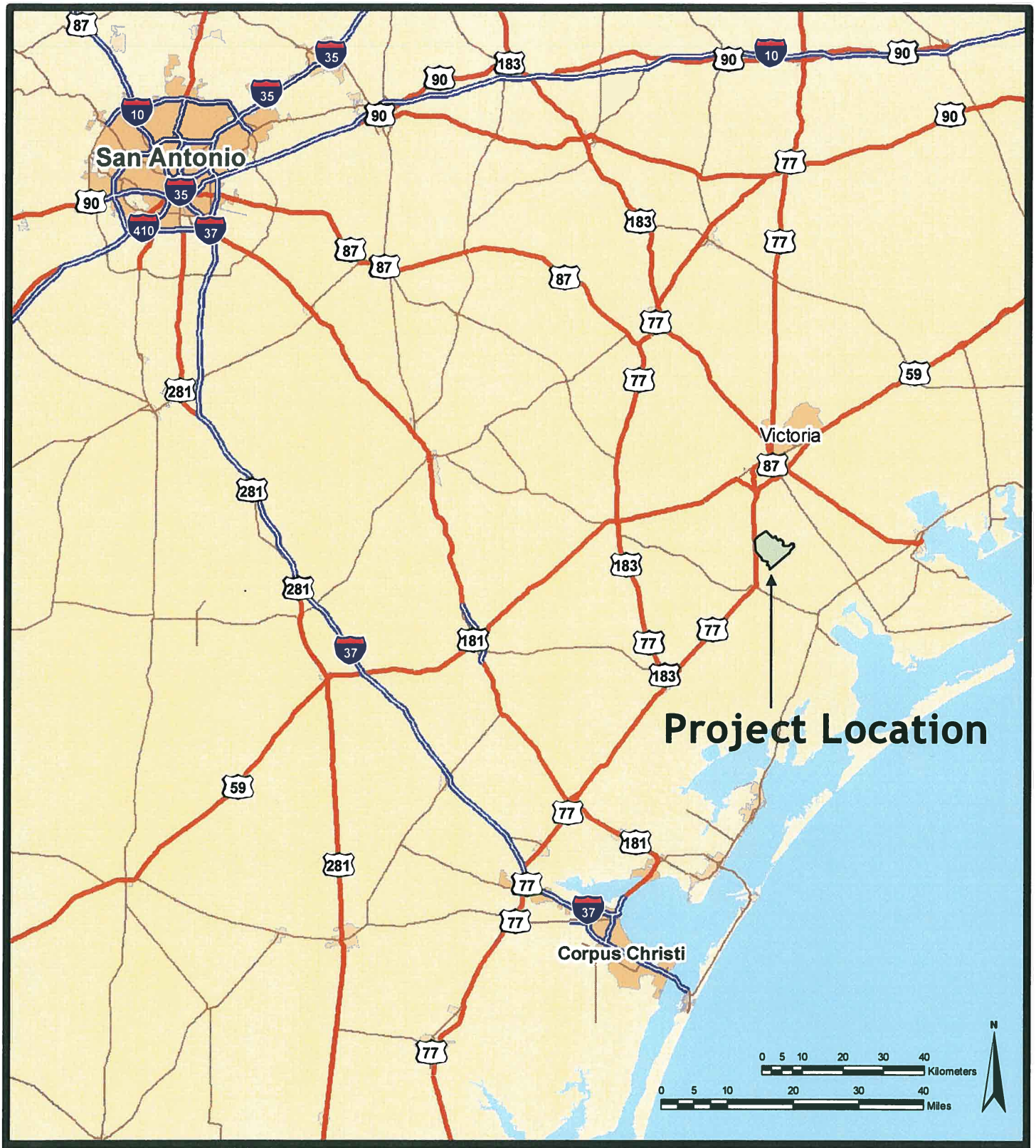


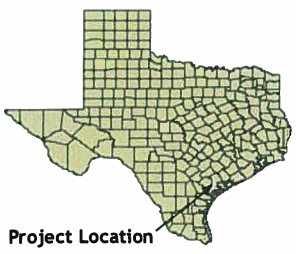
## Appendices

# 1.0 INTRODUCTION

At the request of Tetra Tech NUS, BIO-WEST, Inc. (BIO-WEST) conducted small mammal and herpetological (i.e., amphibian and reptile) surveys at the proposed Exelon Victoria County Site (project location). The project location occurs within the 11,000-acre McCan property, which is located approximately 23 miles south of the city of Victoria, near McFaddin in Victoria County, Texas (Figure 1-1). BIO-WEST understands this biological survey report has been prepared to complement other faunal investigations in an effort to document the baseline inventory of wildlife at the project location. Collectively, these wildlife surveys will be included as part of an Environmental Report (environmental impact assessment) in support of a Combined Construction and Operating License Application (COLA) that will be submitted to the Nuclear Regulatory Commission.

BIO-WEST conducted small mammal and herpetological (wildlife) surveys during the spring of 2008 using quantitative and qualitative survey techniques. Surveys were conducted to characterize wildlife communities by habitat type and to note species relative abundance. Habitat types and limits were derived from maps provided to BIO-WEST from Tetra Tech NUS. These habitat types were based on vegetation communities and were verified at the time of the field effort.




BIO-WEST, Inc.
1018 Frost Street
Rosenberg, Texas 77471
Phone: 832.595.9064
Fax: 832.595.9054

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# Figure 1-1

# Project Location

# 2.0 VICTORIA COUNTY SITE DESCRIPTION

## 2.1 REGIONAL DESCRIPTION

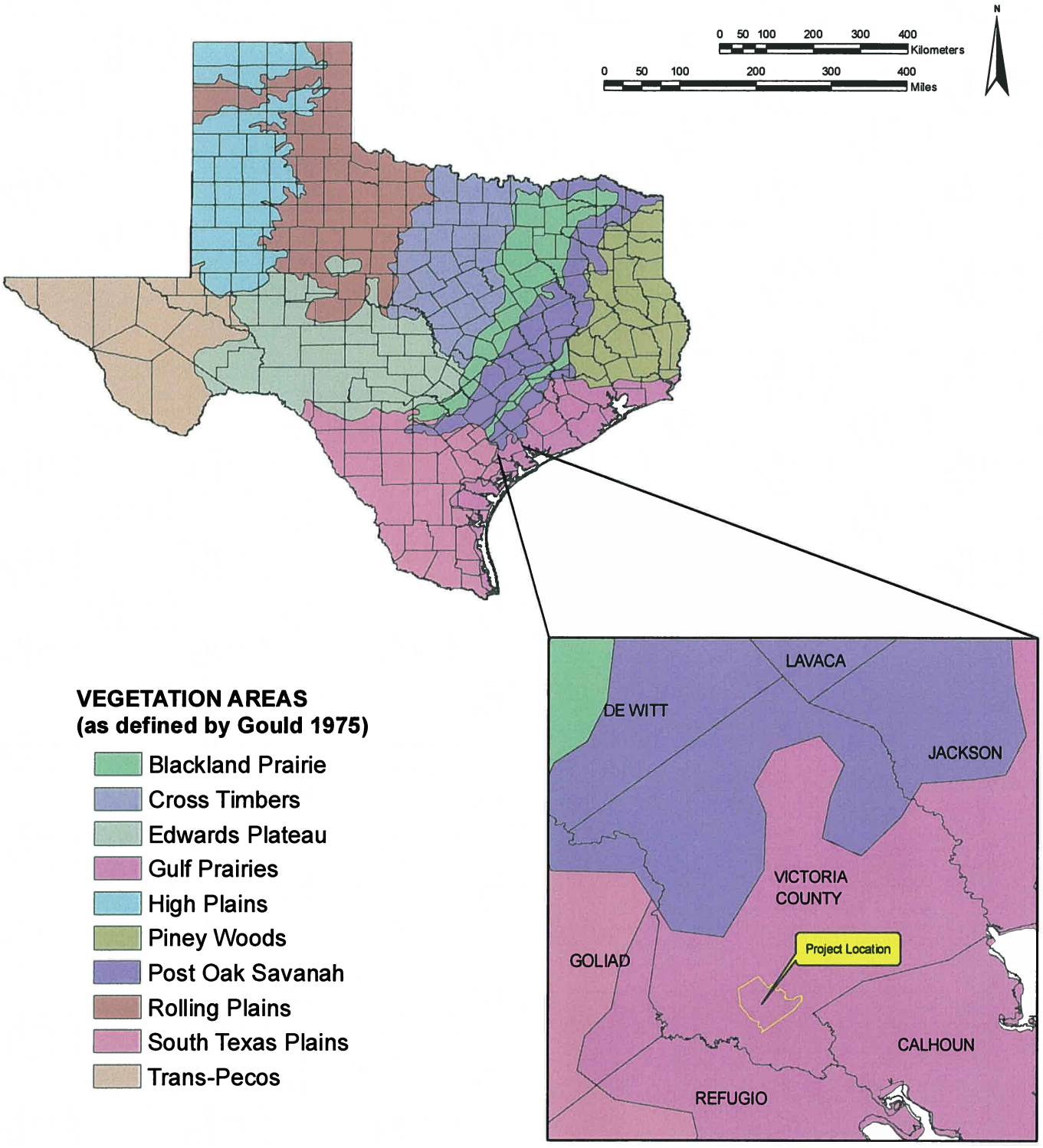
### 2.1.1 Vegetation

The state of Texas is divided into 10 distinct vegetation areas (Schuster and Hatch 1990; TPWD 2007) defined on the basis of the interaction of geology, soils, physiography and climate (Gould et al. 1960 [from Schuster and Hatch 1990]). Victoria County is located within both the Post Oak Savannah and the Gulf Coast Prairie and Marshes vegetation areas. The project location occurs entirely within the Gulf Coast Prairie and Marshes vegetation area (Figure 2-1). The Gulf Coast Prairies and Marshes vegetation area covers approximately 500,000 acres; encompassing a narrow strip approximately 60 miles wide, of lowlands adjacent to and along the Texas coast from the Louisiana border to Brownsville near the Mexican border (Schuster and Hatch 1990; TPWD 2007). The region is divided into Gulf Coast Prairies further inland from Gulf Coast Marshes bordering the coast.

