

# Threatened and Endangered Species Report

**Blackstone Mineral B-2 Well Re-Entry**

December 31, 2008  
Revised May 28, 2009

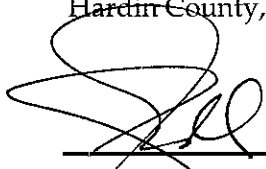
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Endeavor Natural Gas, LP  
Threatened and Endangered  
Species Report: *Blackstone Mineral*  
*B-2 Well Re-Entry*

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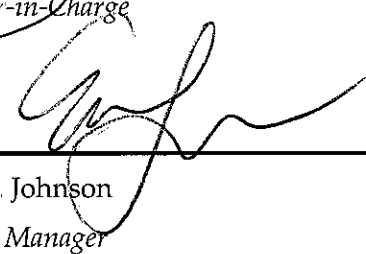
Project No. 0092408

Hardin County, Texas



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## ***ACRONYM GLOSSARY***

ERM	Environmental Resources Management Southwest, Inc.
NWI	National Wetland Inventory
SOC	State Designated Species of Concern
TES	Threatened and Endangered Species
TPWD	Texas Parks and Wildlife Department
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WDR	Wetland Delineation Report

## EXECUTIVE SUMMARY

Environmental Resources Management Southwest, Inc. (ERM) completed a threatened and endangered species survey and project impact effects determination for the proposed Endeavor Natural Gas, L.P. (Endeavor) production of the existing Blackstone Minerals B-2 well in Hardin County, Texas ("the Project"). Proposed Project activities will include directionally drilling from an existing surface location outside of the Big Thicket National Preserve ("the Preserve"), to reach a bottomhole location underneath the Beaumont Unit within the Preserve.

ERM conducted a field investigation in November 2008 to characterize the habitat, vegetation, and general environmental conditions within the area that could potentially be affected by the Project (hereafter, "the Site"). Lists of threatened and endangered species and species of concern for Hardin County maintained by the U.S. Fish and Wildlife Service (USFWS) and the Texas Parks and Wildlife Department (TPWD) were reviewed prior to the field investigation. ERM determined the potential for listed species to occur at the Site based on agency lists and the available habitat at the Site. This report discusses the results of the investigation and presents conclusions regarding the potential for Project activities to impact each listed species.

ERM has concluded the following:

- The Project will have **no effect** on the following threatened and endangered species: red-cockaded woodpecker (*Picoides borealis*); piping plover (*Charadrius melodus*); white-faced ibis (*Plegadis chihi*); wood stork (*Mycteria americana*); blue sucker (*Cycleptus elongates*); creek chubsucker (*Erimyzon oblongus*); paddlefish (*Polyodon spathula*); American black bear (*Ursus americanus*); Louisiana black bear (*Ursus americanus luteolus*); red wolf (*Canis rufus*); and alligator snapping turtle (*Macrochelys temminckii*).
- The Project is **not likely to adversely affect** the following threatened and endangered species: American Peregrine falcon (*Falco peregrinus anatum*); arctic Peregrine falcon (*Falco peregrinus tundrius*); Bachman's sparrow (*Aimophila aestivalis*); bald eagle (*Haliaeetus leucocephalus*); swallow-tailed kite (*Elanoides forficatus*); Rafinesque's big-eared bat (*Corynorhinus rafinesquii*); timber/canebrake rattlesnake (*Crotalus horridus*); Louisiana pine snake (*Pituophis ruthveni*); northern scarlet snake (*Cemophora coccinea copei*); and Texas trailing phlox (*Phlox nivalis ssp texensis*).

The following mitigation measures should be implemented to prevent or minimize potential adverse Project effects on TES (and in some cases the above conclusions are based on the assumption that these mitigation measures will be implemented):

- Timing of Project clearing activities (e.g., outside of the breeding season for Bachman's Sparrow [April through June]);

- If clearing activities are to begin during the breeding season, preconstruction surveys by an environmental monitor to detect the presence/absence of threatened and endangered species;
- Crew notification and implementation of “no-approach” and “no-kill” policies toward wildlife.

## 1.0

### INTRODUCTION

Environmental Resources Management Southwest, Inc. (ERM) completed field investigations to assess potential impacts to federal- and state-listed threatened and endangered wildlife and plant species and state-designated species of concern associated with the proposed Endeavor Natural Gas, L.P. (Endeavor) production of the existing Blackstone Minerals B-2 well in Hardin County, Texas (herein referred to as “the Project”).

The Project is located approximately three miles East of Interstate Highway (IH)-69 on Burge Road (Figure 1-1). ERM biologists conducted a field investigation on November 13, 2008 to characterize existing habitat and site conditions, and to identify federally and state-listed plants and wildlife potentially occurring within the area that could potentially be affected by the Project (herein referred to as “the Site”), located on private property outside of the Preserve. Wetland delineations were performed concurrently, and those results are discussed in a separate Wetland Delineation Report (WDR; ERM, 2008).

This Threatened and Endangered Species Report discusses the anticipated Project-related impacts to federal and state-listed threatened and endangered species (TES) and state-designated species of concern (SOC).

## 1.1

### PROJECT DESCRIPTION AND LOCATION

Endeavor is proposing to re-enter, drill and produce the existing Blackstone Minerals B-2 well (herein referred to as “the well”) in Hardin County, Texas. Proposed Project activities include directionally drilling from the Site, which is located outside of Big Thicket National Preserve (“the Preserve”), to reach a bottomhole location underneath the Beaumont Unit within the Preserve. If the well is completed as a producing well, existing flowlines within the Site would be utilized and new production facilities would be constructed within the Site.

