

# INTERCONTINENTAL TERMINALS COMPANY LLC 2019 DEER PARK TANK FIRE NATURAL RESOURCE DAMAGE ASSESSMENT PLAN

*FINAL*

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Prepared by:

Texas Parks and Wildlife Department

Texas Commission on Environmental Quality

Texas General Land Office

United States Department of the Interior

National Oceanic and Atmospheric Administration



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## LIST OF ACRONYMS AND ABBREVIATIONS

AFFF	Aqueous Film Forming Foams
BNC	Baytown Nature Center
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COCs	Contaminants of Concern
DOC	United States Department of Commerce
DOI	United States Department of the Interior
GLO	Texas General Land Office
HEA	Habitat Equivalency Analysis
ITC	Intercontinental Terminals Company, LLC
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NRDA	Natural Resource Damage Assessment
NRDAR	Natural Resource Damage Assessment and Restoration
QAP	Quality Assurance Plan
QA/QC	Quality Assurance/Quality Control
PAS	Preassessment Screen
PCB	Polychlorinated biphenyls
PFAS	Per- and Poly-fluoroalkyl Substances
PRP	Potentially Responsible Party
REA	Resource Equivalency Analysis
TCEQ	Texas Commission on Environmental Quality
TPWD	Texas Parks and Wildlife Department
TMDL	Total Maximum Daily Load
USEPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

# 1 INTRODUCTION AND BACKGROUND INFORMATION

The Texas Commission on Environmental Quality (TCEQ), the Texas Parks and Wildlife Department (TPWD), the Texas General Land Office (GLO), the National Oceanic and Atmospheric Administration (NOAA) of the United States Department of Commerce, and the United States Fish and Wildlife Service (USFWS), acting on behalf of the United States Department of the Interior (DOI), (collectively, the Trustees), are designated to act on behalf of the public as Trustees for natural resources in the State of Texas (40 CFR §§ 300.600-605). Natural resource trustees are authorized to pursue claims for natural resource damages under Section 107(f) of the Comprehensive Environmental Response, Compensation, and Liability Act as amended (CERCLA), 42 USC § 9607(f), and Section 311 of the Federal Water Pollution Control Act (also known as the Clean Water Act (CWA)), as amended, 33 USC § 1321. The Trustees undertake this task when natural resources have been, or may have been, injured by discharges of hazardous substances. CERCLA regulations establish an administrative process for conducting a natural resource damage assessment and restoration (NRDAR) to determine and quantify injury, determine the damages, and identify, select, and implement restoration to compensate the public for the injured natural resources and lost services (43 CFR Part 11). While following these regulations is optional, trustees who conduct an assessment consistent with these regulations are entitled by law to a rebuttable presumption in any subsequent litigation concerning the natural resource damages claim (42 U.S.C. § 9607(f)(2)(C); 43 CFR § 11.10). This Assessment Plan is one of the documents identified in the CERCLA NRDAR regulations. Its purpose is “to ensure that the assessment is performed in a planned and systematic manner and that methodologies selected...can be conducted at a reasonable cost” (43 CFR § 11.30(b)). The Trustees are making this Assessment Plan available for public comment, including comment by the Potentially Responsible Party (PRP), for a period of thirty days (43 CFR § 11.32(c)).

On Sunday March 17, 2019, a storage tank caught fire engulfing much of the Second 80’s tank battery at the Intercontinental Terminals Company, LLC (ITC) Deer Park facility (Facility) located in Harris County Texas. At the time the fire began, the tank battery contained a reported 470,000 barrels of product. See Figure 1.1 for the location of the facility and Figure 1.2 for damage to the tank farm. The fire continued to burn at the Facility until it was initially extinguished on Wednesday March 20, 2019. On Friday March 22, 2019, damage to the secondary containment wall for the Second 80’s tank battery caused a breach, releasing a mixture of fire water<sup>1</sup>, different firefighting aqueous film forming foams (AFFF), and petrochemical products from the storage tanks into Tidal Road and Independence Parkway ditches and the air (“Releases”). The fire re-ignited following the breach and was re-extinguished later that same day. Releases flowed from Tidal Road and Independence Parkway ditches into Tucker Bayou, then Buffalo Bayou, and were carried by stream

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<sup>1</sup> Fire water refers to water that has been used in firefighting and requires disposal or was released as a result of firefighting activities. Fire water contains materials present in the building or facility involved in the fire and may also contain dissolved and particulate materials from combustion processes and materials generated through quenching.

flow and tides into the San Jacinto River, Houston Ship Channel, Carpenters Bayou, Old River, and Santa Anna Bayou and surrounding water bodies, ultimately impacting or potentially impacting approximately 136 miles of shoreline and associated benthic, marsh, riparian, and beach habitats. Air quality was impacted in the surrounding area, resulting in the closure of roads, schools, parks, and causing shelter in place orders over several days for most of the Deer Park area. The impacts associated with the fire and Releases are referred to throughout this document as the 2019 Fire. Remedial activities to address remaining contamination have not been completed and are not expected to fully restore or compensate for natural resource injuries. This Natural Resource Damage Assessment Plan (Assessment Plan) serves as the guiding document for all damage assessment activities related to the Releases at or from the Facility.

