



Environmental Assessment

Lawco Trigger #1 Cross-boundary Exemption

**Big Thicket National Preserve (BITH)
Little Pine Island - Pine Island Bayou Corridor Unit
Hardin County, Texas**

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1.0 Introduction

1.1 Background

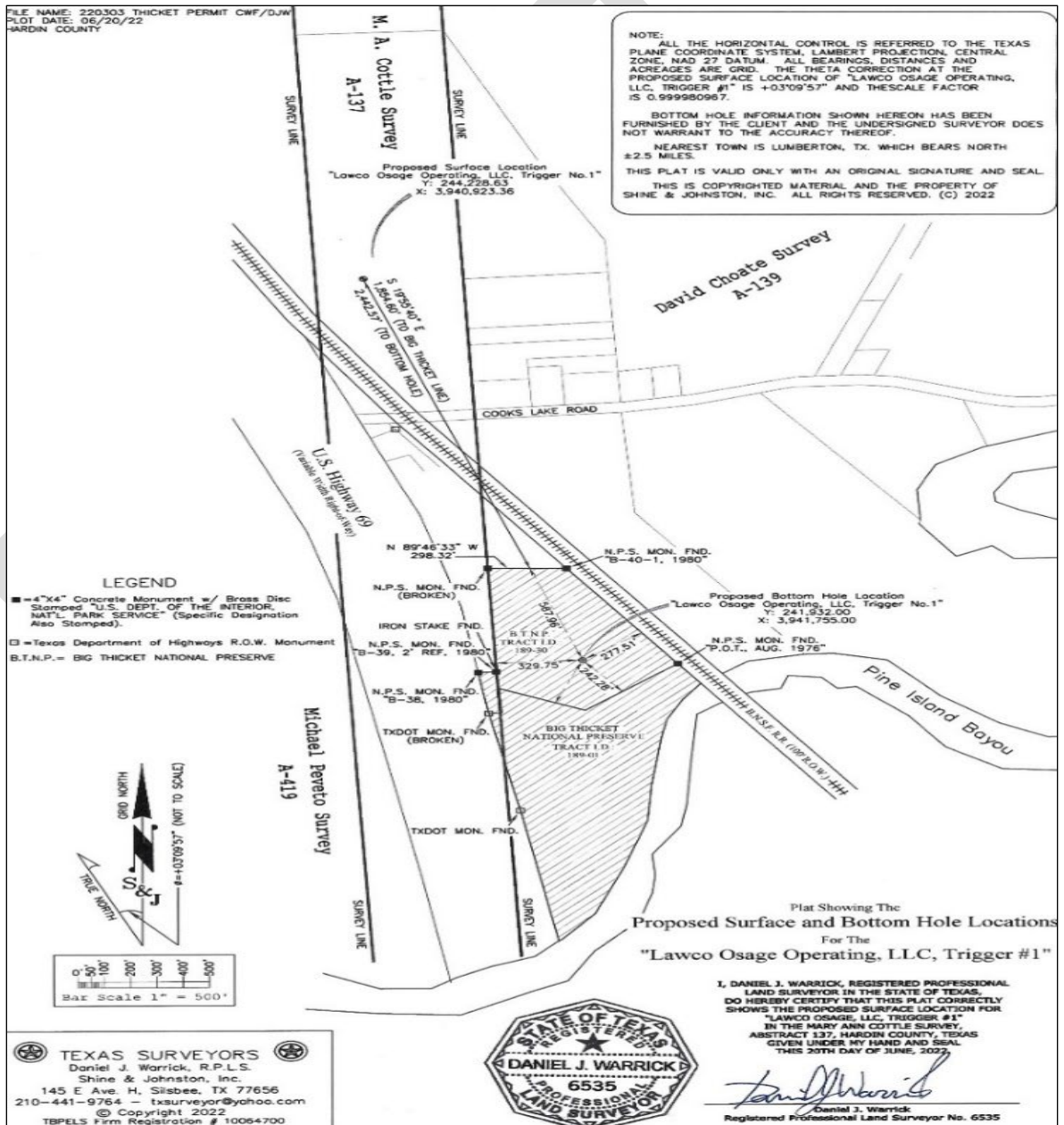
Texian Operating Company, LLC (Texian), on behalf of Lawco Resources LLC and Lawco Osage Operating, LLC (Lawco) is proposing to directionally drill the Trigger No. 1 (Trigger #1) well to explore a valid existing non-federal mineral lease (see Map 1, below). The proposed Lawco Trigger #1 would be located on private property approximately 1,855 feet north-northwest of the Big Thicket National Preserve (BITH) boundary at the nearest point. The Trigger #1 would be collocated on the existing Gemini #1 well pad which was constructed in late 2003 and drilling began on December 14, 2003 (TX-RRC, 2022). The Gemini #1 continues to produce natural gas, although in diminishing amounts. Lawco deliberately chose to reoccupy the Gemini #1 well location as a preferable option to constructing a new well pad at a different location. Reusing the Gemini #1 well pad for the Trigger #1 well pad, Lawco reduces the potential environmental impacts of the new well by minimizing the footprint of new pad construction and associated infrastructure development.

Map 1: Trigger #1 Location



1.1.2 Project Area

The Trigger #1 well pad would be located approximately 500 feet east of U.S. Highway 69/96/287 (US Highway 69) at the nearest point, which has four lanes of 70 mile per hour traffic, and two slower-speed frontage roads with two lanes each, totaling eight lanes. The Trigger #1 would be approximately 100 feet east of the Burlington Northern Santa Fe Railroad (BNSF) mainline railroad track with a 100-foot-wide right-of-way (ROW), which is frequently traveled both day and night, by diesel engine freight trains with up to 100 cars. Access to the well pad would be from the public road named Cook's Lake Road and then onto a private, gated and locked road leading north to the well pad. The well pad is not visible from any public roadway because it is entirely encircled by a thick stand of 30- to 60-foot-tall pine and hardwood trees with a dense understory. The surface location is within an



unincorporated area north of the city of Beaumont, Texas. West of the Trigger #1 location across US Highway 69 is the community of Rose Hill Acres with a population of about 440.

1.2 Proposed Action

The proposed action is for the proponent to directionally drill the Trigger #1 well to explore a valid existing non-federal mineral lease. The proposed action would occur in four phases: construction, drilling, production, plugging and final abandonment which are described in detail in this section see Figure 1).

1.3 Purpose and Need

The purpose of this project is for the National Park Service (NPS) to evaluate Lawco's application to drill and determine whether the directional wells qualify for an exemption under NPS regulation 36 CFR 9.32e.

The need is for the NPS issue an exemption to the operations permit requirement consistent with resource protection mandates and standards as directed by 36 CFR Part 9 Subpart B § 9.70- § 9.73.

1.4 Issues Identified for Detailed Analysis

During internal and public scoping numerous issues were identified and discussed whether to retain them for detailed analysis. Through scoping, one (1) issue was identified for detailed analysis in this EA. The key issue identified during scoping is summarized below (40 CFR 1501.9 (a)), 1501.9 (e), and 1501.9(f).

Issue #	Issue Statement	Impact Indicator
Issue 1	How would air quality (particularly with respect to National Ambient Air Quality Standards and Volatile Organic Compounds [VOCs]) in the Pine Island Bayou Corridor Unit of BITH be affected by emissions generated because of the Proposed Action?	Air Quality and Greenhouse Gases

1.5 Issues Considered but Eliminated from Further Analysis

Following scoping, nine (9) issues were considered but eliminated from further analysis. Each of these issues and rationale for dismissal is outlined in Appendix A with a concise discussion regarding the context and intensity of the impacts related to each issue.

2.0 Alternatives

Two alternatives are described and evaluated in this EA: Alternative A, which is the No Action Alternative, and Alternative B, which is the Proposed Action and Preferred Alternative. No alternative locations or strategies were proposed because drilling from the existing well pad located outside of the park boundary is the best possible location to minimize the environmental impacts in BITH and the surrounding project area.

The NPS agrees that locating surface operations outside of the park better protects park resources, as most impacts from surface operations are avoided or minimized. For this reason, the 36 CFR Part 9(b) regulations include an exemption from the operations permit requirement for mineral owners and operators to locate operations outside of the park and access their private mineral rights through directional drilling techniques.

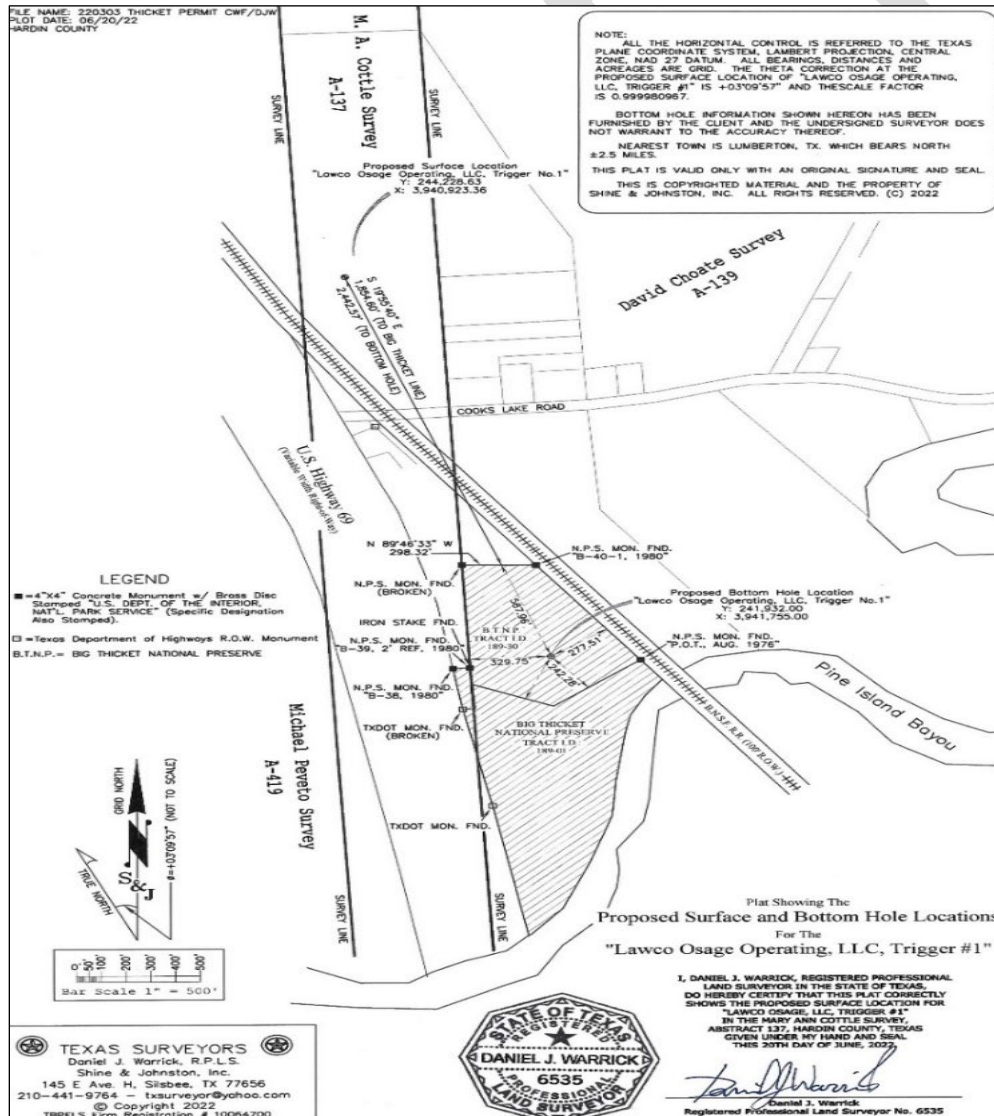
2.1 Alternative A: No Action

Under the no action alternative, the NPS would not approve a directional drilling exemption. Lawco would not drill the Trigger #1 to access its non-federal mineral lease within the boundaries of BITH or expand the Gemini #1 well pad.