The U.S. Geological Survey (USGS) and the U.S. Environmental Protection Agency (EPA) further define and divide the vegetation area into a number of Level IV Ecoregions (Griffith et al. 2004). The project location is situated within the Northern Humid Gulf Coastal Prairies Ecoregion (Griffith et al. 2004). Hereafter, both the Gulf Coast Prairie vegetation area and the Northern Humid Gulf Coastal Prairies Ecoregion will be referred to as Gulf Prairie.

The Gulf Prairies are generally a gently sloping coastal plain having slow surface drainage; elevations range from sea level to 250 ft. Underlying much of the Gulf Prairie are quaternary-age deltaic sands, silts and clays (Griffith et al. 2004). Gulf Prairie soils are dark, neutral to slightly acidic clay or sandy clay loams.

The original vegetation types of the Gulf Prairie were tallgrass prairie with scattered oak mottes. Principal climax grasses of the Gulf Prairie are Gulf cordgrass (*Spartina spartinae*), big bluestem (*Andropogon gerardii* var. *gerardii*), little bluestem (*Schizachyrium scoparium*), yellow Indiangrass (*Sorghastrum nutans*), eastern gammagrass (*Tripsacum dactyloides*), Gulf muhly (*Muhlenbergia capillaris*), tanglehead (*Heteropogon contortus*), brownseed paspalum (*Paspalum plicatulum*), and switchgrass (*Panicum virgatum*) (McMahan et al. 1984; Schuster and Hatch 1990; Griffith et al. 2004; TPWD 2007). Other grasses included bushy bluestem *(Andropogon glomeratus*), inland sea-oats (*Chasmanthium latifolium*) and sugarcane plumegrass (*Saccharum giganteum*) (TPWD 2007).




BIO-WEST, Inc.
1018 Frost Street
Rosenberg, Texas 77471
Phone: 832.595.9064
Fax: 832.595.9054

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# Figure 2-1

# Vegetation Areas of Texas

Characteristic oak species which have increased and "thicketized" in many places include live oak (*Quercus virginiana*), post oak (*Q. stellata*), water oak (*Q. nigra*), willow oak (*Q. phellos*) and Shumard red oak (*Q. shumardii*) (McMahan et al. 1984; Schuster and Hatch 1990; TPWD 2007). Other trees and shrubs include honey mesquite (*Prosopis glandulosa*), sugarberry (*Celtis laevigata*), American elm (*Ulmus americana*), eastern red cedar (*Juniperus virginiana*), short-leaf pine (*Pinus echinata*), loblolly pine (*P. taeda*), huisache (*Acacia farnesiana*), black brush (*A. rigidula*), bushy sea-ox-eye (*Borrichia frutescens*), American beauty berry (*Callicarpa americana*), buttonbush (*Cephalanthis occidentalis*), lantana (*Lantana involucrata*), dwarf palmetto (*Sabal minor*), red mulberry (*Morus rubra*), yaupon (*Ilex vomitoria*), wax myrtle (*Morella cerifera*), flameleaf sumac (*Rhus copallinum*) and red buckeye (*Aesculus pavia*) (Schuster and Hatch 1990; TPWD 2007; Wildflower Center 2007).

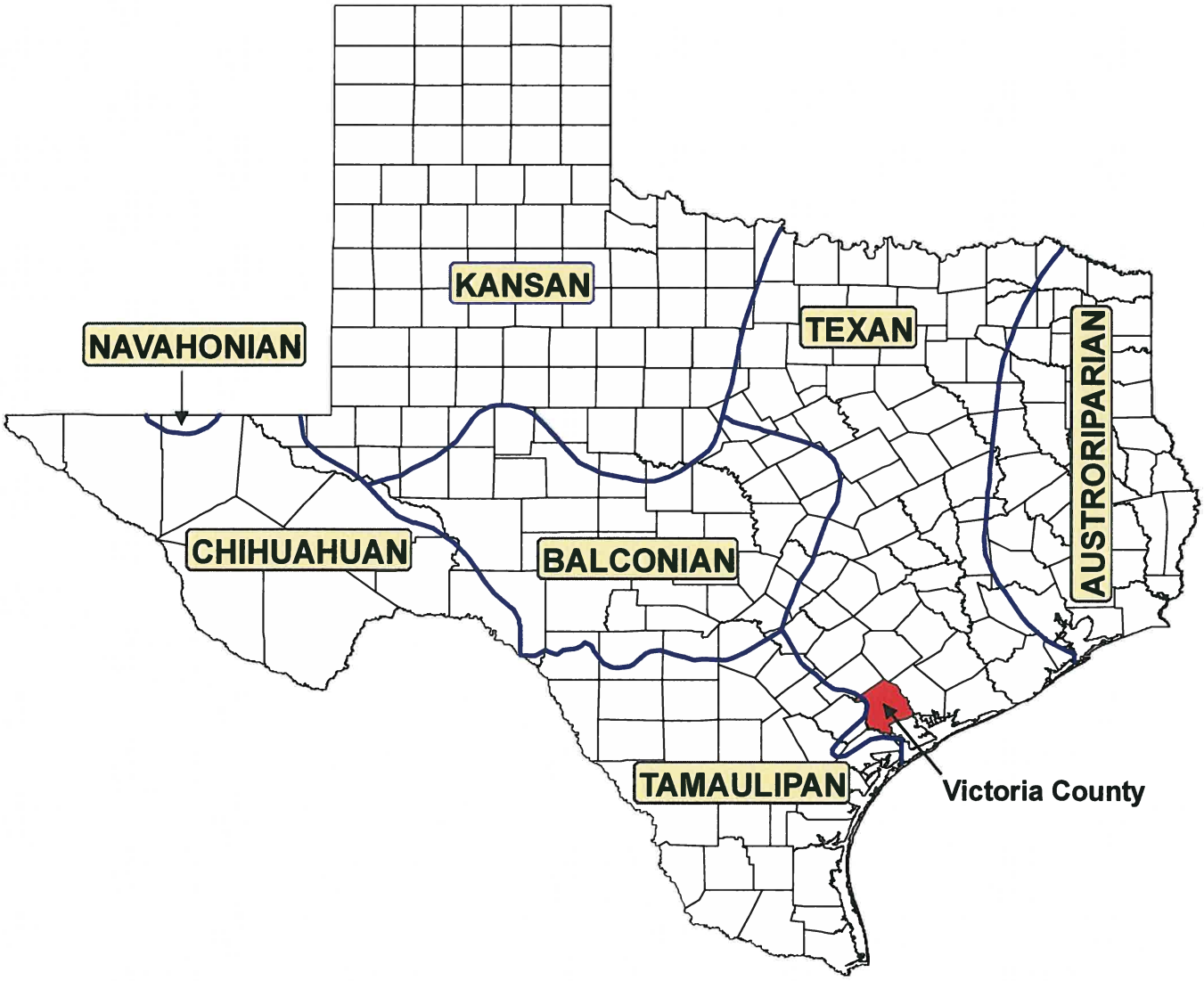
Characteristic succulents, vines and forbs of the Gulf Prairie include prickly-pear cactus (*Opuntia* spp.), Spanish dagger (*Yucca* spp.), pipevine (*Aristolochia macrophylla*), cross-vine (*Bignonia capreolata*), trumpet creeper (*Campsis* spp.), Carolina jessamine (*Gelsemium sempervirens*), coral honeysuckle (*Lonicera sempervirens*), May-pop (*Passiflora incarnata*), muscadine grape (*Vitis rotundifolia*), lance-leaf coreopsis (*Coreopsis lanceolata*), coralbean (*Erythrina* spp.), spider lily (*Hymenocallis lirisome*), cardinal flower (*Lobelia cardinalis*), Gulf Coast penstemon (*Penstemon tenuis*), scarlet sage (*Salvia coccinea*), meadow pink (*Sabatia campestris*), Turk's cap (*Malvaviscus arboreus* var. *drummondii*), asters (*Asters* spp.), Indian paintbrush (*Castilleja indivisa*), poppy mallows (*Callirhoe* spp.), phloxs (*Phlox* spp.), bluebonnets (*Lupinus* spp.) and evening primroses (*Oenothera* spp.) (Hatch et al. 1990; Schuster and Hatch 1990; TPWD 2007; Lady Bird Johnson Wildflower Center 2007).

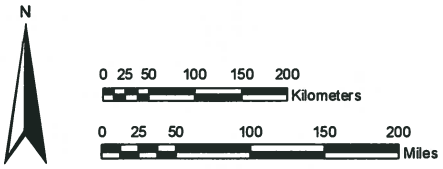
Common increasers and invaders in the area include Chinese tallow tree (*Sapium sebiferum*), Chinese privet (*Ligustrum sinense*) (Griffith et al. 2004), yankeeweed (*Eupatorium compositifolium*), broomsedge bluestem (*A. virginicus*), smutgrass (*Sporobolus indicus*), western ragweed (*Ambrosia psilostachya*), tumblegrass (*Scedonnardus paniculatus*), threeawns (*Aristida* spp.) and other annual forbs and grasses (Schuster and Hatch 1990). In addition to increasing invaders, much of the Gulf prairie has been converted to cropland, rangeland, pasture and urban and industrial land uses. Approximately one-third of the area has been cultivated for rice, sorghum, corn and tame pasture grasses (e.g. bermudagrass and introduced bluestems [*Dichanthium* spp. and *Bothriochloa* spp.]). Of all the areas in Texas, the Gulf Prairies and Marshes vegetation area has seen the greatest industrial development since World War II (Schuster and Hatch 1990).

### 2.1.2 Wildlife

As identified by Blair (1950), the project location occurs almost entirely in the Texan Biotic Province (Figure 2-2). Like the vegetation areas and Ecoregions of Texas, biotic provinces are also characterized by "peculiarities of vegetation type, ecological climax, flora, fauna, climate, physiography and soil" (Dice 1943 [from Blair 1950]). The Texan province has been used to describe the "broad ecotone between the forests of the Austroriparian and Carolinian provinces of eastern Texas and Oklahoma and the grasslands of the western parts of these states" (Dice 1943 [from Blair 1950]). The moist subhumid climate of the Texan province supports the vegetation types described above and classified within the Gulf Prairie.