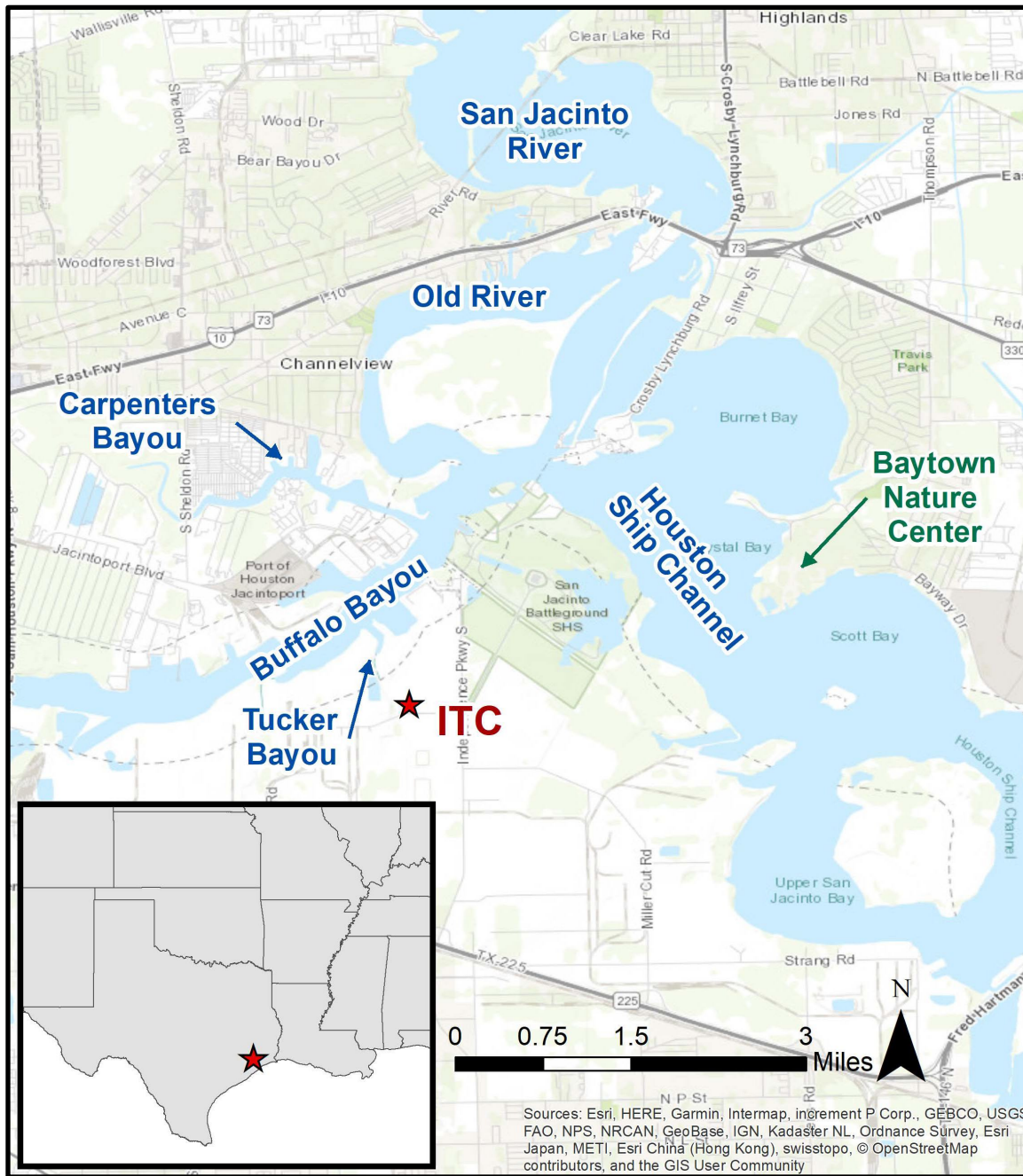


Figure 1.1 Map of the general area where response activities associated with product recovery occurred. The red star indicates the location of the Facility.





**Figure 1.2 Photograph of the ITC Second 80s Tank Farm on March 27, 2019. Credit: U.S. Coast Guard, photo by PA2 Johanna Strickland.**

### 1.1 Purpose of the Assessment Plan

The purpose of this Assessment Plan is to describe the Trustees' approach for conducting a damage assessment in a cost-effective manner. This Assessment Plan outlines the Trustees' proposed approaches for determining and quantifying natural resource injuries and damages associated with those injuries which includes two primary components of a damages claim: 1) the cost to restore, rehabilitate, replace, and/or acquire equivalent resources for the injured resources, and 2) "compensable value," or the monetary value of the natural resource services that were lost pending the restoration of injured resources to their "baseline" condition. *Injury* means a measurable adverse change, either long- or short-term, in the chemical or physical quality or the viability of a natural resource, resulting either directly or indirectly from exposure to a discharge of oil or release of a hazardous substance (43 CFR § 11.14(v)). *Damages* is a legal term for the amount of money sought by Trustees as compensation for injury, destruction, or loss of natural resources; damages include the costs of assessing injuries, as well as the costs of restoration (42 U.S.C. §§ 9601(6), 9607(a)(4)(C); 43 CFR § 11.14(l)). By developing an Assessment Plan, the Trustees ensure that the NRDAR will be completed at a reasonable cost relative to the magnitude of damages sought. The Trustees also intend for this Plan to communicate proposed assessment methodologies to the public, including the PRP, so that these groups can productively participate in

the assessment process.

The Assessment Plan, as currently written, describes the Trustees' understanding of the studies (e.g., Natural Resource Trustees and ITC 2019) and identifies other processes (e.g., data review and analysis) that may be needed to confirm exposure to the Releases and quantify injury to natural resources and their services. This Assessment Plan and the initiation of the Trustees' assessment activities have been undertaken during a global pandemic which has limited the Trustees' ability to capture potentially perishable data and conduct field investigations or studies normally associated with the assessment and quantification of injuries to natural resources and recreational losses. This Plan reflects those limitations and makes use of alternative methods to assess injuries to natural resources and recreational losses from the 2019 Fire. Inclusion of a study within this Plan does not guarantee that it will be undertaken and studies not included within the Plan may be deemed necessary at a later date. The Assessment Plan provides an initial prioritization of efforts the Trustees will take during the Injury Assessment process. Additional plans describing assessment studies, if any, will be tiered off this Assessment Plan and made available for public comment.

## **1.2 Authority to Conduct a NRDAR**

The NRDAR is being conducted jointly by the Trustees pursuant to their respective authorities and responsibilities as natural resource trustees. The Trustees have each been designated as a natural resource trustee pursuant to Section 107(f) of CERCLA, 42 U.S.C. § 9607(f); Section 311(f)(5) of the CWA, 33 U.S.C. § 1321(f)(5); and Subpart G of the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 CFR §§ 300.600 - 300.615. Under these authorities, the Trustees act on behalf of the public to seek damages for the injury, loss, or destruction of natural resources belonging to, managed by, controlled by, or appertaining to the State or United States, that resulted from releases of hazardous substances. This includes the authority to seek compensation for injuries to natural resources and their supporting habitats as a result of response actions (43 CFR § 11.84(c)(2)). This authority includes implementing a NRDAR to evaluate the injury, loss, or destruction of natural resources and their services due to releases of hazardous substances.

The TCEQ, GLO, and TPWD are the designated state natural resource trustees, pursuant to CERCLA, as amended by the Superfund Amendments and Reauthorization Act, which provided that the Governor of each State shall designate State officials . . . and that "(s)uch State officials shall assess damages to natural resources . . . for those natural resources under their trusteeship" (42 USC § 9607(f)(2)(B)).

Pursuant to the NCP, the Secretaries of the Department of the Interior and Department of Commerce act as Trustees for natural resources and their supporting ecosystems, managed or controlled by the DOI and DOC. In this matter, the USFWS is acting on behalf of the Secretary of the DOI as Trustee for natural resources under its jurisdiction, including but not limited to migratory birds and endangered and threatened species. NOAA is acting on behalf of the Secretary of Commerce as Trustee for natural resources under DOC jurisdiction, including but not limited to fish, marine mammals, threatened and endangered species, and their environments.

In addition to the NCP and CERCLA NRDAR regulations, the Texas Water Code provides for recovery of costs to determine impacts on the environment from a spill or discharge and to restore land and aquatic resources held in trust or owned by the State (Tex. Water Code § 26.265). Trustees are authorized to act on behalf of the public under state and/or federal law to assess and recover natural resource damages and to plan and implement actions to restore natural resources and their services that are injured or lost as the result of hazardous substances released at or from a Facility.

The Trustees decided to proceed with this NRDAR based on the results of a Preassessment Screen (PAS) completed on August 5, 2019 (Natural Resource Trustees 2019a; 43 CFR §§ 11.23-11.25).

In the PAS, the Trustees determined:

- A discharge of oil and/or a release(s) of a hazardous substance occurred;
- Natural resources the Trustees may assert trusteeship under CERCLA have been or are likely to have been adversely affected by the release;
- The quantity and concentration of the discharged oil or released hazardous substance is sufficient to potentially cause injury to natural resources;
- Data sufficient to pursue an assessment are readily available or likely to be obtained at a reasonable cost; and
- Response actions carried out or planned do not or will not sufficiently remedy injury to natural resources without further action.

The Trustees therefore concluded that all preassessment screening criteria were met, natural resources that Trustees may assert trusteeship over have been or may have been impacted, and ITC is a viable PRP.