2.2 Alternative B: Proposed Action/Preferred Alternative

The preferred alternative would be to approve a cross-boundary exemption for the Trigger #1 well and allow Lawco to drill 582 feet of wellbore beneath the BITH Pine Island Bayou Corridor Unit to access its valid existing mineral lease within the BITH boundary. Operations would be subject to the general terms and conditions in 36 CFR Part 9 Subpart B § 9.120- § 9.122, the prohibitions and penalties in § 9.180- § 9.182, and the requirements in § 9.73 (Figure 2 below).

Figure 2



2.2.1 Construction Phase

The existing rock-surfaced Gemini #1 well pad would be expanded to the west by 50 feet, and to the north by 170 feet. The regrowth vegetation that would be cleared for the Trigger #1 pad expansion is approximately 19 years old or less, depending on when the Gemini well pad was reduced in size. Clearing would require the removal of approximately 20 small diameter and unmerchantable pine and hardwood trees, along with woody brush species and grasses. The expanded well pad would add approximately 0.9 acres to the existing 1.25 acre well pad for a total combined Trigger #1 well pad of 2.15 acres, or approximately 250 feet by 375 feet. The expanded pad would be stabilized with a 6-to-8-inch layer of road-base aggregate and the well pad surface elevations, gradients and surrounding catchment with waterproof plastic liner would ensure that existing drainage patterns remain unchanged. Best Management Practices would be implemented during construction including (but not limited to) the use of silt fencing, hay bales and aggregate to minimize erosion. It is anticipated that the Trigger #1 construction phase would include 2 dump trucks, 1 bulldozer, 1 backhoe with front-end loader, require 10 days to complete and involve 4 personnel driving to and from the worksite daily.

2.2.2 Drilling Phase

The drilling phase would require an estimated 5 days for drilling rig and facilities set-up, 30 days for drilling and 5 days for the removal of drilling facilities for a total of 40 days. Construction phase and drilling phase combined would require an estimated 50 days. The anticipated drilling rig would be an ST1500 rig (or similar) owned and operated by Precision Drilling Corporation, Houston, Texas that is rated at 1,000 hp. Drilling would be accomplished using a closed mud system with no open pits for mud, water or gas flare. Hydraulic fracturing would not be conducted. Power generation would be from 3 CAT-3512 diesel generators individually housed in insulated, sound attenuating, containers, or "houses". There would be 2 FD-1600 mud pumps, 2 mud tanks, 1 mud suction tank, 1 mud shaker tank, 1 water tank and 1 fuel tank. Rig mast height would be approximately 142 feet from ground level and the mast, pipe rack, drilling floor, drill shack and catwalks would be lighted during nighttime operations for crew safety. Rig mobilization (in and out) would require 3 to 4 diesel semi-trucks. The well would be cased to protect subsurface water in accordance with all state laws and regulations. It is estimated there would be an average of 6 personnel working the rig at any given time, operating 24 hours per day on 10-hour shifts during the 40-day drilling phase, each driving vehicles to and from work, which would amount to approximately 576 passenger vehicle well pad entry and exits. The wellbore would extend approximately 588 feet (0.11 miles) into the boundary of Big Thicket National Preserve (BITH) at Little Pine Island - Pine Island Bayou Corridor Unit (Corridor Unit) at a depth of 10,600 feet beneath the surface. Total well bore length would be 2,443 feet (0.46 miles).

2.2.3 Production Phase

If the Trigger #1 well is successful, all existing on-site Gemini #1 facilities would be used to process and transport the natural gas produced, and any liquid hydrocarbons or water produced by the well would be stored in the 4 existing on-site storage tanks used for that purpose. The only additional infrastructure anticipated would-be surface piping from the wellhead to the various production, processing and connecting points on the well pad. No additional underground piping or pipelines or associated above-ground pipeline infrastructure would be anticipated. Any additional future directional wells beneath BITH would be similarly drilled from the Trigger/Gemini surface location utilizing all existing infrastructure; however, Lawco does not anticipate more than one additional lateral (if any) and a second lateral would only be considered if the Trigger #1 produces adequately. If the Trigger #1 is successful, it would possibly produce natural gas for the next 20 to 30 years,

similar to the Gemini #1, which has operated and produced natural gas since 2004. If a second lateral were to be drilled, it would be after the Trigger #1 production had begun to diminish which is estimated to be between 10 to 30 years. The Trigger #1 production phase would require periodic supervision and maintenance at an estimated average of 1 person and 1 vehicle per week over the life of the well, which is estimated to be between 1,040 and 1,560 onsite visits.

2.2.4 Plugging and Final Abandonment Phase

The Trigger #1 would be plugged and abandoned according to all state laws and regulations when production ceases or is no longer economically viable. The surface location would be reclaimed to its original ecological condition and revegetated with native species. Should the operator require access to the wellhead for additional exploration after plugging, the process will need to be initiated again prompting a new EA and exemption under 9B regulations. Any additional exemption request and the associated compliance pathway will vary depending on type of well and access requested.

For more detailed project information on all four (4) phases of the project, please see the “Cross Boundary Exemption Package”, which includes the right to operate document, including the following: two (2) survey plats showing the gas lease with BITH boundaries and surface location; the drilling and casing plans; Spill Prevention, Control and Countermeasures (SPCC) Plan; and the emergency preparedness plan. The documents in this package can be found on the project page in the NPS’ Planning, Environment & Public Comment (PEPC) System, and are referenced as articles I through VI.

3.0 Affected Environment and Environmental Consequences

3.1 Analysis Area and Affected Environment: Issue 1 (Air Quality and Greenhouse Gases)

The NPS evaluates air quality conditions and trends in parks across the country, including BITH.¹ The NPS rates overall air quality in BITH as *fair condition* with improving trends. The indicators that the NPS uses to evaluate air quality conditions in parks include visibility (haze index), ozone (impact levels considered for both sensitive vegetation and human health), and risk to park ecosystems from pollutant deposition (includes nitrogen, sulfur, and mercury deposition). Park resources that are sensitive to air pollution (e.g., plants, animals, water resources, visibility) are also referred to as Air Quality Related Values (AQRVs). The CAA and the NPS Organic Act give the NPS a responsibility to protect AQRVs in units of the national park system, which includes evaluating status and trends. The NPS indicators for air quality are designed to track AQRV conditions and trends.

The project area is in Hardin County, Texas, north of the City of Beaumont in the Beaumont-Port Arthur (BPA) area and northeast Houston. Emissions contributing to BITH air quality are generally transported from beyond park boundaries in the surrounding region. Emissions of volatile organic compounds (VOCs) and nitrogen oxides (NOx) are precursor emissions to ozone formation, a pollutant that is harmful to sensitive vegetation and human health at elevated concentrations. Sulfur dioxides (SO₂) and NOx are precursors to fine particulates that can impair visibility by absorbing or scattering light in the atmosphere. When deposited on terrestrial or aquatic ecosystems, nitrogen and sulfur containing compounds can impact park ecosystems through acidification or

¹ Conditions and trends data available at: <https://www.nps.gov/subjects/air/park-conditions-trends.htm?tabName=summary&parkCode=BITH¶mCode=Overall%20Air%20Quality&startYr=2009&endYr=2020&timePeriod=Summary>

nutrient enrichment. Industrial activities and urbanization in the surrounding region account for most impacts to air quality in the Preserve when compared to management activity (NPS, 2005).

The proposed action would result in emissions of GHGs that are known to contribute to global climate change. These emissions are associated with combustion sources such as diesel drill and completion/workover rig engines, drill pad construction equipment (i.e., dozers, backhoes, graders, etc.), equipment trucks, water trucks, drill rig crew trucks/vehicles, portable lift equipment. Emissions of GHGs could also occur through venting or fugitive losses from valves and fittings, pumps, compressors, and the well head.

The Clean Air Act (CAA) (42 U.S.C. 7401 et seq.), requires the Environmental Protection Agency (EPA) to set National Ambient Air Quality Standards (NAAQS) (40 CFR, part 50) for six air pollutants (also known as "criteria air pollutants").² The criteria pollutants include Sulfur Dioxide (SO₂), Lead (Pb), Nitrogen Dioxide (NO₂), Ozone (O₃), Particle Pollution (PM-2.5 and PM-10), and Carbon Monoxide (CO) (EPA, 2022c).

The Texas Commission on Environmental Quality (TCEQ) has EPA-approved plans to implement CAA requirements within the state of Texas and ensure compliance with the NAAQS. TCEQ has developed a Texas State Implementation Plan (SIP) as the state's comprehensive plan to ensure clean air and attainment of the federal air quality standards.

Hardin County is in the Beaumont-Port Arthur Attainment Area (BPA) which includes all of Hardin, Jefferson and Orange Counties, Texas. The current attainment status for all six criteria pollutants in the BPA is "Unclassifiable / Attainment" (for the current NAAQS standards) which is defined by the EPA as "meeting the standard or expected to be meeting the standard despite a lack of monitoring data" (TCEQ, 2022b).³

The BPA area was previously designated as a moderate nonattainment for the 1997 Eight-hour Ozone Standard and serious nonattainment for the 1979 one-hour standard. Each of these standards were revoked by the EPA and replaced with the current (2015) eight-hour standard. In 2010, the BPA was redesignated as attainment (Maintenance) under the 1997 eight-hour ozone standard. Most recently on September 2, 2020, the EPA published final approval of the second 10-year maintenance plan for the 1997 eight-hour ozone standard (EPA, 2022h). In 2020, TCEQ also withdrew their redesignation request for the revoked 1979 one-hour standard.

States and the EPA are required to monitor criteria air pollutants to demonstrate compliance with the NAAQS. The 8-hour ozone standard is monitored in the BPA at 6 locations meeting the EPA's quality assurance criteria required for use in regulatory purposes. The highest 3-year average of the annual fourth-highest daily maximum 8-hour average (H-4-H) from 2019 through 2021 from the 6 locations is 66 parts per billion (ppb) for the SETRPC 43 Jefferson Co Airport monitor (EPA Site Number 482450102). The EPA standard states that a community meets the 8-hour standard when the 3-year average of the annual fourth highest daily maximum 8-hour ozone concentration (the standard used by TCEQ) measured at each monitoring site is less than 70 ppb. Therefore, the entire BPA area complies with the current NAAQS.