The Site is approximately two (2) acres of previously disturbed fenced property (Figure 1-2). Prior to the start of construction, vegetation will be cleared from within the fenced boundary and stormwater facilities (*e.g.* culverts, timber matting or other sediment erosion control measures) may be assembled within the Site.

The Site is surrounded by an approximately eight-foot high chain-link fence. The Site is bounded by Burge Road to the north and a forest to the south. The Lower Neches Valley Authority (LNVA) Canal is located approximately 1,250 feet south of the Site. The natural landscape surrounding the remainder of the Site is upland forest and private agriculture/pasture land to the west, east, and north, with an expansive mixed bottomland hardwood-cypress forest to the south.



## **1.2** *PURPOSE AND NEED*

The Project is needed to address the shortage of clean and natural forms of energy for the state of Texas. Endeavor has permitted with the Railroad Commission of Texas for the re-entry operation of the well (API #4219932791), formerly drilled and operated by Mariner Energy Inc. The Project will recomplete the previously produced Yegua EY 1 natural gas reservoir and produce the remaining reserves expected from detailed geological and engineering studies performed by Endeavor.

## **1.3** *SITE HISTORY AND SURVEY AREA*

The Project will take place on property that is currently being leased by Endeavor from Blackstone Minerals Company, L.P. The existing well pad on the Site has been owned in the recent past by several different oil and gas exploration companies, the most recent being Mariner Energy Company, L.P. Though the Site has not been actively used within the past five years, to a large extent the Site is covered by caliche rock, gravel and other stabilizing materials and as such is still considered industrial property.

The surveyed area for this TES assessment (i.e., the Site) includes an erosional swale with natural vegetation. A separate apparently ephemeral swale drains from the agricultural property north of the Site through a culvert and into the Site swale (which runs north and south across the eastern portion of the Site). The Site swale drains south of the site into an observed mixed bottomland hardwood-cypress forest. The mixed bottomland hardwood-cypress forest, a National Wetland Inventory (NWI) mapped feature, is bordered by the LNVA Canal approximately 1,250 feet south of the Site. General topography within the Site is relatively flat, with a gradual slope down toward the south end of the Site.

Field investigations and literature reviews were used to evaluate the Site for the suitability of habitats supporting federal- or state-listed TES and state-listed SOC. Prior to conducting field investigations, a review of listed species at the county level was performed.

A list of county-specific Federally-listed TES was obtained from the U.S. Fish and Wildlife (USFWS) Southwest Region website (USFWS, 2007) to determine potential species occurrences and their critical habitat in Hardin County. A list of state-listed TES, state-listed SOC and associated habitats was obtained from the Texas Parks and Wildlife Department (TPWD) website (TPWD, 2007a).

Field investigations were performed by ERM biologists on November 13, 2008. Visual observation surveys were used to identify and characterize the habitat types and vegetation communities on the Site, and to assess the potential presence of TES on the Site. Surveys consisted of meandering pedestrian transects through the Site and around the perimeter of the Site. The area included for visual observations extended beyond the Site boundaries into adjacent habitats. The Site boundaries, which define the principal area subjected to the field investigation, are shown on Figure 1-2.

### 3.0 *SITE HABITAT AND VEGETATION COMMUNITIES*

Based on the results of the field investigation, the Site is comprised entirely of upland habitat, with the exception of a swale. This section describes the upland and swale habitat components and associated vegetation communities, as well as those of the surrounding area.

#### 3.1 *UPLANDS*

The majority of the upland habitat is dominated by rough dropseed (*Sporobolus asper*), with an area on the west side of the Site that is populated by a small stand of young (less than five years old) loblolly pines (*Pinus taeda*). Surface soils on the Site are characterized as a sandy loam mixed at the surface with caliche rock approximately one inch in diameter.

#### 3.2 *EROSIONAL SWALE*

Located near the eastern boundary of the Site is a swale (Figure 3-1), or a shallow trough-like depression, that carries water mainly during rainstorms. This feature is approximately 0.43 acres in size. Dominant plant species within the swale consist of eastern baccharis (*Baccharis halimifolia*), bushy bluestem (*Andropogon glomeratus*), annual marsh elder (*Iva annua* L.), and giant goldenrod (*Solidago gigantea*).

The swale appears to be caused by the installation within the past five (5) years by an adjacent landowner of a culvert located under Burge Road. No erosional features or swales were previously recorded on the Site prior to the installation of the culvert.

#### 3.3 *SURROUNDING HABITAT*

Upland habitats north of the Site along Burge Road are primarily characterized by various grass species (e.g., rough dropseed) and young loblolly pines. To the east and west of the Site is private agriculture/ pasture land and pine forested areas. Located approximately 50 feet south of the Site is a NWI-mapped wetland with dominant plant species consisting of bald cypress (*Taxodium distichum*) and Chinese tallow (*Triadica sebifera* L.).