### 1.3 NRDAR Process Overview

It is the intent of the Trustees to conduct the ITC 2019 Deer Park Tank Fire NRDAR consistent with the CERCLA NRDAR regulations at 43 CFR Part 11. These regulations describe the process by which Trustees may conduct a NRDAR. This process includes the following three phases:

- Preassessment,
- Assessment (including the Assessment Plan, injury determination, quantification, and damages determination phases), and
- Post-Assessment (i.e., damages recovery and restoration planning and implementation).

To date, as noted above, the Trustees have completed the Preassessment Phase. The following administrative and preassessment planning documentation is available on the [ITC NRDAR website](#).

- [Notice of Intent](#). The Trustees sent a notice of intent to initiate a NRDAR to ITC on August 5, 2019 (Natural Resource Trustees 2019b; 43 CFR § 11.32(a)(2)(iii)(A)-(B)).
- [Preassessment Screen and Determination](#). The Trustees finalized a Preassessment Screen and Determination on August 5, 2019 which provided the basis for the Trustees'

determination that further investigation was warranted based on review of readily available information of the effects of Releases associated with the 2019 Fire (Natural Resource Trustees 2019a).

- [Memorandum of Agreement to conduct a Cooperative Natural Resource Damage Assessment and Restoration Identification Process](#). Consistent with the CERCLA NRDAR regulations, 43 CFR § 11.32(a)(2), the Trustees entered into a Memorandum of Agreement to conduct a Cooperative Natural Resource Damage Assessment and Restoration Identification Process with ITC on March 5, 2020. The purpose of the agreement is to provide an expedited, focused framework for cooperative NRDAR activities and to facilitate the resolution of claims, if any, for natural resource damages, and paying the reasonable assessment costs incurred and to be incurred by the Trustees (Natural Resource Trustees and ITC 2020).

The Trustees are now in the Assessment Phase, which may include, as necessary:

- Assessment Plan Phase (43 CFR §§ 11.30 - 11.38)
- Injury Determination Phase, including pathway determination (43 CFR §§ 11.61-11.70),
- Quantification Phase, including baseline services determination and resource recoverability analyses (43 CFR §§ 11.70-11.73), and
- Damages Determination Phase (43 CFR §§ 11.80-11.84).

Determination of damages will include an analysis of a reasonable number of possible restoration alternatives. The Trustees will evaluate each of the possible alternatives based on all relevant considerations, including the following factors, pursuant to 43 CFR § 11.82(d):

- Technical feasibility,
- The relationship of the expected costs of the proposed actions to the expected benefits,
- Cost-effectiveness,
- The results of any actual or planned response actions,
- Potential for additional injury resulting from the proposed actions,
- The natural recovery period,
- Ability of the resources to recover with or without alternative actions,
- Potential effects of the action on human health and safety,
- Consistency with relevant Federal, State, and tribal policies, and
- Compliance with applicable Federal, State, and tribal laws.

The Trustees anticipate providing this analysis in a separate plan, to be made available for public review.

#### **1.4 Identification of the Potentially Responsible Party (PRP)**

ITC is the owner and operator of the ITC Facility in Deer Park where the fire and Releases of hazardous substances occurred. Therefore, the Trustees are identifying it as the PRP under CERCLA

(42 USC § 9607(a)).

## 1.5 Coordination with Other Activities

The CERCLA NRDAR regulations support the coordination of a damage assessment, to the extent possible, with response actions or other investigations being performed pursuant to the NCP (i.e., cleanup activities). Consistent with 43 CFR § 11.31(a)(3)), the Trustees recognize the benefit of coordinating assessment activities associated with sites that may have significant contaminants of concern (COCs). To that end, Texas Administrative Code Title 30, Part 1, Chapter 7, Section 7.124 describes a Memoranda of Understanding that seeks to facilitate interactions between TCEQ and the Trustees in regard to the ecological risk assessment and ecological service analysis. Integration of Trustee considerations into remedial decisions may resolve certain natural resource damages liability or decrease the cost of assessment activities.

The Trustees participated in the response activities associated with the 2019 Fire and have participated in the remedial process since the Facility first entered the TCEQ Remediation Industrial and Hazardous Waste Corrective Action Program (Corrective Action Program) in 2019. Trustee assessment activities discussed in this Plan make use of existing data generated through the Incident response, remedial process, and other research and data collection efforts.

## 1.6 Public Participation

Public participation is an important part of the NRDAR process. To that end, the Trustees made a draft of the Assessment Plan available to the public, including the PRP, for review and comment for a thirty-day period (43 CFR § 11.32(c)) beginning on November 8, 2021, and ending on December 8, 2021. The Trustees received one comment. The Trustees' responsiveness summary to the comment is included as APPENDIX B to this document. Development of the Assessment Plan, the public comment process, and finalization of the Assessment Plan is performed solely by the Trustees. Based on the public's comments or other information, the Trustees may modify the Assessment Plan at any time. In the event of a significant modification, the Trustees will provide the public with an opportunity to comment on that amendment (43 CFR § 11.32(e)).

## 1.7 Timeline

The activities in this Plan are expected to take a reasonable amount of time to accomplish. If new information becomes available as this assessment progresses, and additional study is deemed warranted, updates to this Plan and the timeline will be made publicly available.

# 2 ASSESSMENT AREA

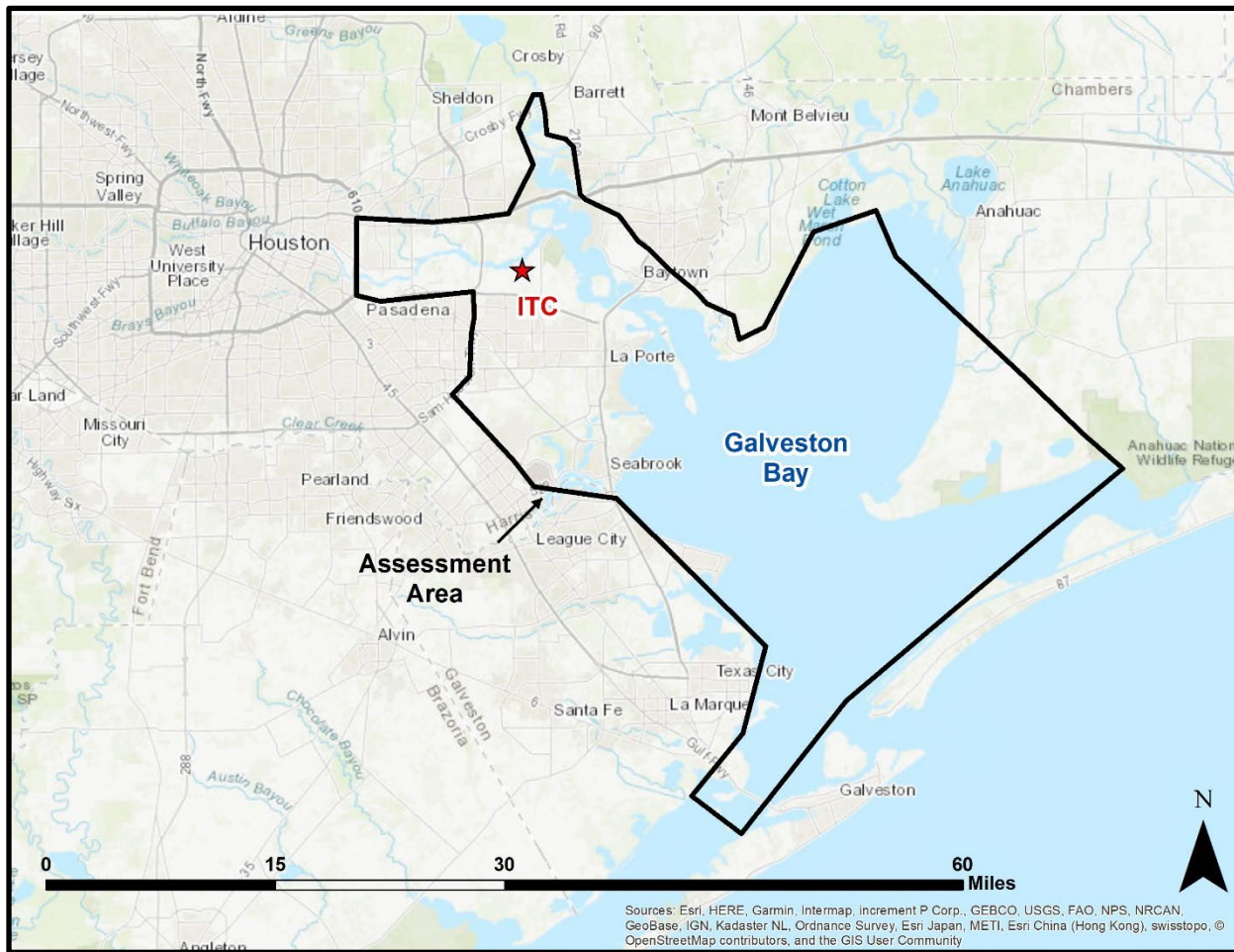
Assessment Area is defined as:

