Biological Resources Report

LDH Energy Mont Belvieu L.P.

Fractionator Project

Chambers County, Texas

Prepared For:
LDH Energy Mont Belvieu L.P.
United States Army Corps of Engineers

July 2010

10550 Richmond Avenue, Suite 155
Houston, Texas 77042
Telephone: 713-914-6699
Fax: 713-789-8404
URS Project 25013766

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1.0 INTRODUCTION

LDH Energy Mont Belvieu L.P. (LDH) is proposing to construct a fractionator facility with associated ancillary buildings and equipment, a pipeline from the existing LDH Mont Belvieu facility to the proposed fractionator facility, and a flare in Chambers County, Texas. Construction within this area will consist of clearing the necessary areas of vegetation, stripping most of the organics, establishing a minimum site grade to facilitate drainage using any excess soils and additional imported material, constructing foundations, installing equipment, constructing roadways, and sowing grass seed in non-process areas. The fractionator facility will be filled with a mixture of sand for general fill and clay suitable for structural support. Six inches of fill will be placed across the facility site, with two feet of fill in the equipment areas. Roads will be constructed within the fractionator facility footprint, and access to the site will be via existing roads. Stormwater and process water discharges will be made to an existing drainage ditch that is a tributary of Cedar Bayou.

URS Corporation (URS) has prepared this *Biological Resources Report* on behalf of LDH to assess the potential impact of the proposed activities on biological resources.

1.1 STUDY AREA

The study area is located west of Mont Belvieu, TX, south of FM 1942, and northeast of Cedar Bayou (**Figure 1**). The study area encompasses a total of appoximately 45 acres bounded by industrial facilities and undelveloped land to the north, a railroad to the east, gravel roads to the west, and a pipeline corridor to the south. The study area is located outside of the 100-year floodplain. Numerous maintained pipeline corridors are located between and surrounding the study tracts (**Figure 2**). Gravel roads and filled areas from oil and gas exploration are located near the North and West study areas and within the South study area.

1.2 PURPOSE OF DOCUMENT

The purpose of this *Biological Resources Report* is to describe the findings of biological surveys conducted in the study area during June 4-25, 2010, and to evaluate potential impacts to threatened and endangered species that might result from this project.

1.3 ENVIRONMENTAL SETTING

The study area is within Chambers County, Texas, in the North Galveston Bay Watershed (HUC 12040203). The following environmental setting information for this county was taken from the Online Handbook of Texas (http://www.tsha.utexas.edu/handbook/online/).

1.3.1 Chambers County

Chambers County is a rural county less than twenty miles east of Houston in the Coastal Prairie region of Southeast Texas. The county is divided by the Trinity River. It comprises 616 square miles of level terrain that slopes toward Galveston Bay and the Gulf of Mexico, its southern and southwestern boundaries. The center point of the county is at 29°42' north latitude and 94°41' west longitude. The elevation rises from sea level to fifty feet. Chambers County has a subtropical, humid climate, with rainfall averaging forty-nine inches, a mean annual temperature of sixty-nine degrees, and a growing season averaging 261 days per year. The soils are chiefly coastal clay and sandy loam. The flora includes tall grasses, live oaks, cypress, pine, and cedar trees, as well as hardwoods along rivers and streams. The Union Pacific provides railroad service, and Interstate Highway 10 was built through the county in 1955. The county's abundant coastal marshland has never supported a large population, but its watery lowlands support the rice culture that yields the county's principal crop. Other farmers raise significant numbers of beef cattle, hogs, sheep, and poultry, as well as corn, feed grains, citrus fruits, vegetables, and some cotton. Natural resources include salt domes, industrial sand, and pine and hardwood timber; oil, gas, and sulfur are present in commercial quantities.

2.0 METHODS

URS field biologists conducted field surveys and general habitat assessments during June 4-25, 2010. Field surveys were conducted within the extent of the project area, as described above and in **Figure 2**. Surveys were conducted by foot, between 8:00 am and 5:00 pm. Potentially suitable habitats for threatened or endangered species were determined by the presence of diagnostic habitat elements. Plant species that could not be identified in the field were collected for closer inspection and positive identification. Wildlife species were either observed directly, or detected from calls, tracks, scat, or other signs.

3.0 RESULTS

The following section discusses the existing plant communities and the potential for threatened or endangered species to occur within the project area, shown in **Figure 2**. The following section also addresses the potential for Federally listed species to occur within the project area.

3.1 PLANT COMMUNITIES OBSERVED

According to “The Vegetation Types of Texas,” the proposed project occurs within the Gulf Prairies and Marshes Ecological Region of Texas. Biologists documented the plant communities within the study area. Variations in species composition and densities were noted, but for the purposes of this report the communities were assessed in broader categories. The vegetation communities listed below were observed in the study area.

3.1.1 Pine-Yaupon Forest

This classification is an assemblage of woody plants greater than 20 feet tall, dominated by loblolly pine (*Pinus taeda*) and hackberry (*Celtis laevigata*). The understory is dominated by yaupon holly (*Ilex vomitoria*). Pine-yaupon forest is located found within upland areas on the eastern side of the study area. Additional species observed within this plant community include: Chinese tallow (*Triadica sebifera*), red maple (*Acer rubrum*), goldenrod (*Solidago canadensis and S. sempervirens*) and southern dewberry (*Rubus trivialis*).

3.1.2 Chinese Tallow Forest

This classification is an assemblage of woody plants greater than 20 feet tall, dominated by Chinese tallow, red maple, hackberry, and green ash (*Fraxinus pennsylvanica)*. The understory is dominated by Chinese tallow, yaupon holly, and false willow (*Baccharis halimifolia*). Tallow forest communities were found throughout the study area. Portions of the eastern side of the study area contained Pine-Yaupon/Chinese Tallow transitional communities, which had more characteristics of tallow forest. Additional species observed within this plant community include: goldenrod, southern dewberry, pepperberry (*Ampelopsis arborea*), Cherokee sedge (*Carex cherokeensis*), Alabama supplejack (*Berchemia scandens*), and dwarf palmetto (*Sabal minor*). In general, this plant community appears to be an early successional forest that is dominated by invasive species. Wetlands, described below, were found within this plant community.