The potential for federally-listed and/or state-listed TES and state-designated SOC to occur on or within the vicinity of the Site was evaluated based primarily on the presence or absence of suitable habitat. The USFWS and the TWPDP provide lists of species by county based on population distribution and occurrence data. Table 4-1 lists TES that are known by USFWS and/or TWPDP to occur or thought to potentially occur in Hardin County, and summarizes their listing status and potential to occur in the area. Table 4-2 lists state-designated SOC that may potentially occur on or within the vicinity of the Site. **The Site does not contain designated critical habitat for any listed species.**

Potential effects on TES from the Project can be classified as short-term, long-term, or permanent. Short-term effects last less than five years and include impacts to suitable habitat, disturbance to wildlife from Project activities (i.e., noise disturbance or increases in human presence), and displacement of individuals. Long-term impacts consist of changes to wildlife habitats lasting five years or longer. The severity of both short- and long-term impacts depends on factors such as the sensitivity of the species impacted, seasonal use patterns, type and timing of construction activities, and physical parameters (e.g., topography, cover, forage, and climate). Permanent impacts include habitat loss resulting from (for example) construction of permanent aboveground facilities.

Potential effects to TES can also be classified as direct or indirect. A direct effect may include individual injury or mortality. Indirect effects may alter the survivorship or reproductive capacity of a species, change the quantity and/or continuity of available suitable habitat, alter the quality and availability of resources used by the species, or alter intraspecific or interspecific competition dynamics.

The following subsections provide species-specific evaluations of the potential for Project-related effects to TES and SOC listed for Hardin County. Project effects determinations are categorized as follows:

- **No effect** – Project activities will have no adverse or beneficial effect on the listed species;
- **Not likely to adversely affect** – Project activities may directly or indirectly affect the listed species or its habitat; however, the effects are likely to be discountable, insignificant, or beneficial; and
- **Likely to adversely affect** – Project activities are anticipated to have significant adverse effects (direct or indirect) on the listed species or its habitat.

**TABLE 4-1: Threatened and Endangered Species listed for Hardin County, Texas**

<i>Species Common Name</i> <sup>(1)</sup>	<i>Scientific Name</i>	<i>Federal Status</i>	<i>State Status</i>	<i>Potential Occurrence on Site</i> <sup>(1)</sup>
<b>Birds</b>				
American Peregrine falcon	<i>Falco peregrinus anatum</i>	DL	E	<b>Yes</b> – may occur as low-altitude migrant
Arctic Peregrine falcon	<i>Falco peregrinus tundrius</i>	DL	T	<b>Yes</b> – may occur as low-altitude migrant
Bachman's sparrow	<i>Aimophila aestivalis</i>	--	T	<b>Yes</b> – prefers brushy habitat in open pine woods or overgrown areas like utility ROWs
Bald eagle <sup>(2)</sup>	<i>Haliaeetus leucocephalus</i>	DL	T	<b>Yes</b> – found near large rivers and lakes (< 25 miles from Site)
Piping plover	<i>Charadrius melodus</i>	LT	T	No – visits Texas Gulf Coast beaches and bayside mud flats during winter migration
Red-cockaded woodpecker	<i>Picoides borealis</i>	LE	E	No – forages in younger (30-60 years) and nests in older (>60 years) pine forests with <i>sparse</i> understory; prefers loblolly, longleaf, and shortleaf pines
Swallow-tailed kite	<i>Elanoides forficatus</i>	--	T	<b>Yes</b> – occurs in lowland forested regions, especially swamps.
White-faced ibis	<i>Plegadis chihi</i>	--	T	No – prefers freshwater marshes
Wood stork	<i>Mycteria americana</i>	--	T	No – forages in shallow water of prairie ponds or flooded fields; no breeding records in TX since 1960
<b>Fishes</b>				
Blue sucker	<i>Cycleptus elongates</i>	--	T	No – frequents deep channels and flowing pools of major rivers
Creek chubsucker	<i>Erimyzon oblongus</i>	--	T	No – species of small creeks and tributaries of major rivers
Paddlefish	<i>Polyodon spathula</i>	--	T	No – occurs in large, free-flowing rivers, and impoundments with access to gravel bar spawning sites
<b>Mammals</b>				
American black bear <sup>(2)</sup>	<i>Ursus americanus</i>	T/SA	T	No – wide-ranging in various forested and marshy habitats; Site is fenced
Louisiana black bear <sup>(2)</sup>	<i>Ursus americanus luteolus</i>	LT	T	No – wide-ranging in various forested and marshy habitats; Site is fenced
Rafinesque's big-eared bat	<i>Corynorhinus rafinesquii</i>	--	T	<b>Yes</b> – roosts in cavity trees of bottomland hardwoods; known to occur within the Big Thicket National Preserve
Red wolf	<i>Canis rufus</i>	LE	E	No – extirpated from eastern Texas

<i>Species Common Name</i> <sup>(1)</sup>	<i>Scientific Name</i>	<i>Federal Status</i>	<i>State Status</i>	<i>Potential Occurrence on Site</i> <sup>(1)</sup>
<b>Reptiles</b>				
Alligator snapping turtle	<i>Macrochelys temminckii</i>	--	T	No – perennial water bodies near deep running water
Louisiana pine snake <sup>(2)</sup>	<i>Pituophis ruthveni</i>	C	T	<b>Yes</b> – mixed deciduous-longleaf pine woodlands
Northern scarlet snake	<i>Cemophora coccinea copei</i>	--	T	<b>Yes</b> – mixed hardwood scrub on sandy soils
Timber/canebrake rattlesnake	<i>Crotalus horridus</i>	--	T	<b>Yes</b> – prefers dense ground cover in swamps, floodplains, uplands habitats
<b>Plants</b>				
Texas trailing phlox	<i>Phlox nivalis ssp texensis</i>	LE	E	<b>Yes</b> – deep, sandy soils that occur in fire-maintained openings of upland pine savannahs or oak woodlands