*The area or areas within which natural resources have been affected directly or indirectly by the discharge of oil or release of a hazardous substance and that serves as the geographic basis for the injury assessment (43 CFR § 11.14(c)).*

The Assessment Area, also referred to as the Site, for the ITC 2019 Deer Park Tank Fire NRDAR includes the location of hazardous substances and oil after release from the Facility. During the fire, the Facility had Releases into the air and Tucker Bayou, then to Buffalo Bayou, and were carried by stream flow and tides into the San Jacinto River, Houston Ship Channel, Carpenters Bayou, Old River, Santa Anna Bayou, and other surrounding water bodies. Additionally, the Assessment Area includes areas that were negatively impacted by the response actions, had air quality impacts as a result of the fire and subsequent Releases, areas that suffered from losses to recreation and use of environmental resources, and locations of supporting habitat for natural resources which may have been exposed to hazardous substances and/or oil as a result of the Releases (Figure 2.1).

The area of response action associated with the 2019 Fire was considered along with surface water data, aerial photography, wildlife data, sediment data, human use data, and other relevant information to determine the bounds of the Assessment Area (Figure 2.1). It is important to analyze multiple data sources to determine the Assessment Area because hazardous substances are known to have moved off site from the Facility and effects to natural resources and human use could potentially be larger than the area of response.





**Figure 2.1 Assessment Area for the ITC 2019 Deer Park Tank Fire NRDAR.**

## 2.1 Areas Near the Facility

As mentioned above, there are numerous water bodies in the vicinity of the Facility (Figure 1.1; Figure 2.1). The waterbodies are part of 310 miles of open streams and rivers within the San Jacinto River watershed. The San Jacinto River is part of a riverine ecosystem that contains reaches with natural undeveloped habitat, as well as reaches with development encroaching to the water's edge. The confluence of Buffalo Bayou and the San Jacinto River creates a unique environment, influenced by freshwater and tidal saltwater inflows, that supports numerous habitats (e.g., fringe marsh, riparian, marsh, mudflat, and riprap habitats) that, in turn, support a wide variety of fish, waterfowl, migratory, wading and shorebird rookeries.

The Baytown Nature Center (BNC), located across from the San Jacinto Battleground State Historic Site on a 450-acre peninsula along the Houston Ship Channel, is bordered by Burnet Bay, Crystal Bay, and Scott Bay (Figure 1.1). The BNC property includes hardwood uplands, tidal marsh, and freshwater wetlands. This unique site is listed on the Great Texas Coastal Birding Trail and provides habitat for 317 species of resident and neo-tropical migrant birds. The American Bird Conservancy designated BNC as a nationally important bird area and is also the site of restoration projects

implemented by the Trustees through other NRDARs.

Restoration projects associated with three other NRDAR cases were impacted or potentially impacted as a result of the Releases:

- French Limited NPL Site: Trustees working with local partners converted an abandoned subdivision in Baytown, Texas into 56 acres of tidal marsh which is now a part of Baytown Nature Center.
- Greens Bayou NRDAR: Trustees restored an additional 12 acres of coastal marsh habitat at the Baytown Nature Center, building off the initial 56 acres of created tidal marsh.
- San Jacinto River Spills (Texaco, Valero and Colonial Pipelines Rupture) NRDAR: Trustees restored an additional 9 acres of coastal marsh at Baytown Nature Center and the San Jacinto Battleground State Historic Site (Figure 1.1).

There are multiple communities in the vicinity of the 2019 Fire including but not limited to Houston, Deer Park, Galena Park, Channelview, LaPorte, and Baytown. A summary of demographic information about these communities and how they compare to the national average are in Table 2.1.

**Table 2.1 Demographic information from the U.S. Census Bureau Quick Facts website**

See <https://www.census.gov/quickfacts/fact/table/US/PST045219> for select areas associated with the response to the 2019 Fire.

Area	Population (April 1, 2010 Census)	Poverty Rate	White, alone	Black or African American, alone	Hispanic or Latino
United States	308,745,538	10.5%	76.3%	13.4%	18.5%
Houston	2,099,451	20.1%	57.0%	22.6%	45.0%
Deer Park	32,010	7.3%	88.5%	1.8%	37.8%
Galena Park	10,887	29.1%	79.6%	9.3%	81.1%
Channelview	38,289	16.8%	79.0%	14.6%	67.0%
LaPorte	33,800	9.9%	83.8%	6.2%	34.8%
Baytown	71,802	15.1%	71.0%	17.5%	47.0%

## 2.2 Facility Description - ITC Deer Park Terminal

The ITC Deer Park Terminal started operations in 1972 and has 11.8 million barrels of capacity in 227 tanks. It stores various petrochemical liquids and gases, as well as fuel oil, gasoline blend stocks, and distillates. The terminal has five ship docks and ten barge docks, rail and truck access, and multiple pipeline connections. Products are stored in tanks that range in size from 8,000 – 160,000 barrels (See ITC website, <https://www.item.com/>).

According to the Harris County Fire Marshal's Office, the tank farm where the fire occurred is



known as the Second 80's because the tanks located within the tank farm were 80,000-barrel tanks. There were 15 tanks in the Second 80's tank battery, each approximately 40 ft tall and 120 ft in diameter, arranged in a 3x5 grid (Figure 2.2). The tank farm area was approximately 328,000 square feet with piping and equipment throughout (HCFMO 2019). A multitude of chemicals and chemical mixtures were housed in the tank farm including gas blends, base oil, xylene, naphtha, toluene, and pygas (a.k.a. pyrolysis gas). The constituents of these tanks are further described in Section 2.2.1.

