# BIOLOGICAL ASSESSMENT

**FOR**

## EXXONMOBIL CHEMICAL COMPANY


**5000 Bayway Drive**
**P.O. Box 4004**
**Baytown, Texas 77522-4004**

**FOR THE**

## MONT BELVIEU PLASTICS PLANT POLYETHYLENE UNIT

**13330 Hatcherville Rd.**
**Mont Belvieu, Texas 77523**
**Chambers County, Texas**

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## EXECUTIVE SUMMARY

The ExxonMobil Chemical Company (ExxonMobil) Mont Belvieu Plastics Plant (MBPP) is located in the northwestern portion of Chambers County, Texas.

ExxonMobil has submitted an application requesting authorization of greenhouse gas emissions to the U. S. Environmental Protection Agency Region 6 (EPA). At the request of EPA, a Biological Assessment (BA) was conducted and submitted December 14, 2012. A supplemental submittal was made on February 28, 2013. This supplemental submittal addressed federally endangered, threatened, proposed, and candidate species that are listed by Texas Parks and Wildlife Department (TPW) for Chambers and Liberty Counties, Texas. A second supplemental submittal was made on May 30, 2013 to address wastewater and linear facilities. ExxonMobil requested the services of Sage Environmental Consulting, L.P. (Sage) to assist in the permit process. Sage requested the services of Raven Environmental Services Inc. (Raven) to prepare this Biological Assessment (BA). Raven is an environmental management and consulting firm located in Huntsville, TX.

The objective of this BA is to determine the potential effects of EPA's issuance of this permit on animal and plant species that are protected under the Endangered Species Act (ESA) and listed by the US Fish and Wildlife Service (FWS) in Chambers and Liberty Counties, Texas. The species list from two counties is considered for analysis because within the total 801-acre action area for the proposed project there are 54-acres located in Liberty County and 747-acres in Chambers County. This BA will provide the necessary information to describe how construction and operation of the proposed Polyethylene Unit will comply with regulations set forth in section 7(a)(2) of ESA and also be in accordance with 50 C.F.R. Part 402 (Interagency Cooperation – Endangered Species Act of 1973, as amended).

Raven conducted a literature review to locate published research concerning the potential effects of air pollution on wildlife generally and the species considered for evaluation in this BA specifically. Resources utilized include the World Wide Web, public libraries, the Raven reference library, and the personal environmental library of the author. Information and literature reviewed regarding the life histories and habitat requirements of the species for consideration include state and federal agency reports, management documents, peer-reviewed scientific literature, and online data provided by NatureServe, FWS, and TPW. Raven also contacted the following individuals to solicit feedback regarding the action area and the species for consideration: Mr. Arturo Vale (FWS Biologist, Houston, Texas) and Mr. Bob Gottfried, (Administrator, Texas Natural Diversity Database, TPW, Austin, Texas). This BA is also based on the on-site field survey conducted by Raven, and the direct observations made of the 801-acre action area. This BA was prepared in accordance with guidelines provided in 50 C.F.R. Part 402.12 (Consultation Procedures, Biological Assessments).

Based on a literature and data review, discussions with experts, the field survey, and the analysis of effects in this BA, this proposed action will have no effect on any FWS species listed as endangered, threatened, proposed or candidate for Chambers or Liberty Counties, Texas. Accordingly, EPA's issuance of the permit for the project will have no effect on federally listed endangered, threatened, proposed or candidate species.

## 1.0 PROJECT DESCRIPTION

### 1.1 Proposed Action

ExxonMobil Chemical Company (ExxonMobil) has submitted an application under the Environmental Protection Agency's (EPA) Greenhouse Gas (GHG) Prevention of Significant Deterioration (PSD) Program requesting authorization of greenhouse gas emissions. Raven has been contracted by ExxonMobil to perform the review for the proposed Polyethylene Unit Project and prepare the Biological Assessment (BA) to evaluate the potential effects to species listed threatened and endangered under the Endangered Species Act (ESA).

This proposed project to construct the Polyethylene Unit is located in the northwestern portion of Chambers County, Texas and is approximately 1.9-miles northwest of Mont Belvieu, Texas (straight-line). The project area is located entirely on ExxonMobil plant property. The project area is located in the southeastern corner of the Sheeks USGS 7.5' Quadrangle (Quad). Specifically, the coordinate for the approximate center of the proposed project area boundary will be Easting 314946 and Northing 3307055 (UTM, NAD 83, Zone 15 North, Meters). For the project area location, please see the attached *Exhibit A - Vicinity Map* in the Appendix.

Permanent project facilities include reactors, finishing/packing/shipping facilities, a cooling tower, boilers, utilities, pollution control devices, water impoundments and storage. General site preparation and pre-construction activities associated with the project include temporary facilities (e.g., roads, offices, parking lots, laydown, utilities), dismantling, land clearing, equipment and piping relocations, and non-operating permanent facilities (e.g., fencing and paving). For a map of the permanent project facilities, please see the attached Exhibits A, B C and D in the Appendix. Process wastewater associated with the project receives treatment under TPDES Permit No. WQ0002546000. Storm water is discharged under General Permit TXR050000.

### 1.2 Alternatives Considered

There were no viable alternative locations for the project because it is an expansion of an existing manufacturing facility. The project's purpose is to increase the capacity and output of specific products and requires infrastructure, support facilities and personnel that are already in place.

## 2.0 METHODOLOGY

### 2.1 Action Area Determination

The "action area" for a BA as defined by 50 C.F.R. Part 402.02 means all areas to be affected directly or indirectly by the Federal action (EPA permit issuance) and not merely the immediate area involved in the action. Guidance from the EPA directed ExxonMobil to use the potential air dispersion of criteria pollutants resulting from the proposed project to evaluate the potential impact on listed and candidate species. The results of this analysis were used to determine the boundary of the action area. As recommended by the FWS Consultation Handbook, the boundaries as defined for this action area will adequately address direct, indirect or interrelated/interdependent effects for listed and candidate species considered in this BA (see Section 3.0). To perform this analysis, ExxonMobil engaged Sage, who utilized the EPA's AERMOD model to predict the maximum ground level concentration values for criteria

pollutants. This analysis resulted in a maximum significant impact area of up to 1.0-miles from the center of the proposed project. Based on CFR guidance, FWS guidance, and the Sage emissions analysis, Raven conservatively defined an action area that includes 801-acres.

ExxonMobil submitted an air dispersion model to TCEQ to evaluate the proposed project impacts. The air dispersion modeling analysis was conducted in accordance with current TCEQ and EPA modeling procedures.

Emissions of criteria pollutants from the project were evaluated to determine if they have a significant impact, as determined by each pollutant's State National Ambient Air Quality Standards (NAAQS) modeling significance level (MSL). The modeled criteria pollutants include carbon monoxide (CO), nitrogen dioxide (NO2), particulate matter with an aerodynamic diameter of 10 microns or less (PM10), particulate matter with an aerodynamic diameter of 2.5-microns or less (PM2.5), and sulfur dioxide (SO2).

Criteria pollutants were modeled using the EPA's AERMOD model to obtain off-property concentrations for comparison with the appropriate State NAAQS thresholds. The modeled concentration from each pollutant was compared to the applicable modeling significance level (MSL). If the modeled concentration did not result in a significant impact (i.e., the modeled concentration is less than the MSL), then the demonstration was complete. If the modeled concentration exceeded the MSL, then further analysis was used to demonstrate compliance with the NAAQS.

**Table 1** lists the criteria pollutants and averaging periods modeled for comparison to the applicable MSL concentrations. The distance from the center of the existing MBPP to where the MSL is exceeded is noted in miles in the table. Pollutants that do not have a distance listed did not result in a significant impact (i.e., the modeled concentration is less than the MSL) beyond the property line of the existing MBPP.

**Table 1**. Constituents evaluated in NAAQS analysis and distances from MBPP where no exceedances are expected.

| Criteria Pollutant | Averaging Period | MSL (ug/m3) | Distance from Center of MBPP where no MSL Exceedance is Expected (miles) |
|---|---|---|---|
| Carbon Monoxide (CO) | 1-Hour | 2,000 | -- |
| | 8-Hour | 500 | -- |
| Nitrogen Dioxide ($NO_2$) | 1-Hour | 7.5 | 0.90 |
| | Annual | 1.0 | -- |
| Particulates ($PM_{10}$) | 24-Hour | 5.0 | -- |
| Particulates ($PM_{2.5}$) | 24-Hour | 1.2 | 0.56 |
| | Annual | 0.3 | -- |
| Sulfur Dioxide ($SO_2$) | 1-Hour | 7.8 | -- |
| | 3-Hour | 25.0 | -- |
| | 24-Hour | 5.0 | -- |
| | Annual | 1.0 | -- |

Based on the results from the State NAAQS analysis, the maximum significant impact area of the proposed emission sources should extend less than 1.0 mile from the center of MBPP. New linear facilities for the project, such as transmission lines for power, pipelines or road easements, will not extend beyond the boundaries of this action area. Table 2 lists the total project emissions in tons per year (tpy).

**Table 2.** Project Emissions

| Pollutant | Annual Emissions (tpy) |
|---|---|
| Volatile Organic Compounds (VOC) | 70.73 |
| Nitrogen Oxides (NOx) | 22.66 |
| Carbon Monoxide (CO) | 54.27 |
| Sulfur Dioxide ($SO_2$) | 4.25 |
| Particulates (PM total) | 23.79 |
| Particulates ($PM_{10}$) | 8.33 |
| Particulates ($PM_{2.5}$) | 4.12 |
| Ammonia (NH3) | 1.43 |



The potential for airborne pollutants to directly affect aquatic habitats in the action area and any subsequent indirect downstream effects was also considered. The potential effects of airborne pollutants on aquatic resources include both acidification and eutrophication. Acidification is the deposition of air pollutants in acid form or that have acid-forming properties. Eutrophication is the over-enrichment of nutrients into an aquatic system. In general, acidification and eutrophication can result in a set of cascading adverse effects that can reduce dissolved oxygen within an aquatic ecosystem that impairs and disrupts normal aquatic processes and functions. No large open surface waters such as bays or estuaries are located within the action area. Aquatic features within the action area are confined to intermittently flowing creeks, improved industrial canals, and small impoundments or industrial ponds.

For the proposed project, given the infrequency of the predicted exposure of a concentration greater than the MSL to the aquatic features (e.g. streams, canals, ponds) within the action area, it is reasonable to assume the emissions resulting from this project will not affect the water quality of the streams and canals within the action area. No pH impact is expected. Since no direct or short-term effects are expected to aquatic features within the action area, no adverse downstream effects to larger watersheds such as Cedar Bayou are expected. For a map of the NO2 and PM2.5 Potential Air Dispersion and Action Area, please see the attached Exhibit B.

Approximately 0.3 miles of new underground pipe inside the MBPP project action area will be added in an existing and maintained pipeline corridor. This area is industrial with a history of intensive land use, soil disturbance and vegetation management (primarily mowing). The area provides no habitat for any species listed as threatened, endangered or as candidates for listing.

Approximately 1.2 miles of new underground pipe outside the MBPP project action area will be added using horizontal directional drilling (HDD). This pipe will be installed to a depth of more than 100 feet in an existing and maintained pipeline corridor. HDD drilling will not cause any surface disturbance or impact any habitat along this 1.2-mile section. The only surface disturbance outside the action area will be a temporary excavation to provide an exit point for the drill. The location of this excavation site is provided in Exhibit C (USGS Quadrangle Map and Action Area) and Exhibit D (Color Aerial Map). The area is industrial with a history of intensive land use, soil disturbance and vegetation management. This area, including 100 feet on either side of the pipe, provides no habitat for any species listed as threatened, endangered or as candidates for listing.

### 2.2 Noise Effects Analysis

The possibility of direct and indirect effects from noise disturbance might occur during the construction phase of the project, followed by the normal operation of the project. It is important

to provide some point of reference when discussing sound. The decibel (dB) is a logarithmic unit that cannot be added and subtracted like ordinary numbers. An increase of 3dB is a doubling of the "strength" of the sound (e.g. an increase of 10dB means the sound is 10 times as loud). As a reference, normal human conversation at a range of 3-feet is in the 60-65 decibel (dB) range, and 85 dBA is the level at which hearing protection is required during 12-hour shifts.