Table 1: Ozone Monitoring Data for the Beaumont-Port Arthur Area

² See EPA discussion at: <https://www.epa.gov/criteria-air-pollutants>

³ See EPA list of Current Nonattainment Counties for All Criteria Pollutants (current as of March 31, 2023): <https://www3.epa.gov/airquality/greenbook/ancl.html#TX>

Ozone Monitor	EPA Site Number	2019 H-4-H (ppb)	2020 H-4-H (ppb)	2021 H-4-H (ppb)	Average (ppb) 2019-2021
West Orange	482450009	64	62	61	62
Port-Arthur West	482450011	66	57	65	62
Hamshire	482450022	65	62	62	63
SETRPC 40 Sabine Pass	482450101	67	62	60	63
SETRPC 43 Jefferson Co Airport	482450102	74	60	66	66
Nederland 17th Street	482451035	63	57	64	61

1. Data Source : https://www.tceq.texas.gov/cqi-bin/compliance/monops/8hr_4highest.pl

2. The average is truncated (rather than rounded) per 40 CFR Appendix P to Part 50 §2.3(d)(1).

Federal actions proposed within a current nonattainment and maintenance areas may be subject to general conformity requirements if the reasonably foreseeable project-related emissions (“direct emissions”) exceed de minimis thresholds. “De minimis” thresholds for an ozone nonattainment (maintenance) area are established for ozone precursor emissions (NO_x and VOCs) and are 50 tons per year NO_x or VOCs for serious nonattainment designations, 50 TPY VOC and 100 TPY NO_x inside an ozone transport region and 100 tons per year NO_x or VOC for moderate and maintenance areas.⁴ As discussed above, the BPA area is attainment status for the current ozone standard. Congress also established a program under the CAA to limit air quality deterioration in areas already meeting the NAAQS, called the Prevention of Significant Deterioration (PSD) program. BITH is designated a Class II area under the PSD provisions of the CAA. The Preserve’s air quality is protected by allowing limited increases (i.e., allowable increments) over baseline concentrations of pollution for the pollutants SO₂, NO₂, and PM. The PSD permitting program is administered by TCEQ and applies to new or modified sources of air pollution with criteria pollutant emissions greater than 100 tons per year for specific source categories (listed source categories) and 250 tons per year or more emissions for all other source categories (non-listed source categories).

Emission limitations under the CAA New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants may apply to certain production facilities. In addition, emissions of GHGs must be reported when the well site emissions exceed a threshold of 25,000 tons-per-year CO₂e. The current emission levels from storage and processing equipment are below this reporting threshold.

3.2 Impacts on Air Quality and Greenhouse Gases in and outside the Unit under Alternative A (No Action)

3.2.1 Direct and Indirect Impacts

Under the No Action Alternative, the NPS would not approve a cross-boundary exemption. Lawco would not drill the Trigger #1 to access their non-federal mineral lease within the boundaries of BITH or expand the Gemini #1 well pad. Therefore, Lawco would not drill the additional well, expand the well pad nor construct additional

⁴ See de minimis levels promulgated by EPA at: <https://www.epa.gov/general-conformity/de-minimis-tables>

pipelines to connect to existing infrastructure. Accordingly, there would be no new direct or indirect impacts on air quality.

3.2.2 Cumulative Impacts

Because there would be no direct or indirect impacts on air quality under this alternative, there would be no cumulative impacts.

3.3 Impacts on Air Quality and Greenhouse Gases in and outside the Unit under Alternative B (Preferred Alternative)

Section 3.3 demonstrates that NO_x and VOC emissions from this project are below the de minimis conformity thresholds for maintenance areas.⁵ Therefore, a conformity analysis is not applicable to this proposed action. Based on the level of anticipated emissions, the Trigger #1 well pad (TX-RRC, 2022) would not be subject to PSD or new source review permitting requirements.

Activities associated with oil and gas development emit air pollutants from construction, well drilling and production operations. Pollutants emitted from oil and gas operations include nitrogen oxides (NO_x), Volatile Organic Compounds (VOCs), particulate matter (PM_{2.5} and PM₁₀), sulfur dioxide (SO₂), and greenhouse gases (GHGs) (note: NO_x and VOCs emissions are precursors to atmospheric ozone formation). These pollutants are emitted from combustion sources used in the construction and drilling phases, including engines/generators used to power the drill rig and tailpipe emissions from construction equipment. Construction activities can also result in particulate matter dust emissions. VOC and GHG emissions are primarily associated with the existing onsite tanks used to store produced liquids during the production phase (tanks are routed to an onsite flare).⁶ Generally, emissions from an individual well or well pad are insignificant and below major source permitting thresholds, as is the case for the Gemini well pad included in this proposal. Estimated emissions associated with the proposed action are described below and reported in the following sections.

Because the BPA area has an active maintenance plan for the 1997 8-hour ozone standard, this analysis includes a discussion of ozone precursor emissions (NO_x and VOCs). Greenhouse gas (GHG) emissions (CO₂ and CH₄) were also estimated for the drilling and production phases.

The drilling engine ozone precursor emissions were estimated based on equipment specifications, including rated emission factors for the proposed drilling equipment (three CAT-3512 diesel generators engines) and estimated activity levels for this proposal (i.e., an estimated total drilling time of 720 hours⁷). GHG emissions (CO₂ and CH₄) associated with the drilling engines and combustion emissions from onsite production equipment were calculated using the EPA default emission factors for diesel fuel combustion found in 40 CFR Part 98,

⁵ See the Beaumont-Port Arthur (BPA) 1997 Eight-Hour Ozone Second 10-Year Maintenance Plan State Implementation Plan (SIP) Revision adopted by the Texas Commission on Environmental Quality on January 30, 2019. Available at: <https://www.tceq.texas.gov/airquality/sip/bpa/bpa-latest-ozone>

⁶ VOC and GHG emissions are also associated with well completion operations, particularly for hydraulically fractured wells. The Trigger #1 well will not be hydraulically fractured.

⁷ Lawco estimates that drilling the Trigger #1 well will require 30 full days, or 720 hours total.

Subpart C⁸ and average fuel usage (on a per well basis) for similar oil and gas activities in the region (Gulf Coast basin).⁹ GHG emissions associated with production phase activities (tanks and flares) were also estimated using the EPA emission reporting guidance provided in 40 CFR Part 98, Subpart C¹⁰ and the average GHG emissions per well for similar wells within the Gulf Coast basin region. Results are reported in the following sections.

3.3.1 Direct and Indirect Impacts

Potential impacts are described below, by phase of activity: construction, drilling, production, and eventual plugging/reclamation.

3.3.1.1 Construction

Ground-disturbing activities associated with expansion of the existing Gemini well pad would result in increased emissions of particulates in the vicinity of the activities. Use of motor vehicles during construction of the access roads and well pad expansion would generate vehicle exhaust emissions and dust from paved and unpaved surfaces. Dust abatement actions, including but not limited to application of water and gravel to driving and construction surfaces, would limit dust. Exhaust from machinery and equipment used intermittently during construction would also contribute to an increase in particulate matter, as well as emissions of hydrocarbons (HC), NOX, and CO. As noted in Section 1, it is anticipated that the Trigger #1 construction phase would include 2 dump trucks, 1 bulldozer, 1 backhoe with front-end loader and involve 4 personnel driving to and from the worksite daily. Prevailing winds from the south/southeast would generally disperse pollutants to the north/northwest, away from the Unit, but variable winds related to passing high pressure fronts could change the direction of these winds into the Unit. These impacts would be localized and temporary, lasting throughout the 10-day period of construction. Construction related emissions associated with well pad expansion are typically short term and a fraction of the emissions associated with drilling. Criteria air pollutant tail pipe construction emissions are estimated to be well below a tenth of a ton each for CO, NO_x, SO₂, VOC, PM₁₀ and PM_{2.5}.¹¹ Tailpipe CO₂ emissions are estimated to be below 3 TPY. Although mobile source construction emissions are not subject to major source permitting requirements, it is noted that these emission levels are well below both major source permitting thresholds (100 TPY), de minimis thresholds for conformity analysis (50 TPY in a serious nonattainment areas) and GHG reporting thresholds under the General Stationary Fuel Combustion Sources Regulation (40 CFR 98 Subpart C) (25,000 metric tons CO₂e).

3.3.1.2 Drilling

The use of vehicles and other machinery to drill the wells would result in increased particulates, NOX, CO, CO₂, and SO₂ in the vicinity of the activities. The drilling phase would require an estimated 5 days for drilling rig and facilities set-up, 30 days for drilling and 5 days for the removal of drilling facilities for a total of 40 days (drilling related emissions would occur while the power generation engines are in operation). The emissions increase is due to the use of vehicles and the proposed three diesel CAT-3512 diesel generator engines used to power the

⁸ Emission factors found in Table C-1 to Subpart C of Part 98 - Default CO₂ Emission Factors and High Heat Values for Various Types of Fuel; 40 CFR § 98.38. Available at: <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-C>

⁹ Fuel usage assumptions were provided by Lawco based on similar well drilling activities in the region. (01/03/2023).

¹⁰ Available at: <https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98/subpart-C>

¹¹ Estimated using BLM well pad tailpipe construction emissions for another oil and gas project, which is based on well pad size and support vehicle miles traveled.

drill rig during the 30-day drilling period. The large diesel engines emit NO_x, and smaller amounts of CO and HC. (Minor amounts of sulfur dioxide (SO₂) are associated with burning diesel fuels, but sulfur content in the fuel is strictly regulated.) The amount of engine emissions depends on the drill rig size, the percent of sulfur in the fuel used (ultra-low sulfur diesel in this case), the hours the engine is operated per day, the number of days the rig operates, and the emissions rating of the engine. An EPA Tier 2 emission compliance rating was assumed, because (1) this is the most widely available engine, and (2) it cannot be guaranteed that Tier 4 compliant engines with the most stringent/lowest emissions ratings could be obtained or ensured (in this case, assuming a Tier 4 rating could underestimate emissions). However, the NPS encourages operators to utilize Tier 4 compliant engines whenever feasible (and available) to reduce overall emissions from drilling.

Potential emissions of both NO_x and VOCs were estimated for the Trigger #1 well based on the information described in Section 3.3 above. Using the emission factors for a CAT 3512 diesel generator engine, potential emissions of NO_x would range from 7.3 to 12.4 tons, VOCs would range from 0.30 to 0.2 tons and CO would range from 0.4 to 1.4 tons for 30 full days of drilling at 50%-75% engine load. The range in engine load was assumed based on a 2014 TCEQ emission inventory report.¹² Combustion sources of GHG emissions from drilling operations are estimated at 996 metric tons of CO₂ and 0.04 metric tons of CH₄.¹³

These impacts on air quality would be greatest during the well drilling, lasting approximately 30 days, and result in emissions that are localized near the drilling activities. Although drill rig emissions are not subject to major source permitting requirements, it is noted that these emission levels are well below both major source permitting thresholds (100 TPY), de minimis thresholds for conformity analysis (50 TPY in serious nonattainment areas) and GHG reporting thresholds under subpart C (25,000 metric tons CO₂e).

3.3.1.3 Production

If the well is successful and placed into production, the operation of existing separation, treatment and storage equipment located on the Gemini well pad, truck transport of fluids from the site, and possible downstream gas compression equipment, would result in ongoing annual emissions over the life of the well (approximately 20-30 years). Routine maintenance activities during production would result in dust particulate emissions in the vicinity of the activities. Because no hydraulic fracturing would occur, workovers emissions are not anticipated by Lawco. Annual GHG emissions associated with production activities are estimated to be 641 metric tons of CO₂ and 9 metric tons of CH₄, and 870 metric tons of CO₂e.¹⁴ According to the EPA's Greenhouse Gas Equivalencies Calculator,¹⁵ this is equivalent to the CO₂e emissions produced by 194 gasoline-powered passenger vehicles driven for one year, or 2,012 barrels of oil consumed.