3.1.3 Wetlands/Waters of the U.S.

All wetlands and Waters of the U.S. that occur within the project area will be addressed in a proposed jurisdictional determination report and submitted for review and comments. Wetlands were classified using the Cowardin classification system (Cowardin, *et al.* 1979). According to this classification system, three types of wetlands were identified: palustrine emergent (PEM), palustrine forested (PFO), and palustrine scrub-shrub (PSS).

- PEM (palustrine emergent) wetlands are defined as those wetlands 100 percent dominated by erect, rooted, herbaceous plants. This type of community was found on the western and southern portions of the study area. These wetlands were commonly dominated by sedges, rushes, grasses, and various forbs.
- PFO (palustrine forested) wetlands are defined as those wetlands dominated by woody vegetation greater than 20 feet tall. This type of wetland community was found throughout the study area. These wetlands were commonly dominated by green ash and Chinese tallow with other trees and shrubs and typically contain less than 5 percent herbaceous vegetation.
- PSS (palustrine scrub-shrub) wetlands are defined by >30% canopy cover of shrubs or small trees <6m (20 ft.) in height. This type of wetland community was found along the

southern property boundary of the study area. These wetlands were dominated by Chinese tallow and black willow trees and false willow shrubs. The PSS wetlands encountered within the study area tended to have depressions of emergent vegetation dominated by cattails (*Typha spp.*), rushes, and sedges.

3.2 THREATENED AND ENDANGERED SPECIES

In Chambers County, three bird and five reptile species are listed as federally threatened or endangered, or recently delisted due to recovery (**Table 1**).

Table 1. Federally threatened and endangered species occurring in Chambers County, Texas

Common Name	Scientific Name	Federal Status
Birds		
Bald eagle	*Haliaeetus leucocephalus*	DM
Piping plover	*Charadrius melodus*	T
Brown pelican	*Pelecanus occidentalis*	DM
Reptiles		
Atlantic hawksbill sea turtle	*Eretmochelys imbricate*	E
Green sea turtle	*Chelonia mydas*	T
Kemp's Ridley sea turtle	*Lepidochelys kempii*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Loggerhead sea turtle	*Caretta caretta*	T

U.S. Fish and Wildlife Service

E = Endangered

T = Threatened

DM = Delisted due to recovery

The Chambers County, Texas State endangered species list is included as **Appendix A**. None of the State listed species were observed in the study area. Based on the location of the study area, habitat types observed, and presence of existing developed areas adjacent to the study site, no impacts to any State listed species are anticipated.

3.2.1 Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles are known to occur in quiet coastal areas, rivers, or lakeshores with large, tall trees. Man-made reservoirs have provided excellent habitat. Bald eagles are opportunistic predators

feeding primarily on fish, but also eat a variety of waterfowl and other birds, small mammals, and turtles. Carrion is also common in the diet, particularly in younger birds.

Males generally measure 3 ft from head to tail, weigh 7 to 10 pounds, and have a wingspan of 6 to 7 ft. Females are larger, some reaching 14 pounds, with a wingspan of up to 8 ft. Adults have a white head, neck, and tail, and a large yellow bill. Bald eagles are believed to live up to 30 years or more in the wild. The typical bald eagle nest is constructed of large sticks, with softer materials such as leaves, grass, and Spanish moss used as nest lining. Nests are typically used for a number of years, with the birds adding nest material every year. Bald eagle nests are often very large, measuring up to 6 ft in width and weighing hundreds of pounds. Eagles often have one or more alternative nests within their territories. Young eagles can fly in 11 to 12 weeks, but the parents continue to feed them for 4 to 6 more weeks while they learn to hunt. In Texas, bald eagles nest from October to July.

Since 1981, TPWD has conducted extensive aerial surveys to monitor bald eagle nesting activity. The 2003 survey identified 117 active nests, which fledged at least 144 young. This compares with only 7 known nest sites in 1971. Midwinter bald eagle counts coordinated by TPWD and conducted by birding enthusiasts throughout the state reported 325 eagles in 2002. From 1986-1989, midwinter counts averaged less than 15 bald eagles per survey site. Since 1990, the average number of eagles per survey site has increased to 18. Bald eagle populations have increased to the extent that they have been delisted from the Federal Endangered Species List. However, the species is protected by the Bald and Golden Eagle Act and the Migratory Bird Act.

Neither this species, nor potentially suitable habitat for this species, was observed within the project area during field surveys. There is a potential for the bald eagle to occur in the vicinity of the proposed project but the project site does not provide suitable foraging or nesting habitats for this species. Bald eagles use tall trees in close proximity to large bodies of water for nesting and roosting. Aside from manmade brine ponds (which are unlikely to be used by bald eagles), there are no large, open bodies of water in the vicinity of the project.

3.2.2 Piping Plover (*Charadrius melodus*)

The piping plover is a small shorebird, about 7 1/4 inches long with a 15 inch wingspan. Distinguishing characteristics include sandy-colored feathers with grayish-brown crowns and backs, white foreheads, and dark bands across their crowns. Dark, but incomplete rings encircle their necks. These little birds have yellow-orange legs, black bands across their foreheads from eye to eye, and black rings around the base of their necks. They are small, stocky, sandy-colored birds that resemble sandpipers, with short, stubby bills. Piping plovers nest in shallow depressions scraped into beach and lakeshore sand about 1 by 2.5 inches (2.5 by 6 cm).

There are just over 5,000 known pairs of breeding piping plovers. Texas is the wintering home for 35 percent of the known population of piping plovers. They begin arriving in late July or early August, and will remain for up to nine months. The piping plover's diet includes marine worms, beetles, spiders, crustaceans, mollusks and other small marine animals. Their typical life span is less than five years, but on occasion, up to 14 years.