The construction period for the proposed project is three years. General site preparation and construction associated with the project will increase noise levels across the plant. During this period, activities will include the use of all or some of the following equipment: bulldozer, dump truck, grader, scraper, loader, backhoe, mobile crane, concrete mixer, and concrete pump. The average noise level range for each type of equipment at a distance of 50-feet for industrial construction is between 91 (truck) and 79 (loader) while the average dBA at 50-feet for all 9 pieces of equipment listed is 84.22 dBA (USEPA, 1971, Noise From Construction Equipment…).

After construction is complete, the project will operate normally. During normal operation, the project will emit noise at a relative ambient or steady level, normally between 10-20 dBA. Noise levels associated with operation of the project will be far below 85 dBA by the time they reach the action area boundary. Given this low level of ambient noise and regardless of the ESA listing status of a given species, it is reasonable to assume that noise alone produced by construction and operation of the project would not displace any species of plants or animals in the action area or preclude the ability of new species to occupy habitat in the action area.

**2.3 Wastewater and Storm Water Analysis**

The proposed project will discharge wastewater, storm water, water softener regenerate, cooling tower blowdown and steam system blowdown. One new storm water retention basin and one new skimmer pond will be constructed. There are no new outfalls. No significant effect on the water quality in the Cedar Bayou receiving body is anticipated. ExxonMobil anticipates amending the existing water permit to combine all discharges, including discharges currently authorized by General Permit TXR050000, into MBPP TPDES Individual Permit No. WQ0002546000. Storm water from the existing plant will continue to be discharged on the west side of the project site and just south of the main entrance road (see Exhibit B – Potential Air Dispersion and Action Area Map for Outfall location). Wastewater will continue to be discharged approximately 3.5 miles from the project and is defined as above tidal in TCEQ Segment Number 0902 of the Trinity-San Jacinto Coastal Basin. It is 13 miles (straight-line) from the project area to the mouth of Cedar Bayou at Galveston Bay. From the project's confluence with Cedar Bayou, it is over 16 miles south along the circuitous centerline of Cedar Bayou to Galveston Bay. This 16-mile length of watershed provides additional and substantial dilution and mixing of project discharge, further limiting affects to water quality of the streams, canals and bays within or downstream from the action area.

Wastewater: Wastewater from process areas will be treated in an existing oil-water separator, then combined with existing streams and routed to an existing storm water retention pond and existing equalization basin. The existing equalization basin discharge is authorized in MBPP TPDES Individual Permit No. WQ0002546000.

Storm Water: First-flush storm water from the project will be routed to a new skimmer pond where floating solids, if any, are removed. The clean effluent will be combined with post first-flush storm water and routed to a new storm water retention basin. The discharge from the new storm water retention basin will be combined with existing streams and routed to an existing

storm water retention pond and existing equalization basin. The existing equalization basin discharge is authorized in MBPP TPDES Individual Permit No. WQ0002546000.

Post first-flush storm water from the project will be routed to the new storm water retention basin. The discharge from the new storm water retention basin will be combined with existing streams and routed to an existing storm water retention pond and existing equalization basin. The existing equalization basin discharge is authorized in MBPP TPDES Individual Permit No. WQ0002546000.

Non-process area storm water from the project will be routed to the existing storm water drainage system. The existing storm water drainage system discharge is authorized by General Permit TXR050000.

During project construction, all applicable storm water requirements will be met.

Water Softener: Regenerate from water softening will be routed to the new storm water retention basin. The discharge from the new storm water retention basin will be combined with existing streams and routed to an existing storm water retention pond and existing equalization basin. The existing equalization basin discharge is authorized in MBPP TPDES Individual Permit No. WQ0002546000.

Cooling Tower and Steam System: Blowdown from the cooling tower water and steam systems will be routed to the new storm water retention basin. This includes non-contact water used for once-through cooling. The discharge from the new storm water retention basin will be combined with existing streams and routed to an existing storm water retention pond and existing equalization basin. The existing stream discharge is authorized in MBPP TPDES Individual Permit No. WQ0002546000.

A flow increase of approximately 2,300,000 gallons per day will result from the project. Based on preliminary project design data and calculated wastewater treatment plant efficiency, the organic load from the project can be accommodated within the existing wastewater permit limits. After the project begins operation, approximately 54% of the wastewater flow will be attributable to the project. Since the project's process is equivalent to the existing process, concentrations in wastewater are not expected to change within normal statistical variation. The existing wastewater treatment facility is sufficient to treat the project wastewater. Table 3 summarizes the estimated impact on the wastewater discharge.

**Table 3**: Preliminary Post-Project Wastewater Emissions

| Pollutant | 2008 Sample Concentrations (mg/l) | Post-Project Estimated Concentration (mg/l) |
|---|---|---|
| BOD (5-day) | 3.6 | 3.6 |
| CBOD (5-day)* | 2.9 | 2.9 |
| Chemical Oxygen Demand* | 45.1 | 45.1 |
| Total Organic Carbon | 11.3 | 11.3 |
| Dissolved Oxygen* | 9.8 | 9.8 |
| Ammonia Nitrogen | 0.371 | 0.371 |
| Total Suspended Solids* | 18 | 18 |

| | | |
|---|---|---|
| Nitrate Nitrogen | < 0.2 | <0.2 |
| Total Organic Nitrogen | 1.39 | 1.39 |
| Total Phosphorus | 2.06 | 2.06 |
| Oil and Grease* | 3.6 | 3.6 |
| Total Residual Chlorine | 0.05 | 0.05 |
| Total Dissolved Solids* | 674 | 674 |
| Sulfate* | 212 | 212 |
| Chloride | 176 | 176 |
| Fluoride | 0.69 | 0.69 |
| Fecal Coliform | 7 | 7 |
| Temperature (°F) | 63 | 63 |
| pH (Standard Units; min/max)* | 7.04 - 8.31 | 7.04 - 8.31 |
| | | |
| | **2008 Sample Concentrations (µg/l)** | **Post-Project Estimated Concentration (µg/l)** |
| Total Aluminum | 801 | 801 |
| Total Antimony | < 30 | < 30 |
| Total Arsenic | < 10 | < 10 |
| Total Barium | 114 | 114 |
| Total Beryllium | < 5 | < 5 |
| Total Cadmium | < 1 | < 1 |
| Total Chromium | < 10 | < 10 |
| Trivalent Chromium | < 10 | < 10 |
| Hexavalent Chromium | < 10 | < 10 |
| Total Copper | < 10 | < 10 |
| Cyanide | < 10 | < 10 |
| Total Lead | < 5 | < 5 |
| Total Mercury | < 0.2 | < 0.2 |
| Total Nickel | < 10 | < 10 |
| Total Selenium | < 10 | < 10 |
| Total Silver | < 2 | < 2 |
| Total Thallium | < 10 | < 10 |
| Total Zinc | 40.2 | 40.2 |

* Data from 2007

The TCEQ Executive Director has reviewed Permit No. WQ0002546000 for consistency with the Texas Coastal Management Program (CMP) goals and policies in accordance with the regulations of the Coastal Coordination Council, and has determined that the action is consistent with the applicable CMP goals and policies.

Although wastewater production is expected to increase in daily and maximum flow, no significant increase in concentration limits in the process wastewater are anticipated from the proposed project. Given there will be no increase in concentration and the treatment standards

described above for the project, it is reasonable to assume the discharge resulting from this project will not affect the water quality of the streams, canals and bays within or near the action area. Since no direct or short-term effects are expected to aquatic features within or near the action area, no adverse downstream effects to larger watersheds such as Cedar Bayou are expected. The TPDES permitting process ensures that potential impacts be considered and that any change in discharge is protective of aquatic life.

### 2.4 FWS Species Review

Federally-listed threatened, endangered, proposed and candidate species are provided by county through the FWS website (http://www.fws.gov/southwest/es/ES_Lists_Main.cfm). A review of this website identified the following species for Chambers County:

- Kemp's Ridley Sea Turtle (*Lepidochelys kempii*): Endangered
- Hawksbill Sea Turtle (*Eretmochelys imbricata*): Endangered
- Leatherback Sea Turtle (*Dermochelys coriacea*): Endangered
- Green Sea Turtle (*Chelonia mydas*): Threatened
- Loggerhead Sea Turtle (*Caretta caretta*): Threatened
- Piping Plover (*Charadrius melodus*): Threatened

A review of the same website identified the following species for Liberty County:

- Red-cockaded woodpecker (*Picoides borealis*): Endangered

Mr. Arturo Vale (FWS Biologist, Houston, Texas), was contacted by Raven via phone and email and asked whether the FWS required or recommended that any additional species be considered for effects in this BA. He responded that the species list provided by this website would be adequate for an evaluation of effects for this project. However, EPA recommends as a conservative measure that federally listed species and candidate species included on the TPW endangered species website for Chambers and Liberty Counties should also be considered in this BA.

### 2.5 TPW Database Review

To assist with species for consideration analysis, Raven accessed two TPW resources for historic occurrence records for endangered, threatened, proposed and candidate species. The first source is the TPW online webpage for “Rare, Threatened, and Endangered Species of Texas by County”. The TPW website can be found at:
http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/

The second source is the TPW Texas Natural Diversity Database (TXNDD), which is a Geographic Information System (GIS) integrated Oracle database that stores spatial and tabular information for: threatened and endangered species; rare species of concern; rare natural vegetation communities; and other rare natural resources.

Raven received TXNDD GIS shapefiles and historic (element) occurrence record documents for the Sheeks Quad that includes the action area, and also the adjacent, contiguous 8 Quads – an area that encompasses approximately 560 square miles for all 9 Quads combined. The GIS shapefiles were projected in ArcView and the element occurrence records were reviewed.

## 2.6 Literature Review

Raven conducted a literature review to locate published research that is focused on the potential effects of air pollution on wildlife, plants and birds. Resources utilized include the World Wide Web, public libraries, the Raven reference library, and the personal environmental library of the author. A few abstracts describing research aimed at determining the effects of air pollutants on both free-ranging and captive birds were found on the web. However, these studies were/are being conducted in Europe and are focused mostly on heavy metals and acid rain pollution emitted from several coal-powered electric plants and one copper smelter. One study by The Nature Conservancy (Lovett 2007) was reviewed that generally describes the effects of four pollutants on eight different imperiled plant communities or forest types in the northeastern U.S. None of the literature reviewed was directly applicable to determining the direct, indirect, and cumulative effects to federally listed species specifically or their preferred habitat and associated plant community.

## 2.7 Field Assessment

The field survey for this BA was conducted on June 27, 2012 by Mr. Ross Carrie (Raven). Portions of the action area were again surveyed on May 24, 2013 by Mr. Eric Keith (Raven) to examine areas that will be used for installation of the new ethylene line. The majority of surface disturbance associated with the proposed project area lies entirely within the existing plant and on ExxonMobil property. The majority of the proposed project area is either currently developed for industrial use or has some recent history of soil disturbance or vegetation management. These developed or disturbed areas would provide approximately 26-acres for the proposed project. The remaining 775-acres within the action area was also observed directly (to the extent legally possible / accessible) and also remotely sensed for habitat type and quality by examining 2008-2009 Texas Orthoimagery Program (TOP), color infrared, 0.5-meter (pixel size) aerial images projected in ESRI® ArcMap™ 10.0, a geographic information software computer program. By using direct observation (pedestrian survey), indirect observation and remote sensing techniques, the entire action area was assessed for habitat type and quality to the greatest degree that is legally possible. Local public roads, including Hatcherville Drive, State Highway 146 and connected municipal roads, were also driven to generally observe and assess the vegetation communities and habitat conditions within the action area.

# 3.0 SPECIES CONSIDERED

Species considered for this BA are those federally listed as endangered or threatened, as determined by the FWS and listed for Chambers and Liberty Counties, Texas on the Region 2, FWS website (accessed February 11, 2013). The FWS has determined that the following species are threatened or endangered in these two counties.