Indirect impacts would include emissions associated with natural gas transport (e.g., pipelines, compressor stations) and downstream end use, such as combustion in a power plant or for home heating. Given that the

¹² Engine load factor range was selected based on a 2014 report prepared for TCEQ: 2014 STATEWIDE DRILLING RIG EMISSIONS INVENTORY WITH UPDATED TRENDS INVENTORIES. This report was based on survey responses from operators across the state of Texas. Table 6-1—Model Rig Engine Parameters—indicates that electric powered rigs operated at 60% load on average when drilling horizontal wells in Texas.

¹³ This accounts for a global warming potential of methane of 25, as recommended in Table A-1 to Subpart A of Part 98 – Global Warming Potentials for EPA's GHG reporting requirements.

¹⁴ Emission estimates for the Trigger #1 project were provided by Lawco based on emission calculations for similar activities (01/03/2023). GWPs recommended in Table A-1 of EPA's GHG reporting rule in 40 CFR part 98 were used to calculate CO₂e emissions.

¹⁵ Available at: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator#results>

proposed action involves drilling a single well, indirect downstream emissions are discussed qualitatively, as downstream emissions from a single well are anticipated to be minimal. Downstream combustion of natural gas (either in power plants, industrial boilers, or homes) results in CO₂ emissions and to a lesser degree, CH₄ and N₂O emissions. Leaks associated with natural gas processing, transport, and compression activities can result in CH₄ emissions.

3.3.1.4 Plugging/Reclamation

Plugging/abandonment/reclamation of the wells would result in increases in particulate matter during the 3-4 days of ground-disturbing activities with the use of vehicles and other machinery. Reclamation impacts would be similar to, but less than, those described for construction emissions in Section 3.3.1.1 above.

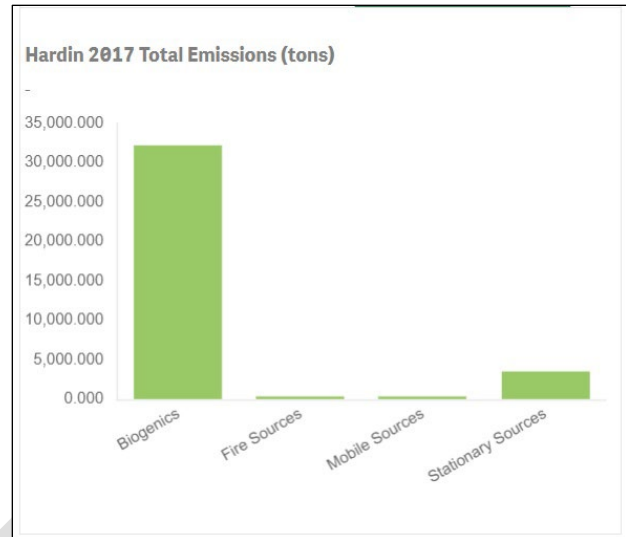
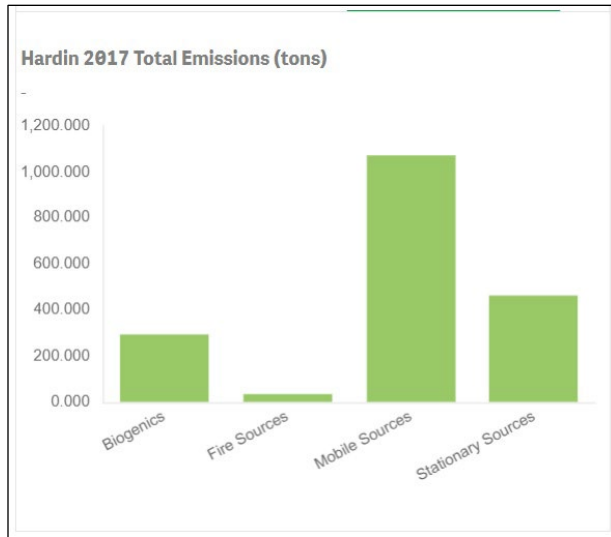
In summary, all phases of oil and gas activities could result in emissions of particulate matter, NO_x, CO, CO₂, and SO₂. Well drilling would result in the greatest criteria pollutant emissions over the course of 30 days due to increased use of vehicles and large diesel engines used to power the drill rig. The production phase would result in the greatest level of GHG emissions and would occur over the life of the well (20-30 years). As noted above, estimated emission levels are well below de minimis thresholds for ozone conformity analyses (50 TPY in serious nonattainment areas) and the GHG reporting thresholds under subpart C (25,000 metric tons CO₂e). Emissions from all phases of activities would be greatest near sources of emissions and depending on wind and atmospheric conditions could disperse towards the park.

3.3.2 Cumulative Impacts

The analysis area for cumulative impacts consists of the Beaumont/Port Arthur airshed (consisting of Hardin, Orange, and Jefferson Counties). The primary pollutants transported from regions affecting the BITH are VOCs and NO_x. Other pollutants that could affect the BITH include CO, SO₂, and particulate matter (PM) (which include heavy metals and lead) (NPS, 2006b). Figures 2 and 3 below show the EPA data collected on NO_x and VOC emission totals (NEI 2017), respectively for sources found in Hardin County, Texas. Mobile, biogenic, fires, and industrial sources account for most impacts on air quality in the area.

Figure 2: Nitrogen Oxides, Hardin County

Figure 3: Volatile Organic Compounds, Hardin County



In support of their 2018 Beaumont-Port Arthur Redesignation Request and Maintenance Plan for the One-Hour Ozone Nonattainment Area and Second 10-Year Maintenance Plan for the 1997 Eight-Hour Ozone Nonattainment Area State Implementation Plan (SIP) Revision, TCEQ provided a statewide oil and gas emission inventory. The inventory is included in Appendix C of TCEQ's SIP and was compiled for emissions year 2008. Oil and gas emissions for the BPA area, as well as statewide Texas oil and gas emissions are presented in Table 2. (Note: There are differences in the 2008 oil and gas inventory emissions reported below and the 2017 NEI numbers reported above. This is because (1) oil and gas areas sources are generally not well represented in the National Emissions Inventory and (2) these inventories represent different inventory years.)

Table 2: Oil and Gas Emissions in BPA and State

County	CO (tons/yr.)	NO _x (tons/yr.)	PM ₁₀ (tons/yr.)	PM _{2.5} (tons/yr.)	SO ₂ (tons/yr.)	VOC (tons/yr.)
Jefferson	287	183	8	8	0	55,659
Hardin	259	349	8	8	0	22,649
Orange	68	71	2	2	0	8,468
BPA Total	614	603	18	18	1	86,776
Statewide Total	128,331	247,237	2,570	2,570	81	1,568,523

The analysis area is influenced by activities such as open burning, residential and industrial fuel combustion, organic chemical transport, and on- and off-shore energy production activities, occurring in the BPA area, and well Houston/Galveston and Lake Charles, Louisiana airsheds. Emissions associated with the proposed action would be additive with background emissions and contribute to background air quality. As noted in Sections 3.1 (Affected Environment) and 3.3.1 (Direct and Indirect Impacts), the BPA area is currently in attainment/unclassifiable status for all criteria air pollutants. Given this and the fact that project-related emissions are well below minimum levels for conformity analyses, cumulative impacts are anticipated to be insignificant.

Past, present, and reasonably foreseeable future impacts on air quality would continue primarily as the result of industrial sources including pulp mills, oil refineries, and petro-chemical manufacturing plants, public utilities,

and urban sources. Activities in and outside the area that would contribute to air quality impacts would include oil and gas operations, prescribed fires in the area, and farming and commercial timber activities occurring adjacent to the area. The use of vehicles and other combustion engines, and fires would also emit PM, NOX, CO, CO2, and SO2. The Preserve's Oil and Gas Management Plan (NPS 2006a) describes moderate, adverse cumulative impacts on the regional airshed. As previously described, the proposed action under Preferred Alternative B would result in additional air emissions. Reasonably foreseeable trends may include further residential development and further construction or alteration of adjacent Hwy 69, BNSF railroad, and residential roadways to improve or increase capacity or efficiency. As described in Section 1.1.4, Lawco foresees no further planned action except the possibility of one additional lateral from the same well pad, which would only occur if the Trigger #1 well produces adequately.

When the effects of Alternative B are combined with other past, present, and reasonably foreseeable future impacts, the total cumulative impact on air quality within and outside of the Preserve would be moderate and adverse. The incremental impacts of Alternative B would not substantially change the overall cumulative air quality in the region.

4.0 Consultation, Coordination, and Public Participation

Persons that identified important issues, developed alternatives, analyzed impacts, and prepared the document are listed below:

Name	Organization	Title	Role
Bennet, Andrew	NPS-BITH	Biologist	Reviewer
Carrie, Ross	Raven Environmental Services, Inc	President	Document Preparer
Devore, Lisa	NPS-Interior Regions 6, 7 and 8	Air Resource Specialist	Reviewer
Hamrick, Joe	Raven Environmental Services, LLC	Project Manager	Document Preparer
Howeth, Whitney	NPS-BITH	Program Manager, Resource Management	Lead Park Reviewer
Lentz, Deena	NPS-Interior Regions 6, 7 and 8	Regional Environmental Coordinator	Lead NEPA Reviewer
Lovegren, Jesse, PhD, PE	Trinity Consultants DiSorbo Consulting	Principal Engineer	Preparer, Air Quality Analysis Sections
McGraw, Michael	NPS-Interior Regions 6, 7 and 8	Regional NEPA Specialist	NEPA Reviewer
Pallante, Amy	NPS-Interior Regions 6, 7 and 8	Section 106 Compliance Coordinator	Reviewer
Philbrook, Kristen	NPS-Interior Regions 6, 7 and 8	Regional Wildlife Biologist	Reviewer
Porter, Michael	NPS-Interior Regions 6, 7 and 8	Regional Energy and Minerals Program Coordinator	Project Lead
Stacy, Andrea	NPS-WASO, Air Resources Division	Environmental Protection Specialist	Reviewer

4.1 Public Engagement

A 15-day Public Scoping period was conducted via the Planning, Environment & Public Comment (PEPC) system from 09/15/2022-09/30/2022. No scoping comments were received. A 15-day public comment period will be held following release of the EA.

4.2 Consultation

Tribal and State Historic Preservation Office (SHPO) consultation will be conducted during the public comment period. The public comment period will also be used to gather input for the Section 106 consultation process. BITH's ten affiliated tribal partners listed below will also be consulted during the 15-day public comment period.