One of the biogeographic features of the Texan Province is the drainage patterns. Numerous rivers such as the Brazos, Colorado, San Marcos and Guadalupe rivers drain the southern part of the Texan province. "The alluvial soils of these river valleys support a mesic forest of oaks, hackberries, pecans and other trees...[providing] avenues for westward dispersal of forest-inhabiting, Austroriparian species of animals into...the Texan province" (Blair 1950). Forty-nine species of mammals have occurred in the Texan province in recent times, 41 of which also occur in the Austroriparian. Eight species range into the Texan from the western, southern or northern regions and do not disperse beyond the Texan into the Austroriparian.

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BIO-WEST, Inc.
1018 Frost Street
Rosenberg, Texas 77471
Phone: 832.595.9064
Fax: 832.595.9054

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# Figure 2-2

# Biotic Provinces of Texas

Mammal species names provided in Blair (1950) have been modified to reflect current nomenclature according to Manning and Jones (1998). Common mammal species of the Texas Biotic Province that also occur in the Austroriparian include Virginia opossum (*Didelphis virginiana*), eastern mole (*Scalopus aquaticus*), fox squirrel (*Sciurus niger*), Baird's pocket gopher (*Geomys breviceps*), fulvous harvest mouse (*Reithrodontomys fulvescens*), white-footed mouse (*Peromyscus leucopus*), hispid cotton rat (*Sigmodon hispidus*), eastern cottontail (*Sylvilagus floridanus*) and swamp rabbit (*S. aquaticus*). Common grassland mammals include hibernating ground squirrel (*Spermophilus tridecemlineatus*), hispid pocket mouse (*Perognathus hispidus*), deer mouse (*P. maniculatus*) and black-tailed jack rabbit (*Lepus californicus*). The Gulf Prairie includes some subtropical species such as northern pygmy mouse (*Baiomys taylori*) and nine-banded armadillo (*Dasypus novemcinctus*) and in recent times, jaguar (*Panthera onca*) and ocelot (*Leopardus pardalis*) (Blair 1950; Manning and Jones 1998).

Two species of box turtles are known to occur in the Texan Province. The ornate box turtle (*T. ornata*) is a grassland species that becomes rare along the edge of the Austroriparian while the eastern box turtle (*T. carolina*) reaches its western limit in the Texan. Sixteen species of lizards in the Texan are also characteristic of those in the Austroriparian and include Carolina anole (*Anolis carolinensis*), eastern fence lizard (*Sceloporus undulatus*), Texas spiny lizard (*S. olivaceus*), eastern glass lizard (*Ophiosaurus ventralis*), collared lizard (*Crotaphytus collaris*), Texas horned lizard (*Phrynosoma cornutum*) and Great Plains skink (*Eumeces obsoletus*) (Blair 1950).

At least 39 species of snakes occur in the Texan province and include black racer (*Coluber constrictor*), coachwhip (*Coluber flagellum*), Texas rat snake (*Elaphe obsoleta*), kingsnake (*Lampropeltis getulus*), diamondback water snake (*Nerodia rhombifer*), ribbon snake (*Thamnophis sauritus*), northern copperhead (*Agkistrodon contortrix mokasen*), cottonmouth (*A. piscivorus*) and timber rattlesnake (*Crotalus horridus*). Twelve other species reach their eastern limits in the Texan province from regions to the west; these species include glossy snake (*Arizona elegans*), checkered garter snake (*Thamnophis marcianus*), gopher snake (*Pituophis catenifer*) and diamondback rattlesnack (*Crotalus atrox*) (Blair 1950; Crother 2008).

Anuran fauna is composed almost entirely of Austroriparian or widely distributed species. Common species occurring in the Texan province include the eastern spadefoot (*Scaphiopus holbrookii*), Gulf Coast toad (*Bufo valliceps*), Woodhouse's toad (*B. woodhousii*), southern cricket frog (*Acris gryllus*), southern chorus frog (*Pseudascris nigrita*), grey treefrog (*Hyla versicolor*), green treefrog (*H. cinerea*), American bullfrog (*Rana catesbeiana*), northern leopard treefrog (*R. pipiens*) and eastern narrow-mouthed toad (*Gastrophryne carolinensis*). Five species range into the Texan province and into the Austroriparian from the west and include Couch's spadefoot (*Scaphiopus couchii*), spotted chorus frog (*Pseudacris clarkii*), Strecker's chorus frog (*P. streckeri*) and western narrow-mouthed toad (*Gastrophryne olivacea*). The most commonly occurring urodele fauna within the Texan province include small-mouthed salamander (*Ambystoma texanum*), eastern tiger salamander (*A. tigrinum*) and lesser siren (*Siren intermedia*) (Blair 1950; Crother 2008).

## 2.2 LOCAL DESCRIPTION

Five different vegetation types were identified by Tetra Tech within the Victoria County Site using recent aerial photography. These vegetation types were verified in the field and provided the distinction for habitat types. These included Bluestem Grassland, Bottomland Hardwood Forest, Isolated Wetland, Live Oak Forest and Live Oak Motte. The following paragraphs provide a description of each habitat type. Representative photographs are provided in Appendix A.

### 2.2.1 Bluestem Grassland

The Bluestem Grassland was the dominant habitat type occupying approximately 10,307 acres (93.2%) of the project area. This habitat type occurred on mostly level to rolling terrain supported by sandy loam to clay soils. Based on discussions with the local area biologist and observations in the field, it was evident that this bluestem grassland habitat type is diligently managed. Management practices implemented within this grassland included prescribed burns, livestock grazing rotation and mechanical clearing of encroaching woody vegetation. Together these efforts result in a grassland community in various stages of vegetational succession. For the purpose of this survey, grassland community descriptions were combined to describe the grassland as a whole and includes dominant species observed throughout.

The Bluestem Grasslands were composed of open grasslands intermixed with woody vegetation occurring in varying degrees of density. The herbaceous layer was dominated in by little bluestem, big bluestem, yellow Indiangrass and Pan American balsamscale (*Elyonurus tripsacoides*) along with southern dewberry (*Rubus trivialis*), western ragweed, tickseed coreopsis (*Coreopsis tinctoria*), wooly croton (*Croton capitatus*), pink evening primrose (*Oenothera speciosa*) and cone flower (*Rudbeckia hirta*). Woody species are intermixed in some of the grasslands and consist of young specimens of honey mesquite and huisache.

### 2.2.2 Bottomland Hardwood Forest

The Bottomland Hardwood Forest occurred at the base on an escarpment that separated the Guadalupe River flood plain and upland grassland prairie. This habitat type encompassed approximately 256 acres or 2.3% of the site and occurred along the northeastern portion of the property adjacent to Linn Lake. Soils within this habitat type consisted of clays with varying inclusions of sand. This area appears to experience intermittent flooding as evident by debris lines identified at the time of the field effort.

Dominant tree species that occurred in this area consisted of sugar hackberry (*Celtis laevigata*), green ash (*Fraxinus pennsylvanica*), pecan and American elm. Adjacent to Linn Lake other more mesic species occurred including black willow (*Salix nigra*) and bald cypress (*Taxodium distichum*). The shrub layer was relatively open and consisted of palmetto, yaupon and buttonbush. The herbaceous layer in the bottomland hardwood forest was sparse in areas of dense canopy cover. Vegetation within these areas were dominated by climbing hemp vine (*Mikania scandens*), pepper vine (*Ampelopsis arborea*) and sedges (*Carex* spp.). Adjacent to Lin Lake in areas with greater light penetration, the herbaceous layer was more dense and consisted of seacoast sumpweed (*Iva annua*), poison ivy (*Toxicodendron radicans*) along with those species found under the canopy.

### 2.2.3 Isolated Wetland

Isolated Wetlands occur throughout the project area and are identified as those areas that support aquatic or mesic vegetation. This habitat type encompasses approximately 120 acres, or 1.1% of the total project area. Most of the Isolated Wetlands are associated with anthropogenic impoundments used for a water source for livestock (i.e. stock tanks). Others wetland areas appear to be natural depressions that possess wet or moist conditions most of the year (i.e., natural wetland). Both of these wetland types were

supported by dark silty clay soils. Each isolated wetland is distinct, but all share common vegetation communities. The following paragraph provides habitat descriptions for two general types of isolated wetlands encountered; stock tanks and natural wetlands.

The stock tanks within the project area were created by building earthen berms in upland pastures along or next to existing drainages. These drainages along with some ground water wells provide a water source for these areas. Adjacent to these areas are wetland fringes that support a mesic vegetation community that is dictated by water depth. Dominant vegetation species that occur in order from the upper wetland fringe to open water include jungle rice (*Echinochloa colonum*), Drummond's rattlebush (*Sesbania drummondii*), squarestem spikerush (*Eleocharis quadrangulata*), jointed flatsedge (*Cyperus articulatus*), smartweed (*Polygonum hydropiperoides*) and smooth water primrose (*Ludwigia peploides*). The natural wetlands support the same vegetation as described in the stock tanks, but also include longlobe arrowhead (*Sagittaria longiloba*) and water lotus (*Nelumbo lutea*).

### 2.2.4 Live Oak Forest

The Live Oak Forest habitat type occurs along the upper escarpment of the Guadalupe River bottom between the Bluestem Grassland and the lower Bottomland Hardwood Forest and occupies approximately 370 acres or 3.3% of the project area. Since many of the same woody vegetation species occurred in both the Hardwood Bottomland and Live Oak Forest, these habitat types were distinguished by elevation and the lack of hydrophytic vegetation. The Live Oak Forest occurs on gently sloping to undulating terrain underlain by sandy loam soils. The undulating terrain is a result of small incised drainages that lead down-slope to the bottomland.

As suggested by the name of this habitat type, live oak trees dominated this woodland. Other less common tree species that were identified included American elm, coma (*Bumelia lanuginosa*) and honey locust (*Gleditsia triacanthos*). The shrub layer was dominated by palmetto and yaupon. The forest floor possessed an abundance of leaf litter along with dominant herbaceous species of greenbrair (*Smilax bona-nox*), poison ivy, peppervine and seedlings of the overstory species.

### 2.2.5 Live Oak Motte

A few intermittent stands of Live Oak Mottes occur within the Bluestem Grasslands and encompass approximately 10 acres or 0.1% of the project area. These mottes are represented by isolated dense stands of live oak trees typically occupying less than five acres. Soils identified within these live oak mottes were typically a sandy loam. These areas appear to be highly utilized by livestock and deer exhibiting a distinct browse line and disturbed understory.