Piping Plovers live on sandy beaches and lakeshores. These shorebirds migrate through the Great Lakes along the river systems through the Bahamas and West Indies. They are currently found along the Atlantic Coast from Canada to North Carolina and along the shorelines of Lakes Michigan and Superior. Gulf Coast beaches from Florida to Mexico, and Atlantic coast beaches from Florida to North Carolina provide winter homes for plovers. There is no sandy beach or lakeshore habitat occurring within the project area, therefore no impacts to the piping plovers are anticipated.

3.2.3 Brown Pelican (*Pelecanus occidentalis*)

The brown pelican has an 18-inch long bill and large throat pouch. Its head is white in front and dark brown behind, extending down the neck and back. During the breeding season, the white plumage turns a vibrant yellowish-gold color. Silver-gray feathers cover the rest of the pelican's body. The brown pelican weighs about 9 pounds and has a 6-foot wingspan.

When feeding, pelicans soar in the air looking for fish near the surface of the water. When a fish is spotted, the pelican goes into a dive, plunging 30 to 60 feet bill-first into the water. The impact of hitting the water would kill an ordinary bird, but the pelican is equipped with air sacs just beneath the skin to cushion the blow.

The loose skin on the underside of the bill extends to form a scoop net with a capacity of 2.5 gallons. The pelican drains the water from its pouch and tosses its head back to swallow the fish. Their diet consists of menhaden and mullet fish. They lay 2 to 4 white eggs during breeding season, and live up to 30 years or more. Young pelicans are fed for about 9 weeks. During this time, each nestling will eat about 150 pounds of fish.

Brown pelican populations have recovered sufficiently to be delisted from the Federal Endangered Species List. Brown pelicans nest on small, isolated coastal islands where they are safe from predators such as raccoons and coyotes. Brown pelicans are found along the Atlantic and Gulf of Mexico coasts. The project area does not extend to the coast; therefore, no impacts to brown pelicans are expected.

3.2.4 Sea Turtles

The Atlantic hawksbill sea turtle (*Eretmochelys imbricate*), green sea turtle (*Chelonia mydas*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), and loggerhead sea turtle (*Caretta caretta*) are each listed as either threatened or endangered,

both Federally and in the state of Texas. Sea turtles are found only in oceans and coastal areas. The project area does not include these areas, therefore no impacts to any of the listed sea turtles are anticipated.

4.0 SUMMARY

The project area includes: Pine-yaupon forests, Chinese tallow forest, and wetlands of types PEM, PFO, and PSS. Impacts to wetlands and other Waters of the U.S. are addressed in a separate *Proposed Jurisdictional Determination of Waters of the United States* document.

Federally-listed threatened and endangered species occurring in Chambers County are: piping plover, Atlantic hawksbill sea turtle, green sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle. The bald eagle and brown pelican have been delisted due to recovery. None of these threatened or endangered species, or habitats suitable for these species were observed in the project area. Bald eagles use tall trees near large open bodies of water. The five sea turtle species are found in oceans and shorelines. Piping plovers and brown pelicans rely on coastal habitats. None of these required habitat types are found in the project area. No State listed species were observed within the study area, and the habitat types observed were unlikely to support populations of State listed species. Therefore, no project-related impacts to threatened or endangered species are anticipated.

5.0 REFERENCES

Cowardin, L.M., Carter, V., Golet, F.C., and LaRoe, E.T. 1979. Classification of Wetlands and Deepwater Habitats of the United States. U.S. Government. Printing Office, Washington, D.C. 103 pp.

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Figures

Title:	**Vicinity Map**
Project:	**Fractionator Project** **Biological Resources Report**
Client:	**LDH Energy Mont Belvieu L.P.**
Drawn by: **DW**	Date: **9/27/2010**
Project No. **SWG-2010-876**	**Figure 1**

Map Features

- Study Area
- 100 year Floodplain

N

0 375 750 1,500
Feet

Title: **Site Map**

Project: **Fractionator Project**
Biological Resources Report

Client: **LDH Energy Mont Belvieu L.P.**

Drawn by:	Date:	USACE Project No.:	
DW	9/27/2010	SWG-2010-876	Figure 2

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Imagery Source: HGAC

Appendix A

State listed threatened and endangered species occurring in Chambers County, Texas

CHAMBERS COUNTY

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon *Falco peregrinus tundrius* DL

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Bald Eagle *Haliaeetus leucocephalus* DL T

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

Black Rail *Laterallus jamaicensis*

salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous year's dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Brown Pelican *Pelecanus occidentalis* DL E

largely coastal and near shore areas, where it roosts and nests on islands and spoil banks

Henslow's Sparrow *Ammodramus henslowii*

wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking

Peregrine Falcon *Falco peregrinus* DL T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

Piping Plover *Charadrius melodus* LT T

wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats

Reddish Egret *Egretta rufescens* T

resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear

Snowy Plover *Charadrius alexandrinus*

formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast

CHAMBERS COUNTY

BIRDS

		Federal Status	State Status
Southeastern Snowy Plover	*Charadrius alexandrinus tenuirostris*		

wintering migrant along the Texas Gulf Coast beaches and bayside mud or salt flats

Swallow-tailed Kite	*Elanoides forficatus*		T

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

Western Snowy Plover	*Charadrius alexandrinus nivosus*		

uncommon breeder in the Panhandle; potential migrant; winter along coast

White-faced Ibis	*Plegadis chihi*		T

prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats

Wood Stork	*Mycteria americana*		T

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

FISHES

		Federal Status	State Status
American eel	*Anguilla rostrata*		

coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally

Smalltooth sawfish	*Pristis pectinata*	LE	E

different life history stages have different patterns of habitat use; young found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 32 ft (10 m); in sheltered bays, on shallow banks, and in estuaries or river mouths; adult sawfish are encountered in various habitat types (mangrove, reef, seagrass, and coral), in varying salinity regimes and temperatures, and at various water depths, feed on a variety of fish species and crustaceans