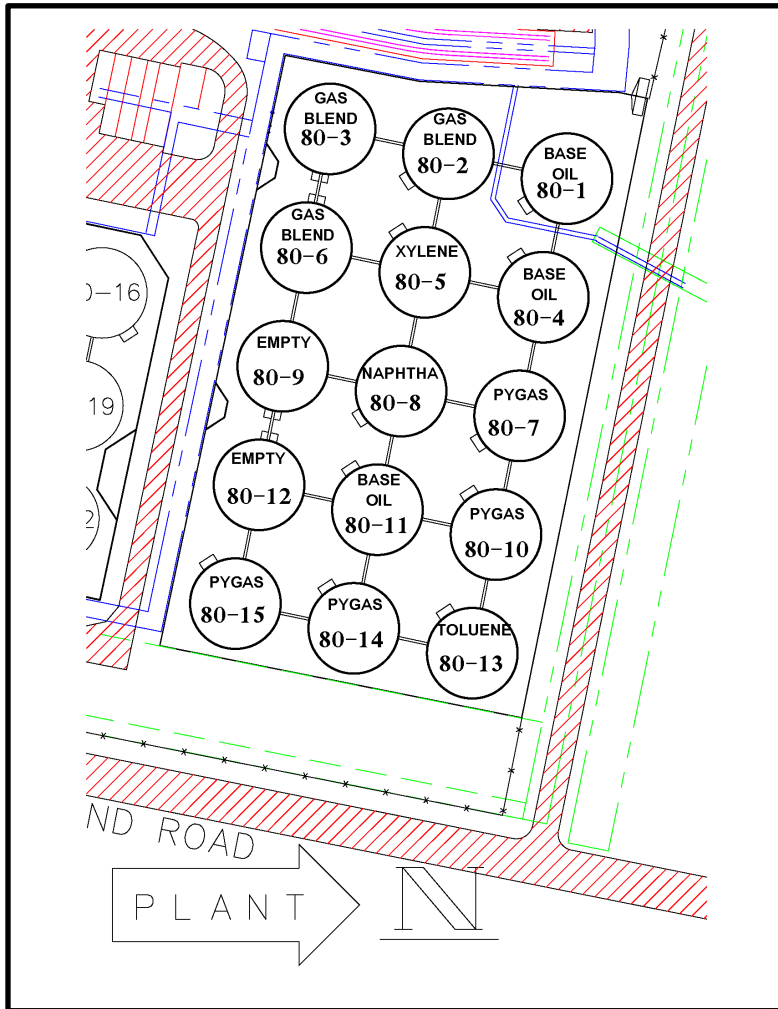


Figure 2.2 Diagram of the ITC Second 80's tank farm.

### 2.2.1 Summary of Releases

As a result of the tank fire and resulting response, hazardous substances and oil from at least 12 of 15 above-ground storage tanks may have been released into Tidal Road and Independence Parkway ditches, flowed into Tucker Bayou, and then into the surrounding environment. The Harris County Fire Marshal's Office determined Tanks 80-9 and 80-12, were empty prior to the incident (HCFMO 2019; Trinity Environmental 2021; Figure 1.1Figure 2.2). The tanks contained base oil, gasoline blend stock, mixed xylenes, toluene, pygas, and naphtha. A preliminary estimate of the

pre-incident volume in the tanks was more than 470,000 barrels (Cardno 2020).

In addition to hazardous substances and oil in the above-ground storage tanks, thousands of gallons of AFFF were applied to combat the fire and some of the material in these foams was released into the aquatic environment. Ingredients in AFFF used during the response may contain persistent organic chemicals like per- and poly-fluoroalkyl substances (PFAS), or other compounds that cause ecological harm. Firefighting foam containers were inventoried after the response ended to assess the approximate amounts and type of materials used: dozens of 5-gallon buckets, hundreds of 55-gallon drums, and more than a thousand 265-320-gallon totes were evaluated. More than 50 types of AFFF formulations were used to respond to the fire (Cardno 2020).

The ITC 2019 Deer Park Tank Fire Natural Resource Damage Assessment (NRDA) will focus on direct and indirect injuries stemming from exposure to released hazardous substances and oils, including mixtures as defined in Section 101(14) of CERCLA. The NRDA may also focus on injuries associated with response actions. At this time, the Trustees are considering impacts of AFFF to the aquatic environment and impacts from boat closures and shelter in place orders to recreational use. An initial list of chemicals that were known to have been released as a result of the 2019 Fire is in APPENDIX A. This list will be refined during the assessment and the chemicals that will be the focus of the injury analysis will be chosen as part of the assessment process.

### *2.2.2 Confirmation of Exposure*

Natural resources under the jurisdiction of the Trustees have been exposed<sup>2</sup> to hazardous substances and oil released at and from the Facility (Table 2.2).

**Table 2.2 Examples of resources that have been exposed to hazardous substances released at and from the Facility.**

Resource Category	Description	Information Source
Surface Water	Releases from Second 80's tank farm flowed adjacent to Tidal Road and into Tucker Bayou	TCEQ analysis of selected surface water data collected on 4/5/2019 (TCEQ 2019)
Surface Water	Product on substrate	SCAT forms; photographs of product on rip/rap; TCEQ remedial documents (Trinity Environmental 2021)
Biological	The fish and shellfish advisory (Advisory - 55 modification) for the Houston Ship Channel	Texas Department of State Health Services Fishing Advisories - Advisory 55 Modification (TDSHS 2019)

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<sup>2</sup> Exposed means "all or part of a natural resource is, or has been, in physical contact with oil or a hazardous substance, or with media containing oil or a hazardous substance" (43 CFR § 11.14(q)).

Resource Category	Description	Information Source
	was made more restrictive on March 27, 2019 as a result of Releases associated with the 2019 Fire.	
Biological	Product in marsh habitat	SCAT forms; marsh monitoring data
Biological	Product on wildlife	ITC Spill Response documentation – animal intake logs; avian necropsy report (Natural Resource Trustees and ITC 2019)

### 3 AFFECTED NATURAL RESOURCES

Natural resources for which natural resource damages may be sought include: land, fish, wildlife, biota, air, water, groundwater, drinking water supplies, and other such resources belonging to, managed by, held in trust by, appertaining to, or otherwise controlled by the United States... [or] State...” (43 CFR § 11.14(z)). The CERCLA NRDAR regulations group these natural resources into five categories: surface water resources, ground water resources, air resources, geologic resources, and biological resources.

The Assessment Area supports a variety of natural resources and services potentially affected by hazardous substances and oil released at and from the Facility. The following paragraphs briefly summarize select features of the natural resources that the Trustees are currently considering assessing for injury.

#### 3.1 Surface Water Resources

Surface water resources in the Assessment Area include water, suspended sediment, and bed and bank sediments (43 CFR § 11.14(pp)). Surface water may be considered injured if, for example, there is an exceedance of an applicable water quality or drinking water standard as a result of an unpermitted release (43 CFR § 11.62(b)(1)) or if other resources (e.g., fish) are injured as a result of exposure to the concentrations in the surface water (43 CFR § 11.62(b)(v)). Surface water supports other biological resources, so surface water has both direct and indirect impacts on the health of biological resources. For example, contaminated sediments can cause injury to benthic invertebrate populations, which in turn can result in injuries to resident fish populations for whom the invertebrates are a source of food. Similarly, injury to invertebrates and/or fish resulting from exposure to contaminated sediments and surface water can lead to injury in local insectivorous (insect eating) or piscivorous (fish eating) bird populations. In addition, contaminated sediments serve as a source of continuing Releases of hazardous substances to the water column.

Surface water resources provide a suite of ecological and human services. Ecological services include, but are not limited to, habitat for trust species, including food, shelter, breeding areas, and other factors essential to survival. Human use services provided by surface water resources include, but are not limited to, recreational fishing, boating, and canoeing.