C = Federal Candidate for listing

DL = Delisted Endangered/Threatened

LE = Federally Listed Endangered

LT = Federally Listed Threatened

T/SA = Federally Listed Threatened based on Similarity of Appearance

E = State Listed Endangered

T = State Listed Threatened

(1) Source: TPWD (<http://www.tpwd.state.tx.us/huntwild/wild/species/endang/index.phtml>)

(2) Source: USFWS Southwest Region

(<http://www.fws.gov/southwest/es/EndangeredSpecies/lists/default.cfm>)

**TABLE 4-2: State Species of Concern Potentially Occurring on the Site**

<i>Species Common Name</i>	<i>Scientific Name</i>	<i>Suitable Habitat on Site</i> <sup>(1)</sup>
<b>Birds</b>		
Henslow's sparrow	<i>Ammodramus henslowii</i>	In winter: weedy fields or cut-over areas with bunch grasses, vines, and brambles
<b>Mammals</b>		
Plains spotted skunk	<i>Spilogale putorius interrupta</i>	Open habitats (i.e. fields, forest edges, woodlands)
Southeastern myotis bat	<i>Myotis austroriparius</i>	Bottomland hardwoods, concrete culverts, and abandoned man-made structures
<b>Plants</b>		
Chapman's orchid	<i>Platanthera chapmanii</i>	Sandy, wet to dry woods, pine barrens and meadows
Long-sepaed false dragonhead	<i>Physostegia longisepala</i>	Bottomland hardwood forests along streams and in flat terrain; known to occur in road side ditches
Texas screwstem	<i>Bartonia texana</i>	Sandy soils in dry mesic pine forests
White firewheel	<i>Gaillardia aestivalis var. winkleri</i>	Deep, sandy soils that occur in fire-maintained openings of upland pine savannahs or oak woodlands

(1) Source: <http://www.tpwd.state.tx.us/huntwild/wild/species/endang/index.phtml>

## 4.1

## BIRDS

### 4.1.1

#### *American Peregrine Falcon / Arctic Peregrine Falcon*

Two sub-species of peregrine falcon potentially occur in eastern Texas: the American peregrine falcon (*Falco peregrinus anatum*) is state-listed as endangered, and the Arctic peregrine falcon (*Falco peregrinus tundrius*) is state-listed as threatened. Both sub-species migrate through Texas twice a year as they move to and from their wintering areas in South America (TPWD, 2007a). There is minimal potential for peregrine falcons to incidentally occur on the Site during migration as the Site lacks suitable nesting habitat. While suitable foraging habitat could be found in the Site, the proposed drilling activities would make the Site a less desirable resting point.

The Project is **not likely to adversely affect** American or arctic peregrine falcons because of discountable, indirect disturbance effects on peregrine falcons incidentally occurring on the Site.

### 4.1.2

#### *Bachman's Sparrow*

Bachman's sparrow (*Aimophila aestivalis*) is state-listed as threatened due to habitat decline from the infrequency of natural or prescribed fire burns. Bachman's sparrow breeds from approximately April through June in early succession pine woodlands or open habitats with dense grasses and forbs. No Bachman's sparrows were observed on the Site during ERM field investigations.

Since adult Bachman's sparrows are highly mobile, direct adverse effects on non-breeding individuals (e.g., injury or mortality) can be avoided if Project vegetation clearing activities take place outside of the breeding season (April through June). The Project may have a temporary adverse effect on Bachman's sparrow habitat through vegetation removal. Suitable Bachman's sparrow habitat is limited to the small loblolly pine stand and the brushy vegetation of the swale found within the Site.

Breeding adults, nests, eggs, or young of Bachman's sparrow could be incidentally taken if vegetation clearing activities take place in the above mentioned area during the breeding season. In the event that Project activities affecting potential Bachman's sparrow breeding habitat are anticipated to take place during the breeding season between April and June, an environmental monitor should conduct surveys just prior to clearing activities to detect the presence or absence of breeding Bachman's sparrows. In the event that breeding individuals are identified, Endeavor should notify the proper agencies prior to beginning any clearing activities in that area.

The Project is **not likely to adversely affect** Bachman's sparrows because direct adverse effects could be avoided by conducting Project clearing activities outside of the breeding season, or by conducting pre-construction surveys if construction begins during the breeding season. Furthermore, effects to Bachman's sparrow

habitat are discountable due to the limited area of potential habitat available on the Site.

#### 4.1.3

##### *Bald Eagle*

The bald eagle (*Haliaeetus leucocephalus*) is a state-listed threatened species, and was recently de-listed as federally-threatened in east Texas on July 9, 2007. Bald eagles are found primarily near seacoasts, rivers, and large lakes, where their primary prey is fish. Bald eagles also hunt terrestrial prey, feed on carrion, or pirate food from other birds. They prefer to nest in tall trees or on cliffs near water, and will use the same nest for several years. Bald eagles often roost communally, especially in winter.

Hardin County is not identified by the TPWD as containing potential nesting or migration areas for the bald eagle (TPWD, 2008). No cliffs or large, lone trees are available on the Site for bald eagle nests. Furthermore, no bald eagle nests were observed in the habitat surrounding the Site. Because the bald eagle is a wide-ranging and highly mobile species, it is possible that foraging bald eagles could occur on the Site. However, it is not likely that bald eagles will regularly frequent the Site for nesting, roosting, or foraging.