Vegetation within the Live Oak Motte consist of an overstory monoculture of live oak trees reaching heights of up to 30 feet. The shrub strata density varies depending on the individual oak motte, but includes species of yaupon, American beautyberry and Jerusalem cherry (*Solanum pseudo-capsicum*). The herbaceous layer is dominated in leaf litter with random vines of poison ivy, pepper vine, green briar and Virginia creeper (*Parthenocissus quinquefolia*) along with a few young sedges.

# 3.0 WILDLIFE SURVEY

## 3.1 METHODOLOGY

Wildlife surveys were conducted under BIO-WEST's current Texas Parks and Wildlife Scientific Collection Permit (permit number: SPR-0690-121) during the spring for two individual trips. Amphibians and reptiles were the focus of the first trip and small mammal trapping was the focus on the second. However, observational data were collected for all wildlife during any time spent on the project area. Methodologies implemented during each survey are provided below.

### 3.1.1 Amphibians and Reptiles

Prior to field surveys, a list of potentially occuring amphibian and reptile species occurring within the project location in Victoria County was prepared based on Tennant (1984, 1985, 2006), Garrett and Barker (1987) and Dixon (2000) (Appendix B). This list, which is inclusive of all the herps that are known to occur within Victoria County and the adjacent areas is comprised of a total of 80 species, roughly ordered as follows: 4 species of urodeles (sirens, newts and salamanders), 16 species of anurans (frogs and toads), 14 species of lizards, 34 species of snakes, 11 species of turtles and 1 crocodilian species. When necessary, amphibians and reptiles were identified using Dixon (2000), Garrett and Barker (1987), Tennant (2006), Dixon and Werler (2005) and Elliott (2004).

Quantitative field surveys were conducted for amphibians and reptiles from 28 April to 2 May 2008 on a daily basis using pedestrian time-constrained scan searching (Halliday 1996). These surveys consisted of searching an individual habitat type for a set amount of time investigating areas likely to be occupied by reptiles and amphibians (dead logs, debris piles, dilapidated structures, etc,). Search efforts were aided by the use of Stump Ripper™ reptile hooks (FurMont Reptile Equipment) and Whitney Snake Tongs™ (Whitco, Inc.). Survey sample periods occurred throughout daylight hours and into the evenings in each habitat type. This diurnal variation in survey time allowed for the detection of different species that are active at different times of the day. Survey time was kept using minutes per person effort and weighted according to the extent of each habitat type. This weighted time approach was to allow for equal search effort per area depending on the abundance of habitat. These quantitative search efforts assisted in determining species relative abundance based on encounters. A summary of the pedestrian time-constrained scan searching effort by habitat type is presented in Table 3-1.

Table 3-1. Amphibian and Reptile Search Time by Habitat Type.

| Habitat Type | Habitat Acreage | Habitat Percentage | Amphibian & Reptile Search Time | |
|---|---|---|---|---|
| | | | Minutes | Hours |
| Bluestem Grassland | 10,307 | 93.2% | 720 | 12 |
| Bottomland Hardwood Forest | 256 | 2.3% | 240 | 4 |
| Isolated Wetland | 120 | 1.1% | 300 | 5 |
| Live Oak Forest | 370 | 3.3% | 240 | 4 |
| Live Oak Motte | 10 | 0.1% | 180 | 3 |
| Total | 11,063 | 100% | 1,680 | 28 |

In addition to aforementioned efforts, audible call identification and a nocturnal road cruise were also conducted. Audible call identification occurred throughout the entire survey effort, but focused at times of the evening and early night during active periods of call vocalization. A nocturnal road cruise survey also occurred throughout roads in the project area. Funnel traps were set out in aquatic habitat types to capture any aquatic amphibians or reptiles that may occur. A total of 6 funnel traps were set for 3 nights.

Additional observational data were also collected during BIO-WEST's quarterly on-site fish and macrobenthic inventory baseline (28 April to 02 May 2008) and during the small mammal survey (19 to 23 May 2008) and have been incorporated into this report.

### 3.1.2 Small Mammals

Small mammal surveys were conducted using 3" × 3.5" × 9" folding aluminum H.B. Sherman™ live traps. Traps were placed along transects within each habitat type spaced approximately 10 meters apart and baited with sterilized rolled oats. The start and end point of each trap line was recorded using GPS. Traps were set during the daytime and checked the next morning. Each trap set equates to one "trap night". Trapping efforts were weighted according to habitat type abundance; therefore, the larger habitat types received more traps in an effort to evenly distribute trap density (Table 3-2).

Table 3-2. Small Mammal Survey Summary

| Habitat Type | Habitat Acreage | Habitat Type Percentage | Mammals | |
|---|---|---|---|---|
| | | | Trap Nights | Game Camera Days |
| Bluestem Grassland | 10,307 | 93.2% | 400 | 50 |
| Bottomland Hardwood Forest | 256 | 2.3% | 100 | 25 |
| Isolated Wetland | 120 | 1.1% | 100 | 0 |
| Live Oak Forest | 370 | 3.3% | 100 | 25 |
| Live Oak Motte | 10 | 0.1% | 100 | 25 |
| Total | 11,063 | 100% | 800 | 125 |

Digital remote game cameras were deployed to document mammals too large to be captured in the Sherman live traps. Game cameras were installed on 28 April 2008 and retrieved on 22 May 2008 for a total of 25 days. Cameras were focused on a location that was baited using sardines and/or commercial game scent. These baits and scents act as an attractant for animals as well as a focal point for and photographs. Surveillance periods were also weighted according to habitat type abundance in a effort to equally sample each habitat type. This equated to one additional game camera being deployed in the dominant Bluestem Grassland habitat. Due to inundation and lack of deployment structures, a game camera was not installed within the isolated wetland. A summary of the game camera surveillance efforts is presented in Table 3-2

Nighttime spotlight surveys were conducted on 30 April 2008 throughout existing roads on the project site. The survey route attempted to include all habitat types, but access to many of these areas were limited. Hand-held spotlights were used by two people, one on each side of the vehicle, to identify any mammals encountered. All encounters were documented along with the respective habitat type.

Mist nets were erected on the night of 19 May 2008 in an effort to document any bats that may occur within the project site. Two 6-ft tall mist nets (18 ft and 42 ft in length) were place under the forest canopy within the Live Oak Woodland. This netting site was chosen due to the protection of sustained winds (which usually blow the mist nets allowing detection and avoidance) experienced at the time of the survey efforts.

### 3.1.3 Data Analysis

#### 3.1.3.1 Similarity

It is considered important to include the full suite of species observed in each habitat when assessing community similarities. However, no abundance estimates were available for aquatic amphibians or reptiles or large mammals, only random funnel traps, incidental observation and game camera counts that identified species presence. Therefore, the similarity of herpetological and mammal communities were assessed among the sites using the coefficient of Jaccard (Krebs, 1999). This method is appropriate for evaluating communities for which abundance data are not available, only species presence-absence data. For each habitat type pairing, the coefficient $S_J$ was calculated according to the equation:

$$S_J = \frac{a}{a+b+c}$$

where:
$a$ = number of species observed in both communities,
$b$ = number of species in community A, but not in B, and
$c$ = number of species in community B, but not in A.

The coefficient of Jaccard theoretically can take on any value ranging from 0 to 1: 0 meaning that the two communities have no species in common, and 1 meaning that the communities have the exact same species present. Thus, the larger the value of habitat pair's coefficient, the more similar the communities are.

#### 3.1.3.2 Diversity

To assess wildlife community diversity within each habitat, two diversity measures were used for both the amphibians and reptiles (as one) and mammals. Because portions of the community were sampled only for species presence/absence, diversity was first assessed using simply the number of species observed as an index of species richness. While it is impossible to definitively enumerate all the species in a given community, this does give some idea of the overall species diversity.

It was also decided to more closely investigate wildlife species heterogeneity, a more comprehensive measure of diversity than simple species richness. Heterogeneity indices capture both species richness and the degree to which individuals are spread among the various species present. Thus, given two communities composed of the same species, the community where each species was equally abundant would have a higher species diversity than the community where one species was overwhelmingly prevalent. This community heterogeneity was assessed using the Brillouin index ( $\hat{H}$ ), calculated as:

$$\hat{H} = \frac{1}{N} log\left(\frac{N!}{n_1!n_2!n_3!\cdots}\right)$$

where
$N$ = total number of individuals of all species,
$n_1$ = total number of individuals belonging to species 1,
$n_2$ = total number of individuals belonging to species 2, etc.

Because heterogeneity requires some measure of species abundance, this analysis was limited to the small mammal trapping and timed amphibian and reptile surveys. As heterogeneity increases (through increasing species richness and/or increasing evenness of individuals among species), the Brillouin index

takes on larger and larger values. By definition, communities with a single species will have a heterogeneity value of 0, regardless of abundance.