Surface waters in the Assessment Area have multiple parameters that do not meet water quality standards (TCEQ 2020b), sediments are known to contain toxic chemicals (e.g., dioxins, polychlorinated biphenyls [PCBs]) (TCEQ 2021), chemicals which are not known to have been released as a result of the 2019 Fire), and the area has fish consumption advisories for dioxins and PCBs (TDSHS 2021). As a result of the Releases, the existing fish consumption advisory was modified to include volatile organic compounds and the consumption recommendation for women past childbearing age and adult men was changed from “1 meal/month” to “do not eat” (Section 0).

### **3.2 Groundwater Resources**

Groundwater resources include the water in a saturated subsurface zone and the rocks or sediments through which this water flows. Groundwater resources serve as a potential pathway for contaminants to migrate from their source to surface water resources. Groundwater may be determined to be injured if concentrations of substances are in excess of applicable water quality criteria for public water supplies or the contaminated groundwater causes injury to other resources (43 CFR § 11.62(c)).

### **3.3 Air Resources**

Air resources are naturally occurring constituents of the atmosphere, including those gases essential for human, plant, and animal life. Air resources affect human use of the environment, the intrinsic value of air quality, and also affects other living things. An air resource may be determined injured if, for example, concentrations of emissions are in excess of applicable standards or if the contaminated air caused injury to other resources (43 CFR § 11.62(d)).

Air quality in the Assessment Area is within an area the United States Environmental Protection Agency (USEPA) designates as the Houston-Galveston-Brazoria Intrastate Air Quality Control Region (HGB). The HGB is designated as unclassifiable/attainment with the National Ambient Air Quality Standards for all criteria pollutants (i.e. ground-level ozone, particulate matter, carbon monoxide, lead, sulfur dioxide, nitrogen dioxide) except ground-level ozone. Ground-level ozone is the main ingredient in smog and can negatively affect people. According to the USEPA, ozone “is created by chemical reactions between oxides of nitrogen (NOx) and volatile organic compounds (VOC). This happens when pollutants emitted by cars, power plants, industrial boilers, refineries, chemical plants, and other sources chemically react in the presence of sunlight” (USEPA 2021). The USEPA currently lists the HGB as marginal nonattainment for existing ozone standards.

### **3.4 Geologic resources**

Geologic resources include soils and sediments that are not otherwise accounted for under the

definition of surface water or ground water resources. Geological resources, including soil and sediment resources in riparian and other wetland areas, provide habitat for natural resources such as migratory birds and also provide other services that regulate ecosystems and water quality, while also offering human services and access to recreational fishing. Geologic resources may be injured if, for example, concentrations of substances in the soil are sufficient to cause injury to groundwater or a toxic response to soil invertebrates (43 CFR § 11.62(e)).

### 3.5 Biological resources

Biological resources include natural resources, as defined earlier, and other biota, including, terrestrial and aquatic plants, threatened, endangered, state sensitive species, other legally protected species, and other living organisms not listed (43 CFR § 11.14(f)). Insects, amphibians, reptiles, birds, fish, and small mammals serve as food sources for higher trophic level animals including raptors and predatory mammals. Biological resources also provide a range of human services including fishing and wildlife viewing. Among other causes, injury to a biological resource could occur if exposure to released hazardous substances and oil cause the biological resource death, disease, or reduction in reproduction or if there is a directive to limit or ban consumption (43 CFR § 11.62(f)). Additionally, the Trustees may choose to focus the NRDA on a few representative resources.

#### 3.5.1 Aquatic Organisms

The tidal waters of the San Jacinto River, Houston Ship Channel and other associated smaller bays and inlets support species important for commercial and recreational usage and provide habitat for the following organisms: white shrimp (*Litopenaeus setiferus*) and brown shrimp (*Farfantepenaeus aztecus*), blue crab (*Callinectes sapidus*), barnacles, mussels, eastern oyster (*Crassostrea virginica*), spotted seatrout (*Cynoscion nebulosus*), sand seatrout (*Cynoscion arenarius*), Atlantic croaker (*Micropogonius undulatus*), red drum (*Sciaenops ocellatus*), black drum (*Pogonius cromis*), southern kingfish (*Menticirrhus americanus*), Gulf kingfish (*Menticirrhus littoralis*), sheepshead (*Argosargus probatocephalus*), southern flounder (*Paralichthys lethostigma*), striped mullet (*Mugil cephalus*), sea catfish (*Galeichthys felis*), Gulf menhaden (*Brevoortia patronus*), smallmouth buffalo (*Ictiobus bubalus*), gafftopsail catfish (*Bagre marinus*), hardhead catfish (*Arius felis*), and alligator gar (*Atractosteus spatula*). In addition, numerous other estuarine and marine resources are found in the area including bay anchovy (*Anchoa mitchilli*), silver perch (*Bairdiella chrysoura*), bull shark (*Carcharhinus leucas*), sheepshead minnow (*Cyprinodon variegatus*), gizzard shad (*Dorosoma cepedianum*), Gulf killifish (*Fundulus grandis*), cude goby (*Gobiosoma robustum*), pinfish (*Lagodon rhomboides*), spot (*Leiostomus xanthurus*), silversides (*Menidia* spp.), Gulf flounder (*Paralichthys albigutta*), bluefish (*Pomatomus saltatrix*), Spanish mackerel (*Scomberomorus maculatus*), bay squid (*Lolliguncula brevis*), hard clam (*Mercenaria mercenaria*), and grass shrimp (*Palaemonetes pugio*).

Many estuarine organisms migrate within the Galveston Bay estuary and use a variety of habitats for food and shelter during their lifecycle. Important habitats for aquatic organisms found within

the Assessment Area include marshes, hard structures (e.g., riprap), mudflats, and sandy beaches.

### 3.5.2 Coastal marsh

Coastal marshes provide an assortment of benefits including habitat and food for a variety of species. These marshes are important to nekton populations and fishing industries because research has shown that fishery production is directly proportional to marsh edge (Minello and Rozas 2002). Shorelines in the Assessment Area are home to a variety of typical plant species found in estuarine wetlands, including cordgrasses (*Spartina alterniflora* and *S. patens*), Saltmarsh bulrush (*Bolboschoenus robustus*), sea oxeye (*Borrchia frutescens*), and marsh elder (*Iva frutescens*).

### 3.5.3 Birds

Over 300 species of birds have been observed in the Assessment Area, with 224 species observed between 1/1/2019 and 8/21/2020 (eBird 2021). There are at least five known colonial water bird rookeries and 25 nesting species (USFWS 2018), foraging habitat for two active bald eagle nests, and habitats where Least Terns are known to forage.

As part of the 2019 Fire response efforts, 20 species of birds were recovered, including:

- |                   |                 |                     |
|-------------------|-----------------|---------------------|
| • American Avocet | • Common        | • Pied-billed Grebe |
| • American Coot   | • Nighthawk     | • Royal Tern        |
| • Barn Swallow    | • Herring Gull  | • Ruddy Duck        |
| • Black Vulture   | • Ibis          | • Snowy Egret       |
| • Black-bellied   | • Laughing Gull | • Sora Rail         |
| Whistling Duck    | • Neotropic     | • White Ibis        |
| • Brown Pelican   | • Cormorant     | • White Pelican     |
| • Cattle Egret    | • Osprey        |                     |

### 3.5.4 Encrusting and Benthic Communities

Encrusting and benthic communities live on a variety of different habitats, including mudflats, sandy shorelines, river bottom, marshes, and hard structures (e.g., riprap, pilings, rock, shell). Some of the larger and most visible benthic organisms in the Assessment Area include oysters, barnacles, mussels, clams, and periwinkles. Benthic organisms known to inhabit the marshes within the Assessment Area include species such as the ribbed mussel (*Guekensia demissa*) and the marsh periwinkle (*Littoraria irrorata*). The Eastern oyster (*Crassostrea virginica*) may be attached to hard structures or found scattered on mudflats or other estuarine substrates. Additionally, barnacles and mussels are also known to attach to hard substrates in the area. The common rangia (*Rangia cuneata*) has also been observed on the river bottom within the Assessment Area.