- Kemp's Ridley Sea Turtle (*Lepidochelys kempii*): Endangered
- Hawksbill Sea Turtle (*Eretmochelys imbricata*): Endangered
- Leatherback Sea Turtle (*Dermochelys coriacea*): Endangered
- Red-cockaded woodpecker (Picoides borealis): Endangered
- Green Sea Turtle (*Chelonia mydas*): Threatened
- Loggerhead Sea Turtle (*Caretta caretta*): Threatened
- Piping Plover (*Charadrius melodus*): Threatened

At the request of EPA, this BA also conservatively considers federally listed endangered, threatened, proposed and candidate species that are not listed by FWS for Chambers and

Liberty County, Texas, but that are listed by TPW for Chambers and Liberty County, Texas. The TPW website was accessed February 11, 2013, and the TPW species listed for Chambers and Liberty Counties (without FWS duplication) include:

- Smalltooth Sawfish (*Pristis pectinata*): Endangered
- Red Wolf (*Canis rufus*): Endangered
- Houston Toad (*Anaxyrus houstonensis*): Endangered
- Louisiana Black Bear (*Ursus americanus luteolus*): Threatened
- Sprague's Pipit (*Anthus spragueii*): Candidate
- Louisiana Pine Snake (*Pituophis ruthveni*): Candidate

The 801-acre action area was field-surveyed (direct observation) to the extent possible and also remotely sensed (surveyed) for the presence of these thirteen species and their suitable habitat. Additional information sources include NatureServe, FWS, TPW / TNNDD element occurrence records, literature listed in the reference section and GIS shapefiles. The most current survey information and location/occurrence status was also obtained from various sources.

## 4.0 EVALUATION OF EFFECTS

### 4.1 Field Assessment Results

The action area is located within the Western Gulf Coastal Plain, as described in Level III Ecoregions of the United States, and in the Northern Humid Gulf Coastal Prairies as Level IV. The Gulf Coastal Plain is a low, flat plain extending more than 360-miles long and 50 to 100-miles wide along the Texas and Gulf of Mexico coastline. Rivers that drain from the north-west highlands of Texas to the Gulf of Mexico deposited sediments on coastal plain during the Pleistocene and Holocene Epochs. Being a transition area between the continent and the ocean, the coastal plain is home to a myriad of people, plants, wildlife, and fish. All these living organisms depend on streams that bisect this region to some extent for the supply of fresh water, sediments, and nutrients to maintain their lives and productivity. A large quantity of water, nonetheless, has been diverted to municipal, agricultural and industrial uses as human population increases and economic development rises.

The Northern Humid Gulf Coastal Prairies lies within the gently sloping coastal plain. The original vegetation was mostly grasslands with a few clusters of oaks (*Quercus* spp.), known as oak mottes or maritime woodlands. Little bluestem (*Schizachyrium scoparium*), yellow indiangrass (*Sorghastrum nutans*), brownseed paspalum (*Paspalum plicatulum*), gulf muhly (*Muhlenbergia capillaris*), and switchgrass (*Panicum* virgatum) were the dominant grassland species. Almost all of the coastal prairies have been converted to cropland, rangeland, pasture, or urban land uses. The exotic tallowtree (*Triadica sebifera*) and Chinese privet (*Ligustrum chinensis*) have invaded large areas in this region. Some loblolly pine (*Pinus taeda*) occurs in the northern part of the region. Soils are mostly fine-textured: clay, clay loam, or sandy clay loam. Annual precipitation varies from 37-inches in the southwest portion to 58-inches in the northeast. (USEPA, Omernick, 1987)

Direct observation of the proposed project area and action area during the field survey confirms the invasion of exotic species and the conversion from native grasslands to agriculture, urban and industrial land use. Portions of the 26-acre construction and plant expansion area is almost entirely covered with tallowtree, intermixed with numerous chinaberry trees and sugarberry (*Celtis laevigata*), with a groundcover comprised almost entirely of another non-native invasive species (NNIS) such as Japanese honeysuckle (*Lonicera japonica*). The previously described

ponds are variously bordered by black willow (*Salix nigra*), wax myrtle (*Morella* spp.), cattail (*Typha* spp.) and palmetto (*Sabal* spp.).

Land-use in the action area, as observed by driving public roads, was comprised primarily of intensive agriculture, primarily the production of domestic rice (*Oryza* spp.) with some scattered areas of small woodlands - all of which appear to be invaded primarily by tallowtree, as well as other NNIS tree, shrub and grass species. Grass species directly observed included mostly bermudagrass (*Cynodon* spp.) and bahiagrass (*Paspalum notatum*), with almost no native grassland species observed.

For a map of the action area for the proposed project overlaid on a USGS Topographic quadrangle, please see the attached *Exhibit C – USGS Quadrangle Map*. For a map of the action area overlaid on a color infrared aerial image, please see the attached *Exhibit D – Color Aerial Map*.

### 4.2 Species Analysis

#### 4.2.1 Piping Plover – Threatened (FWS Chambers Co.)

##### 4.2.1.1 Environmental Baseline

The Piping Plover (*Charadrius melodus*) is a small, stocky, sandy-colored bird resembling a sandpiper. The adult has yellow-orange legs, a black band across the forehead from eye to eye, and a black ring around the base of its neck. Like other plovers, it runs in short starts and stops. When still, the Piping Plover blends into the pale background of open, sandy habitat on outer beaches where it feeds and nests. The bird's name derives from its call notes, plaintive bell-like whistles which are often heard before the birds are seen.

In 1985, the Piping Plover was listed as endangered (50 FR 50726-50734) in the Great Lakes watershed region (IL, IN, MI, MN, NY, OH, PA, WI, ONCA) where it breeds, and was also concurrently listed as threatened throughout the remainder of its entire range, which in addition to the Great Lakes breeding population, includes an Atlantic coast breeding population and a Northern Great Plains breeding population. In each Piping Plover population, the preferred habitat is sparsely vegetated; open; sandy, gravel or cobble beaches; and adjacent to large bodies of open water. Piping Plovers may live to be 8-10 years old. In the winter, during the non-breeding season, all three populations inhabit beaches, mudflats, sandflats along the Gulf of Mexico and Atlantic coasts barrier island beaches and spoil islands on the Gulf Intercoastal Waterway.

In the spring, Piping Plovers return to their northerly breeding grounds in late March or early April. Following establishment of nesting territories and courtship rituals, the pair forms a depression in the sand. The nest is sometimes lined with small stones or fragments of shell. Both sexes incubate to constantly protect eggs from extreme temperatures. The average clutch size is four eggs and the precocial downy young immediately use the “peck-and-run” foraging behavior of adults. Plovers often gather in groups on undisturbed beaches prior to their southward migration. By mid-September, both adult and young plovers will have departed from their southern, coastal wintering areas. The lack of Piping Plover sightings at inland shorebird stopover sites during migration suggests plovers may adopt a nonstop migration strategy between their breeding range in the Great Lakes and wintering grounds on the Texas Gulf Coast.

Three Recovery Plans for this species were reviewed for this BA. They are:

- U.S. Fish and Wildlife Service. 1996. Piping Plover *(Charadnus melodus),* Atlantic Coast Population, Revised Recovery Plan. Hadley, Massachusetts. 258 pp.
- U.S. Fish and Wildlife Service. 1988. Great Lakes and Northern Great Plains Piping Plover Recovery Plan. Twin Cities, Minnesota. 160 pp.
- U.S. Fish and Wildlife Service. 1988. Recovery Plan for the Great Lakes Piping Plover *(Charadnus melodus*). Ft. Snelling, Minnesota. viii + 141 pp.

Critical habitat for wintering Piping Plovers has been designated along the Gulf Coast in Texas, Louisiana, Alabama and Florida (FWS). The nearest FWS designated critical (wintering) habitat for the Piping Plover to the proposed project is: 1) Site TX-35, Big Reef on the far eastern tip of Galveston Island; 2) Site TX-36, Bolivar Beach on the western end of Bolivar Peninsula; and 3) Site TX-37, Rollover Bay (Pass) at about a midpoint along the Bolivar Peninsula. The closest designated critical habitat, Bolivar Beach, is over 33-miles from the project and well outside the action area.

#### 4.2.1.2 Available Inventories

Recent inventories in or near the action area for this species are available from the following sources:

- 2006 International Piping Plover Survey located near the project
- North American Breeding Bird Survey routes located near the project
- Audubon Society Christmas Bird Count surveys located in or near the project
- TPW Natural Diversity Database (TXNDD) maintained by TPW
- Ground surveys by Raven on June 27, 2012.

The International Piping Plover Census (IPPC) has been conducted at five year intervals since 1991. The 2011 IPPC has occurred; however, the final report and survey results are not yet available as of this date. The most recent IPPC data available relevant to this project is the winter 2006 Texas IPPC, which resulted in a total of 2,090 Piping Plovers observed. The Texas survey is divided into three regions; the upper coast, middle coast and lower coast. The IPPC upper Texas coast survey covers habitat from the Louisiana border to Matagorda County. The upper Texas coast includes this proposed action and was surveyed by a total of 36 participants including Federal and State employees and many volunteers from non-governmental organizations. The 2006 IPPC upper Texas coast survey resulted in a total of 551 birds being observed. This represents 26% of all Piping Plovers observed in Texas during the 2006 winter survey. The number of Piping Plovers recorded at Bolivar Flats (33-miles distant) was 275 and the number at San Luis Pass was 70 (54-miles distant). The nearest IPPC survey collection point to this proposed action is the Chambers County, Mid-Bay site. One (1) adult Piping Plover was observed at Mid Bay during the 2006 IPPC and none (0) were observed at Mid Bay during the previous three Texas surveys conducted in 1991, 1996, and 2001.

The North American Breeding Bird Survey (BBS) is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations. Each year during the height of the avian breeding season, volunteers skilled in avian identification collect bird population data along 24.5-mile roadside survey routes. Over 4,100 survey routes are located across the continental U.S. and Canada. Two routes are located near the action area: the Stowell route (Number 83021) located 14-miles east and the Winnie route (Number 83020) located 20-miles southeast. Both routes were established in 1967

and surveys have been completed almost every year since establishment. No (0) Piping Plover has ever been observed during any year for either of the two survey routes.

The National Audubon Society Christmas Bird Count (CBC) is a 100 year-old, citizen scientist program, where thousands of volunteers across go out over a 24 hour period in early winter to count birds. Volunteers follow specified routes through a designated 15-mile (24-km) diameter circle, counting every bird they see or hear. All individual CBC's are conducted in the period from December 14 to January 5 (inclusive dates) each season, and each count is conducted in one calendar day. The data is compiled annually and is available to the general public through the Audubon website. The two nearest CBC counts to this proposed action is the Houston-Baytown (TXHO) circle to the southwest and the Old River (TXOR) circle to the northeast. The results query for both CBC count areas (TXHO and TXOR) from 1998 until 2010 was that one (1) Piping Plover was counted within the TXHO survey area and no (0) Piping Plovers have been observed within the TXOR survey area.

There are no (0) TXNDD element occurrence records for Piping Plover within the ~560 square mile and nine quadrangle information request area.

A ground survey of ExxonMobil-owned property in the action area was conducted by Mr. Ross Carrie (Raven) on June 27, 2012. The remotely sensed survey of the non-ExxonMobil-owned property was accomplished by Raven personnel afterwards. No Piping Plover habitat was detected during these surveys.

At the time of this on-site survey conducted by Raven, the Texas wintering population of Piping Plovers would have already departed for their breeding grounds located elsewhere in the United States. No Piping Plover habitat whatsoever exists within the project area or action area, and there is sufficient additional inventory data, as listed and discussed above, to indicate that any occurrence of wintering Piping Plovers flying through or over this project area or action area is extremely unlikely. The Raven field survey and the additional remote surveys described above are adequate to guide the following determination of effects.

#### 4.2.1.3 Determination of Effects

Field surveys of the construction site and the action area indicate no suitable plover habitat exists within the proposed project area. In addition, no suitable plover habitat was detected by remote sensing techniques in the 801-acre action area. Historic occurrence data and surveys provided by the IPPC, CBC, and BBS surveys also support the fact that plovers have not and likely will not occur in or near the action area or this far inland from their normal coastal beach habitats. Their specific winter requirement for suitable coastal beach habitat is further reinforced by the FWS designation of the coastal areas of Bolivar Beach, Rollover Bay and Big Reef as critical habitat for the plover. The action area does not include this type of habitat and is in excess of 30-miles of what could be considered suitable plover winter habitat. The evidence that plovers use a non-stop migratory strategy between their northern breeding range and southern coastal winter range suggest it is also very unlikely that the action area would provide a stopover destination for migrating plovers. Given this lack of suitable habitat in or near the action area, that the plover has no history of occurrence in or near the action area and no individuals were seen during surveys of the action area, the construction and operation of the expansion will have no effect on Piping Plovers.