Consulting Tribal Partners:

- Absentee-Shawnee Tribe of Indians of Oklahoma
- Alabama-Coushatta Tribe of Texas
- Alabama-Quassarte Tribal Town
- Caddo Nation of Oklahoma
- Coushatta Tribe of Louisiana
- Kialegee Tribal Town
- Poarch Band of Creek Indians
- The Muscogee (Creek) Nation
- Thlopthloco Tribal Town
- Tunica-Biloxi Tribe

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6.0 Appendices

Appendix A: Issues Considered but Eliminated from Detailed Analysis

Issue	Rationale for Eliminating from Further Analysis
Cultural Resources	<p>The Trigger #1 well will be drilled from the existing Gemini #1 well pad which is surfaced with a 6-to-8-inch layer of road-base aggregate. The initial date of drilling for the Gemini #1 was December 14, 2003. The well pad was later downsized at an unknown date to its current dimensions after gas production began in 2004. Approximately 0.9 acres of 19-year-old (or younger) vegetative regrowth will be cleared to enlarge the existing well pad to accommodate the Trigger #1 and all additional clearing will be confined to the originally disturbed area of the Gemini #1 (RRC GIS mapper, 2022). The probability of a cultural site or sites, or individual cultural artifacts existing within this previously cleared, rock-surface 0.9-acre area is small and the probability that the minimum of 2 archaeological shovel tests recommended by the Texas Historical Commission (THC) would result in an artifact or cultural site discovery are equally insignificant (THC, 2020). The existing pad and pad expansion area are both rock surface, and the expansion area is in a previously cleared, graded area. Because of this and the small likelihood that (two) 2 shovel tests would result in the discovery of artifact(s) that would indicate a cultural site or resource, cultural resources are eliminated from further analysis.</p>
Environmental Justice	<p>The United States Environmental Protection Agency (EPA) Environmental Justice (EJ) Screening and Mapping Tool (EPA EJ Mapper, 2022a) was used to create a 1-mile buffer around the Trigger #1 well location and the “Explore Reports” tool was used to review the results. The screener estimates there is a population of 757 people within the 1-mile buffer. Among these 757, “people of color” represent 21%, while the state average is 58%, and the US average is 36%. The area east of US Highway 69 to Pine Island Bayou and south of BITH has been identified by EPA as a disadvantaged community under the Justice40 Initiative, established by Section 223 of Executive Order (EO) 14008 (EPA EJ Mapper, 2022a).</p> <p>The resulting report calculates the percentage of the population within that buffer who are currently affected by the standard 12 EJ hazards which are: Particulate Matter 2.5</p>

Issue	Rationale for Eliminating from Further Analysis
	<p>(micrometers or smaller), Ozone, 2017 Diesel Particulate Matter, 2017 Air Toxics Cancer Risk, 2017 Air Toxics Respiratory Hazard Index (HI), Traffic Proximity, Lead Paint, Superfund Proximity, RMP Facility Proximity, Hazardous Waste Proximity, Underground Storage Tanks and Wastewater Discharge. When comparing the EPA Region 6 percentile within the 1-mile buffer to the United States percentile, the EPA Region 6 buffer was, on average, 31.5% lower (less affected) across all hazards. Comparing the Region 6 buffer percentile to the State percentile, the EPA Region 6 buffer was on average 8.3% higher (more affected) than the state. Please see Appendix C “EJ Screen Report”. EPA Region 6 includes all of Texas, Louisiana, Arkansas, Oklahoma, and New Mexico.</p> <p>The Trigger #1 well will not significantly add to any of the 12 EJ hazards during construction, drilling or production, and any addition to the existing hazards during the estimated 50-day period of pad construction and drilling would be minimal and temporary when compared to the ambient hazards produced by US Highway 69 and BNSF railroad. The production phase would include the exhaust from the on-site natural gas fueled compressor, which only energizes periodically based on system demand. The production phase would also include the periodic flaring and combustion of natural gas and the engine emissions from vehicles that would periodically be on-site for maintenance and observation. While the Trigger #1 would add small amounts of EJ hazards into the environment for a period of approximately 50 days, those hazards are miniscule compared to the already existing ambient hazards produced by the automobile exhaust on adjacent US Highway 69 and from the frequent BNSF railroad diesel engines traversing their adjacent tracks. Therefore, environmental justice is eliminated from further analysis.</p>
<p>Fish and Wildlife</p> <ul style="list-style-type: none"> • Special Status Species • Threatened and Endangered 	<p>There are 15 species listed by the U.S. Fish and Wildlife Service (FWS) as Endangered, Threatened, Proposed or Candidate for Hardin County, Texas (FWS 2022a). Eight are endangered, 5 threatened, 1 proposed and 1 candidate. Among these are 5 sea turtle species and 5 shorebird species, each of which have no suitable habitat or known history of occurrence within the project area. One additional endangered bird species listed by both FWS, and Texas Parks and Wildlife (TPW) is the Red-cockaded Woodpecker (RCW, <i>Dryobates borealis</i>). This species is dependent on open, park-like, old-growth pine forest habitats with living pine</p>

Issue	Rationale for Eliminating from Further Analysis
	<p>trees that are over 60 years old where it excavates its nests and roost cavities. Hardin County is listed by TPW in 1999 as having 3 to 10 groups of RCW (TPW, 2022b). That RCW group estimate has likely been drastically reduced in the intervening 23 years and suitable RCW habitat does not exist within the project area. The 2 FWS endangered plants are described later in the Vegetation section. One freshwater mussel is Proposed for listing as Threatened by FWS that is also state listed Threatened by TPW, Texas Fawnsfoot (<i>Truncilla macrodon</i>), which has no habitat within the project area and no record of occurrence in Hardin County. One migratory insect, the Monarch Butterfly (<i>Danaus plexippus</i>), is an FWS Candidate for listing and currently has no regulatory protections or suitable habitat within the project area, and if it were migrating through the area, the threat posed by impacts with vehicles on adjacent US Highway 69 is far greater than any threat posed by any phase of the Trigger #1. There is no FWS designated critical habitat within the project area or within Hardin County (FWS, 2022b). Please see Appendix C “Species List” for the complete list of FWS species including the rationale for their exclusion from detailed analysis.</p> <p>There are 73 total species listed by the TPW as Endangered, Threatened or as a Species of Greatest Conservation Need (SGCN) for Hardin County (TPW, 2022a). Two are endangered, 18 are threatened and 53 are listed as SGCN. SGCN have no Texas State legal or regulatory protections. There are 4 duplicate species between the FWS and TPW lists. Please see Appendix C “Species List” for the complete list of TPW species including the rationale for their exclusion from detailed analysis.</p> <p>No Trigger #1 activities would occur within the project area or within the BITH unit that would affect TPW and FWS listed species. No suitable habitat exists within the project area for any listed species, and any potential for harm is expected to be minimal compared to the impacts from existing and ongoing human activities and existing infrastructure, including the adjacent US Highway 69 vehicular traffic and the adjacent BNSF mainline railroad.</p>
Geology and Soils	<p>The geologic rock formation beneath the Trigger #1 project area is the Lissie Formation (Ql) formed in the most recent Quaternary period (USGS, 2022). Soil in the Trigger project area is the Spurger very fine sandy loam (SpuB) soil type on 0 to 3 percent slopes with a 5% hydric component. It is</p>

Issue	Rationale for Eliminating from Further Analysis
	<p>moderately well drained with very high runoff and with no frequency of flooding or ponding and is not classified by Natural Resource Conservation Service (NRCS) as prime farmland. Soil horizons are 0 to 11 inches very fine sandy loam, 11 to 58 inches clay, and 58 to 80 inches sandy clay loam. Depth to moisture is about 60 to 72 inches and depth to a restrictive layer is more than 80 inches (NRCS mapper, 2022). . The soils and deeper geology in the Trigger #1 project area are suitable for well pad and well infrastructure development and present no unique challenges or anticipated environmental consequences and therefore geology and soils are eliminated from further analysis.</p>
Indian Trust Resources	<p>The Bureau of Indian Affairs (BIA), US Domestic Sovereign Nations: Land Areas of Federally Recognized Tribes online mapper was consulted, titled US Domestic Sovereign Nations: Land Areas of Federally-Recognized Tribes, which indicates the nearest tribal lands are owned by the Alabama-Coushatta Tribe of Texas, located 47 miles northwest of the Trigger #1 and east of Livingston, Texas. There are no known sacred sites and during Tribal consultation no issues were raised regarding the project area therefore, Indian trust resources and sacred sites are eliminated from detailed analysis (BIA mapper, 2022).</p>
<p>Vegetation</p> <ul style="list-style-type: none"> Threatened and Endangered Noxious Weeds 	<p>Navasota Ladies-tresses (<i>Spiranthes parksii</i>) is a rocky barrens species, and Texas Trailing Phlox (<i>Phlox nivalis</i> ssp. <i>texensis</i>) is a deep sand fire-climax species. In Hardin County, both species are federally listed as endangered by the FWS. Texas Trailing Phlox is also listed as endangered by the Texas Parks and Wildlife Department (TPWD) in Hardin County. There are 15 other plants listed by TPWD as Species of Greatest Conservation Need (SGCN) which have no regulatory protections under the Texas Endangered Species Act (1973) or through other state regulations. None of the federal or state listed plant species or state SGCN species have suitable habitat within the project area. There are no state nor federally endangered, threatened, proposed or candidate plant species, or state listed plant species of concern, within the existing well pad or well pad expansion area where approximately 20 small pine and hardwood trees, along with brush, groundcover and grass species, would be cleared. All vegetation proposed for removal was under 19 years old when the original Gemini pad was constructed in December 2003. No vegetation will be removed or disturbed within the BITH Corridor Unit. For these reasons, threatened and endangered plant species are</p>

Issue	Rationale for Eliminating from Further Analysis
	<p>eliminated from further analysis. Please see Appendix C “Species List” for all Hardin County state and federal listed species including the rationale for the dismissal of each species.</p> <p>Noxious and non-native invasive species (NNIS) are common in southeastern Texas and the Gulf Coastal Plain ecoregion, especially Chinese Tallowtree (<i>Triadica sebifera</i>) which was observed along roadways outside of the project area but not along the private well pad access road or the well pad site. Because the project is utilizing an existing well pad and no additional fill dirt is anticipated to be needed, which could introduce noxious weed seed, and because all vehicles would be washed offsite, which could also potentially introduce noxious weed seed, the likelihood that the proposed action would contribute additional noxious weeds to the project site or the BITH Corridor Unit located 0.35-miles away is very low and therefore noxious weeds are eliminated from further analysis.</p>
<p>Visitor Use Experience</p> <ul style="list-style-type: none"> • Public Recreation • Impacts to Viewshed • Impacts to Soundscape • Impacts to Night Skies 	<p>The nearest BITH visitor use facility is the Cook’s Lake Road Day Use Area, located 3,000 feet (0.57 miles) east-southeast of the proposed Trigger #1. The average sound level from a typical (1,000 horsepower) drilling rig is 71 to 79 dBA at 200 feet (Radke 2016). An accepted rule for noise attenuation is that sound levels decrease by 6 dB when the distance between a source and the receiver doubles (Berger et al, 2003). Expected noise levels from drilling operations at Cook’s Lake Road Day Use Area would be approximately 46 to 54 dBA and the noise level at the BITH bottomhole Corridor Unit boundary would be approximately 52 to 60 dBA.</p> <p>There is a 68 hp Arrow VRG-330 natural gas fueled compressor located on the eastern edge of the well pad next to the tree line, that is necessary for ongoing Gemini #1 gas production. Manufacturer specifications indicate that at a distance of 1 meter (3.28 feet) it operates between 72 dBA at idle and 98 dBA at the maximum rpm of 1,800 (Arrow Engine, 1979). This equates to 36 dBA and 62 dBA at a distance of 210 feet. The VGR-330 would remain part of the production facility should the Trigger #1 be successful.</p> <p>These estimated dBA levels do not consider the further reduction in noise due to the attenuating effects of the wooded area surrounding the Trigger well pad and other</p>