### 3.5.5 Federally-Protected Species

Multiple species known to inhabit the area receive protections under the Migratory Bird Treaty

Act, Bald and Golden Eagle Protection Act, Marine Mammal Protection Act, and the Endangered Species Act (Table 3.1 Federally-listed threatened or endangered species that may inhabit the Assessment Area.).

**Table 3.1 Federally-listed threatened or endangered species that may inhabit the Assessment Area.**

<b>Taxon</b>	<b>Scientific Name</b>	<b>Common Name</b>	<b>Federal ESA Listing Status</b>
Bird	<i>Laterallus jamaicensis</i>	Black Rail	Threatened
Bird	<i>Grus americana</i>	Whooping Crane	Endangered
Bird	<i>Charadrius melodus</i>	Piping Plover	Threatened
Bird	<i>Calidris canutus rufa</i>	Red Knot	Threatened
Bird	<i>Picoides borealis</i>	Red-Cockaded Woodpecker	Endangered
Bird	<i>Sterna antillarum</i>	Least Tern	Endangered
Reptile	<i>Caretta caretta</i>	Loggerhead Sea Turtle	Threatened
Reptile	<i>Lepidochelys kempii</i>	Kemp's Ridley Sea Turtle	Endangered
Reptile	<i>Chelonia mydas</i>	Green Sea Turtle	Endangered
Mammal	<i>Trichechus manatus</i>	West Indian Manatee	Threatened
Plant	<i>Hymenoxys texana</i>	Texas Prairie Dawn	Endangered

### 3.5.6 Human/Recreational Use

The Assessment Area has a rich cultural history and provides ample opportunities for general human uses and recreational activities, such as dog-walking, boating, fishing, camping, bird watching, and attending organized events like youth sports, the Baytown Nature Center Full Moon Hike, and the San Jacinto Day Festival. The Assessment Area includes multiple city, county, and state parks, a golf course, schools, sports fields, a ferry, and public boat ramps.

The City of Houston was established at the headwaters of Buffalo Bayou shortly after Texas won its independence from Mexico in 1836 as a result of the Battle of San Jacinto that took place near the confluence of Buffalo Bayou (now the Houston Ship Channel) and the San Jacinto River. In this battle, General Sam Houston's Texian troops, after facing defeats at Goliad and the Alamo, defeated the Mexican Army led by General Santa Anna. The battleground is preserved as the San Jacinto Battleground State Historic Site.

The San Jacinto Battleground State Historic Site is adjacent to the Houston Ship Channel in unincorporated Harris County, Texas and the ITC Facility (Figure 1.1). This Historic Site houses and celebrates the battleground that helped Texas defeat Mexico and win its independence. The Historic Site includes the location of the Battle of San Jacinto, the San Jacinto Museum of History, the San Jacinto Monument, and the Battleship Texas State Historic Site where the USS Texas was docked at the time of the Releases. The Battleground, which was designated a National Historic Landmark in 1960, also protects coastal prairie, forests and marshlands that provide refuge for variety of migratory birds and waterfowl, alligators, and other wildlife. There are multiple amenities at the site including an amphitheater, outdoor classroom, and nature trails.

Recreation on or in the water may be affected in certain areas by the numerous commercial vessels traversing the waterway and the fish consumption advisories along the Houston Ship



Channel. As a result of the Releases, the fish consumption advisory was modified on March 27, 2019. The advisory, “ADV-55 modification,” recommends not eating any species of fish or blue crab due to high concentrations of dioxins, PCBs, and possible presence of VOCs (TDSHS 2019; TDSHS 2021).

## **4 INJURY ASSESSMENT AND PATHWAY DETERMINATION APPROACH**

This Assessment Plan sets forth assessment studies or activities the Trustees intend to pursue as part of the ITC 2019 Deer Park Tank Fire NRDAR.

During the injury assessment, the Trustees quantify the effects of the release(s) of hazardous substances on the natural resources to determine whether there is a measurable adverse effect (“injury”) to the resource as a result of the exposure. For purposes of NRDAR, the Trustees measure the extent of the injury, estimate the baseline condition and/or baseline services of the injured natural resources, determine the recoverability of the injured natural resources, and estimate the reduction in services that resulted from the release(s) of hazardous substances (43 CFR § 11.70(c)). Baseline is defined as the condition or conditions that would have existed in the assessment area had the releases of the hazardous substances under investigation not occurred (43 CFR § 11.14(e)). Baseline conditions may be established based on the review of historical, pre-release data and information, or by control areas that exhibit similar physical, chemical, and biological conditions as the assessment area and lack exposure to the releases (43 CFR § 11.72).

At this time, the Trustees have determined that further assessment is appropriate for (1) surface water resources; (2) biological resources; (3) groundwater resources; and (4) air resources.

### **4.1 Temporal**

The temporal scope of this NRDA will be based on determining injuries to natural resources and corresponding reductions in natural resource services from the time of the initial release through the return of the injured resource to baseline conditions. This may change as more information is revealed through the remedial process or other means discovered during the assessment.

### **4.2 Use of Available Data**

The Trustees’ general approach to the NRDA is and has been to review the existing data, analyze gaps, and then undertake additional studies or activities including testing and sampling as needed. This minimizes the cost of the assessment and maximizes the use of existing information.

### **4.3 Intent to Perform a Type B Assessment**

As part of the assessment planning process, the Trustees decide whether to conduct a simplified assessment (Type A) or a comprehensive assessment (Type B) (43 CFR §§ 11.33-11.36). The Type A procedures, which use minimal field observations and computer models to generate a damage claim, are limited to the assessment of relatively minor, short duration discharges or releases (43



CFR § 11.34). Considering the complexities associated with the Releases and that additional site-specific data can be collected at reasonable cost, the Trustees have concluded that the use of Type B procedures is appropriate and justified.

The Trustees must confirm that at least one of the natural resources identified as potentially injured in the PAS has been exposed to released hazardous substance before including any Type B methodologies in the Assessment Plan (43 CFR § 11.37). The PAS identified several resources and their services that were potentially exposed as a result of the Releases of hazardous substances from the Facility, including:

- Migratory birds, including osprey, bald eagle, waterfowl, and shorebirds
- Fish
- Marine and terrestrial mammals, reptiles and amphibians
- Aquatic invertebrates
- Aquatic plants
- Beaches, mud flats, wetlands, riparian, and upland habitats
- Surface water, including sediments
- Supporting habitat for natural resources, including food, shelter, breeding, foraging, rookeries, and other factors essential for survival
- Recreational uses

Multiple natural resource categories are confirmed as exposed to hazardous substances (see Section 0, [Confirmation of Exposure](#)) released from the Facility. Information describing the methods that confirm additional resources have been exposed will be described in the sections below under [Pathway Determination](#) and [Injury Assessment](#).