# 4.0 BASELINE SURVEY RESULTS

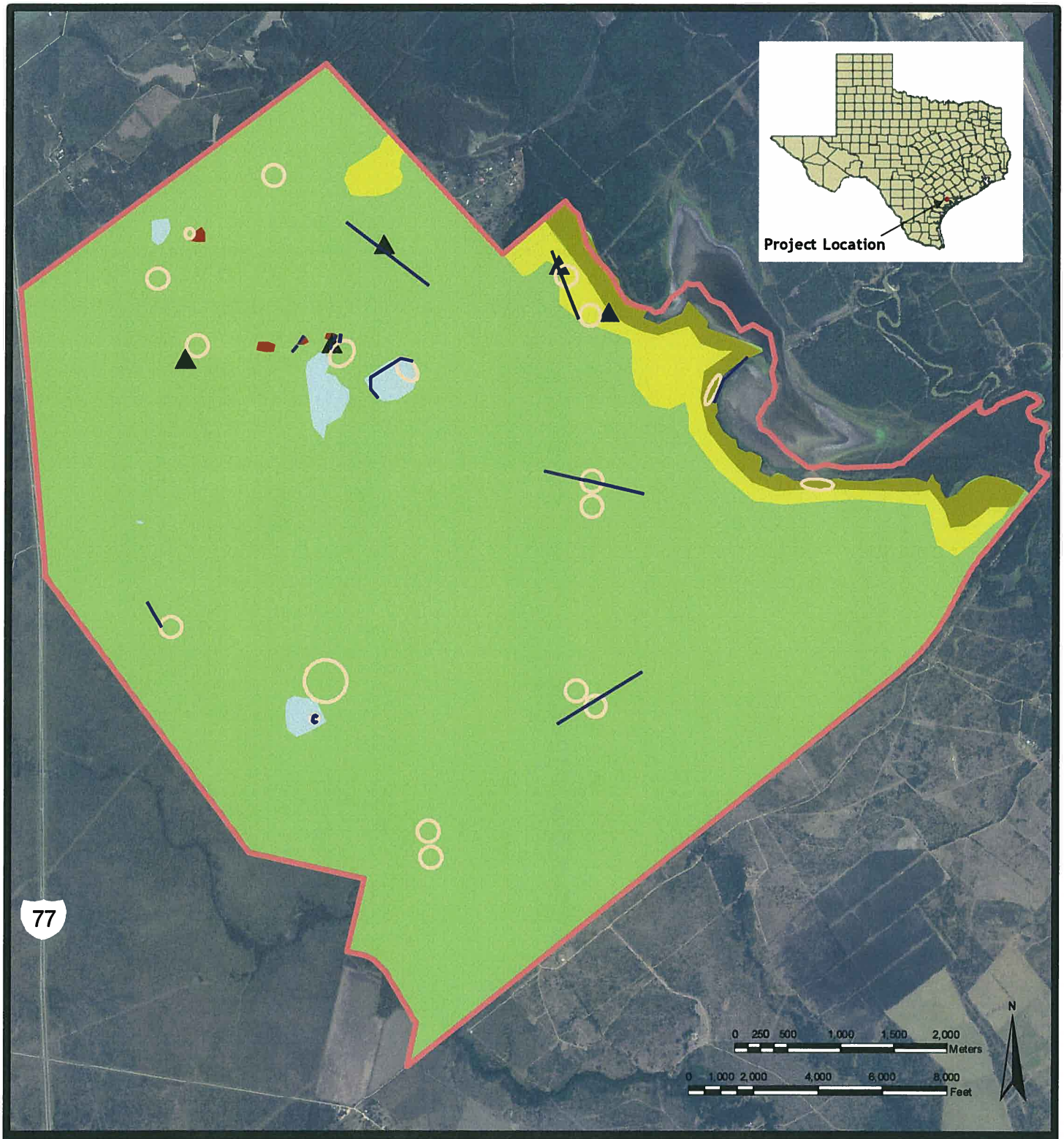
## 4.1 AMPHIBIANS AND REPTILES

A total of 8,160 minutes (136 hours) were spent searching all habitat types within the project area documenting a total of 46 individuals representing 14 amphibian and reptile species (Table 4-1). The location and approximate area of each pedestrian survey by habitat type is depicted on Figure 4-1. These survey efforts revealed that the Isolated Wetlands supported the greatest diversity (n=8) of species encountered followed by Live Oak Forest (n=7), Bottomland Hardwood Forest (n=5), Live Oak Motte (n=1) and Bluestem Grassland (n=0), respectively. This habitat hierarchy remained consistent for total number of animals encountered as well as catch per unit effort.

Table 4-1. Amphibian and Reptile Search Effort Summary

| Species | | Habitat Types | | | | | |
|---|---|---|---|---|---|---|---|
| Common Name | Scientific Name | Bluestem Grassland | Bottomland Hardwood Forest | Isolated Wetland | Live Oak Forest | Live Oak Motte | Total |
| Gulf Coast toad | *Bufo valliceps* | | 1 | 1 | 1 | 1 | 4 |
| Green treefrog | *Hyla cinerea* | | | | 1 | | 1 |
| Squirrel treefrog | *Hyla squirella* | | | | 1 | | 1 |
| Eastern narrowmouth toad | *Gastrophryne carolinensis* | | | | 1 | | 1 |
| Bull frog | *Rana catesbeiana* | | | 1 | | | 1 |
| Southern leopard frog | *Rana utricularia* | | 1 | 16 | | | 17 |
| Five-lined skink | *Eumeces fasciatus* | | 3 | | | | 3 |
| Ground skink | *Scincella lateralis* | | 4 | | 1 | | 5 |
| Prairie kingsnake | *Lampropeltis calligaster calligaster* | | | 1 | | | 1 |
| Eastern Coachwhip | *Masticophis flagellum flagellum* | | | 1 | 1 | | 2 |
| Broad-banded water snake | *Nerodia fasciata confluens* | | 1 | 1 | | | 2 |
| Diamondbacked water snake | *Nerodia rhombifer rhombifer* | | | 6 | | | 6 |
| Ground snake | *Virginia striatula* | | | | 1 | | 1 |
| Western Cottonmouth | *Agkistrodon piscivorus leucostoma* | | | 1 | | | 1 |
| Total Animals Encountered | | 0 | 10 | 28 | 7 | 1 | 46 |
| Total Minutes Surveyed | | 7,200 | 240 | 300 | 240 | 180 | |
| Catch per Unit Effort | | 0.00% | 4.17% | 9.33% | 2.92% | 0.56% | |

The aquatic funnel trapping efforts in the Isolated Wetlands resulted in the capture of 7 western lesser sirens (*Siren intermedia nettingi*) and 1 diamondback water snake (*Nerodia rhombifer rhombifer*). Incidental observations during all other activities (including call counts and road cruise surveys) on the project site included the identification of 58 total individuals representing 22 species. These species included Blanchard's cricket frog (*Acris crepitans blanchardi*), Texas rat snake (*Elaphe obsoleta lindheimeri*), speckled kingsnake (*Lampropeltis getula splendida*), common snapping turtle (*Chelydra serpentina*), red-eared slider (*Trachemys scripta elegans*), spiny softshell (*Trionyx spinerfera*) and the American alligator (*Alligator mississippiensis*). Since these species were not encountered during actual quantitative surveys, they were only included as incidental observations. A comprehensive list of all amphibian and reptile species likely to occur within the project site along with habitat preference and abundance (based on the spring field effort) are provided in Appendix B. Species abundance, as provided in Appendix B as abundant, common, uncommon, occasional or rare was intuitively based on species encounters within the project area and supported by local knowledge of this region.




| Habitat Type | Acres |
|---|---|
| Bluestem Grassland | 10,307 |
| Bottomland Hardwood Forest | 256 |
| Isolated Wetland | 120 |
| Live Oak Forest | 370 |
| Live Oak Motte | 10 |

Game Camera
Pedestrain Herp Survey Location
Small Mammal Trap Line
Property Boundary

# Figure 4-1
# Wildlife Survey Locations

| | |
|---|---|
| Job No: 1163.00 | Drawn By: J. Enright |
| Date: May 28, 2008 | Scale: 1 inch = 4,000 feet |

File: P:\Projects\Exelon\GIS\Herp_Mammal_Surveys.mxd

BIO-WEST, Inc.
Coastal Division
1018 Frost Street
Rosenberg, Texas 77471
Phone: 832.595.9064
Fax: 832.595.9054

## 4.2 SMALL MAMMALS

A total of 800 trap nights were accumulated during the spring small mammal trapping effort documenting a total of 39 individuals composed of 5 species. Small mammal trapping efforts revealed that the Bluestem Grassland supported the greatest number of species (n=5) followed by the Isolated Wetland (n=2), Live Oak Forest and Live Oak Motte (each: n=1) and Bottomland Hardwood Forest (n=0). The total number of animals captured as well as trap success also followed this same order (Table 4-2). A comprehensive list of all mammal species likely to occur within the project site along with habitat preference and abundance (based on the spring field effort) are provided in Appendix C.

Table 4-2. Small Mammal Trapping Effort Summary

| Species | | Habitiat Type | | | | | |
|---|---|---|---|---|---|---|---|
| Common Name | Scientific Name | Bluestem Grassland | Bottomland Hardwood Forest | Isolated Wetland | Live Oak Forest | Live Oak Motte | Total |
| Marsh Rice Rat | *Oryzomys palustris* | 4 | 0 | 2 | 0 | 0 | 6 |
| Fulvous Harvest Mouse | *Reithrodontomys fulvescens* | 4 | 0 | 0 | 0 | 0 | 4 |
| White-footed Mouse | *Peromyscus leucopus* | 3 | 0 | 0 | 1 | 1 | 5 |
| Northern Pygmy Mouse | *Baiomys taylori* | 1 | 0 | 0 | 0 | 0 | 1 |
| Hispid Cotton Rat | *Sigmodon hispidus* | 21 | 0 | 1 | 0 | 0 | 22 |
| Total Number of Species | | 5 | 0 | 2 | 1 | 1 | 5 |
| Total Animals Captured | | 33 | 0 | 3 | 1 | 1 | 38 |
| Number of Trap Nights | | 400 | 100 | 100 | 100 | 100 | 800 |
| Percent Trap Success | | 8.3% | 0.0% | 3.0% | 1.0% | 1.0% | 4.8% |

Remote game camera surveillance documented a total of 8 additional mammal species (Table 4-3). The greatest species diversity occurred equally in the Bottomland Hardwood Forest and Live Oak Forest (n=5), followed by Bluestem Grassland and Live Oak Motte (equally: n=2). Due to inundation and lack of supporting structures, no game cameras were deployed in the Isolated Wetland habitat. Table 4-3 provides a summary of all species documented by the remote game cameras in each habitat type. Representative photographs of each species documented by the remote game camera are provided in Appendix D. To note, game camera photographs collected during periods of dim light were taken using an infrared flash appear in black and white, while daytime photos are in color. The habitat type, ambient temperature, date and time of each image capture is embedded at the bottom of each photograph. Small mammal trapping transects and remote game camera stations are shown in Figure 4-1.