MAMMALS

		Federal Status	State Status
Louisiana black bear	*Ursus americanus luteolus*	LT	T

possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas

Plains spotted skunk	*Spilogale putorius interrupta*		

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Red wolf	*Canis rufus*	LE	E

CHAMBERS COUNTY

MAMMALS

		Federal Status	State Status

extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies

Southeastern myotis bat *Myotis austroriparius*

roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

MOLLUSKS

		Federal Status	State Status
Louisiana pigtoe	*Pleurobema riddellii*		T

streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins

REPTILES

		Federal Status	State Status
Alligator snapping turtle	*Macrochelys temminckii*		T

perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October

Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	LE	E

Gulf and bay system, warm shallow waters especially in rocky marine environments, such as coral reefs and jetties, juveniles found in floating mats of sea plants; feed on sponges, jellyfish, sea urchins, molluscs, and crustaceans, nests April through November

Green sea turtle	*Chelonia mydas*	LT	T

Gulf and bay system; shallow water seagrass beds, open water between feeding and nesting areas, barrier island beaches; adults are herbivorous feeding on sea grass and seaweed; juveniles are omnivorous feeding initially on marine invertebrates, then increasingly on sea grasses and seaweeds; nesting behavior extends from March to October, with peak activity in May and June

Gulf Saltmarsh snake *Nerodia clarkii*

saline flats, coastal bays, and brackish river mouthss

Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE	E

Gulf and bay system, adults stay within the shallow waters of the Gulf of Mexico; feed primarily on crabs, but also snails, clams, other crustaceans and plants, juveniles feed on sargassum and its associated fauna; nests April through August

Leatherback sea turtle	*Dermochelys coriacea*	LE	E

Gulf and bay systems, and widest ranging open water reptile; omnivorous, shows a preference for jellyfish; in the US portion of their western Atlantic nesting territories, nesting season ranges from March to August

Loggerhead sea turtle	*Caretta caretta*	LT	T

Gulf and bay system primarily for juveniles, adults are most pelagic of the sea turtles; omnivorous, shows a preference for mollusks, crustaceans, and coral; nests from April through November

CHAMBERS COUNTY

REPTILES

		Federal Status	State Status
Northern scarlet snake	*Cemophora coccinea copei*		T

mixed hardwood scrub on sandy soils; feeds on reptile eggs; semi-fossorial; active April-September

Smooth green snake	*Liochlorophis vernalis*		T

Gulf Coastal Plain; mesic coastal shortgrass prairie vegetation; prefers dense vegetation

Texas diamondback terrapin *Malaclemys terrapin littoralis*

coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches; brackish and salt water; burrows into mud when inactive; may venture into lowlands at high tide

Texas horned lizard	*Phrynosoma cornutum*		T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

Timber/Canebrake rattlesnake	*Crotalus horridus*		T

swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

PLANTS

		Federal Status	State Status
Texas windmill-grass	*Chloris texensis*		

Texas endemic; sandy to sandy loam soils in relatively bare areas in coastal prairie grassland remnants, often on roadsides where regular mowing may mimic natural prairie fire regimes; flowering in fall

Biological Resources Report

Lone Star NGL Mont Belvieu, L.P.

Fractionator #2 Project

Chambers County, Texas

Prepared For:
Lone Star NGL Mont Belvieu, L.P.
United States Army Corps of Engineers

November 2011

10550 Richmond Avenue, Suite 155

URS

Houston, Texas 77042
Telephone: 713-914-6699
Fax: 713-789-8404
URS Project 25014274

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Appendix

1.0 INTRODUCTION

Lone Star NGL Mont Belvieu, L.P. (Lone Star) is proposing to construct a fractionator facility with associated ancillary buildings and equipment in Chambers County, Texas. Construction within this area will consist of clearing the necessary areas of vegetation, stripping most of the organics, establishing a minimum site grade to facilitate drainage using any excess soils and additional imported material, constructing foundations, installing equipment, constructing roadways, and sowing grass seed in non-process areas. The fractionator facility will be filled with a mixture of sand for general fill and clay suitable for structural support. Roads will be constructed within the fractionator facility footprint, and access to the site will be via existing roads. Stormwater and process water discharges will be made to an existing stream that is a tributary of Cedar Bayou.

URS Corporation (URS) has prepared this *Biological Resources Report* on behalf of Lone Star to assess the potential impact of the proposed activities on biological resources.

1.1 STUDY AREA

The study area is located west of Mont Belvieu, TX, south of FM 1942, and northeast of Cedar Bayou (**Figure 1**). The study area encompasses a total of appoximately 70.8 acres located between industrial facilities, brine ponds, railroad tracks, a leveed canal, maintained pipeline corridors, and FM 1942; and approximately 1.3 acres is located within the Federal Emergency Management Agency (FEMA) 100-year floodplain (**Figure 2**). The study area consists of three tracts, to the northwest, southwest, and southeast of a previously permitted Lone Star fractionator site (permit number SWG-2010-00876). The southwestern portion has been previously cleared and is maintained free of woody vegetation.

1.2 PURPOSE OF DOCUMENT

The purpose of this *Biological Resources Report* is to describe the findings of biological surveys conducted in the study area during June 4-25, 2010 and on September 20, 2011; and to evaluate potential impacts to threatened and endangered species that might result from this project.

1.3 ENVIRONMENTAL SETTING

The study area is within Chambers County, Texas, in the North Galveston Bay Watershed (HUC 12040203). The following environmental setting information for this county was taken from the Online Handbook of Texas (http://www.tsha.utexas.edu/handbook/online/).