Issue	Rationale for Eliminating from Further Analysis
	<p data-bbox="670 237 1383 300">buffering features (topography, structures, etc.) in between the source and receiver.</p> <p data-bbox="670 342 1393 583">According to the U.S. Department of Transportation (USDOT) train conductors are required by federal law (Train Horn Rule, 49 CFR Part 222) to sound their horns at least 15 seconds, but no more than 20 seconds, in advance of all public grade crossings (USDOT, 2022). The Cook's Lake Road railroad crossing is 840 feet (0.16 miles) south of the Trigger #1.</p> <p data-bbox="670 625 1382 825">According to Texas Department of Transportation (TXDOT) traffic data, US Highway 69 adjacent to the Trigger #1 at counting stations located about 0.25 miles northwest of the project area, had average annual daily traffic (AADT) of 51,364 vehicles on all 8 lanes of roadway in 2021 (TXDOT AADT mapper, 2022).</p> <p data-bbox="670 867 1382 972">Below are 24-hour cumulative noise levels (Ldr) for relevant noise sources within the project area (Metropolitan Council, 2015):</p> <ul data-bbox="719 1014 1365 1371" style="list-style-type: none"> • 85 dBH - Freight rail with horn, 25 mph, 2 engines, 50 cars at 50 feet • 85 dBH - Ambient noise level close to major freeways • 70 dBH - Freight rail with NO horn, 25 mph, 2 engines, 50 cars at 50 feet • 70 dBH - Urban ambient • 60 dBH - Suburban ambient • 45 dBH - Rural ambient • 35 dBH - Wilderness ambient <p data-bbox="670 1413 1386 1759">The noise level of BNSF trains and the ambient noise level of traffic from U.S. Highway 69 would each be higher than the anticipated approximate 71 to 79 dBH from the drilling rig. The Cook's Lake Road Day Area estimate of 46 to 54 dBA coming from the Trigger #1 would be the equivalent of rural to suburban ambient noise. The BITH bottomhole unit estimate of 52 to 60 dBA coming from the Trigger #1 would be overcome by the estimated 70 to 85 dBA ambient noise levels coming from the bounding BNSF railroad and U.S. Highway 69.</p> <p data-bbox="670 1801 1357 1890">The top of the drilling rig would be visible above the pad's surrounding trees by some observers, especially those traveling on the US Highway 69 overpass west of the well</p>

Issue	Rationale for Eliminating from Further Analysis
	<p>pad. However, observers at the Cook's Lake Road Day Area and the bottomhole BITH unit would be unable to see the derrick. Streetlights and residential lights exist in the project area, as well as a consistent nightly flow of vehicular headlights on the adjacent highway, feeder roads and residential roads. The night sky would be minimally affected for an estimated 40 days by lights on the drilling rig and during set-up and take-down. The brightness of these lights would be reduced by the surrounding trees while the derrick lights would be visible from the overpass and in the immediate surrounding area. The flare stack has been periodically flaring since the Gemini #1 well was completed in early 2004. The physical flare pipe and igniter at the top of the flare is not visible from the U.S. Highway 69 overpass or other roadways; however, although buffered by surrounding trees, the brief and intermittent flame and noise of the flare would be heard and visible by nearby observers.</p> <p>Because the Trigger #1 is 1,855 feet from the nearest BITH boundary, the nearby ambient noise levels from the BNSF railroad and U.S. Highway 69 are estimated to be greater than that of the drilling rig and ongoing production, and the nightscape and viewshed would be unimpacted or minimally impacted for a period of not more than 50 days, visitor use, and experience is eliminated from further analysis.</p>
<p>Water Resources</p> <ul style="list-style-type: none"> • Surface/Groundwater Quality • Surface/Groundwater Quantity • Water Rights • Floodplains/Wetlands/Riparian 	<p>There would be no hydraulic fracturing and casing would isolate groundwater. Drilling would be accomplished with a closed mud system with no open pits and all drilling fluids and water would be stored on-site in fifth wheel containers designed and constructed specifically for that purpose. The entire well pad perimeter would have a ring levee catchment basin lined with impervious plastic to capture any contaminants carried by surface runoff from the well pad. This catchment would also contain any escaped fluids from the on-site fifth wheel tanks. The Trigger #1 Spill Contingency Plan and SPCC Emergency Plan would greatly reduce the possibility of off-site contamination as described in the Cross Boundary Exemption Package on file with NPS.</p> <p>In accordance with Texas Administrative Code (TAC 2002), Title 16, Economic Administration, Part 1, Railroad Commission of Texas, Chapter 3, Oil and Gas Division, Lawco would comply with all Texas Railroad Commission (RRC) regulations including but not limited to, adhering to all casing requirements, and acquiring a groundwater protection determination (RRC Form GW-2 permit). Lawco</p>

Issue	Rationale for Eliminating from Further Analysis
	<p>would also acquire a RRC Form W-1 permit, Application for Permit to Drill (APD), Recomplete or Re-enter, where RRC petroleum engineers review and approve the drilling and casing plans. NPS petroleum engineers have also reviewed the Trigger #1 drilling plan and found it to be in regulatory conformance. All water utilized during drilling operations will be from a commercially permitted source and brought onsite in fifth wheel water tanks.</p> <p>The US Fish and Wildlife Service (FWS) National Wetlands Inventory (NWI) mapper indicates the nearest remotely sensed jurisdictional emergent wetland or forested wetland is located approximately 800 feet northeast of the well pad edge at the nearest point (FWS, NWI mapper, 2022c). Jink's Pond and the unnamed pond are classified like almost all other manmade ponds as PUBHx or palustrine (P), unconsolidated bottom (UB), permanently flooded (H) and excavated (x). According to the FEMA floodplain mapper, this well pad is not located within the 100-year floodplain (FEMA, 2022).</p> <p>Due to the fact that no hydraulic fracturing would occur, drilling would utilize a closed mud system, all state regulations, permits and casing requirements regarding groundwater protection would be followed, all water would be legally and commercially sourced offsite (i.e. no onsite water well), RRC and NPS petroleum engineer review of the Trigger #1 drilling plan is determined to be in regulatory conformance, multiple plans and processes would be in place that would likely prevent or control any hazardous spills, and the well pad would not be located within a floodplain or within or near a jurisdictional wetland, water resources is eliminated from further analysis.</p>

Appendix B: EJ Screening Form



EJScreen Report (Version 2.0)



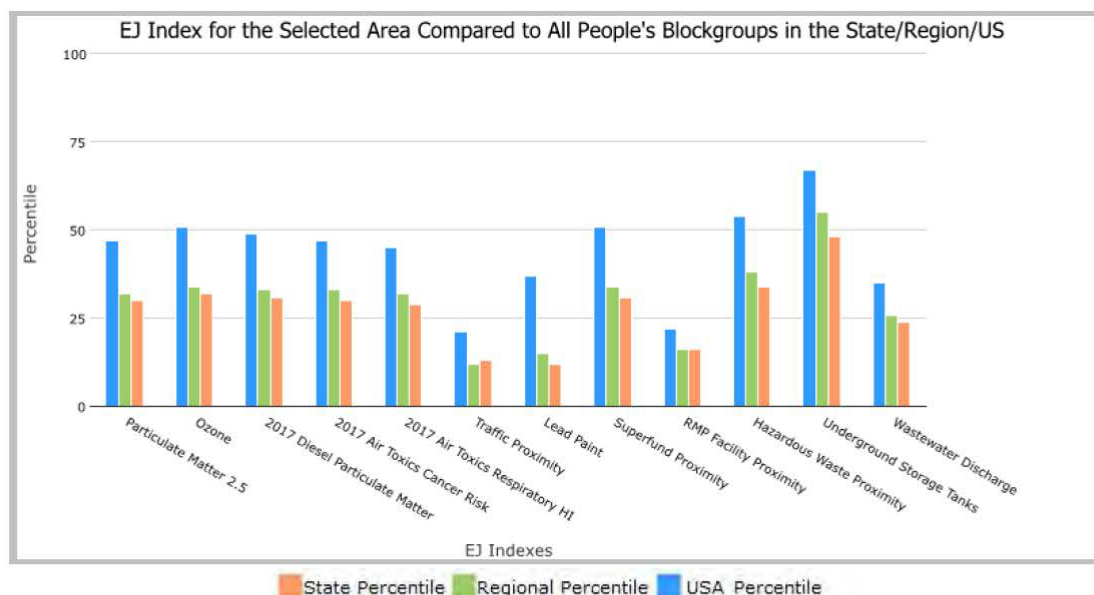
1 mile Ring Centered at 30.190794,-94.187021, TEXAS, EPA Region 6

Approximate Population: 757

Input Area (sq. miles): 3.14

Lawco Trigger #1

Selected Variables	State Percentile	EPA Region Percentile	USA Percentile
Environmental Justice Indexes			
EJ Index for Particulate Matter 2.5	30	32	47
EJ Index for Ozone	32	34	51
EJ Index for 2017 Diesel Particulate Matter*	31	33	49
EJ Index for 2017 Air Toxics Cancer Risk*	30	33	47
EJ Index for 2017 Air Toxics Respiratory HI*	29	32	45
EJ Index for Traffic Proximity	13	12	21
EJ Index for Lead Paint	12	15	37
EJ Index for Superfund Proximity	31	34	51
EJ Index for RMP Facility Proximity	16	16	22
EJ Index for Hazardous Waste Proximity	34	38	54
EJ Index for Underground Storage Tanks	48	55	67
EJ Index for Wastewater Discharge	24	26	35



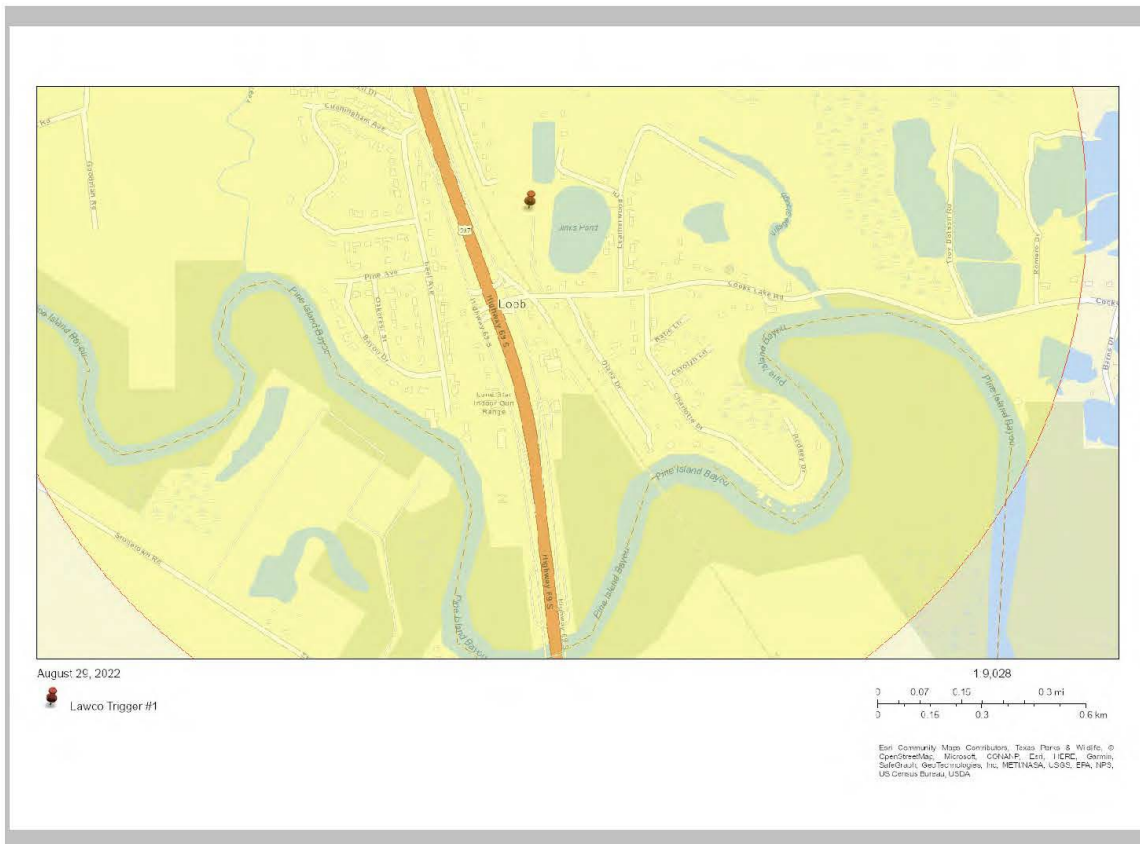
This report shows the values for environmental and demographic indicators and EJSCREEN indexes. It shows environmental and demographic raw data (e.g., the estimated concentration of ozone in the air), and also shows what percentile each raw data value represents. These percentiles provide perspective on how the selected block group or buffer area compares to the entire state, EPA region, or nation. For example, if a given location is at the 95th percentile nationwide, this means that only 5 percent of the US population has a higher block group value than the average person in the location being analyzed. The years for which the data are available, and the methods used, vary across these indicators. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJSCREEN documentation for discussion of these issues before using reports.