### 4.2.2 Five (5) Sea Turtles – 3 Endangered and 2 Threatened (FWS Chambers Co.)

#### 4.2.2.1 Environmental Baseline

Below are the five federally listed sea turtles for Chambers County, Texas. Because they share almost identical life histories, habitat requirements, and environmental threats, they are analyzed for effect in this BA collectively.

Kemp's Ridley Sea Turtle (*Lepidochelys kempii*): Endangered
Hawksbill Sea Turtle (*Eretmochelys imbricata*): Endangered
Leatherback Sea Turtle (*Dermochelys coriacea*): Endangered
Green Sea Turtle (*Chelonia mydas*): Threatened
Loggerhead Sea Turtle (*Caretta caretta*): Threatened

The endangered Kemp's Ridley Sea Turtle is the most endangered species of sea turtle. The Kemp's Ridley's range is mainly in the Gulf of Mexico, but immature turtles, probably carried by the currents, often appear along the Atlantic coast, as far north as New England and Nova Scotia. Adults occur primarily in the Gulf of Mexico. Kemp's Ridleys feed mostly on crabs, but their diet also includes marine invertebrates and plants, especially when they are young. Crab species consumed varies geographically. In south Texas, Kemp's Ridleys consume a variety of crab species. Of the five sea turtle species that roam the Gulf of Mexico, the Kemp's Ridley is the smallest with an average length of 23 to 27.5-inches (58.5 to 70-cm) and average weight of 100 pounds (45 kg). The Kemp's Ridley is the only sea turtle with an almost circular upper shell. The young are dark gray in color but change as they mature. Adults are olive green above and yellow below.

The endangered hawksbill sea turtle is one of seven species of sea turtles found throughout the world. One of the smaller sea turtles, it has overlapping scutes (plates) that are thicker than those of other sea turtles. This protects them from being battered against sharp coral and rocks during storm events. Adults range in size from 30 to 36-inches (0.8 to 1.0-meter) carapace length, and weigh 100 to 200 pounds (45 to 90-kilograms). Its carapace (upper shell) is an attractive dark brown with faint yellow streaks and blotches and a yellow plastron (under shell). The name "hawksbill" refers to the turtle's prominent hooked beak.

The endangered leatherback sea turtle is the largest, deepest diving, and most migratory and wide ranging of all sea turtles. The adult leatherback can reach 4 to 8-feet in length and 500 to 2000 pounds in weight. Its shell is composed of a mosaic of small bones covered by firm, rubbery skin with seven longitudinal ridges or keels. The skin is predominantly black with varying degrees of pale spotting; including a notable pink spot on the dorsal surface of the head in adults. A toothlike cusp is located on each side of the gray upper jaw; the lower jaw is hooked anteriorly. The paddle-like clawless limbs are black with white margins and pale spotting.

The threatened green sea turtle is generally found in fairly shallow waters (except when migrating) inside reefs, bays, and inlets. These turtles are attracted to lagoons and shoals with an abundance of marine grass and algae. Open beaches with a sloping platform and minimal disturbance are required for nesting. Green sea turtles apparently have a strong nesting site fidelity and often make long distance migrations between feeding grounds and nesting beaches. Hatchlings have been observed to seek refuge and food in sargassum rafts. Hatchling green sea turtles eat a variety of plants and animals, but adults feed almost exclusively on seagrasses and marine algae. The term "green" applies not to the external coloration, but to the color of the turtle's subdermal fat. The nesting season varies with the locality. In the Southeastern U.S., it is

roughly June through September. Nesting occurs nocturnally at 2, 3, or 4-year intervals. Only occasionally do females produce clutches in successive years. A female may lay as a many as nine clutches within a nesting season (overall average is about 3.3 nests per season) at about 13-day intervals. Clutch size varies from 75 to 200 eggs, with an average clutch size of 136 eggs reported for Florida. Incubation ranges from about 45 to 75 days, depending on incubation temperatures. Hatchlings generally emerge at night. Age at sexual maturity is believed to be 20 to 50 years. The green sea turtle has a worldwide distribution in tropical and subtropical waters. Major green sea turtle nesting colonies in the Atlantic occur on Ascension Island, Aves Island, Costa Rica, and Surinam. Within the U.S., green sea turtles nest in small numbers in the U.S. Virgin Islands, Puerto Rico, Georgia, South Carolina, and North Carolina, and in larger numbers in Florida (FWS).

The threatened loggerhead sea turtle is named for their relatively large head, which support powerful jaws and enable them to feed on hard-shelled prey, such as whelks and conch. The carapace (top shell) is slightly heart-shaped and reddish-brown in adults and sub-adults, while the plastron (bottom shell) is generally a pale yellowish color. The neck and flippers are usually dull brown to reddish brown on top and medium to pale yellow on the sides and bottom. Mean straight carapace length of adults in the southeastern U.S. is approximately 36 in (92 cm); corresponding weight is about 250 lbs (113 kg).

Threats to all five of these turtles include direct exploitation for food (including eggs) and curio materials, incidental take (chiefly by drowning in shrimp trawls), habitat degradation (including beach development and beachfront lighting; Peters and Verhoeven 1994, Salmon and Witherington 1995), ocean pollution (including marine debris, which may be ingested), and dredging (direct kills and injuries). Beach armoring, including sea walls, rock revetments, riprap, sandbag installation, groins, and jetties, can result in loss of nesting beaches due to accelerated erosion, prevention of natural beach and dune accretion, and interference with females attempting to reach suitable nesting sites. Beach cleaning operations can destroy nests or produce tire ruts that inhibit movement of hatchlings to sea. The effect of beach restoration may depend on sand type used and subsequent management. Additional threats include predation and/or trampling of eggs and young by raccoons and feral mammals, trampling/crushing of eggs or young by vehicles or human pedestrians, deaths caused by collisions with boats (e.g., in southeastern and southern Florida and shallow coastal bays of the Gulf of Mexico) and intentional attacks by humans (fishermen) (Mitchell 1991). Long-term threats include sea level rise which, coupled with inland urbanization, may reduce available nesting beaches. Annual mortality due to drowning in shrimp nets has been estimated at 5,000-50,000 in the southeastern U.S.; an additional 550-5,500 may die each year from other human activities (CSTC 1990). The fall bottom fishery and black drum fishery may be having adverse effects on loggerheads that use Chesapeake Bay (Mitchell 1991).

#### 4.2.2.2 Available Inventories

The FWS Recovery Plan for each of these five species was reviewed. The National Marine Fisheries Service *Five Year Review: Summary and Evaluation* for each of the five species was reviewed. There was no inventory data included in any of these documents that could be directly correlated to this proposed action and action area.

The project area is located within the Cedar Bayou watershed and lies approximately 2.6-miles from the main channel (straight-line) at the nearest point. Following the circuitous centerline of the nearest (unnamed) stream channel, from the project area to that streams' confluence with Cedar Bayou, is approximately 3.1 miles. From that confluence with Cedar Bayou, it is over 16-

miles south along the circuitous centerline of Cedar Bayou to Galveston Bay. It is 13 miles (straight-line) from the project area to the mouth of Cedar Bayou at Galveston Bay.

In the eleven year period between 1980 and 1991, Caillouet et al reported a total of 27 sea turtle records from Galveston Bay, including: 16 Kemp's Ridley; 4 Green Sea, 3 Loggerhead; 2 Leatherback; and 2 unknown.

Since 1991, four of the five species of sea turtles found in the Gulf of Mexico have been reported in Galveston Bay. All turtles that are reported to the Sea Turtle Stranding and Salvage Network (STSSN) are documented. Dead turtles are recovered and necropsied, while live turtles are brought to the National Marine Fisheries Service Sea Turtle Research and Rehabilitation Facility for rehabilitation. Dead strandings make up the majority of the reports (85%). Due to the condition of the carcasses, a definitive cause of death is rarely determined, but they are still important sources of life history data such as sex ratios, food sources and feeding habits. Few of the stranded turtles are reported alive (15%). Generally it is known why the turtle stranded alive (cold stunned, caught on power plant intake screen, injured post hatchlings, or caught by recreational hook-and-line); however, there are still unknown causes. (From the Texas A&M University, Galveston website: http://repositories.tdl.org/tamug-ir/handle/1969.3/22972?show=full)

In 2004, the Houston Chronicle (Friday, May 14, 2004) reported 3 incidence of Kemp's Ridley nesting attempts in Galveston County: Bolivar Peninsula (Crystal Beach); west end of Galveston Island; below the seawall – City of Galveston.

There are no (0) TXNDD element occurrence records for sea turtles within the ~560 square mile and nine quadrangle information request area.

A ground survey of ExxonMobil-owned property in the action area was conducted by Mr. Ross Carrie (Raven) on June 27, 2012. The remotely sensed survey of the non-ExxonMobil-owned property was accomplished by Raven personnel afterwards. No sea turtle habitat was detected during these surveys.

No sea turtle habitat whatsoever exists within the project area or action area, and there is sufficient additional inventory data and historic occurrence data, as discussed above, to indicate that any occurrence of sea turtles in or near the mouth of Cedar Bayou is extremely unlikely. The Raven field survey and the additional remote surveys described above are adequate to guide the following determination of effects.

#### 4.2.2.3 Determination of Effects

No suitable sea turtle habitat exists within 10-miles of the proposed project area. In addition, no suitable sea turtle habitat was detected by remote sensing techniques in the 801-acre action area. Historic occurrence data and surveys also support the fact that these species of sea turtles have not and likely will not occur in or near the action area or this far inland from their normal marine habitats. In addition, given the wastewater and storm water treatment standards for the project, discharge resulting from this project will not affect the water quality of the streams and canals within the action area and will produce no adverse downstream effects to larger watersheds including the nearest man-made water control canals (Cedar Point Lateral and Coastal Water Authority Canal) and the Cedar Creek watershed. Given the lack of suitable habitat in the action area, that these species of sea turtles have no history of occurrence in or near the action area and no individuals were seen during surveys of the action area, the

construction and operation of the proposed project will have no effect on these five species of sea turtles: Kemp's Ridley Sea Turtle, Hawksbill Sea Turtle, Leatherback Sea Turtle, Green Sea Turtle and Loggerhead Sea Turtle.

### 4.2.3 Red-cockaded Woodpecker – Endangered (FWS Liberty Co.)

#### 4.2.3.1 Environmental Baseline

The red-cockaded woodpecker (*Picoides borealis*) is associated with open, mature pine forests that it uses for nesting, foraging, and cavity excavation (Jackson 1971). FWS estimates the current red-cockaded woodpecker (RCW) population in the Southeast U.S. is less than 3 percent of the original population (FWS 2003).

The loss of old-growth pine forest in the southeastern United States, particularly the open park-like longleaf uplands, has greatly contributed to the decline of the RCW. Large-scale timber harvesting during the latter 1800's and early 1900's in conjunction with the conversion of many forested areas to agriculture were the primary factors responsible for the decline in RCW habitat. More recently, urbanization of woodlands, short-rotation timber management, and especially suppression of natural fire regimes have intensified the decline of suitable RCW habitat (Jackson 1995).

The USFWS formally listed red-cockaded woodpeckers as endangered in 1973. Despite this status, RCW numbers continued to decline until the mid-1990's (James 1995). New management techniques that increase cavity availability (restrictor plates and artificial cavity inserts) and improvements in habitat management (midstory control) have displayed encouraging results in sustaining and/or increasing populations in the last 10 to 15 years.

The RCW has a high potential to occur in mature (80+ years-old), upland pine forests with an open canopy, sparse mid-story, and a grassy, herbaceous groundcover layer normally resulting from a history of periodic fire. The RCW has a lower potential to occur in mature pine stands on more mesic sites, with denser canopies, an increased hardwood component and forests with little to no herbaceous groundcover species.