1.3.1 Chambers County

Chambers County is a rural county less than twenty miles east of Houston in the Coastal Prairie region of Southeast Texas. The county is divided by the Trinity River. It comprises 616 square miles of level terrain that slopes toward Galveston Bay and the Gulf of Mexico, its southern and southwestern boundaries. The center point of the county is at 29°42' north latitude and 94°41' west longitude. The elevation rises from sea level to fifty feet. Chambers County has a subtropical, humid climate, with rainfall averaging forty-nine inches, a mean annual temperature of sixty-nine degrees, and a growing season averaging 261 days per year. The soils are chiefly coastal clay and sandy loam. The flora includes tall grasses, live oaks, cypress, pine, and cedar trees, as well as hardwoods along rivers and streams. The Union Pacific provides railroad service, and Interstate Highway 10 was built through the county in 1955. The county's abundant coastal marshland has never supported a large population, but its watery lowlands support the rice culture that yields the county's principal crop. Other farmers raise significant numbers of beef cattle, hogs, sheep, and poultry, as well as corn, feed grains, citrus fruits, vegetables, and some cotton. Natural resources include salt domes, industrial sand, and pine and hardwood timber; oil, gas, and sulfur are present in commercial quantities.

2.0 METHODS

URS field biologists conducted field surveys and general habitat assessments during June 4-26, 2010; August 1-3, 2011; and on September 20, 2011. Field surveys were conducted within the extent of the project area, as described above and in **Figure 2**. Surveys were conducted by foot, between 8:00 am and 5:00 pm. Potentially suitable habitats for threatened or endangered species were determined by the presence of diagnostic habitat elements. Plant species that could not be identified in the field were collected for closer inspection and positive identification. Wildlife species were either observed directly, or detected from calls, tracks, scat, or other signs.

3.0 RESULTS

The following section discusses the existing plant communities and the potential for threatened or endangered species to occur within the project area, shown in **Figure 2**. The following section also addresses the potential for federally-listed species to occur within the project area.

3.1 PLANT COMMUNITIES OBSERVED

According to “The Vegetation Types of Texas,” the proposed project occurs within the Gulf Prairies and Marshes Ecological Region of Texas. Biologists documented the plant communities within the study area. Variations in species composition and densities were noted, but for the purposes of this report the communities were assessed in broader categories. The vegetation communities listed below were observed in the study area.

3.1.1 Pine-Yaupon Forest

This classification is an assemblage of woody plants greater than 20 feet tall, dominated by loblolly pine (*Pinus taeda*) and hackberry (*Celtis laevigata*). The understory is dominated by yaupon holly (*Ilex vomitoria*). Additional species observed within this plant community include: Chinese tallow (*Triadica sebifera*), red maple (*Acer rubrum*), goldenrod (*Solidago canadensis and S. sempervirens*) and southern dewberry (*Rubus trivialis*). Pine-yaupon forest is found within upland areas on the eastern tract of the study area and the northern half of the western tract of the study area.

3.1.2 Chinese Tallow Forest

This classification is an assemblage of woody plants greater than 20 feet tall, dominated by Chinese tallow, red maple, hackberry, and green ash (*Fraxinus pennsylvanica)*. The understory is dominated by Chinese tallow, yaupon holly, and false willow (*Baccharis halimifolia*). Tallow forest communities were found throughout the study area. Portions of the eastern tract of the study area contained Pine-Yaupon/Chinese Tallow transitional communities, which had more characteristics of tallow forest. Additional species observed within this plant community include: goldenrod, southern dewberry, peppervine (*Ampelopsis arborea*), Cherokee sedge (*Carex cherokeensis*), Alabama supplejack (*Berchemia scandens*), and dwarf palmetto (*Sabal minor*). In general, this plant community appears to be an early successional forest that is dominated by invasive species. Wetlands, described below, were found within this plant community.

3.1.3 Mowed Uplands

The southern portions of both the east and northwest tracts and the southwest tract of the study area are maintained free of woody vegetation by mowing. These areas are dominated by grasses and other herbaceous upland species. Species observed in these areas include: bahiagrass (*Paspalum notatum*), Vasey's grass (*Paspalum urvellei*), goldenrod, annual ragweed (*Ambrosia artemisiifolia*), St. Augustine grass (*Stenotaphrum secundatum*), and Johnsongrass (*Sorghum halepense*).

3.1.4 Wetlands/Waters of the U.S.

All wetlands and Waters of the U.S. that occur within the project area will be addressed in a *Proposed Jurisdictional Determination of Waters of the United States* and submitted to the United States Army Corps of Engineers for review and comments. Wetlands were classified using the Cowardin classification system (Cowardin, *et al.* 1979). According to this classification system, palustrine forested (PFO) wetlands and palustrine scrub/shrub (PSS) wetlands were identified.

- PFO wetlands are defined as those wetlands dominated by woody vegetation greater than 20 feet tall. This type of wetland community was found in the northern and eastern

portions of the study area. These wetlands were commonly dominated by green ash and Chinese tallow with other trees and shrubs and typically contain less than 5 percent herbaceous vegetation.

- One PSS wetland was identified. This wetland had hydrology that was influenced by berms to the south and east and maintained corridors to the north and west. The area had standing dead trees that appear to have died in the past few years. Shrub species included Chinese tallow and yaupon (*Ilex vomitoria*). Other species found in this wetland are southern cattail (*Typha domingensis*), camphorweed (*Pluchea camphorata*), and green flatsedge (*Cyperus virens*). The PSS wetland had small areas that appear to have been excavated and that had standing water.

3.2 THREATENED AND ENDANGERED SPECIES

In Chambers County, three bird and five reptile species are listed as federally threatened or endangered, or recently delisted due to recovery (**Table 1**).

Table 1. Federally-listed threatened and endangered species occurring in Chambers County, Texas

Common Name	Scientific Name	Federal Status
Birds		
Bald eagle	*Haliaeetus leucocephalus*	DM
Piping plover	*Charadrius melodus*	T
Brown pelican	*Pelecanus occidentalis*	DM
Reptiles		
Atlantic hawksbill sea turtle	*Eretmochelys imbricate*	E
Green sea turtle	*Chelonia mydas*	T
Kemp's Ridley sea turtle	*Lepidochelys kempii*	E
Leatherback sea turtle	*Dermochelys coriacea*	E
Loggerhead sea turtle	*Caretta caretta*	T

U.S. Fish and Wildlife Service

E = Endangered

T = Threatened

DM = Delisted due to recovery

The Chambers County, Texas State endangered species list is included as **Appendix A**. None of the state listed species were observed in the study area. Based on the location of the study

area, habitat types observed, and presence of existing developed areas adjacent to the study site, no impacts to any state listed species are anticipated.