1 mile Ring Centered at 30.190794, -94.187021, TEXAS, EPA Region 6

Approximate Population: 757

Input Area (sq. miles): 3.14

Lawco Trigger #1



Sites reporting to EPA

Superfund NPL

0

Hazardous Waste Treatment, Storage, and Disposal Facilities (TSDF)

0

EJScreen Report (Version 2.0)

1 mile Ring Centered at 30.190794,-94.187021, TEXAS, EPA Region 6

Approximate Population: 757

Input Area (sq. miles): 3.14

Lawco Trigger #1



Selected Variables	Value	State Avg.	%ile in State	EPA Region Avg.	%ile in EPA Region	USA Avg.	%ile in USA
Pollution and Sources							
Particulate Matter 2.5 ($\mu\text{g}/\text{m}^3$)	10.1	9.57	77	9.32	81	8.74	85
Ozone (ppb)	35.3	40	22	41.1	16	42.6	13
2017 Diesel Particulate Matter* ($\mu\text{g}/\text{m}^3$)	0.187	0.214	42	0.219	<50th	0.295	<50th
2017 Air Toxics Cancer Risk* (lifetime risk per million)	30	31	83	32	70-80th	29	80-90th
2017 Air Toxics Respiratory HI*	0.4	0.36	95	0.37	80-90th	0.36	80-90th
Traffic Proximity (daily traffic count/distance to road)	430	510	69	470	72	710	65
Lead Paint (% Pre-1960 Housing)	0.1	0.15	64	0.16	58	0.28	39
Superfund Proximity (site count/km distance)	0.028	0.084	35	0.08	38	0.13	25
RMP Facility Proximity (facility count/km distance)	0.86	0.92	66	0.83	69	0.75	72
Hazardous Waste Proximity (facility count/km distance)	0.077	0.72	14	0.8	17	2.2	12
Underground Storage Tanks (count/km ²)	0.2	2.2	21	2	25	3.9	27
Wastewater Discharge (toxicity-weighted concentration/m distance)	0.00029	0.33	32	0.5	34	12	39
Socioeconomic Indicators							
Demographic Index	21%	46%	15	44%	17	36%	33
People of Color	21%	58%	12	52%	18	40%	37
Low Income	21%	34%	33	36%	29	31%	37
Unemployment Rate	6%	5%	65	5%	63	5%	63
Linguistically Isolated	0%	8%	28	6%	38	5%	46
Less Than High School Education	21%	16%	69	15%	72	12%	81
Under Age 5	6%	7%	43	7%	45	6%	54
Over Age 64	11%	12%	53	13%	45	16%	34

*Diesel particulate matter, air toxics cancer risk, and air toxics respiratory hazard index are from the EPA's 2017 Air Toxics Data Update, which is the Agency's ongoing, comprehensive evaluation of air toxics in the United States. This effort aims to prioritize air toxics, emission sources, and locations of interest for further study. It is important to remember that the air toxics data presented here provide broad estimates of health risks over geographic areas of the country, not definitive risks to specific individuals or locations. Cancer risks and hazard indices from the Air Toxics Data Update are reported to one significant figure and any additional significant figures here are due to rounding. More information on the Air Toxics Data Update can be found at: <https://www.epa.gov/haps/air-toxics-data-update>.

For additional information, see: www.epa.gov/environmentaljustice

EJScreen is a screening tool for pre-decisional use only. It can help identify areas that may warrant additional consideration, analysis, or outreach. It does not provide a basis for decision-making, but it may help identify potential areas of EJ concern. Users should keep in mind that screening tools are subject to substantial uncertainty in their demographic and environmental data, particularly when looking at small geographic areas. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators. Please see EJScreen documentation for discussion of these issues before using reports. This screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location. EJScreen outputs should be supplemented with additional information and local knowledge before taking any action to address potential EJ concerns.

Appendix C: Federal and State Endangered Species Lists

FEDERAL FWS ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	Federal Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
Birds					
Eastern Black Rail, <i>Laterallus jamaicensis</i> ssp. <i>jamaicensis</i>	T	No	No	HAB	Coastal salt and brackish marshes with dense cover but can also be found in upland areas of these marshes.
Least Tern, <i>Sterna antillarum</i>	E	No	Yes, but not in project area	HAB	Bare or sparsely vegetated sand, shell, and gravel beaches, sandbars, islands, and salt flats on the coast, rivers or reservoirs.
Piping Plover, <i>Charadrius melodus</i>	T	No	No	HAB	Beaches, sandflats, and dunes along the Gulf Coast and adjacent offshore islands.
Red Knot, <i>Calidris canutus rufa</i>	T	No	No	HAB	Shorebird which breeds in tundra and the Arctic Cordillera in the far north of Canada, Europe, and Russia.
Red-cockaded Woodpecker, <i>Picoides borealis</i>	E	No	No	HAB	Open, grassy, fire-maintained pine forests; constructs nest cavity in older living pines (60+ years).
Whooping Crane, <i>Grus americana</i>	E	No	No	HAB	Wetlands, marshes, mudflats, wet prairies and fields.
Insects					
Monarch Butterfly, <i>Danaus plexippus</i>	C	Yes	No	HAB	Spring & summer prefers open fields and meadows with milkweed. Winters in Mexico.
Mollusks					
Texas Fawnsfoot, <i>Truncilla macrodont</i>	P	No	No	HAB	A freshwater mussel commonly found in riffles of streams and rivers.
Plants					
Navasota Ladies-tresses, <i>Spiranthes parksii</i>	E	No	No	HAB	Openings of post oak woodlands in sandy loam soils, often over an impermeable clay layer, adjacent to drainages.
Texas Trailing Phlox, <i>Phlox nivalis</i> ssp. <i>texensis</i>	E	No	No	HAB	Relatively open, fire-maintained pine or pine-hardwood forests on soils with a deep, sandy surface

FEDERAL FWS ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	Federal Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
					layer and clayey subsurface layers; flowers late Mar-Apr
Reptiles					
Green Sea Turtle, <i>Chelonia mydas</i>	T	No	No	HAB	A non-anadromous, non-catadromous ocean species with no record of occurrence within the project area.
Hawksbill Sea Turtle, <i>Eretmochelys imbricata</i>	E	No	No	HAB	A non-anadromous, non-catadromous ocean species with no record of occurrence within the project area.
Kemp's Ridley Sea Turtle, <i>Lepidochelys kempii</i>	E	No	No	HAB	A non-anadromous, non-catadromous ocean species with no record of occurrence within the project area.
Leatherback Sea Turtle, <i>Dermochelys coriacea</i>	E	No	No	HAB	A non-anadromous, non-catadromous ocean species with no record of occurrence within the project area.
Loggerhead Sea Turtle, <i>Caretta caretta</i>	T	No	No	HAB	A non-anadromous, non-catadromous ocean species with no record of occurrence within the project area.

1. E=Endangered, T=Threatened, P=Proposed, C=Candidate.

2. HAB= No suitable habitat exists within the project area.

STATE TPW ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
Amphibians					
Spotted Dusky Salamander, <i>Desmognathus conanti</i>	SGCN	NO	NO	HAB	Small, clear, spring fed streams with sandy substrate bordered with ferns and moss.
Gulf Coast Waterdog, <i>Necturus beyeri</i>	SGCN	NO	NO	HAB	Permanent flowing water within forested habitats, from small streams to large rivers.

STATE TPW ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
Woodhouse's Toad, <i>Anaxyrus woodhousii</i>	SGCN	NO	NO	HAB	Terrestrial and aquatic: forests, grasslands, and barrier island sand dunes. Aquatic habitats varied.
Strecker's Chorus Frog, <i>Pseudacris streckeri</i>	SGCN	NO	NO	HAB	Terrestrial and aquatic: Wooded floodplains, flats, prairies, cultivated fields, marshes.
Southern Crawfish Frog, <i>Lithobates areolatus areolatus</i>	SGCN	NO	NO	HAB	Terrestrial and aquatic: preferred habitat is ephemeral wetlands.
Birds					
White-faced Ibis, <i>Plegadis chihi</i>	T	NO	NO	HAB	Freshwater marshes, sloughs, and irrigated rice fields, confined to near- coastal rookeries.
Wood Stork, <i>Mycteria americana</i>	T	NO	NO	HAB	Nest in large tracts of baldcypress or red mangrove.
Swallow-tailed Kite, <i>Elanoides forficatus</i>	T	NO	NO	HAB	Swampy lowland forests, open woodland, marshes, along rivers, lakes, and ponds.
Bald Eagle, <i>Haliaeetus leucocephalus</i>	SGCN	NO	NO	HAB	Large lakes, nests in tall trees or cliffs near water, communally roosts.
Piping Plover, <i>Charadrius melodus</i>	T	NO	NO	HAB	Beaches, sandflats, dunes, offshore islands, spoil islands with limited human disturbance.
Franklin's Gull, <i>Leucophaeus pipixcan</i>	SGCN	NO	NO	HAB	Spring and fall migrant in Texas prefers wetlands, lake shore, or islands to roost for the night.
Red-cockaded Woodpecker, <i>Dryobates borealis</i>	E	NO	NO	HAB	Cavity nests in older pine (60+ years); forages in younger pine (30+ years).
Sprague's Pipit, <i>Anthus spragueii</i>	SGCN	NO	NO	HAB	Pastures and weedy fields, grasslands with dense herbaceous vegetation.
Bachman's Sparrow,	T	NO	NO	HAB	Open pine woods with scattered bushes and grassy understory.