#### 4.2.3.2 Available Inventories

The nearest CBC (TXHO circle), BBS (Stowell and Winnie lines) resources have no (0) records of RCW having ever been observed in their respective areas of coverage. A single observation of RCW was reported in Ebird (http://ebird.org; website visited January 23, 2013) for Liberty County, over 30-miles from the proposed project area on the Trinity River National Wildlife Refuge. No TPW element occurrence records for RCW are documented within the TXNDD sample area (9 Quadrangles equaling ~560 square miles). The nearest known active RCW group is located 39-miles north-northwest of the proposed project area within Compartment 119 of the Sam Houston National Forest, which is managed and operated by the U.S. Department of Agriculture, Forest Service.

A ground survey of the action area and surrounding area was conducted by personnel from Raven on June 27, 2012 to determine whether suitable habitat was present in the 801-acre action area, and to determine whether RCW could be present. No RCW were detected during this survey. Suitable RCW habitat is absent from the action area. The nearest timber stands consist almost entirely of young hardwood species and non-native plant species and are

completely lacking the open, grassy, park-like, older-age class pine forest habitat required by this species.

#### 4.2.3.3 Determination of Effects

As noted above, there are no RCW occurrence records in the TXNDD database within the action area or the 560 square mile data acquisition area. There are no records of RCW observations in any of the closest CBC and BBS surveys and only a single record in Ebird for Liberty County. No individual RCW or mature pine forest habitat used by the RCW for nesting and foraging was observed during the field survey conducted by Raven. In addition, the action area and surrounding area, which is comprised of heavy industry and dense urban development includes no open mature pine forest habitat that is considered suitable for the RCW. For these reasons, the construction and operation of the proposed project will have no effect on RCW.

### 4.2.4 Smalltooth Sawfish – Endangered (TPW Chambers Co.)

#### 4.2.4.1 Environmental Baseline

The distinct population segment (DPS) of smalltooth sawfish (*Pristis pectinata*) was listed as endangered under the ESA on April 1, 2003 (68 FR 15674) in response to a 1999 listing petition from The Ocean Conservancy (formerly the Center for Marine Conservation). Smalltooth sawfish were once prevalent throughout Florida and were commonly encountered from Texas to North Carolina. Currently, smalltooth sawfish can only be found with any regularity in south Florida between the Caloosahatchee River and the Florida Keys. Based on the contraction in range and anecdotal data, it is likely that the population is currently at a level less than 5% of its size at the time of European settlement. As of January 30, 2006, TPW has listed smalltooth sawfish as endangered under the Parks and Wildlife Code Chapter 68 (NMFS, 2009).

The smalltooth sawfish has different life history stages and different patterns of habitat use. The young can be found very close to shore in muddy and sandy bottoms, seldom descending to depths greater than 32-feet. It can also be found in sheltered bays, on shallow banks, and in estuaries or river mouths. Adult sawfish are encountered in various habitat types including: mangrove, reef, seagrass, and coral; in varying salinity regimes and temperatures; and at various water depths. Adults feed on a variety of fish species and crustaceans.

#### 4.2.4.2 Available Inventories

Smalltooth sawfish in the US used to be common from Texas to the Carolinas and ranged occasionally as far north as New York. The range has contracted by approximately 90% and is now restricted primarily to peninsular Florida. Smalltooth sawfish can only be found with any regularity off the extreme southern portion of Florida. Occurrences of smalltooth sawfish in the northern and western Gulf of Mexico have become rare in the last 30 years. Since 1971, there have been only three published or museum reports of smalltooth sawfish captured from this region, and all have been from Texas (1978, 1979, and 1984). Recent studies to document encounters with smalltooth sawfish since 1990 have yielded only a handful of records. The Mote Marine Laboratory (MML) database has single verified records (one each) from Texas, Louisiana, and Alabama, and several from the Florida Panhandle (Simpfendorfer and Wiley 2005a; Simpfendorfer unpublished data). Most records from the Florida Panhandle are juveniles, from all times of the year (NMFS, 2009). There are no (0) TXNDD element occurrence records for smalltooth sawfish within the ~560 square mile and nine quadrangle information request area.

A ground survey of the 801-acre action area was conducted by Mr. Ross Carrie (Raven) on June 27, 2012. The remotely sensed survey of the 801-acre action area was also conducted by Raven personnel. No individual smalltooth sawfish or smalltooth sawfish habitat was detected within the action area during these surveys.

#### 4.2.4.3 Determination of Effects

The aquatic habitat that the smalltooth sawfish relies on for all of its life stages does not exist within the action area. No suitable smalltooth sawfish habitat was detected by remote sensing techniques in the 801-acre action area. Historic occurrence data and surveys also support the fact that this species has not, and likely will not, occur in or near the action area. In addition, given the wastewater and storm water treatment standards for the project, discharge resulting from this project will not affect the water quality of the streams and canals within the action area and will produce no adverse downstream effects to larger watersheds including the nearest man-made water control canals (Cedar Point Lateral and Coastal Water Authority Canal) and the Cedar Creek watershed. Given the lack of suitable habitat in the action area and because this species has no history of occurrence in or near the action area and no individuals were seen during surveys of the action area, the construction and operation of the proposed project will have no effect on the smalltooth sawfish.

### 4.2.5 Red Wolf – Endangered (TPW Chambers Co.)

#### 4.2.5.1 Environmental Baseline

The red wolf (*Canis rufus*) is smaller but morphologically similar to its larger cousin the gray wolf. As its name implies, the red wolf has a coat that is brown to reddish in color. The red wolf weighs 45-80 pounds, stands approximately 26-inches tall at the shoulder and measures 4-feet in length. Red wolves feed mostly on mammals including rabbits, deer, small pigs and opossums (FWS, 2007). The red wolf was formerly known throughout the eastern one-half of Texas in brushy and forested areas, as well as native grass coastal prairies, and is now considered extirpated (Species Account, TPW).

#### 4.2.5.2 Available Inventories

Formerly the red wolf was believed to have occurred from central Texas eastward to the coasts of Florida and Georgia and north to North Carolina, and along the Mississippi River Valley north to southern Illinois, and occasionally in Mexico. The last remnant population along Texas/Louisiana coast was rendered functionally extinct due to hybridization with the coyote. A single experimentally reintroduced population now occurs in an area of northeastern North Carolina and two propagation populations are currently maintained by the FWS. Other red wolves exist in many captive-breeding facilities. Historically the red wolf was found throughout much of Texas. The last known wild red wolf was killed in 1980 and the species is currently considered extirpated from the state of Texas.

There are no (0) TXNDD element occurrence records for red wolf within the ~560 square mile and nine quadrangle information request area. A ground survey of the 801-acre action area was conducted by Mr. Ross Carrie (Raven) on June 27, 2012. The remotely sensed survey of the action area was also accomplished by Raven personnel. No individual red wolves or red wolf habitat was detected within the action area during these surveys.

#### 4.2.5.3 Determination of Effects

The red wolf is considered extirpated from Texas. No suitable red wolf habitat exists within the action area. Based on historic occurrence data, field surveys and remotely sensed evaluations, the absence of suitable habitat in the immediate area, and the extirpated status of the red wolf from Texas and its range overall throughout the southeastern United States, it is unlikely that red wolves will ever occur within or traverse through the action area. Therefore, the construction and operation of the proposed project would have no effect on red wolves.

### 4.2.6 Louisiana Black Bear – Threatened (TPW Chambers Co.)

#### 4.2.6.1 Environmental Baseline

The Louisiana black bear (*Ursus americanus luteolus*) is federally listed as a threatened species. It is one of 16 recognized subspecies of the American black bear (*Ursus americanus*). This bear was formerly widespread in North America, from Alaska to Mexico. The Louisiana black bear is distinguished from other black bears by a longer and narrower skull and it possesses proportionately larger molar teeth. They are big, bulky mammals. They have brown muzzles and long black hair, although fur can vary in shades of brown or red, and some have white chest patches. Weight ranges between 200 to 400 pounds for males and 120 to 200 pounds for females. The Louisiana black bear is a habitat generalist and often overwinters in hollow cypress trees either in or along sloughs, lakes or riverbanks in bottomland hardwoods. These bears are mobile, opportunistic, largely herbivorous omnivores that exploit a variety of foods, including insects. The distribution and abundance of foods, particularly mast such as nuts and berries, largely affect their movements. Important elements of black bear habitat include hard and soft mast, escape cover, den sites, travel corridors and minimum human disturbance.

All free-ranging black bear subspecies within the historic range of Louisiana black bear are federally listed as threatened due to similarity in appearance, and given the same legal protection.

#### 4.2.6.2 Available Inventories

Black bear populations in the neighboring states of Arkansas, Louisiana and Oklahoma are stable or increasing. Concurrently, the frequency of occurrence of black bears, primarily dispersing juvenile males, within eastern Texas is on the increase. This has been documented in the Red River and Sulphur River Basins in northeast Texas, and at other locations in eastern Texas. There have been some 24 confirmed black bear sightings within eastern Texas since 1977. There have been reliable black bear sightings in the following counties: Anderson, Angelina, Bowie, Cass, Fannin, Franklin, Harrison, Henderson, Hopkins, Jasper, Lamar, Marion, Morris, Nacogdoches, Newton, Panola, Polk, San Jacinto, and Shelby Counties. Approximately 67 percent of these sightings have occurred since 1990. Additionally, approximately 70 percent of these sightings have occurred within the northeastern counties of eastern Texas (Species Account, TPW).

There are no (0) TXNDD element occurrence records for Louisiana black bear within the ~560 square mile and nine quadrangle information request area. A ground survey of the 801-acre action area was conducted by Mr. Ross Carrie (Raven) on June 27, 2012. The remotely sensed survey of the action area was also accomplished by Raven personnel. No individuals or suitable habitat for Louisiana black bear or American black bear habitat was detected during these surveys.

#### 4.2.6.3 Determination of Effects

The critical components of suitable Louisiana black bear habitat, such as mast production, den sites and travel corridors, do not exist within the action area. In addition, intensive industrial and agricultural land-use across the landscape in this part of Chambers County, create an environment of persistent human disturbance that Louisiana black bears would avoid. Based on the complete lack of historic occurrence data in the coastal bend region of Texas and the absence of suitable habitat, it is highly unlikely that Louisiana black bear will ever occur within or traverse through the action area. Therefore, there will be no effects to Louisiana black bear or American black bear from the construction and operation of the proposed project.

### 4.2.7 Sprague's Pipit – Candidate (TPW Chambers Co.)

Sprague's pipit (*Anthus spragueii*) is not listed under authority of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.). Since 2010, Sprague's pipit has been considered by FWS as a candidate for proposed listing as endangered or threatened; however, they have yet to propose this species for listing. Inclusion of candidate species in a BA is considered optional by the FWS. At the request of EPA, ExxonMobil has elected to conservatively include candidate species and assess the potential impacts of the proposed project. While this analysis provides a determination of potential impacts for the pipit, it is for completeness purposes only.

#### 4.2.7.1 Environmental Baseline

Sprague's pipit spends its winters generally in northern Mexico and across all of Texas, except for the Texas Panhandle region, from mid-September through early April. Their spring and summer breeding range is located in the northern native grass prairies of the Great Plains, including portions of southern-central Canada and nearly all of North Dakota and Montana. Year-round habitat is open grasslands and fields that are well drained and essentially devoid of shrubbery and trees. This bird prefers native grass species over non-natives, and prairies and fields that have an intermediate density and height in clump-grass structure. Their diet consists primarily of arthropods, but some seeds are consumed during the winter. This pipit is small, ranging in length from 10 to15-centimeters and weighing between 22 to 26-grams and is considered a ground-inhabiting passerine. Both sexes and all ages are similar in appearance; being generally an overall buff color, accentuated with darker browns. When flushed, they typically rise in an undulating flight, often circling while giving diagnostic, single-syllable, squeaky, "squick" calls. They are generally solitary on wintering and migratory grounds. During breeding, this species nests on the ground, usually at the base of a dense tussock of grass, and lays between 4 and 5 eggs. Since being first described in 1843, Sprague's pipit has suffered a dramatic decline throughout its range, due primarily to the disappearance of native prairie due to conversion to agriculture and cultivation, overgrazing by domestic livestock, and invasion and introduction of non-native grasses (Robbins, 1999).

#### 4.2.7.2 Available Inventories

In the 2010 FWS 12-month petition finding for this species, the CBC data from the winters of 1966 through 2006 (40 years), were analyzed for Sprague's pipit occurrence in Texas with the result of an estimated annual decline of 2.54 percent (75 FR 56028-56050).