3.2.1 Bald Eagle (*Haliaeetus leucocephalus*)

Bald eagles are known to occur in quiet coastal areas, rivers, or lakeshores with large, tall trees. Man-made reservoirs have provided excellent habitat. Bald eagles are opportunistic predators feeding primarily on fish, but also eat a variety of waterfowl and other birds, small mammals, and turtles. Carrion is also common in the diet, particularly in younger birds.

Males generally measure 3 ft from head to tail, weigh 7 to 10 pounds, and have a wingspan of 6 to 7 ft. Females are larger, some reaching 14 pounds, with a wingspan of up to 8 ft. Adults have a white head, neck, and tail, and a large yellow bill. Bald eagles are believed to live up to 30 years or more in the wild. The typical bald eagle nest is constructed of large sticks, with softer materials such as leaves, grass, and Spanish moss used as nest lining. Nests are typically used for a number of years, with the birds adding nest material every year. Bald eagle nests are often very large, measuring up to 6 ft in width and weighing hundreds of pounds. Eagles often have one or more alternative nests within their territories. Young eagles can fly in 11 to 12 weeks, but the parents continue to feed them for 4 to 6 more weeks while they learn to hunt. In Texas, bald eagles nest from October to July.

Since 1981, Texas Parks and Wildlife Department (TPWD) has conducted extensive aerial surveys to monitor bald eagle nesting activity. The 2003 survey identified 117 active nests, which fledged at least 144 young. This compares with only 7 known nest sites in 1971. Midwinter bald eagle counts coordinated by TPWD and conducted by birding enthusiasts throughout the state reported 325 eagles in 2002. From 1986-1989, midwinter counts averaged less than 15 bald eagles per survey site. Since 1990, the average number of eagles per survey site has increased to 18. Bald eagle populations have increased to the extent that they have been delisted from the Federal Endangered Species List. However, the species is protected by the Bald and Golden Eagle Act and the Migratory Bird Act.

Neither this species, nor potentially suitable habitat for this species, was observed within the study area during field surveys. There is a potential for the bald eagle to occur in the vicinity of the proposed project but the project site does not provide suitable foraging or nesting habitats for this species. Bald eagles use tall trees in close proximity to large bodies of water for nesting and roosting. Aside from manmade brine ponds (which are unlikely to be used by bald eagles), there are no large, open bodies of water in the vicinity of the project. No impacts to bald eagles are anticipated.

3.2.2 Piping Plover (*Charadrius melodus*)

The piping plover is a small shorebird, about 7 1/4 inches long with a 15 inch wingspan. Distinguishing characteristics include sandy-colored feathers with grayish-brown crowns and

backs, white foreheads, and dark bands across their crowns. Dark, but incomplete, rings encircle their necks. These little birds have yellow-orange legs, black bands across their foreheads from eye to eye, and black rings around the base of their necks. They are small, stocky, sandy-colored birds that resemble sandpipers, with short, stubby bills. Piping plovers nest in shallow depressions scraped into beach and lakeshore sand about 1 by 2.5 inches (2.5 by 6 cm).

There are just over 5,000 known pairs of breeding piping plovers. Texas is the wintering home for 35 percent of the known population of piping plovers. They begin arriving in late July or early August, and will remain for up to nine months. The piping plover's diet includes marine worms, beetles, spiders, crustaceans, mollusks and other small marine animals. Their typical life span is less than five years, but on occasion, up to 14 years.

Piping Plovers live on sandy beaches and lakeshores. These shorebirds migrate through the Great Lakes along the river systems through the Bahamas and West Indies. They are currently found along the Atlantic Coast from Canada to North Carolina and along the shorelines of Lakes Michigan and Superior. Gulf Coast beaches from Florida to Mexico and Atlantic coast beaches from Florida to North Carolina provide winter homes for plovers. There is no sandy beach or lakeshore habitat occurring within the study area; therefore, no impacts to the piping plovers are anticipated.

3.2.3 Brown Pelican (*Pelecanus occidentalis*)

The brown pelican has an 18-inch long bill and large throat pouch. Its head is white in front and dark brown behind, extending down the neck and back. During the breeding season, the white plumage turns a vibrant yellowish-gold color. Silver-gray feathers cover the rest of the pelican's body. The brown pelican weighs about 9 pounds and has a 6-foot wingspan.

When feeding, pelicans soar in the air looking for fish near the surface of the water. When a fish is spotted, the pelican goes into a dive, plunging 30 to 60 feet bill-first into the water. The impact of hitting the water would kill an ordinary bird, but the pelican is equipped with air sacs just beneath the skin to cushion the blow.

The loose skin on the underside of the bill extends to form a scoop net with a capacity of 2.5 gallons. The pelican drains the water from its pouch and tosses its head back to swallow the fish. Their diet consists of menhaden and mullet fish. They lay 2 to 4 white eggs during breeding season, and live up to 30 years or more. Young pelicans are fed for about 9 weeks. During this time, each nestling will eat about 150 pounds of fish.

Brown pelican populations have recovered sufficiently to be delisted from the Federal Endangered Species List. Brown pelicans nest on small, isolated coastal islands where they are safe from predators such as raccoons and coyotes. Brown pelicans are found along the

Atlantic and Gulf of Mexico coasts. The study area does not extend to the coast; therefore, no impacts to brown pelicans are expected.

3.2.4 Sea Turtles

The Atlantic hawksbill sea turtle (*Eretmochelys imbricate*), green sea turtle (*Chelonia mydas*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), and loggerhead sea turtle (*Caretta caretta*) are each listed as either threatened or endangered, both federally and in the state of Texas. Sea turtles are found only in oceans and coastal areas. The study area does not include these areas; therefore, no impacts to any of the listed sea turtles are anticipated.