Table 4-3. Remote Game Camera Surveillance Summary

| Species | | Habitiat Type | | | | |
|---|---|---|---|---|---|---|
| Common Name | Scientific Name | Bluestem Grassland | Bottomland Hardwood Forest | Isolated Wetland[1] | Live Oak Forest | Live Oak Motte |
| White-tailed Deer | *Odocoileus virginianus* | X | X | | X | X |
| Coyote | *Canis latrans* | | X | | | |
| Bobcat | *Lynx rufus* | | X | | | |
| Northern Raccoon | *Procyon lotor* | | X | | X | |
| Virginia Opossum | *Didelphis virginiana* | | | | X | |
| Eastern Fox Squirrel | *Sciurus niger* | | | | X | |
| Nine-banded Armadillo | *Dasypus novemcinctus* | | | | X | |
| Feral Hog | Sus Scrofa | X | X | | | X |
| Total Number of Species | | 2 | 5 | -- | 5 | 2 |

[1] - no game cameras were deployed

Since the roads within the project site occurred almost exclusively within the Bluestem Grasslands, road cruise surveys were interpreted as qualitative data only. These surveys resulted in the observation of 88 white-tailed deer, 10 feral hogs and 1 eastern cottontail rabbit. Road Cruise datasheets are provided in Appendix E.

An abundance of gopher mounds were also observed throughout in the project area in all upland sites. Once set of Victor™ gopher traps were placed in an excavated gopher tunnel and resulted in the capture of one Baird's pocket gopher; confirming the species of pocket gopher likely to occur.

Mist netting efforts at night did not result in the capture of any bats. These efforts were therefore supplemented by observing water sources (i.e. stock ponds and water troughs) in the evening and at night during the road cruise surveys. Neither effort yielded the observation of any bats.

## 4.3 DATA ANALYSIS

### 4.3.1 Amphibians and Reptiles

#### 4.3.1.1 Similarity

As stated previously, using the coefficient of Jaccard, this similarity index can theoretically take on any value ranging from 0 to 1; with 0 meaning that the two communities have no species in common and 1 meaning that the communities have the exact same species present. Thus, the larger the value of habitat pair's coefficient, the more similar the communities are.

Mathematical results suggest that all habitats are quite dissimilar from each other with similarity values of ≤0.33 (Figure 4-2). Habitat similarity values have been visually emphasized using color shading; the darker the color the greater the similarity. Of the five habitat types, the Bottomland Hardwood Forest is most similar to Isolated Wetland, Live Oak Forest and Live Oak Motte (equally). However, with such a low value, this similarity is extremely weak. Bluestem Grassland did not show similarity to any other habitat types.

| Habitat Type | Bluestem Grassland | Bottomland Hardwood Forest | Isolated Wetland | Live Oak Forest | Live Oak Motte |
|---|---|---|---|---|---|
| Bluestem Grassland | | 0.00 | 0.00 | 0.00 | 0.00 |
| Bottomland Hardwood Forest | | | 0.20 | 0.20 | 0.20 |
| Isolated Wetland | | | | 0.11 | 0.08 |
| Live Oak Forest | | | | | 0.14 |
| Live Oak Motte | | | | | |

Figure 4-2. Amphibian and Reptile Habitat Similarity Indices

#### 4.3.1.2 Diversity

Also stated previously, the Brillouin index takes on larger and larger values as heterogeneity increases (through increasing species richness and/or increasing evenness of individuals among species). By definition, communities with a single species will have a heterogeneity value of 0, regardless of abundance. Based on this diversity index, mathematical results indicate that the Isolated Wetland habitat type possesses the greatest heterogeneity ($S_j$=2.25), followed by Live Oak Forest ($S_j$=1.76) and Bottomland Hardwood Forest ($S_j$ =1.46), respectively. Since the Bluestem Grassland and Live Oak Motte only produced a singe species each, values remained at zero.

The raw species richness is an actual measurement of the total number of species encountered for each habitat type (Table 4-4). These summations indicated similar results, identifying species richness in the following descending order: Isolated wetlands, Live Oak Forest, Bottomland Hardwood Forest and Live Oak Motte and Bluestem Grassland (equally).

Table 4-4. Amphibian and Reptile Diversity Indices

| Diversity Indices | Habitat Type | | | | |
|---|---|---|---|---|---|
| | Bluestem Grassland | Bottomland Hardwood | Isolated Wetland | Live Oak Forest | Live Oak Motte |
| Brillouin Index of Heterogeneity | 0 | 1.46 | 2.25 | 1.76 | 0 |
| Raw Species Richness | 1 | 5 | 13 | 7 | 1 |

### 4.3.2 Small Mammals

#### 4.3.2.1 Similarity

Mathematical results suggest that most habitats are quite dissimilar from each other. With the exception of the Live Oak Motte – Little Bluestem Grassland pair (highlighted below in orange), all habitat pairs had similarity values of ≤0.33 (Figure 4-3). Three habitat pairs had no mammal species in common. As with the previous similarity indices figure, the habitat similarity values have been visually emphasized using color shading; the darker the color the greater the similarity.

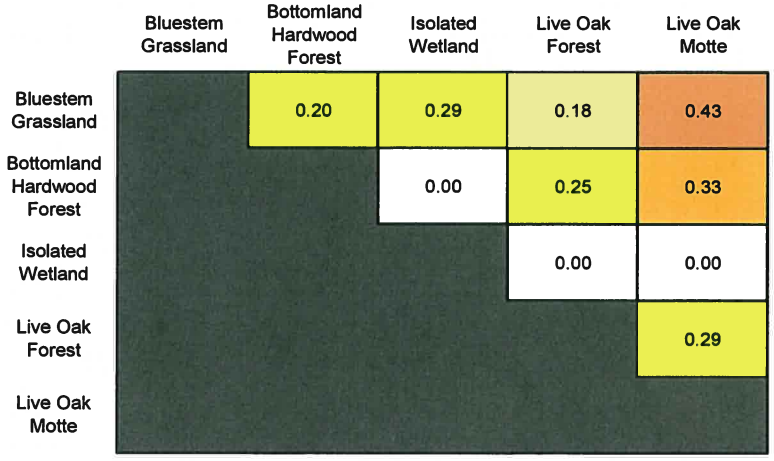



Figure 4-3. Small Mammal Habitat Similarity Indices.

#### 4.3.2.2 Diversity

The Brillouin small mammal diversity indices identifies the Bluestem Grassland to have the greatest diversity ($\hat{H}$=1.38) followed by Isolated Wetland ($\hat{H}$=0.53). The remaining habitat types all resulted in a score of zero. The Raw species richness also reflected this order with Bluestem Grassland possessing the greatest number of species (n=5) followed by Isolated Wetland (n=3), Live Oak Forest and Live Oak Motte (both, n=1) and lastly Bottomland Hardwood (n=0).

Table 4-5. Small Mammal Diversity Indices.

| Diversity Indices | Habitat Type | | | | |
|---|---|---|---|---|---|
| | Bluestem Grassland | Bottomland Hardwood Forest | Isolated Wetland | Live Oak Forest | Live Oak Motte |
| Brillouin Index of Heterogeneity | 1.38 | 0 | 0.53 | 0 | 0 |
| Raw Species Richness | 5 | 0 | 3 | 1 | 1 |

#### 4.3.2.3 Summary

According to the calculations derived using the coefficient of Jaccard, the similarity indices identified that each individual habitat that occurs within the project area is unique from a wildlife perspective. There does appear to be a slightly greater similarity in habitat types from a small mammal community perspective than from amphibians or reptiles. This is somewhat expected due to the greater mobility and range of mammals than that of most amphibians or reptiles.

The diversity indices identified that both species richness and heterogeneity by hab'tat type follow similar trends for each faunal community (i.e., amphibians and reptiles vs. small mammals). However, these data indicate that the herpetological community occupies the Isolated Wetlands with a greater diversity than any other habitat and the small mammal community has the greatest diversity within the Bluestem Grassland. When combined, looking at both faunal communities, the Isolated Wetland habitat type supports the greatest wildlife diversity (Figure 4-4).

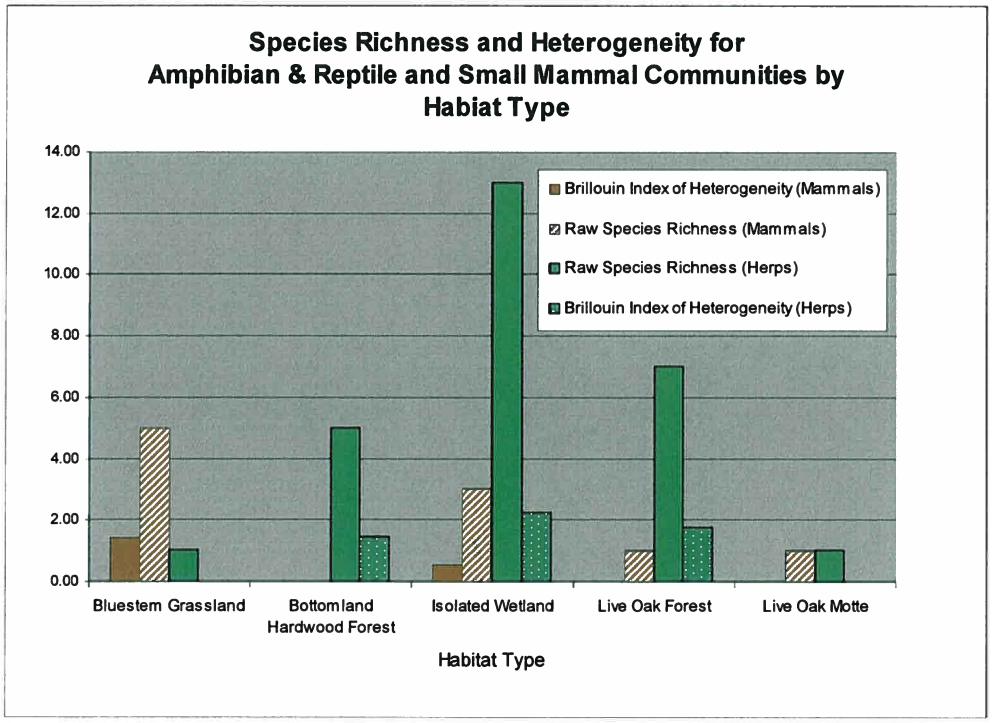



Figure 4-4. Comparative Species Richness and Heterogeneity Graph.

After conducting these surveys and analyzing the data, two observations were noted: 1) there appears to be a lack of herpetofauna in the Bluestem Grasslands and 2) there appears to be a lack of small mammals in the Bottomland Hardwood Forest. The lack of amphibians and reptiles in the grasslands may be influenced by thick ground cover, thus preventing the observation of animals using the direct search technique, but it is believed that there are just few species that occur in this habitat type. The lack of small mammals in the Bottomland Hardwood Forest is thought to be related to frequent flooding events that occur within this low-lying area displacing these animals. Conversations with the local land manager and ranch biologist confirmed this area is inundated for extended periods of time after sever rainfall. Overall, trapping efforts and incidental observation results appeared to be typical of this area during the spring.