All BBS data (survey-wide) indicate a significant decline averaging 3.9 percent per year for 1967-2007 (40 years), which amounts to an 80 percent decline for this time period. BBS abundance declined from an average of 2.5 to 4.0 birds per route in 1967-1977 to 0.9 to 1.2 birds per route in 2000-2007 (Natureserve). No (0) Sprague's pipit has ever been observed during any year for either of the two BBS survey routes.

The nearest CBC circle to this project is the Houston-Baytown circle (TXHO). In the last 60 years, (since 1953), a total of 212 Sprague's pipits have been recorded by CBC observers in the TXHO circle, with 44 Sprague's pipits having been observed within the last 10 years. No Sprague's pipits have been observed along either of the two nearest BBS routes (Stowell and Winnie), which is logical since these surveys are during the spring after pipits have migrated north.

Based on data submitted to the Ebird website (visited January 8, 2013), between the years 2000 and 2012, between 2 and 5 Sprague's pipits have been detected on average per observer checklist in Chambers County. Observations were recorded between November and March in any given year with the greatest frequency in February. Abundance values (provides a measure of how common a species is reported compared to all other species in a region) calculated from this same data and time period scored over 0.09 relative to other species suggesting Sprague's pipit is uncommon but can be routinely observed in Chambers County during a full day of bird observation in the area.

No element occurrence records for Sprague's pipit are documented within the TXNDD sample area (~560 square miles). A ground survey of the 801-acre action area was conducted by Mr. Ross Carrie (Raven) on June 27, 2012 and no Sprague's pipits were observed. A remotely sensed survey of the action area was also conducted by Raven personnel. Some suitable Sprague's pipit winter habitat exists within the action area, primarily in the form of improved pasture, which in some cases, also contains scattered patches of more preferred native grass species.

#### 4.2.7.3 Determination of Effects

The proposed project will be built almost entirely on mowed fields with non-native herbaceous vegetation and scattered trees (see Appendix E). These fields represent poor to unsuitable winter habitat that may be used for intermittent foraging by Sprague's pipit. This proposed action will cause the loss of poor quality winter habitat for Sprague's pipit where permanent facilities are constructed. Because the candidate status of Sprague's pipit is based mostly on the continued loss of limited nesting habitat in the northern Great Plains region and less on the loss of the more abundant and wide-spread winter habitat distributed throughout its southern range, the construction and operation of the proposed project will not contribute to the decline of this species. As such, this proposed action will not contribute to a trend of population decline or decreased species viability for the Sprague's pipit.

### 4.2.8 Houston Toad – Endangered (TPW Liberty Co.)

#### 4.2.8.1 Environmental Baseline

The Houston toad (*Anaxyrus houstonensis*) requires loose, deep sands, supporting woodland savannah, and still or flowing waters for breeding. The largest population of Houston toads exists in Bastrop County, Texas. The Houston toad is 2 to 3.5-inches long. Its general coloration varies from light brown to gray or purplish gray, sometimes with green patches. The pale

undersides often have small, dark spots. Males have a dark throat, which appears bluish when distended. The Houston toad lives primarily on land. The toads burrow into the sand for protection from cold weather in the winter (hibernation) and hot, dry conditions in the summer (aestivation). Plants that are often present in Houston toad habitat include loblolly pine, post oak (*Q. stellata*), bluejack oak (*Q. incana*), yaupon holly (*Ilex vomitoria*), and little bluestem (*Schizachyrium scoparium*). The Houston toad is a year-round resident where found, although its presence can most easily be detected during the breeding season, February through March, when males may be heard calling. Males usually call in or near shallow water or from small mounds of soil or grass surrounded by water.

Habitat loss and alteration are the most serious threats facing the Houston toad. Alteration of ephemeral and permanent natural wetlands for urban and agricultural uses eliminates breeding sites. Draining a wetland, or converting an ephemeral wetland to a permanent pond, can eventually cause the Houston toad to decline or be eliminated entirely. Conversion to permanent water not only makes them more vulnerable to predation by snakes, fish, and other predators; but also increases competition and hybridization with closely related species (Species Account, TPW).

#### 4.2.8.2 Available Inventories

The TXNDD GIS data indicates one historic occurrence for the Houston toad in adjacent Liberty County. The sighting was made by John C. Wottring in 1953 somewhere within the Moss Bluff Quadrangle. The Moss Bluff Quad is located 8.5-miles north-northeast of the proposed project area. This sighting is the only record for Liberty County and there are no records of this species occurring in Chambers County.

The TPW "Five-year Status Review: Houston Toad; Final Report, As Required by The Endangered Species Program, Texas" was published in March 2010. The list of counties from which Houston toads have been historically reported by authorities includes Austin, Bastrop, Burleson, Colorado, Fort Bend, Harris, Lavaca, Lee, Leon, Liberty, Milam, and Robertson. The last Houston toads reported from Liberty County were in the 1950s, Fort Bend in the 1960s, Harris in the mid-1970s, Burleson in 1990, and Lavaca in 1991. Based on the most recent surveys and research, TPW now considers the Houston toad to be likely extirpated in Lavaca, Fort Bend, Harris, and Liberty Counties.

A ground survey of the 801-acre action area was conducted by Mr. Ross Carrie (Raven) on June 27, 2012. The remotely sensed survey of the action area was also accomplished by Raven personnel. No individuals or suitable habitat for the Houston toad was detected during these surveys.

#### 4.2.8.3 Determination of Effects

TPW now considers the Houston toad to be likely extirpated in adjacent Liberty County with the last record of occurrence from there being more than 60 years old (from 1953). There is no occurrence record of Houston toads having ever been sighted in Chambers County. During the Raven field survey, no Houston toads or the deep, sandy soil habitat normally used by toads was observed within or near the action area. As described previously, the project area and large portions of the action area have a long history of industrial use, intensive vegetation management and habitat disturbance that have eliminated the native herbaceous vegetation, specifically bunchgrass species, that Houston Toad normally prefer. This intensive land use environment has produced a compacted and/or heavily disturbed soil profile in most areas that

is likely no longer suitable as burrowing habitat for toads. For these reasons, the construction and operation of the proposed project will have no effect on Houston toads.

### 4.2.9 Louisiana Pine Snake – Candidate (TPW, Liberty Co.)

#### 4.2.9.1 Environmental Baseline

Pine snakes (genus *Pituophis*) are large, short-tailed, powerful constricting snakes with keeled scales, a single anal plate (the scale covering the cloaca) and disproportionately small heads. Their snouts are pointed and they are good burrowers. The Louisiana pine snake (*P. ruthveni*) has a buff to yellowish background color with dark brown to russet dorsal blotches covering its total length. Blotches run together near the head, often obscuring the background color, and then become more separate and well-defined towards the tail. Typically, there are no noticeable head markings, although rarely a light bar or stripe may occur behind the eye.

The Louisiana pine snake historically occurred in the fire-maintained longleaf pine ecosystem within west-central Louisiana and extreme east-central Texas. Most of the historical longleaf pine habitat of the Louisiana pine snake has been destroyed or degraded due to logging, fire suppression, roadways, short-rotation silviculture, and grazing. The loss and fragmentation of the longleaf pine ecosystem has resulted in extant Louisiana pine snake populations that are isolated and small. A Candidate Conservation Agreement (CCA) was completed in 2003 to maintain and enhance occupied and potential habitat on public lands, and to protect known Louisiana pine snake populations. This proactive habitat management has likely slowed or reversed the rate of Louisiana pine snake habitat degradation on many portions of federal lands. Because all extant populations are currently isolated and fragmented by habitat loss in the matrix between populations, there is little potential for dispersal among remnant populations or for the natural re-colonization of vacant habitat patches (FWS 2012)

#### 4.2.9.2 Available Inventories

The Louisiana pine snake is currently restricted to seven disjunct populations; five of the populations occur on federal lands, and two occur mainly on private industrial timberlands. Currently occupied habitat in Louisiana and Texas is estimated to be approximately 159,000-acres. All remnant Louisiana pine snake populations have been affected by habitat loss and all require active habitat management. The nearest Louisiana pine snake occurrence record to the proposed project is on the Angelina National Forest in Jasper County, Texas which is located approximately 90-miles from this proposed project area.

There are no (0) TXNDD element occurrence records for Louisiana pine snakes within the ~560 square mile and nine quadrangle information request area. A ground survey of the 801-acre action area was conducted by Mr. Ross Carrie (Raven) on June 27, 2012. The remotely sensed survey of the action area was also accomplished by Raven personnel. No individual Louisiana pine snakes or suitable habitat was detected during these surveys.

#### 4.2.9.3 Determination of Effects

The critical components of suitable Louisiana pine snake habitat such as longleaf pine (or any other pine species) woodlands, loosely textured sandy soils and a history of natural or prescribed fire do not exist anywhere within the action area. In addition, intensive industrial, residential and agricultural land-use across the landscape in this part of Chambers County has

eradicated all suitable habitat (if it ever existed). Based on the complete lack of historic occurrence data in the coastal bend region of Texas and the current and historic absence of suitable habitat, it is highly unlikely that Louisiana pine snakes have ever occurred, or will ever occur within the action area. Therefore, this proposed action will not contribute to a trend of population decline or decreased species viability for the Louisiana pine snake..

## 5.0 DETERMINATION OF EFFECTS SUMMARY

The following summary describes the determinations of effect for the species evaluated in this BA. For the following federally listed and candidate species, this proposed action will have ***no effect***.

- Kemp's Ridley Sea Turtle (*Lepidochelys kempii*): Endangered
- Hawksbill Sea Turtle (*Eretmochelys imbricata*): Endangered
- Leatherback Sea Turtle (*Dermochelys coriacea*): Endangered
- Green Sea Turtle (*Chelonia mydas*): Threatened
- Loggerhead Sea Turtle (*Caretta caretta*): Threatened
- Piping Plover (*Charadrius melodus*): Threatened
- Smalltooth Sawfish (*Pristis pectinata*): Endangered
- Red Wolf (*Canis rufus*): Endangered
- Louisiana Black Bear (*Ursus americanus luteolus*): Threatened
- Houston Toad (*Anaxyrus houstonensis*): Endangered
- Red-cockaded woodpecker (*Picoides borealis*): Endangered

For the following candidate species, this proposed action will not contribute to a trend of population decline or decreased species viability:

- Sprague's Pipit (*Anthus spragueii*): Candidate
- Louisiana Pine Snake (Pituophis ruthveni): Candidate

## 6.0 LITERATURE CITED AND REFERENCES


Allen, Robert (Pers. comm.). Wildlife Biologist. U.S. Fish and Wildlife Service. East Texas Sub-office. 2221 North Raguet Street, Lufkin, Texas 75904.

Barnes, J.D., L.N. Miller, and E.W. Wood. 1976. Prediction of noise from power plant construction. Bolt Beranek and Newman, Inc. Cambridge, MA. Prepared for the Empire State Electric Energy Research Corporation, Schenectady, NY.

Caillouet, Charles W. et al. Sea Turtle Head Starting and Ecology Research. National Marine Fisheries Service.

Ehrlich, P. R., D. S. Dobkin, and D. Wheye. 1992. Birds in Jeopardy: the Imperiled and Extinct Birds of the United States and Canada, Including Hawaii and Puerto Rico. Stanford University Press, Stanford, California. 259 pp.

Eliott-Smith, E., Haig, S.M., and Powers, B.M., 2009, Data from the 2006 International Piping Plover Census: U.S. Geological Survey Data Series 426, 332 p.

Forstner, Michael R. 2010. Five-year status review: Houston toad. Final Report. Texas Parks and Wildlife Department. 4200 Smith School Road, Austin, Tx.

Gottfried, Bob (Pers. comm.). Texas Parks and Wildlife Department. Texas Natural Diversity Database Administrator. 4200 Smith School Road, Austin, Texas.

Lovett, Gary M., and T.H. Tear et.al. 2007. Effects of Atmospheric Deposition on Biological Diversity in the Eastern United States. Institute of Ecosystem Studies and The Nature Conservancy. New York. 56pp.