4.0 SUMMARY

The project area includes: pine-yaupon forests, Chinese tallow forest, mowed uplands, PFO wetlands, and PSS wetlands. Impacts to wetlands and other Waters of the U.S. are addressed in a separate *Proposed Jurisdictional Determination of Waters of the United States* document.

Federally-listed threatened and endangered species occurring in Chambers County are: piping plover, Atlantic hawksbill sea turtle, green sea turtle, Kemp's Ridley sea turtle, leatherback sea turtle, and loggerhead sea turtle. The bald eagle and brown pelican have been delisted due to recovery. None of these threatened or endangered species, or habitats suitable for these species were observed in the study area. Bald eagles use tall trees near large open bodies of water. The five sea turtle species are found in oceans and shorelines. Piping plovers and brown pelicans rely on coastal habitats. None of these required habitat types are found in the study area. No state-listed species were observed within the study area, and the habitat types observed were unlikely to support populations of state-listed species. Therefore, no project-related impacts to threatened or endangered species are anticipated.

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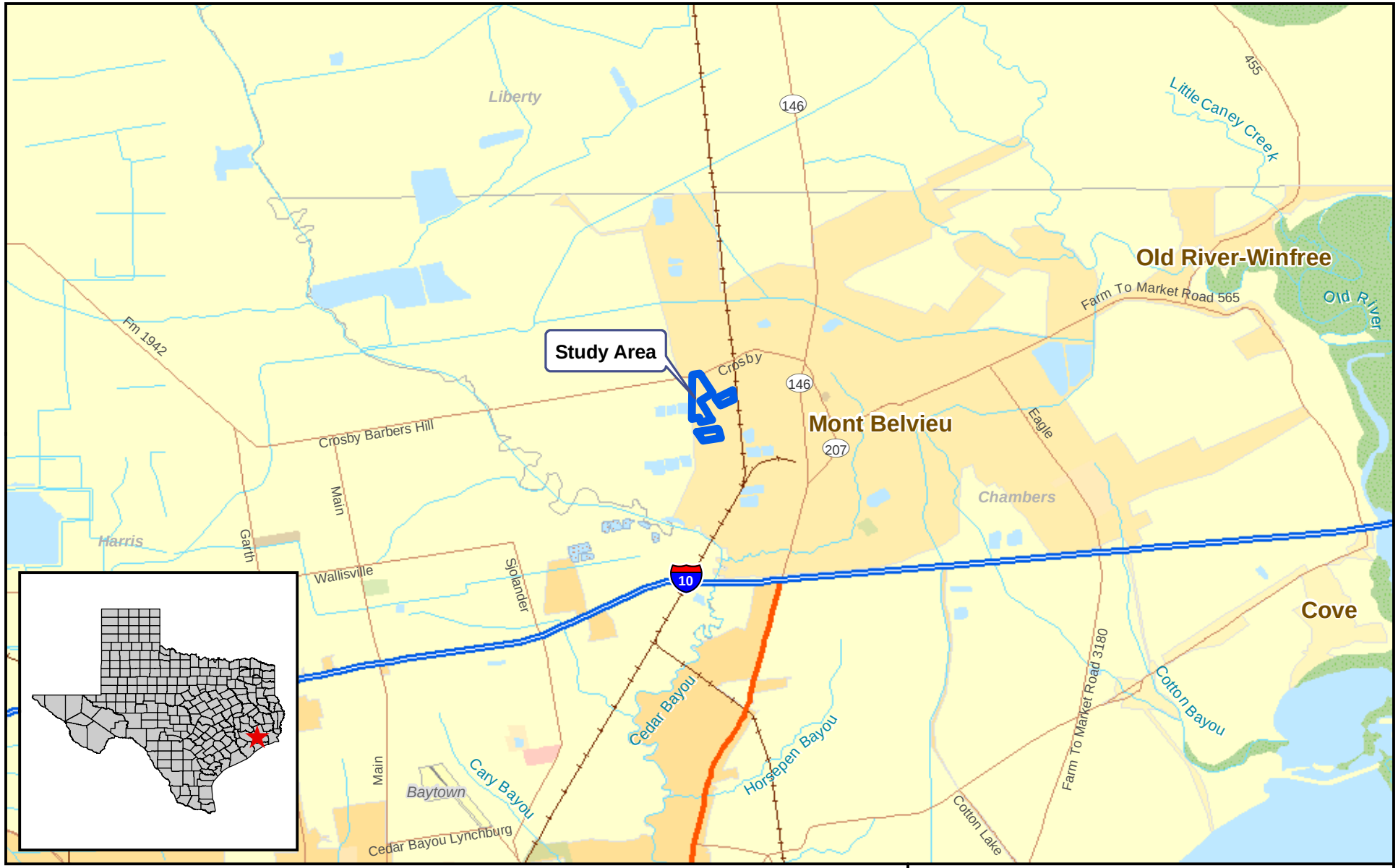
Figures



URS
10550 Richmond, Suite 155
Houston, TX 77042
Tel: 713.914.6699
Fax: 713.789.8404

Title:	**Vicinity Map**		
Project:	**Lone Star Mont Belvieu Fractionator #2 Project Biological Resources Report**		
Client:	**Lone Star NGL Mont Belvieu L.P.**		
Drawn by: **AM**	Date: **10/31/11**	URS Project No. **25014274**	**Figure 1**

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Map Features

- Study Area
- 100 year Floodplain

URS
10550 Richmond, Suite 155
Houston, TX 77042
Tel: 713.914.6699
Fax: 713.789.8404

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Title:	Site Map
Project:	Lone Star Mont Belvieu Fractionator #2 Project Biological Resources Report
Client:	Lone Star NGL Mont Belvieu L.P.