The Project is **not likely to adversely affect** bald eagles because of discountable indirect disturbance effects on bald eagles incidentally occurring on the Site.

#### 4.1.4

##### *Swallow-tailed Kite*

The swallow-tailed kite (*Elanoides forficatus*) is a state-listed threatened species that typically occurs in uneven-aged forest stands adjacent to freshwater wetland areas with an abundance of small prey. Edges of pine forest adjacent to riparian and swamp forest are especially important. The swallow-tailed kite nests high in tall trees located at forest edges or in clearings.

The Site could provide foraging habitat for swallow-tailed kites, while the surrounding forest could provide suitable nesting habitat. However, no swallow-tailed kite individuals or nests were observed within or immediately surrounding the Site during ERM's field investigations.

The Project is **not likely to adversely affect** the swallow-tailed kite because of discountable indirect effects due to disturbance or displacement of non-breeding adults.

#### 4.2

##### *MAMMALS*

#### 4.2.1

##### *Rafinesque's Big-eared Bat*

The Rafinesque's big-eared bat (*Corynorhinus rafinesquii*) is a state-listed threatened species that prefers deciduous forested habitat with natural roosting places in hollow trees, and behind bark and dry leaves. The species also roosts in



concrete culverts and abandoned man-made structures. No active roosting sites were identified on the Site.

Foraging Rafinesque's big-eared bats are active at night. Project activities will take place throughout the day and night, and therefore there is minimal potential for direct disturbance effects on bats.

The Project is **not likely to adversely affect** Rafinesque's big-eared bat because the location of project activities minimizes the potential for indirect effects due to disturbance.

#### 4.3 REPTILES

##### 4.3.1 *Timber/Canebrake Rattlesnake*

The timber/canebrake rattlesnake (*Crotalus horridus*) is a state-listed threatened species that prefers moist lowland forests and hilly woodlands or thickets near permanent water sources such as rivers, lakes, ponds, streams and swamps where tree stumps, logs and branches provide refuge. No individual snakes were observed during field investigations. However, as suitable habitat is present adjacent to the Site, there is a potential for this mobile species to enter the Site from those locations.

This species is potentially vulnerable to direct adverse impacts (e.g., injury or death) during vegetation clearing activities because in addition to escape movements, it also employs hiding as a strategy to avoid danger by sheltering in dense vegetation or under debris. Endeavor construction crews will implement a "no-approach" and "no-kill" policy towards snakes encountered on the Site. In addition, a designated crew member will be present prior and during vegetation clearing activities to detect snakes and minimize the potential for incidental take.

The Project is **not likely to adversely affect** this species because the potential for direct adverse effects to individual rattlesnakes is small and will be mitigated by the implementation of a "no-kill" policy toward snakes encountered on the Site.

##### 4.3.2 *Louisiana Pine Snake*

The Louisiana pine snake (*Pituophis ruthveni*) is a state-listed threatened species that prefers dry, sandy-soiled pine ridges historically dominated by fire-climax longleaf pine-oak habitats. No individual snakes were observed during field investigations. However, as more suitable habitat is present adjacent to the Site, there is a potential for this mobile species to enter the Site from those locations.

This species is potentially vulnerable to direct adverse impacts (e.g., injury or death) during vegetation clearing activities because it also will remain motionless as a hiding strategy to avoid danger by sheltering in dense vegetation or under debris. Endeavor construction crews will implement a "no-approach" and "no-kill" policy towards snakes encountered on the Site. In addition, a

designated crew member will be present prior and during vegetation clearing activities to detect snakes and minimize the potential for incidental take.

The Project is **not likely to adversely affect** this species because the potential for direct adverse effects to individuals is small and will be mitigated by the implementation of a “no-kill” policy toward snakes encountered on the Site.

#### 4.3.3 *Northern Scarlet Snake*

The northern scarlet snake is a state-listed threatened species that typically occupies sandy soils of pine flatwoods, dry prairies, hardwood hammocks, mixed hardwood scrub and sandhills. No individual snakes were observed during field investigations. However, as suitable habitat is present on Site and in areas adjacent to the Site, there is a potential for mobile species to occur on the Site.

This species is potentially vulnerable to direct adverse impacts (e.g., injury or death) during vegetation clearing activities because in addition to escape movements, it also employs hiding as a strategy to avoid danger by sheltering in dense vegetation or under debris. Endeavor construction crews will implement a “no-approach” and “no-kill” policy towards snakes encountered on the Site. In addition, a designated crew member will be present prior and during vegetation clearing activities to detect snakes and minimize the potential for incidental take.

The Project is **not likely to adversely affect** this species because the potential for direct adverse effects to individuals is small and will be mitigated by the implementation of a “no-kill” policy toward snakes encountered on the Site.

#### 4.4 *PLANTS*

##### 4.4.1 *Texas Trailing Phlox*

The Texas trailing phlox (*Phlox nivalis* ssp *texensis*) is a federal and state-listed endangered species that thrives in deep sandy soils that occur in fire-maintained openings of upland pine savannahs or oak woodlands. While sandy soils occur within the Site, they have been disturbed by previous exploration activities on Site. Furthermore, the young loblolly pine stand on Site has an extremely dense non-maintained understory. During the November 2008 survey conducted by ERM, no Texas trailing phlox, an evergreen perennial herb, was identified.