Jackson, J. A. 1971. The evolution, taxonomy, distribution, past populations and current status of the Red-cockaded Woodpecker. Pages 4-29 in R. L. Thompson, editor. The ecology and management of the Red-cockaded Woodpecker. Bureau of Sport Fisheries and Wildlife, Washington D.C., and Tall Timbers Research Station, Tallahassee, Florida, USA.

Jackson, J.A. 1995. The red-cockaded woodpecker: two hundred years of knowledge, twenty years under the Endangered Species Act. Pgs. 42-48 in D.L. Kulhavy, R.G. Hooper, and R. Costa, eds. Red-cockaded woodpecker: recovery, ecology, and management. Center for Applied Studies in Forestry, S.F.A.S.U., Nacogdoches, Tx.

James, F. C. 1995. The status of the red-cockaded woodpecker in 1990 and the prospect for recovery. Pages 439-451 in D. L. Kulhavy, R. G. Hooper, and R. Costa, eds. Red-cockaded woodpecker: recovery, ecology, and management. Center for Applied Studies in Forestry, College of Forestry, Stephen F. Austin State Univ., Nacogdoches, Tx.

Miller, James H. 2003. Nonnative Invasive Plants of Southern Forests. Revised. Gen. Tech. Rep. SRS-62. Asheville, NC. Department of Agriculture, Forest Service, Southern Research Station. 93 pp.

National Audubon Society, Inc. Christmas Bird Count. Historical Results. Data for a Species. Whooping Crane. Available at: http://birds.audubon.org/christmas-bird-count (Accessed Jan 6, 2012).

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1991. Recovery Plan for U.S. Population of Atlantic Green Turtle. National Marine Fisheries Service, Washington, D.C.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1992. Recovery Plan for Leatherback Turtles in the U.S. Caribbean, Atlantic and Gulf of Mexico. National Marine Fisheries Service, Washington, D.C.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 1993. Recovery Plan for Hawksbill Turtles in the U.S. Caribbean Sea, Atlantic Ocean, and Gulf of Mexico. National Marine Fisheries Service, St. Petersburg, Florida.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. 2008. Recovery Plan for the Northwest Atlantic Population of the Loggerhead Sea Turtle (*Caretta caretta*), Second Revision. National Marine Fisheries Service, Silver Spring, MD.

National Marine Fisheries Service, U.S. Fish and Wildlife Service, and SEMARNAT. 2010. Bi-National Recovery Plan for the Kemp's Ridley Sea Turtle (*Lepidochelys kempii*), Second Revision. National Marine Fisheries Service. Silver Spring, Maryland.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. August 2007. Green Sea Turtle (*Chelonia mydas*) Five Year Review: Summary and Evaluation. National Marine Fisheries Service, Silver Spring, Maryland.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. August 2007. Hawksbill Sea Turtle (*Eretmochelys imbricata*) Five Year Review: Summary and Evaluation. National Marine Fisheries Service, Silver Spring, Maryland.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. August 2007. Kemp's Ridley Sea Turtle (Lepidochelys kempii) Five Year Review: Summary and Evaluation. National Marine Fisheries Service, Silver Spring, Maryland.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. August 2007. Leatherback Sea Turtle (*Dermochelys coriacea*) Five Year Review: Summary and Evaluation. National Marine Fisheries Service, Silver Spring, Maryland.

National Marine Fisheries Service and U.S. Fish and Wildlife Service. August 2007. Loggerhead Sea Turtle (*Caretta caretta*) Five Year Review: Summary and Evaluation. National Marine Fisheries Service, Silver Spring, Maryland.

Nature Serve. 2012. NatureServe Explorer: An online encyclopedia of life [web application]. Version 6.1. NatureServe, Arlington, Virginia. (Accessed: Jun 8, 2012). Available at: http://www.natureserve.org/explorer

Texas Parks and Wildlife Department. Wildlife Division. Wildlife Habitat Assessment Program. Texas Natural Diversity Database. 4200 Smith School Road, Austin, Texas.

Texas Parks and Wildlife Department. 2012. The Rare, Threatened, and Endangered Species of Texas by County [web application]. Austin, Texas. Available at: http://www.tpwd.state.tx.us/landwater/land/maps/gis/ris/endangered_species/

Texas Parks and Wildlife Department. 2012. Ecosystem Resources. [web application]. Austin, Texas. Available at: http://www.tpwd.state.tx.us/landwater/water/conservation/coastal_studies/

U.S. Environemntal Protection Agency. 1971. Effects of Noise on Wildlife and Other Animals. Washington, D.C. 74pp.

U.S. Environmental Protection Agency. 1987. Level III Ecoregions of the Continental United States [Map]. Omernick.

U.S. Fish and Wildlife Service. 2003. Recovery plan for the red-cockaded woodpecker (Picoides borealis): second revision. U.S. Fish and Wildlife Service, Atlanta, GA. 296 pp.

U.S. Fish and Wildlife Service Website. 2012. Southwest Region Ecological Services, Endangered Species List and Life Histories. Available at http://ecos.fws.gov/docs/life_histories

U.S. Fish and Wildlife Service. 2012. Species Assessment and Listing Priority Assignment Form for the Louisiana Pine Snake (*Pituophis ruthveni*). 26 pp.

U.S. Geological Survey, Patuxent Wildlife Research Center. North American Breeding Bird Survey Raw Data Online Retrieval System. Available at http://www.pwrc.usgs.gov (Accessed Jun 8 2012).

Vale, Arturo J. (Pers. comm.). U.S. Fish and Wildlife Service. Project Leader. Clear Lake Environmental Services Field Office, 17629 El Camino Real #211, Houston TX 77058-3051.

**SIGNATURE PAGE**

**Prepared By:** Date:

_____ June 4, 2013

Mr. Ross Carrie
Project Manager
Raven Environmental Services, Inc.

**Approved By:** Date:

_____ _____

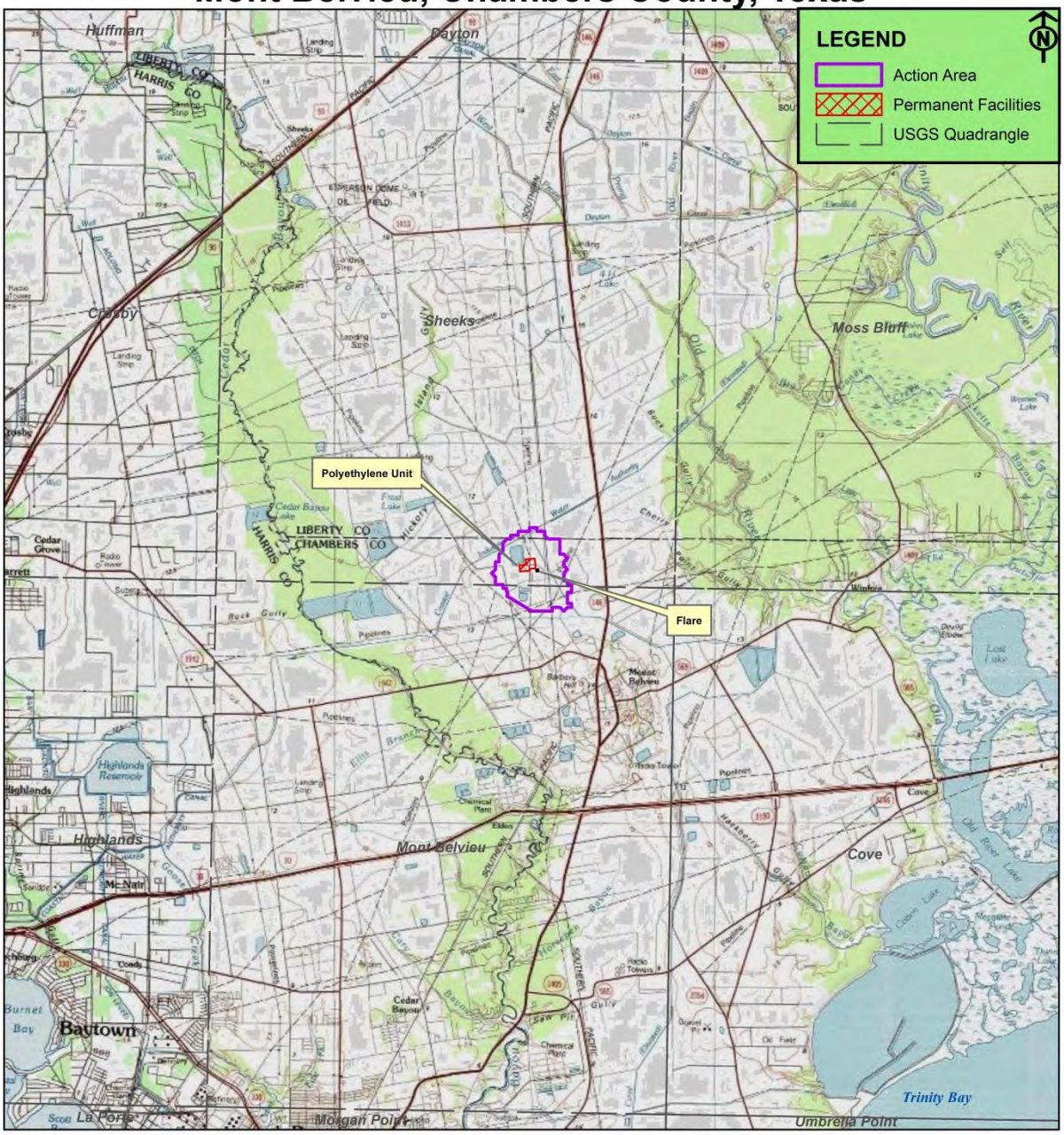
Dr. Alfred Dumaual, Ph.D.
EPA, Region 6, Arlington, TX

## APPENDIX

**EXHIBIT A – Vicinity Map**
**EXHIBIT B – Potential Air Dispersion and Action Area**
**EXHIBIT C - USGS Quadrangle Map and Action Area**
**EXHIBIT D – Color Aerial Map and Action Area**
**EXHIBIT E – List of Preparers**
**EXHIBIT F – Project Area Photographs**

## Exhibit A – Vicinity Map

# EXXONMOBIL CHEMICAL COMPANY
# Mont Belvieu Plastics Plant, Polyethylene Unit Project
# Mont Belvieu, Chambers County, Texas



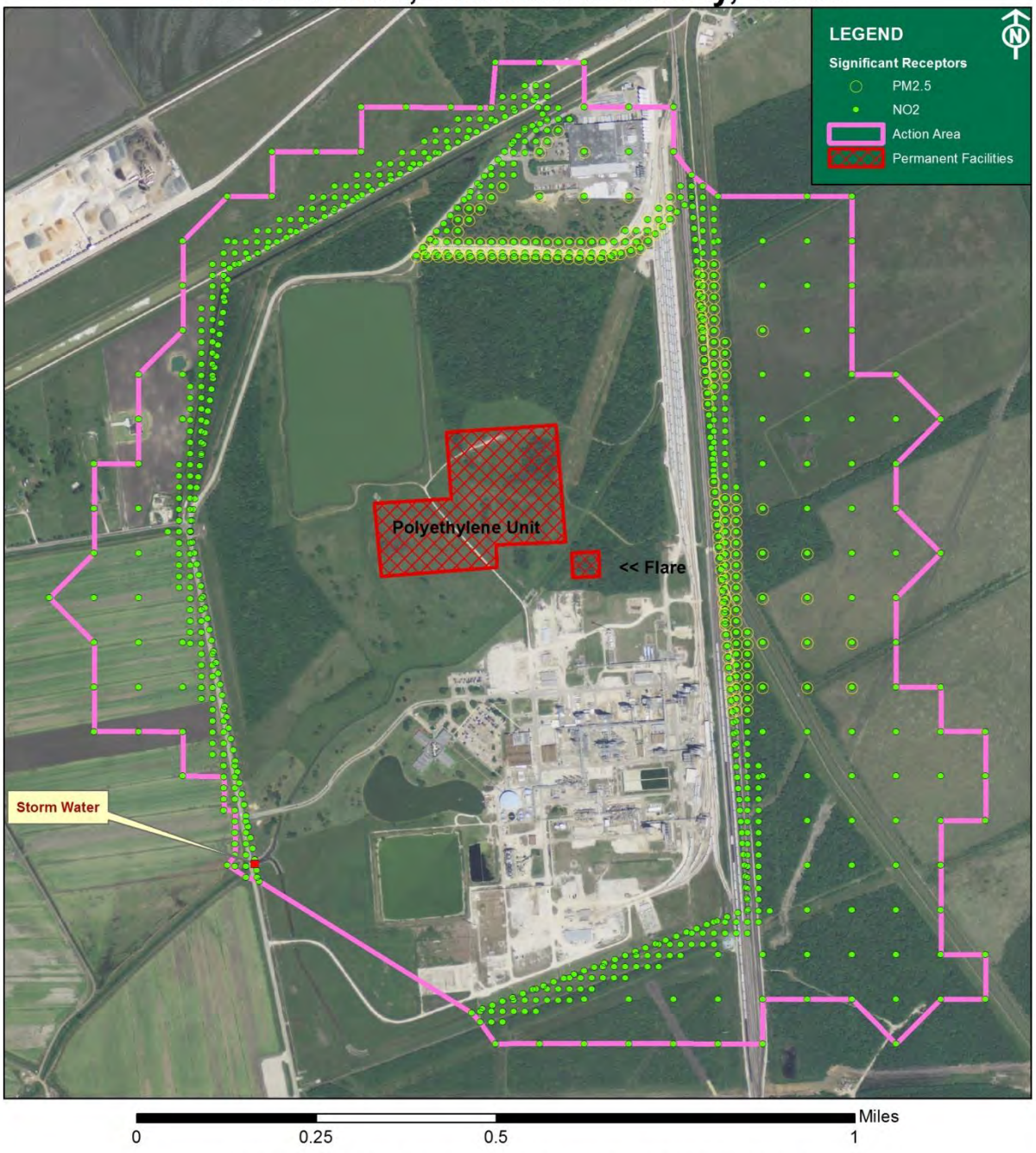

***VICINITY MAP***

Raven Environmental Services, Inc.