Drawn by:	Date:	URS Project No.:	
AM	10/31/11	25014274	Figure 2

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Image Source: NAIP 2010

Appendix A

State-listed threatened and endangered species occurring in Chambers County, Texas

CHAMBERS COUNTY

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon *Falco peregrinus tundrius* DL

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Bald Eagle *Haliaeetus leucocephalus* DL T

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

Black Rail *Laterallus jamaicensis*

salt, brackish, and freshwater marshes, pond borders, wet meadows, and grassy swamps; nests in or along edge of marsh, sometimes on damp ground, but usually on mat of previous year's dead grasses; nest usually hidden in marsh grass or at base of Salicornia

Brown Pelican *Pelecanus occidentalis* DL E

largely coastal and near shore areas, where it roosts and nests on islands and spoil banks

Henslow's Sparrow *Ammodramus henslowii*

wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking

Peregrine Falcon *Falco peregrinus* DL T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

Piping Plover *Charadrius melodus* LT T

wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats

Reddish Egret *Egretta rufescens* T

resident of the Texas Gulf Coast; brackish marshes and shallow salt ponds and tidal flats; nests on ground or in trees or bushes, on dry coastal islands in brushy thickets of yucca and prickly pear

Snowy Plover *Charadrius alexandrinus*

formerly an uncommon breeder in the Panhandle; potential migrant; winter along coast

CHAMBERS COUNTY

BIRDS

		Federal Status	State Status
Southeastern Snowy Plover	*Charadrius alexandrinus tenuirostris*		

wintering migrant along the Texas Gulf Coast beaches and bayside mud or salt flats

Sprague's Pipit	*Anthus spragueii*	C	

only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.

Swallow-tailed Kite	*Elanoides forficatus*		T

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

Western Snowy Plover	*Charadrius alexandrinus nivosus*		

uncommon breeder in the Panhandle; potential migrant; winter along coast

White-faced Ibis	*Plegadis chihi*		T

prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats

Wood Stork	*Mycteria americana*		T

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

FISHES

		Federal Status	State Status
American eel	*Anguilla rostrata*		

coastal waterways below reservoirs to gulf; spawns January to February in ocean, larva move to coastal waters, metamorphose, then females move into freshwater; most aquatic habitats with access to ocean, muddy bottoms, still waters, large streams, lakes; can travel overland in wet areas; males in brackish estuaries; diet varies widely, geographically, and seasonally

Smalltooth sawfish	*Pristis pectinata*	LE	E

different life history stages have different patterns of habitat use; young found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 32 ft (10 m); in sheltered bays, on shallow banks, and in estuaries or river mouths; adult sawfish are encountered in various habitat types (mangrove, reef, seagrass, and coral), in varying salinity regimes and temperatures, and at various water depths, feed on a variety of fish species and crustaceans

MAMMALS

		Federal Status	State Status
Louisiana black bear	*Ursus americanus luteolus*	LT	T

possible as transient; bottomland hardwoods and large tracts of inaccessible forested areas

CHAMBERS COUNTY

MAMMALS

		Federal Status	State Status
Plains spotted skunk	*Spilogale putorius interrupta*		

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

Red wolf	*Canis rufus*	LE	E

extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies

Southeastern myotis bat *Myotis austroriparius*

roosts in cavity trees of bottomland hardwoods, concrete culverts, and abandoned man-made structures

MOLLUSKS

		Federal Status	State Status
Louisiana pigtoe	*Pleurobema riddellii*		T

streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins

REPTILES

		Federal Status	State Status
Alligator snapping turtle	*Macrochelys temminckii*		T

perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October

Atlantic hawksbill sea turtle	*Eretmochelys imbricata*	LE	E

Gulf and bay system, warm shallow waters especially in rocky marine environments, such as coral reefs and jetties, juveniles found in floating mats of sea plants; feed on sponges, jellyfish, sea urchins, molluscs, and crustaceans, nests April through November

Green sea turtle	*Chelonia mydas*	LT	T

Gulf and bay system; shallow water seagrass beds, open water between feeding and nesting areas, barrier island beaches; adults are herbivorous feeding on sea grass and seaweed; juveniles are omnivorous feeding initially on marine invertebrates, then increasingly on sea grasses and seaweeds; nesting behavior extends from March to October, with peak activity in May and June

Gulf Saltmarsh snake *Nerodia clarkii*

saline flats, coastal bays, and brackish river mouthss

Kemp's Ridley sea turtle	*Lepidochelys kempii*	LE	E

Gulf and bay system, adults stay within the shallow waters of the Gulf of Mexico; feed primarily on crabs, but also snails, clams, other crustaceans and plants, juveniles feed on sargassum and its associated fauna; nests April through August

Leatherback sea turtle	*Dermochelys coriacea*	LE	E

CHAMBERS COUNTY

REPTILES

		Federal Status	State Status
Loggerhead sea turtle	*Caretta caretta*	LT	T

Gulf and bay systems, and widest ranging open water reptile; omnivorous, shows a preference for jellyfish; in the US portion of their western Atlantic nesting territories, nesting season ranges from March to August

Gulf and bay system primarily for juveniles, adults are most pelagic of the sea turtles; omnivorous, shows a preference for mollusks, crustaceans, and coral; nests from April through November

Northern scarlet snake	*Cemophora coccinea copei*	T

mixed hardwood scrub on sandy soils; feeds on reptile eggs; semi-fossorial; active April-September

Smooth green snake	*Liochlorophis vernalis*	T

Gulf Coastal Plain; mesic coastal shortgrass prairie vegetation; prefers dense vegetation

Texas diamondback terrapin *Malaclemys terrapin littoralis*

coastal marshes, tidal flats, coves, estuaries, and lagoons behind barrier beaches; brackish and salt water; burrows into mud when inactive; may venture into lowlands at high tide

Texas horned lizard	*Phrynosoma cornutum*	T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

Timber/Canebrake rattlesnake	*Crotalus horridus*	T

swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

PLANTS

		Federal Status	State Status
Texas windmill-grass	*Chloris texensis*		

Texas endemic; sandy to sandy loam soils in relatively bare areas in coastal prairie grassland remnants, often on roadsides where regular mowing may mimic natural prairie fire regimes; flowering in fall