The Project is **not likely to adversely affect** the Texas trailing phlox due to the absence of suitable habitat within the Site.

#### 4.5 *OTHER THREATENED AND ENDANGERED SPECIES*

The Project will have **no effect** on the following threatened and endangered species because there is no suitable foraging and/or breeding habitat located on

the Site or in the immediate surrounding area: red-cockaded woodpecker (*Picoides borealis*); piping plover (*Charadrius melodus*); white-faced ibis (*Plegadis chihi*); wood stork (*Mycteria americana*); blue sucker (*Cycleptus elongates*); creek chubsucker (*Erimyzon oblongus*); paddlefish (*Polyodon spathula*); American black bear (*Ursus americanus*); Louisiana black bear (*Ursus americanus luteolus*); red wolf (*Canis rufus*); and alligator snapping turtle (*Macrochelys temminckii*).

#### 4.6 SPECIES OF CONCERN

The TPWD and USFWS designate plant and wildlife species with limited distribution and/or rare occurrence as SOC, and seek to identify and minimize potential conservation threats. SOC do not receive regulatory protection; therefore, a determination of Project effects is not required per regulation. However, mitigation measures designed to minimize potential adverse Project effects on TES also are likely to minimize potential adverse effects on SOC.

## CONCLUSIONS

Endeavor is proposing to produce the existing Blackstone Minerals B-2 well in Hardin County, Texas ("the Project"). The Project will involve the potential disturbance of up to 2 acres within a fenced area that includes the entry point for the well ("the Site"). ERM conducted a field investigation in November 2008 to characterize the habitat, vegetation, and general environmental conditions within the Site. Lists of TES and SOC for Hardin County maintained by the USFWS and the TPWD were reviewed prior to the field events. ERM determined the potential for TES and SOC to occur at the Site based on agency lists and the available habitat. **The Site does not contain designated critical habitat for any listed species.** ERM has concluded the following regarding the potential for Project-related effects to TES and SOC potentially occurring on the Site:

- The Project will have **no effect** on the following threatened and endangered species: red-cockaded woodpecker, piping plover, white-faced ibis, wood stork, blue sucker, creek chubsucker, paddlefish, American black bear, Louisiana black bear, red wolf, and alligator snapping turtle.
- The Project is **not likely to adversely affect** the following threatened and endangered species: American Peregrine falcon, arctic Peregrine falcon, Bachman's sparrow, bald eagle, swallow-tailed kite, Rafinesque's big-eared bat, timber/canebrake rattlesnake, Louisiana pine snake, northern scarlet snake, and Texas trailing phlox.

The following mitigation measures should be implemented to prevent or minimize potential adverse Project effects on TES (and in some cases the above conclusions are based on the assumption that these mitigation measures will be implemented):

- Timing of Project clearing activities (e.g., outside of the breeding season for Bachman's Sparrow); or
  - If clearing activities are to begin during the breeding season, preconstruction surveys by an environmental monitor to detect the presence/absence of threatened and endangered species;
- Implementation of "no-approach" and "no-kill" policies toward wildlife.

## 6.0

## REFERENCES

### 6.1

### ENVIRONMENTAL INVESTIGATORS

- Anitsakis, Erin C.            Environmental Resources Management, Environmental Scientist
- McMahon, Kathryn C.      Environmental Resources Management, Environmental Scientist
- Weizer, Julie M.            Environmental Resources Management, Associate Scientist