Joe Hamrick, February 27, 2013

**Exhibit B – Potential Air Dispersion and Action Area**

# EXXONMOBIL CHEMICAL COMPANY
## Mont Belvieu Plastics Plant, Polyethylene Unit Project
## Mont Belvieu, Chambers County, Texas



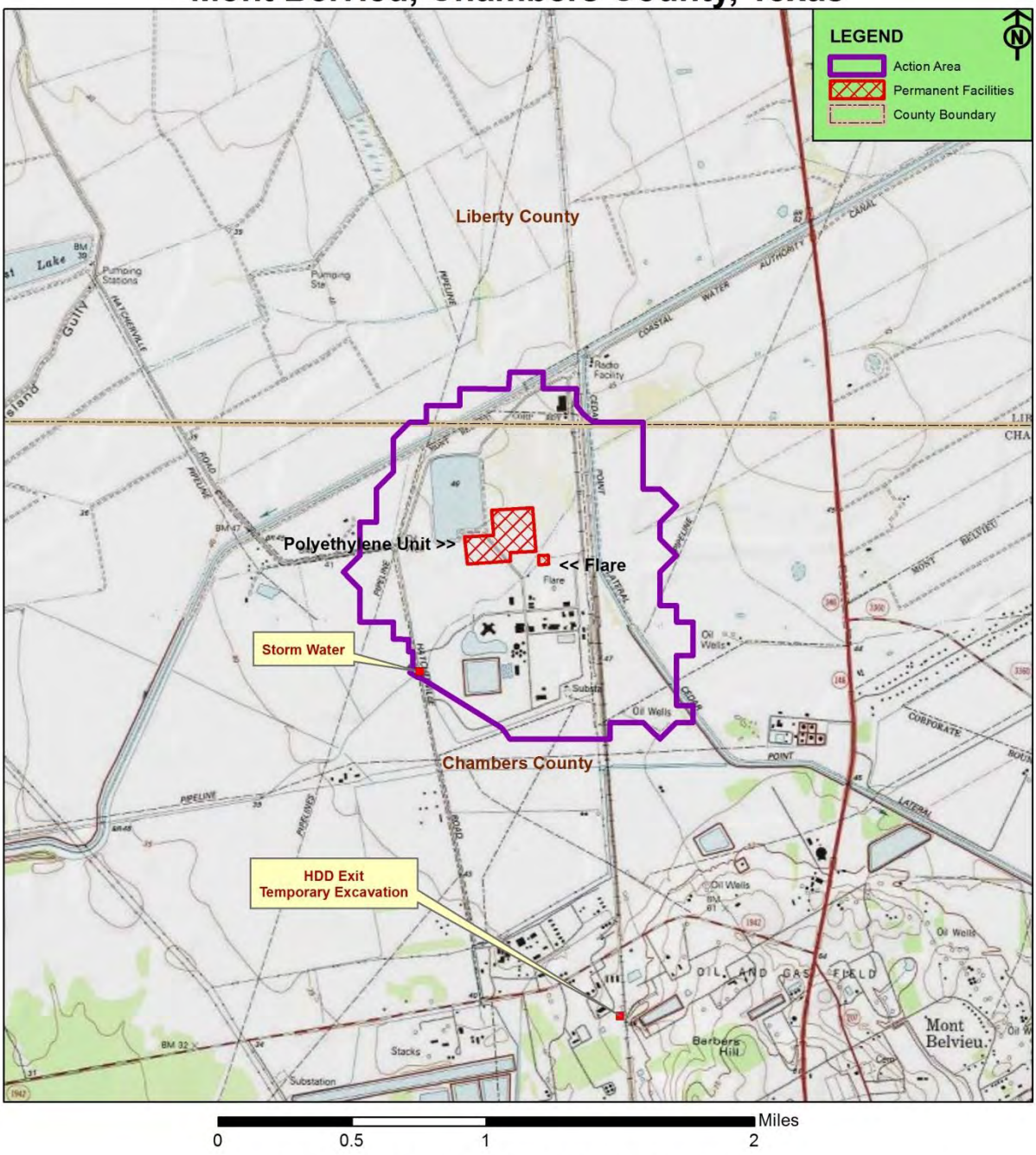

***POTENTIAL AIR DISPERSION AND ACTION AREA***

Raven Environmental Services, Inc.

Joe Hamrick, May 29, 2013 (11,200)

**Exhibit C – USGS Quadrangle Map and Action Area**

# EXXONMOBIL CHEMICAL COMPANY
## Mont Belvieu Plastics Plant, Polyethylene Unit Project
## Mont Belvieu, Chambers County, Texas



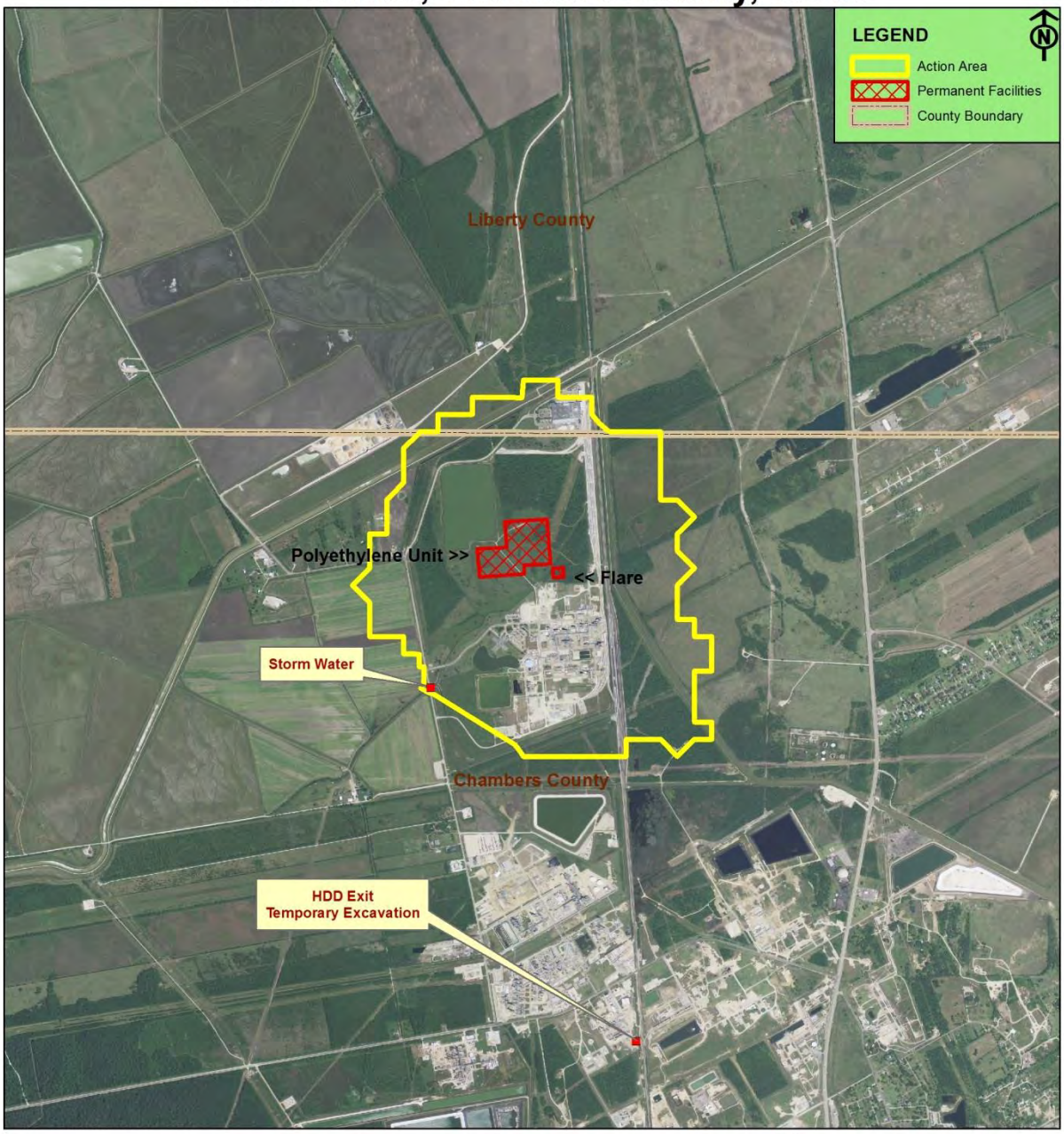

***USGS QUADRANGLE AND ACTION AREA***

Raven Environmental Services, Inc.

Joe Hamrick, May 29, 2013 (30,000)

**Exhibit D – Color Aerial Map and Action Area**

# EXXONMOBIL CHEMICAL COMPANY
## Mont Belvieu Plastics Plant, Polyethylene Unit Project
## Mont Belvieu, Chambers County, Texas




***COLOR AERIAL AND ACTION AREA***

Raven Environmental Services, Inc.

Joe Hamrick, May 29, 2013 (30,000)

## Exhibit E – List of Preparers

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*Qualifications of the Primary Author*

Mr. Ross Carrie is the primary author of this BA. Mr. Ross Carrie received his Bachelor of Science degree in Zoology and a Masters of Science degree in Wildlife and Fisheries Sciences from Texas A&M University. He has worked more than eighteen years as a manager, consultant, and educator in non-game wildlife management and research, endangered species, environmental and regulatory compliance, and zoonosis management and research. Ross has accumulated over eight years' experience working at management-level positions in county, state, and federal government. His experience includes conducting and publishing original research on endangered species and rare grassland bird species, managing endangered and non-game species on U.S. Forest Service and Department of Defense lands in Texas and Louisiana, developing NEPA-related documents to assess potential impacts of projects proposed on U.S. Forest Service lands, teaching in the Biology Department of Texas A&M University and developing and managing an avian encephalitis surveillance program for all of Harris County, Texas. These experiences inspired him to found Raven in 1996 as a turnkey natural resources management company, providing exemplary and cost-effective services in environmental planning, management, compliance and research. Ross is both President of Raven and a Project Manager, specializing in services that include research design, data collection and management, statistical analysis and publication, and technical writing support.

## Exhibit F – Project Area Photographs


**Forest habitat with dense understory vegetation and heavy encroachment of non-native tree species on north side of action area.**


**Forest habitat with dense understory vegetation on north side of action area.**


**Mowed fields with non-native herbaceous vegetation and patches of dense forest habitat. Representative of habitats on north and west sides of action area.**


**Mowed fields with non-native herbaceous vegetation and scattered trees. Representative of habitats on south and west sides of action area.**