STATE TPW ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
<i>Peucaea aestivalis</i>					
Crustaceans					
Big Thicket Burrowing Crayfish, <i>Fallicambarus kountzeae</i>	SGCN	NO	NO	HAB	Primary burrower with 100% of known adults and subadults collected from burrows.
Fish					
American Eel, <i>Anguilla rostrata</i>	SGCN	NO	NO	HAB	Large rivers, streams, tributaries, coastal watersheds, estuaries, bays, and oceans.
Mississippi Silvery Minnow, <i>Hybognathus nuchalis</i>	SGCN	NO	NO	HAB	Moderate current, silty, muddy, or rocky substrate in smaller tributary streams.
Blackspot Shiner, <i>Notropis atrocaudalis</i>	SGCN	NO	NO	HAB	Small to moderate size tributary streams in runs and pools over all types of substrates.
Ironcolor Shiner, <i>Notropis chalybaeus</i>	SGCN	NO	NO	HAB	Acidic, tannin-stained, non-turbid, sluggish Coastal Plain streams with aquatic vegetation.
Sabine Shiner, <i>Notropis sabinae</i>	SGCN	NO	NO	HAB	Small streams and large rivers with shallow, moving water, rarely found in pools or backwater.
Western Creek Chubsucker, <i>Erimyzon claviformis</i>	T	NO	NO	HAB	Silt, sand, and gravel pools of clear headwaters, creeks, small rivers, near vegetation, occasionally in lakes.
Western Sand Darter, <i>Ammocrypta clara</i>	SGCN	NO	NO	HAB	Substrates of course sand and fine gravels in moderate current in medium to large streams.
Insects					
American Bumblebee, <i>Bombus pensylvanicus</i>	SGCN	NO	NO	HAB	Habitat description is not currently available.

STATE TPW ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
Texas Emerald Dragonfly, <i>Somatochlora margarita</i>	SGCN	NO	NO	HAB	Springfed creeks, bogs, small sandy forested streams with moderate current.
No accepted common name, <i>Neotrichia mobilensis</i>	SGCN	NO	NO	HAB	Habitat description is not currently available.
Mammals					
Southeastern Myotis Bat, <i>Myotis austroriparius</i>	SGCN	NO	NO	HAB	Lowland pine and hardwood forests with large hollow trees near water.
Tricolored Bat, <i>Perimyotis subflavus</i>	SGCN	NO	NO	HAB	Forest, woodland, and riparian areas are important. Caves are very important to this species.
Big Brown Bat, <i>Eptesicus fuscus</i>	SGCN	NO	NO	HAB	Any wooded areas or woodlands except south Texas. Riparian areas in west Texas.
Eastern Red Bat, <i>Lasiurus borealis</i>	SGCN	NO	NO	HAB	Forests for foliage roosting. Also common along the coastline.
Hoary Bat, <i>Lasiurus cinereus</i>	SGCN	NO	NO	HAB	Forests for foliage roosting, also unforested parts and lowland deserts.
Northern Yellow Bat, <i>Lasiurus intermedius</i>	SGCN	NO	NO	HAB	Roosts in spanish moss and hanging palm fronds. Common where this vegetation occurs.
Rafinesque's Big-eared Bat, <i>Corynorhinus rafinesquii</i>	T	NO	NO	HAB	Lowland pine and hardwood forests with large hollow trees for roosting.
Swamp Rabbit, <i>Sylvilagus aquaticus</i>	SGCN	NO	NO	HAB	Lowland areas near water: cypress bogs, marshes, floodplains, creeks, rivers.
Prairie Vole, <i>Microtus ochrogaster</i>	SGCN	NO	NO	HAB	Extreme north Panhandle, colonial, upland herbaceous fields, grasslands.

STATE TPW ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
Muskrat, <i>Ondatra zibethicus</i>	SGCN	NO	NO	HAB	Brackish marshes, lakes, ponds, swamps, and other slow-moving waters. Most abundant in cattail.
Louisiana Black Bear, <i>Ursus americanus luteolus</i>	T	NO	NO	HAB	Bottomland hardwoods, floodplain forests, upland hardwoods with mixed pine, marsh.
Long-tailed Weasel, <i>Mustela frenata</i>	SGCN	NO	NO	HAB	Brushlands, fence rows, upland woods, bottomland hardwoods, forest edges, rocky desert scrub, close to water.
Eastern Spotted Skunk, <i>Spilogale putorius</i>	SGCN	NO	NO	HAB	Open fields prairies, croplands, fence rows, farmyards, forest edges, wooded, brushy area.
Western Hog- nosed Skunk, <i>Conepatus leuconotus</i>	SGCN	NO	NO	HAB	Most common in rugged, rocky canyon country.
Mountain Lion, <i>Puma concolor</i>	SGCN	NO	NO	HAB	Most frequently in rugged mountains and riparian zones.
Mussels					
Texas Pigtoe, <i>Fusconaia askewi</i>	T	NO	NO	HAB	Small streams to large rivers in riffles of sand and gravel, not known from reservoirs.
Sandbank Pocketbook, <i>Lampsilis satura</i>	T	NO	NO	HAB	Small streams to large rivers in sandy mud to sand and gravel substrate in slow current.
Southern Hickorynut, <i>Obovaria arkansasensis</i>	T	NO	NO	HAB	Clay, sand, and gravel substrates with low to moderate current in Neches, Sabine, and Cypress River basins.
Louisiana Pigtoe, <i>Pleurobema riddellii</i>	T	NO	NO	HAB	Small streams to large rivers, slow to moderate currents in clay, mud, sand, and gravel. Not known from impoundments.

STATE TPW ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
Texas Heelsplitter, <i>Potamilus amphichaenus</i>	T	NO	NO	HAB	Small streams to large rivers, standing to slow-flowing water in mud, silt, sand, or in banks, backwaters, quiet pools, some reservoirs.
Texas Fawnsfoot, <i>Truncilla macrodon</i>	T	NO	NO	HAB	Large rivers to medium-sized streams, banks and backwaters, riffles, point bars, low to moderate water velocities, in mud, gravel and cobble.
Plants					
White Firewheel, <i>Gaillardia aestivalis</i> var. <i>winkleri</i>	SGCN	NO	NO	HAB	Open pine-oak woodlands and farkleberry sandhills in deep, loose, well-drained whitish sands.
Slender Gay- feather, <i>Liatris tenuis</i>	SGCN	NO	NO	HAB	Sandy soils of fire-maintained upland longleaf pine savannas, mostly over the Catahoula Formation.
Barbed Rattlesnake- root, <i>Prenanthes barbata</i>	SGCN	NO	NO	HAB	Calciphilic hardwood terraces above floodplains, seepage slopes, prairies, barrens, open woodlands with calcareous substrates.
Scarlet Catchfly, <i>Silene subciliata</i>	SGCN	NO	NO	HAB	Deep well-drained sandy soils of fire-maintained, dry, upland, longleaf pine savannas.
Smooth Indigobush, <i>Amorpha laevigata</i>	SGCN	NO	NO	HAB	Prairies, open woods and creek banks, perennial.
Panicled Indigobush, <i>Amorpha paniculata</i>	SGCN	NO	NO	HAB	Acid seep forests, peat bogs, floodplain forests on the edge of Saline Prairies in East Texas.
Soxman's Milkvetch, <i>Astragalus soxmaniorum</i>	SGCN	NO	NO	HAB	Deep sandy soils of sandhills, fallow fields, and open scrub oak-pine woodlands; Perennial.
Texas screwstem, <i>Bartonia</i>	SGCN	NO	NO	HAB	Acid seeps in Pine-Oak forests on gentle slopes, baygall thickets at spring heads.

STATE TPW ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
<i>paniculata</i> ssp. <i>texana</i>					
Long-sepaled False Dragon- head, <i>Physostegia longisepala</i>	SGCN	NO	NO	HAB	Poorly drained, acid loams on level terrain over Beaumont, Deweyville, and Montgomery formations.
Texas Trailing Phlox, <i>Phlox nivalis</i> ssp. <i>texensis</i>	E	NO	NO	HAB	Open fire-maintained pine or pine- hardwood forests on soils with a deep, sandy surface layer and clayey subsurface layers.
Mohlenbrock's Sedge, <i>Cyperus grayioides</i>	SGCN	NO	NO	HAB	Deep sand and sandy loam in dry, almost barren openings in upland longleaf pine savannas, mixed pine-oak forests, and post oak woodlands.
Indianola Beakrush, <i>Rhynchospora indianolensis</i>	SGCN	NO	NO	HAB	Abundant in cattle pastures during wet years, possibly becoming a management problem in such sites.
Texas Sunnybell, <i>Schoenolirion wrightii</i>	SGCN	NO	NO	HAB	Rocky barrens in the Post Oak region near College Station, with a few disjunct populations on the Catahoula Formation of southeast Texas.
Oklahoma Grass Pink, <i>Calopogon oklahomensis</i>	SGCN	NO	NO	HAB	Mesic, acidic, sandy to loamy prairies, pine savannas, oak woodlands, edges of bogs, and frequently mowed meadows.
Chapman's Orchid, <i>Platanthera chapmanii</i>	SGCN	NO	NO	HAB	Wetland pine savannas and savanna swales in hillside seepage bogs.
Giant Spiral Ladies'- tresses, <i>Spiranthes longilabris</i>	SGCN	NO	NO	HAB	Wetland pine savannas, low woods, wet open areas.
Reptiles					
Alligator Snapping Turtle,	T	NO	NO	HAB	Aquatic: Perennial water bodies, rivers, canals, lakes, oxbows, swamps, bayous, and ponds near running water.

STATE TPW ESA LISTED SPECIES FOR HARDIN COUNTY, TEXAS					
Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
<i>Macrochelys temminckii</i>					
Western Chicken Turtle, <i>Deirochelys reticularia miaria</i>	SGCN	NO	NO	HAB	Aquatic and terrestrial: Aquatic habitat is highly vegetated shallow wetlands with gentle slopes. Terrestrial not well known.
Eastern Box Turtle, <i>Terrapene carolina</i>	SGCN	NO	NO	HAB	Terrestrial: Forests, fields, forest-brush, and forest-field ecotones. Commonly enters pools of shallow water in summer.
Western Box Turtle, <i>Terrapene ornata</i>	SGCN	NO	NO	HAB	Terrestrial: Grassland, pasture, fields, sandhills, and open woodland, sometimes in slow, shallow streams and creek pools.
Smooth Softshell, <i>Apalone mutica</i>	SGCN	NO	NO	HAB	Aquatic: Large rivers, streams, lakes, impoundments with sandy or mud bottom and few aquatic plants.
Slender Glass Lizard, <i>Ophisaurus attenuatus</i>	SGCN	NO	NO	HAB	Terrestrial: Grassland, prairie, open woodland, savannas, pine flatwoods, with sand soils near streams and ponds.
Texas Horned Lizard, <i>Phrynosoma cornutum</i>	T	NO	NO	HAB	Terrestrial: Open, sparse vegetation, soils from sandy to rocky.
Northern Scarlet Snake, <i>Cemophora coccinea</i>	T	NO	NO	HAB	Terrestrial: Well drained soils with pine, hardwood, or mixed hardwood scrub or open grassland habitats.
Louisiana Pine Snake, <i>Pituophis ruthveni</i>	T	NO	NO	HAB	Terrestrial: Deep sandy soils with large stands of well-managed long leaf pine woodlands.
Timber (Canebrake) Rattlesnake,	SGCN	NO	NO	HAB	Terrestrial: Swamps, upland pine, deciduous woodland, abandoned farmland, limestone bluffs with dense groundcover of grapevines, palmetto.

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Species Common Name, <i>Scientific Name</i>	State Status ¹	Potential to Occur	Critical Habitat	Exclusion Rationale ²	Habitat Description & Range in Action Area
<i>Crotalus horridus</i>					
Pygmy Rattlesnake, <i>Sistrurus miliaris</i>	SGCN	NO	NO	HAB	Variety of wooded habitats: bottomland hardwood forests, upland savannas, frequently near standing water.

1. E=Endangered, T=Threatened, SGCN= Species of Greatest Conservation Need.

2. HAB= No suitable habitat exists within the project area.