### 6.2

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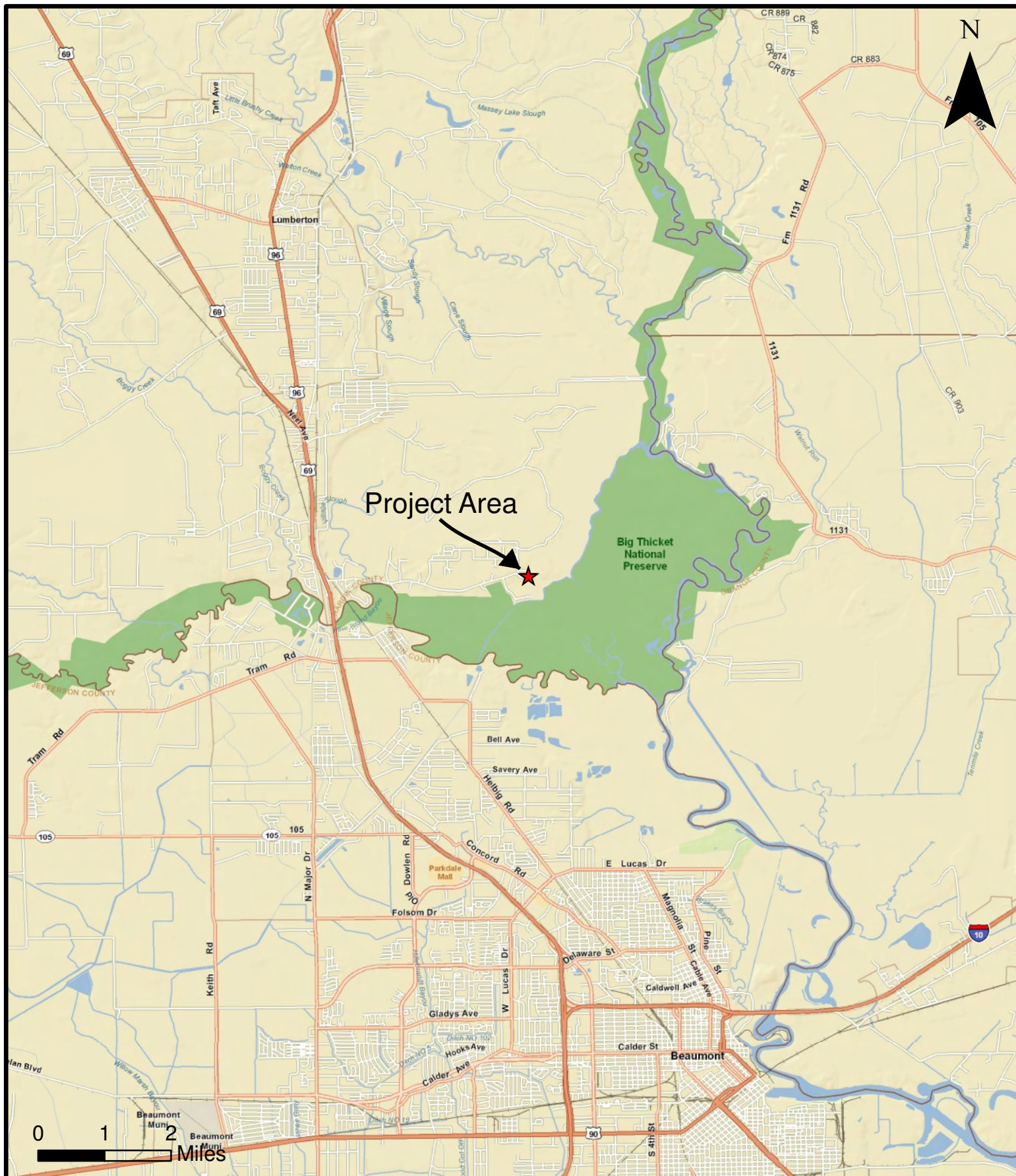
## **Figures**

*May 28, 2009*

*Project No. 0092408*

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Houston, Texas 77084-5140  
(281) 600-1000