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# Appendix A

# Representative Habitat Photographs at the Exelon Victoria County Site

# Exelon Victoria County Site
# Habitat Types

Bluestem Grassland

Bottomland Hardwood Forest

Exelon Victoria County Site
Habitat Types

Isolated Wetland

Live Oak Forest

Exelon Victoria County Site
Habitat Types

Live Oak Motte

# Appendix B

# Amphibians and Reptiles of Potential Occurrence at the Exelon Victoria County Site

# APPENDIX B

## Amphibians and Reptiles[1] of Potential Occurrence[2] at the Exelon Victoria County Site

| Species | | General Habitat[3] | Observed in Project Area/Abundance[4] |
|---|---|---|---|
| Common Name | Scientific Name | | |
| Western Lesser Siren | *Siren intermedia nettingi* | I | C |
| Eastern Green Toad | *Bufo debilis* | G, I | |
| Texas Toad | *Bufo speciosus* | G, I | |
| Gulf Coast Toad | *Bufo valliceps* | G, I | C |
| Woodhouse's Toad | *Bufo woodhousii woodhousii* | G, I | |
| Blanchard's Cricket Frog | *Acris crepitans blanchardi* | B, F, M, I | C |
| Cope's Gray Treefrog | *Hyla chrysoscelis* | B, F, M, I | |
| Green Treefrog | *Hyla cinerea* | B, F, M, I | C |
| Squirrel Treefrog | *Hyla squirella* | B, F, M, I | O |
| Gray Treefrog | *Hyla versicolor* | B, F, M, I | |
| Spotted Chorus Frog | *Pseudacris clarkii* | B, F, M, I | |
| Strecker's Chorus frog | *Pseudacris streckeri* | B, F, M, I | |
| Western Chorus Frog | *Pseudacris triseriata* | B, F, M, I | |
| Eastern Narrowmouth Toad | *Gastrophryne carolinensis* | B, F, M, I | O |
| Great Plains Narrowmouth Toad | *Gastrophryne olivacea* | B, F, M, I | |
| Hurter's Spadefoot | *Scaphiopus hurterii* | G, I | |
| Bullfrog | *Rana catesbeiana* | I | C |
| Southern Leopard Frog | *Rana sphenocephala* | I | A |
| Smallmouth Salamander | *Ambystoma texanum* | I | |
| Slimy Salamander | *Plethodon glutinosus complex* | I | |
| Southern Redback Salamander | *Plethodon serratus* | I | |
| Eastern Newt | *Notophthalmus viridescens* | I | |
| Western Slender Glass Lizard | *Ophisaurus attenuatus* | G | |
| Keeled Earless Lizard | *Holbrookia propinqua propinqua* | G | |
| Texas Horned Lizard | *Phrynosoma cornutum* | G | |
| Texas Spiny Lizard | *Sceloporus olivaceus* | G, F | |
| Northern Fence/Prairie Lizard | *Sceloporus undulatus hyacinthinus* | G ,F | |
| Southern Prairie Skink | *Sceloporus septentrionalis obtusirostris* | G, F | |
| Green Anole | *Anolis carolinensis* | B, F, M, I | |
| Five-lined Skink | *Eumeces fasciatus* | B, F, M | C |
| Broadhead Skink | *Eumeces laticeps* | B, F, M | |
| Southern Prairie Skink | *Eumeces septentrionalis obtusirostris* | G, B, F, M | |
| Ground Skink | *Scincella lateralis* | B, F, M | C |
| Texas Spotted Whiptail | *Cnemidophorus gularis* | G | |
| Marbled Whiptail | *Cnemidophorus marmoratus* | G | |
| Six-lined Racerunner | *Cnemidophorus sexlineatus sexlineatus* | G | |
| Texas Blind Snake | *Leptotyphlops dulcis* | B, F, M | |
| Texas Glossy Snake | *Arizona elegans arenicola* | G | |
| Eastern Yellow-bellied Racer | *Coluber constrictor flaviventris* | G | |
| Great Plains Rat Snake | *Elaphe emoryi* | G, F | |
| Southwestern Rat Snake | *Elaphe guttata meahllmorum* | G, F | |
| Texas Rat Snake | *Elaphe obsoleta lindheimeri* | G, F | C |

## APPENDIX B (Cont'd)

| Species | | General Habitat[3] | Observed in Project Area/Abundance[4] |
|---|---|---|---|
| Common Name | Scientific Name | | |
| Mud Snake | *Farancia abacura* | I | |
| Eastern Hognose Snake | *Heterodon platirhinos* | G | |
| Texas Night Snake | *Hypsiglena torquata jani* | G | |
| Prairie King Snake | *Lampropeltis calligaster calligaster* | G | O |
| Speckled King Snake | *Lampropeltis getula splendida* | G | O |
| Louisiana Milk Snake | *Lampropeltis triangulum amaura* | B, F, M | |
| Eastern Coachwhip | *Masticophis flagellum flagellum* | G | C |
| Blotched Water Snake | *Nerodia erythrogaster transversa* | I | |
| Broad-banded Water Snake | *Nerodia fasciata confluens* | I | C |
| Diamondback Water Snake | *Nerodia rhombifer rhombifer* | I | A |
| Rough Green Snake | *Opheodrys aestivus* | B, F, M | |
| Bull Snake | *Pituophis catenifer sayi* | G | |
| Graham's Crayfish Snake | *Regina grahamii* | I | |
| Marsh Brown Snake | *Storeria dekayi limnetes* | B, F, M, I, | |
| Ground snake | *Virginia striatula* | B, F, M, I | U |
| Flathead Snake | *Tantilla gracilis* | B, F, M | |
| Plains Black-headed Snake | *Tantilla nigriceps nigriceps* | B, F, M | |
| Checkered Garter Snake | *Thamnophis marcianus marcianus* | G, I | |
| Gulf Coast Ribbon Snake | *Thamnophis proximus orarius* | G, I | |
| Eastern Garter Snake | *Thamnophis sirtalis sirtalis* | G, I | |
| Texas Lined Snake | *Tropidoclonion lineatum texanum* | G, I | |
| Rough Earth Snake | *Virginia striatula* | B, F, M | |
| Texas Coral Snake | *Micrurus fulvius tenere* | B, F, M | |
| Broad-baned Copperhead | *Agkistrodon contortrix laticinctus* | B, F, M | |
| Western Cottonmouth | *Agkistrodon piscivorus leucostoma* | I | U |
| Western Diamondback Rattlesnake | *Crotalus atrox* | G, F | |
| Canebrake Rattlesnake | *Crotalus horridus atricaudatus* | B, F, M | |
| Western Massasauga | *Sistrurus catenatus tergeminus* | G, F | |
| Western Pygmy Rattlesnake | *Sistrurus miliarius streckeri* | G, F | |
| Common Snapping Turtle | *Chelydra serpentina* | I | U |
| Cagle's Map Turtle | *Graptemys caglei* | I | |
| Texas River Cooter | *Pseudemys texana* | I | |
| Eastern Box Turtle | *Terrapene carolina* | G, F | |
| Ornate Box Turtle | *Terrapene ornata* | G | |
| Red-eared Slider | *Trachemys scripta* | I | C |
| Yellow Mud Turtle | *Kinosternon flavescens* | I | |
| Mississippi Mud Turtle | *Kinosternon subrubrum hoppocrepis* | I | |
| Common Musk Turtle | *Sternotherus odoratus* | I | |
| Texas Tortoise | *Gopherus berlandieri* | G | |
| Spiny Softshell | *Apalone spinifera* | I | U |
| American Alligator | *Alligator mississippiensis* | I | C |
| Mediterranean Gecko[5] | *Hemidactlus turcicus turcicus* | B, F | |

[1] - Nomeclature follows Dixon (2000)

[2] - According toTennant (1984, 1985, 2006), Garrett and Barker (1987), and Dixon (2000)

[3] - G - Bluestem Grassland
B - Bottomland Hardwood Forest
F - Live Oak Forest
M - Live Oak Motte
I - Isloated Wetland

[4] - A - Abundant
C - Common
U - Uncommon
O - Occasional
R - Rare

[5] - Exotic species

# Appendix C

# Mammals of Potential Occurrence at the Exelon Victoria County Site

# APPENDIX C

## Mammals[1] of Potential Occurrence[2] at the Exelon Victoria County Site

| Species | | General Habitat[3] | Observed in Project Area/Abundance[4] |
|---|---|---|---|
| Common Name | Scientific Name | | |
| Virginia Opossum | *Didelphis virginiana* | G, B, F, I | C |
| Nine-banded Armadillo | *Dasypus novemcinctus* | G, F | C |
| Least Shrew | *Cryptotis parva* | G, F | |
| Crawford's Gray Shrew | *Notiosorex crawfordi* | G | |
| Eastern Mole | *Scalopus aquaticus* | G, F | |
| Big Brown Bat | *Eptesicus fuscus* | G, B, F, I | |
| Silver-haired Bat | *Lasionycteris noctivagans* | G, B, F, I | |
| Red Bat | *Lasiurus borealis* | G, B, F, I | |
| Hoary Bat | *Lasiurus cinereus* | G, B, F, I | |
| Northern Yellow Bat | *Lasiurus intermedius* | G, B, F, I | |
| Seminole Bat | *Lasiurus seminolus* | G, B, F, I | |
| Cave Myotis | *Myotis velifer* | G, B, F, I | |
| Evening Bat | *Nycticeius humeralis* | G, B, F, I | |
| Eastern Perimyotis | *Pipistrellus subflavus* | G, B, F, I | |
| Big Free-tailed Bat | *Nyctinomops macrotis* | G, I | |
| Brazilian Free-tailed Bat | *Tadarida brasiliensis* | G, I | |
| Coyote | *Canis latrans* | G, F | U |
| Common Gray Fox | *Urocyon cinereoargenteus* | G, F | |
| Red Fox | *Vulpes vulpes* | G, F, | |
| Ringtail | *Bassariscus astutus* | B, F, M | |
| White-nosed Coati | *Nasua narica* | B, F, M | |
| Northern Raccoon | *Procyon lotor* | B, F, I | A |
| Long-tailed Weasel | *Mustela frenata* | G, B, F | |
| American Badger | *Taxidea taxus* | G | |
| Striped Skunk | *Mephitis mephitis* | G, F | |
| Eastern Spotted Skunk | *Spilogale putorius* | G, B, F | |
| Northern River Otter | *Lontra canadensis* | G, B, F | |
| Bobcat | *Lynx rufus* | G, F, M | O |
| Cougar | *Puma concolor* | G, F | |
| Collared Peccary | *Pecari tajacu* | G, F | |
| White-tailed Deer | *Odocoileus virginiana* | G, B, F, M | A |
| American Beaver | *Castor canadensis* | I | |
| Attwater's Pocket Gopher | *Geomys attwateri* | G | A |
| Hispid Pocket Mouse | *Chaetodipus hispidus* | G | |
| Northern Pygmy Mouse* | *Baiomys taylori* | G | O |
| Eastern Woodrat | *Neotoma floridana* | G, F | |
| Northern Grasshopper Mouse | *Onychomys leucogaster* | G | |
| Marsh Rice Rat* | *Oryzomys palustris* | I | C |
| White-footed Mouse* | *Peromyscus leucopus* | G, F | C |
| Deer Mouse | *Peromyscus maniculatus* | G, B, F, M | |
| Fulvous Harvest Mouse* | *Reithrodontomys fulvescens* | G | U |
| Plains Harvest Mouse | *Reithrodontomys montanus* | G | |