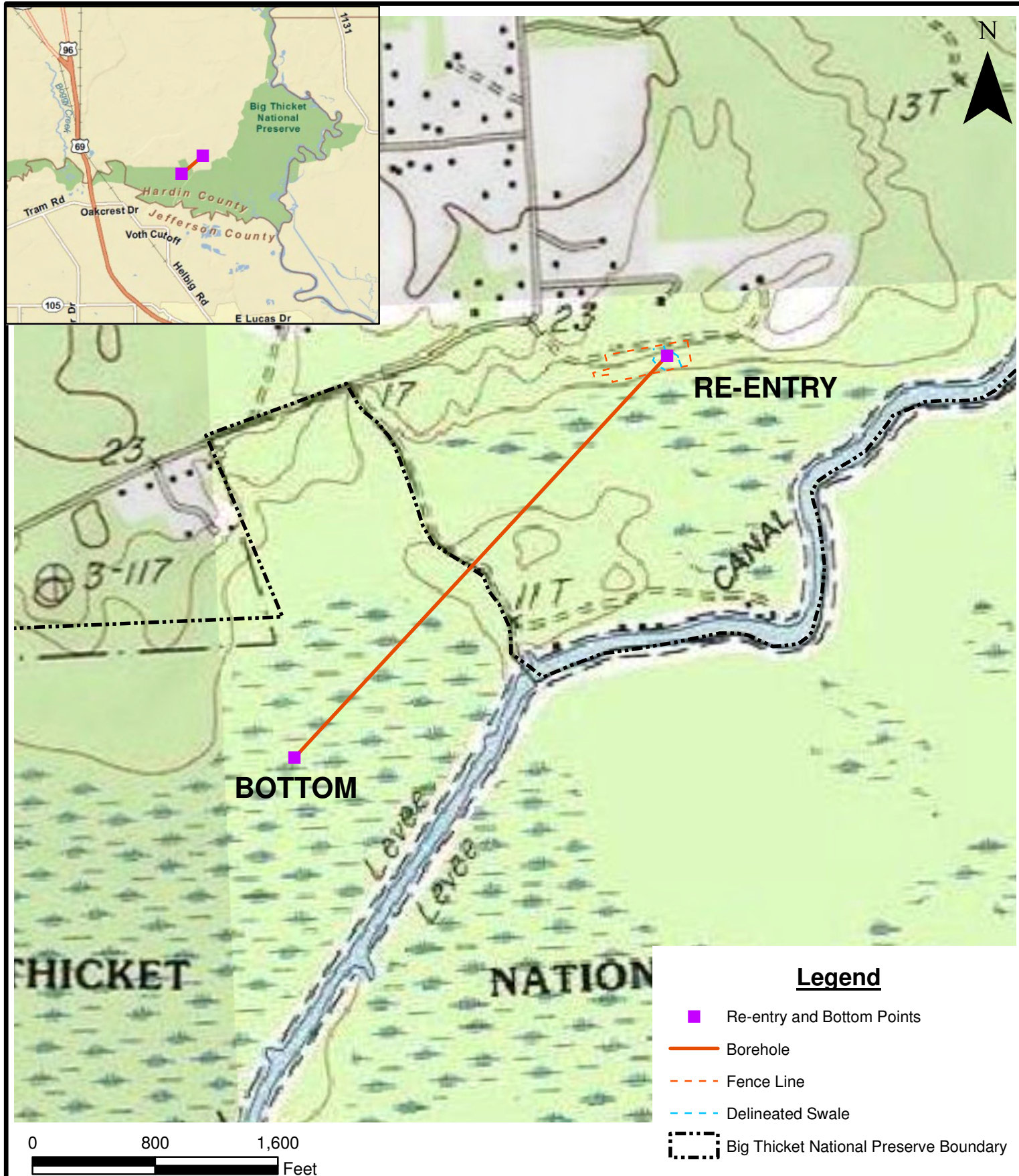
## Environmental Resources Management

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DATE: 11/24/08	SCALE: AS SHOWN	REVISION: 0
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**FIGURE 1-1**  
**VICINITY MAP**  
 Blackstone Minerals B-2 Re-entry  
 Endeavor Natural Gas LP  
 Hardin County, Texas







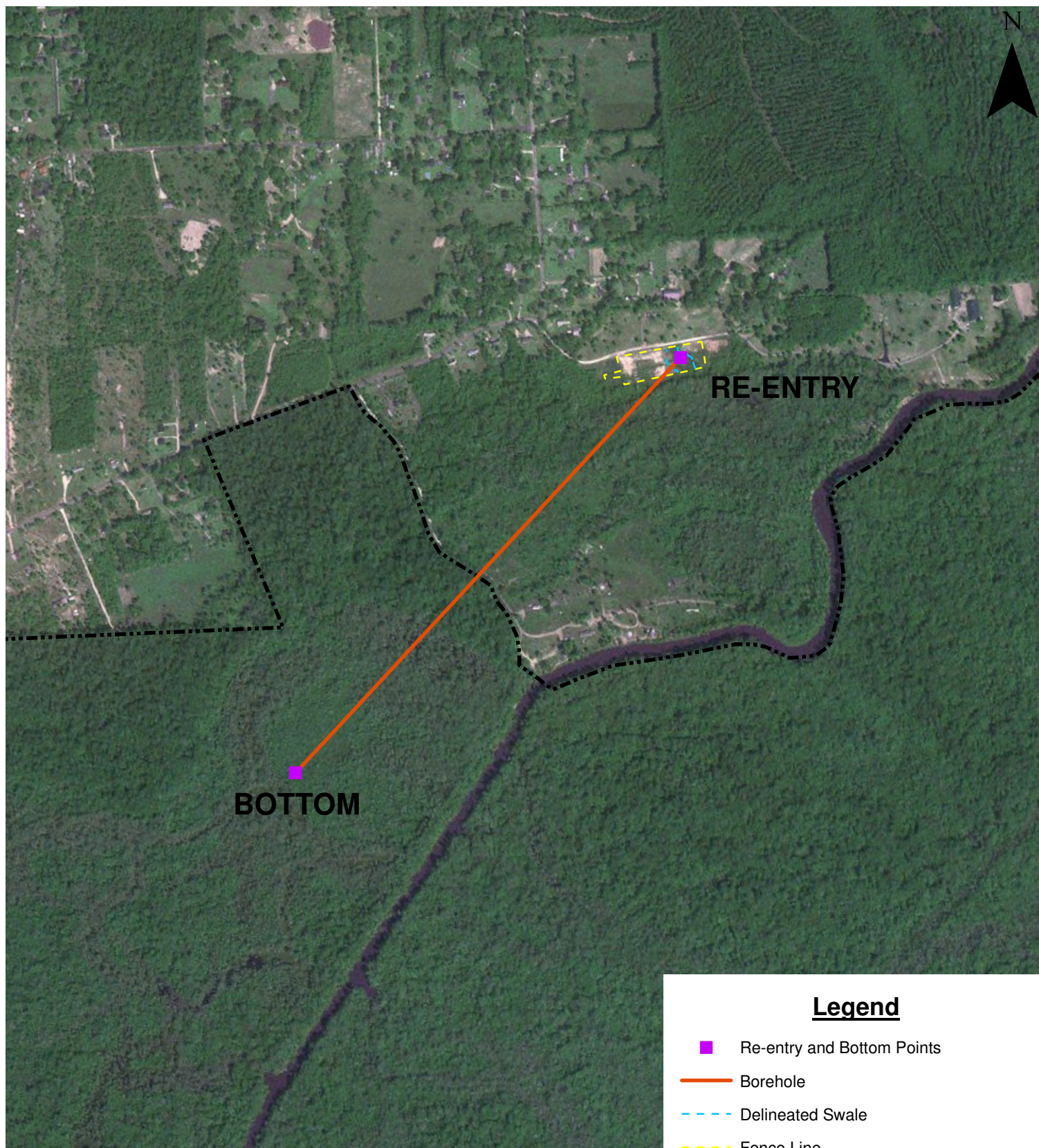
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**FIGURE 1-2  
SITE MAP**  
Blackstone Minerals B-2 Re-entry  
Endeavor Natural Gas LP  
Hardin County, Texas







0 800 1,600  
Feet

### Legend

- Re-entry and Bottom Points
- Borehole
- Delineated Swale
- Fence Line
- Big Thicket National Preserve Boundary

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FIGURE 3-1  
AERIAL MAP  
Blackstone Minerals B-2 Re-entry  
Endeavor Natural Gas LP  
Hardin County, Texas