## APPENDIX C (Cont'd)

| Species | | General Habitat[3] | Observed in Project Area/Abundance[4] |
|---|---|---|---|
| Common Name | Scientific Name | | |
| Hispid Cotton Rat* | *Sigmodon hispidus* | G, I | A |
| Southern Flying Squirrel | *Glaucomys volans* | B, F, M | |
| Eastern Gray Squirrel | *Sciurus carolinensis* | B, F, M | |
| Eastern Fox Squirrel | *Sciurus niger* | B, F, M | A |
| Mexican Ground Squirrel | *Spermophilus mexicanus* | G | |
| Thirteen-lined Ground Squirrel | *Spermophilus tridecemlineatus* | G | |
| Black-tailed Jackrabbit | *Lepus californicus* | G | |
| Swamp Rabbit | *Sylvilagus aquaticus* | I | |
| Eastern Cottontail | *Sylvilagus floridanus* | G, F | C |
| Feral Hog[5] | *Sus scrofa* | G, B, F, M | |

[1] - Nomeclature follows Schmidley (1994)

[2] - According to Schmidley (1994), Davis and Schmidley (1994)

[3] - G - Bluestem Grassland
B - Bottomland Hardwood Forest
F - Live Oak Forest
M - Live Oak Motte
I - Isloated Wetland

[4] - A - Abundant
C - Common
U - Uncommon
O - Occasional
R - Rare

[5] - Exotic species

* - Caputred in Sherman Live Traps

# Appendix D

# Representative Game Camera Photographs at the Exelon Victoria County Site

Exelon Victoria County Site
Game Camera Photographs


White-tailed Deer


Eastern Fox Squirrel

Exelon Victoria County Site
Game Camera Photographs


Bobcat


Armadillo

Exelon Victoria County Site
Game Camera Photographs


Coyote


Opossum and Raccoon

Exelon Victoria County Site
Game Camera Photographs


Raccoons

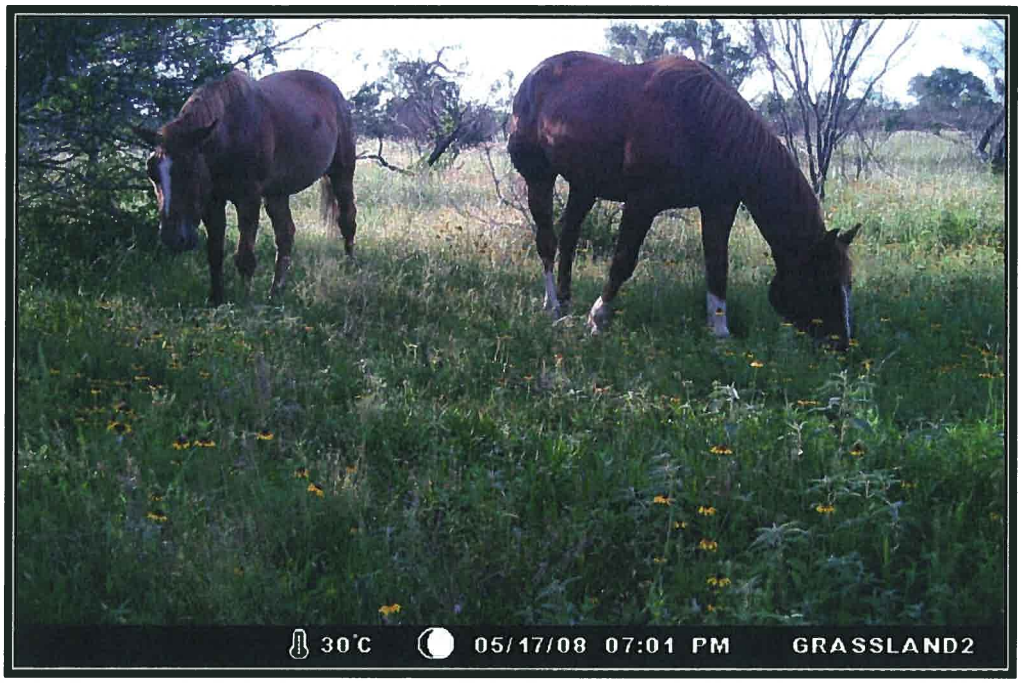

Turkey Vulture

Exelon Victoria County Site
Game Camera Photographs


Feral Hog


Feral Hog Family

Exelon Victoria County Site
Game Camera Photographs




Domestic Horses


Domestic Cows

# Appendix E

# Road Cruise Field Datasheet from the Exelon Victoria County Site

BIO-WEST, Inc.

# Road Cruise Field Datasheet

Date: 30 April 2008 Start Time: 20:00 End Time: 22:31

Field Crew: R. Manning, J. Enright Weather: 22.3°C, wind SSE @ 5-10 mph

| Taxon | Time | GPS Waypoint | Coordinates (NAD 83, Lat/Long) | Comments |
|---|---|---|---|---|
| White-tailed deer | 20:01 | 3166 | N28.61959 W97.03857 | 2 |
| White-tailed deer | 20:32 | 3167 | N28.62318 W97.03504 | 1 |
| White-tailed deer | 20:33 | 3168 | N28.62358 W97.03463 | 1 |
| White-tailed deer | 20:34 | 3169 | N28.62459 W97.03362 | 1 |
| Southern leopard frog | 20:38 | 3170 | N28.63058 W97.02748 | 1 on road |
| White-tailed deer | 20:42 | 3171 | N28.63562 W97.02228 | 3 |
| White-tailed deer | 20:44 | 3172 | N28.63224 W97.01846 | 9 |
| White-tailed deer | 20:46 | 3173 | N28.63023 W97.01669 | 3 |
| White-tailed deer | 20:50 | 3174 | N28.62226 W97.01594 | 2 |
| White-tailed deer | 20:51 | 3175 | N28.62097 W97.01611 | 1 |
| White-tailed deer | 20:53 | 3176 | N28.61944 W97.01234 | 3 (bucks in velvet) |
| White-tailed deer | 20:55 | 3177 | N28.61794 W97.00790 | 3 |
| White-tailed deer | 20:56 | 3178 | N28.61660 W97.00681 | 2 |
| White-tailed deer | 20:59 | 3179 | N28.61260 W97.00658 | 1 |
| Feral Hog | 20:59 | 3180 | N28.61159 W97.00701 | 9 |
| White-tailed deer | 20:59 | 3180 | N28.61159 W97.00701 | 13 |
| White-tailed deer | 21:02 | 3181 | N28.61008 W97.00767 | 2 |
| White-tailed deer | 21:03 | 3182 | N28.60805 W97.00856 | 2 |
| White-tailed deer | 21:06 | 3183 | N28.60223 W97.00992 | 4 |
| White-tailed deer | 21:09 | 3184 | N28.59696 W97.01065 | 5 |
| White-tailed deer | 21:26 | 3185 | N28.59738 W96.98002 | 2 |
| Eastern cottontail | 21:28 | 3186 | N28.59748 W96.97928 | 1 |
| Southern leopard frog | 21:40 | 3187 | N28.58329 W96.99905 | 3 in concrete tank |
| Southern leopard frog | 21:44 | 3188 | N28.58133 W96.99962 | 3 in pond by road |
| White-tailed deer | 21:47 | 3189 | N28.57845 W96.99686 | 1 doe |
| White-tailed deer | 21:48 | 3190 | N28.57739 W96.99590 | 1 |
| Southern leopard frog | 21:50 | 3191 | N28.57419 W96.99314 | 1 road |
| White-tailed deer | 21:52 | 3192 | N28.57224 W96.99504 | 3 |
| Southern leopard frog | 21:53 | 3193 | N28.57163 W96.99672 | 1 |
| Rana sp. | 21:57 | 3194 | N28.56821 W96.99959 | 1 across road |
| White-tailed deer | 21:58 | 3195 | N28.56692 W96.99990 | 1 |
| Southern leopard frog | 22:03 | 3196 | N28.56320 W97.00491 | 1 across road |
| White-tailed deer | 22:07 | 3197 | N28.56795 W97.00631 | 4 |
| White-tailed deer | 22:15 | 3198 | N28.58265 W97.01229 | 1 |
| White-tailed deer | 22:16 | 3199 | N28.58408 W97.01336 | 2 |
| White-tailed deer | 22:18 | 3200 | N28.58572 W97.01457 | 1 |
| White-tailed deer | 22:20 | 3201 | N28.58851 W97.01745 | 7 |
| Feral Hog | 22:22 | 3202 | N28.59036 W97.02208 | 1 |
| White-tailed deer | 22:24 | 3203 | N28.59017 W97.02445 | 4 |
| White-tailed deer | 22:27 | 3204 | N28.59016 W97.02448 | 1 |
| White-tailed deer | 22:31 | 3205 | N28.59203 W97.02618 | 3 |