#### **4.4 Pathway Determination**

Pathway is defined as the “route or medium through which oil or a hazardous substance is or was transported from the source of the... release to the injured resource” (43 CFR § 11.14(dd)). Determinations involve identifying the sources of hazardous substances and tracing the fate and transport of the substances through the environment to the resources (e.g., through surface water, sediments, to fish and birds). Pathways may be determined by demonstrating the presence of a hazardous substance in a resource or by using a model that demonstrates that the route served as a pathway (43 CFR § 11.63(a)(2)).

## **5 INJURY ASSESSMENT**

The Trustees expect to evaluate injury associated with the natural resources and services described below. The Trustees’ defined injury assessment categories combine multiple natural resources that are defined in the regulations (43 CFR § 11.14(z)) (i.e., surface water resources, ground water resources, geologic resources, and biological resources).

## 5.1 Injury Assessment for Aquatic and Shoreline Resources

The Trustees anticipate focusing assessment of aquatic resources on surface water, sediment, and fish tissue data and the pathway(s) to affect biological resources. The Trustees foresee the assessment of shoreline resources focusing on hard structure habitat (e.g., riprap, bulkhead) coastal marsh, and riparian habitat. The Trustees will review data and information gathered as part of the response to the 2019 Fire, data collected by the PRP, data generated from the TCEQ remedial process (i.e., Texas Risk Reduction Program and TCEQ Ecological Risk Assessment Program), Texas surface water quality standards, TCEQ benchmarks, USEPA screening values, published injury thresholds, and other relevant published screening values, standards, and/or benchmarks. The Trustees will consider peer-reviewed literature on the harmful effects of COCs released at and from the Facility on surface water and biological resources that reside in aquatic (e.g., fish) and shoreline habitats (e.g., marsh). During the NRDA, the Trustees will continue to evaluate any new or relevant data sources that may inform the injury assessment.

### 5.1.1 Aquatic Resources Evaluation

Surface water and aquatic-dependent biological resources within the Assessment Area may have been injured by direct contact with dissolved, floating, or suspended chemicals in the water column, direct contact with contaminated sediments, ingestion of contaminated surface water and sediment during foraging or feeding, inhalation of chemicals, and/or indirect contact through ingestion of contaminated prey species.

The Trustees will evaluate the concentrations of COCs (APPENDIX A) in surface waters (i.e., water column), sediments, and fish to assess the degree to which these substances may be causing injury. Specific assessment activities include:

#### **A. Screening of chemical contaminants in surface waters, sediment, and fish**

This assessment activity will:

- Identify the highest surface water, sediment, and fish concentrations for released hazardous substances;
- Identify ecological benchmarks and injury thresholds for COCs;
- Compare the highest concentrations to the lowest and most conservative applicable ecological benchmark or injury thresholds; and
- Develop a database of retained COCs for analysis.

#### **B. Assessing trends of contaminant data and performing data analysis**

This assessment activity will identify baseline contaminant concentrations and temporal patterns of chemical contaminant concentrations above baseline and determine if quantifiable injuries to surface water resources and encrusting organisms occurred from exposure to hazardous substances. The Trustees will use data quality objectives approach (USEPA 2000; USEPA 2006a; USEPA 2006b; USEPA 2006c) to perform a data analysis to:

- Identify the frequency of detection of chemical concentrations in surface water, sediment, and fish, by geographic sub-areas and time;
- Analyze and apply appropriate statistics on selected data to compare chemical concentrations in the Assessment Area to baseline concentrations or other appropriate chemical observations;
- Visualize data using charts and graphs; and
- Describe and document analysis results.

### **C. Performing geospatial analysis**

The purpose of this activity is to determine the geographic and temporal extent of injury or contamination. Information from the above activities (i.e., A. Screening of chemical contaminants in surface waters, sediment, and fish; B. Assessing trends of contaminant data and performing data analysis) will be used during this analysis. ArcGIS™ will be employed to perform data interpolation and visualization techniques that can quantify the geographical extent of injury or contamination. This task may include the following:

- Identify data that are appropriate for interpolation and visualization;
- Visualize data using charts, graphs, and/or maps; and/or
- Delineate the number of acres of impacted area by magnitude of contamination or magnitude of injury.

#### *5.1.2 Shoreline Resources Evaluation*

Shoreline resources within the Assessment Area may have been injured by direct contact with dissolved, floating, or suspended chemicals in the water column, direct contact with contaminated sediments, absorption of chemicals by marsh plants, and/or uptake of chemicals by encrusting organisms during feeding. Assessment activities for shoreline resources are expected to focus on marsh habitats, riparian habitats, and hard substrates (e.g., riprap, bulkheads). The Trustees will evaluate exposure and magnitude of effects from exposure to Releases by performing assessment activities and/or relying upon assessment activities undertaken for other resources. These activities may include:

### **A. Delineating shoreline habitat types**

The Trustees will:

- Identify data sources that delineate habitat types or could be used to delineate habitat types (e.g., environmental sensitivity index maps, imagery);
- Identify, delineate, and visualize habitat types using maps; and
- Delineate the number of acres and/or shoreline miles of each shoreline community being assessed.

### **B. Delineating spatial and temporal extent of Releases**

Using data generated as part of the Aquatic Resources Evaluation, the Trustees will

- Visualize the product release extent using maps; and
- Delineate the number of acres injured as a result of the Releases.

### **C. Collecting and compiling shoreline data**

The Trustees will likely need to obtain field data to quantify the extent of injury.

- Evaluate available data associated with background and marsh in the Assessment Area. Important marsh metrics may include but are not limited to: marsh width, percent cover, stem density, and species present;
- Compile and review relevant research about species presence and life cycle data; and
- Compile and review relevant research about the effects of COCs on shoreline biota such as barnacles and oysters.

### **D. Quantifying shoreline injury**

The Trustees will use information and data previously discussed to determine whether habitat(s) is impacted. If a habitat is impacted, the Trustees will

- Classify the injury to each habitat type (spatial and temporal);
- Visualize the classified habitat types using maps; and
- Delineate the number of acres and/or shoreline miles of impacted habitat by magnitude of contamination or magnitude of injury.

## **5.2 Air Resources**

In addition to being essential for human life and enjoyment, air resources support a wide variety of plants and animals. Emissions of hazardous substances were released into the atmosphere during the 2019 Fire. The Trustees will focus on assessing air resources as a pathway for the Releases to make their way to other natural resources and services, such as outdoor recreation, being assessed as part of the injury assessment.

## **5.3 Ground Water Resources**

The TCEQ remedial investigation has indicated that COCs associated with the 2019 Fire may have leached through the substrates and entered the groundwater. The ground water resources in this area may potentially connect with sediments and surface water, thereby transporting COCs from ground water to other resources (Golder 2020; Trinity Environmental 2021). The Trustees will focus on assessing ground water resources as a pathway for the Releases to make their way to other natural resources being evaluated as part of the injury assessment.

## **5.4 Birds**

There are many species of birds that use the Assessment Area for all or part of their lifecycle. The Trustees will focus their assessment activities on determining whether, and to what extent birds

have been injured as a result of exposure to Releases from the 2019 Fire. Specific assessment activities may include:

#### **A. Compiling and evaluating data**

The Trustees will compile data from a variety of sources to assess injury. In general terms, this would include information about bird biology, habitat use, and toxicology information. Data or information may include but is not limited to:

- Data generated as part of the injury assessment for other resources (e.g., aquatic and shoreline resources, air resources);
- Life history information;
- Bird population density information;
- Toxicology and mortality information;
- Peer reviewed studies;
- USFWS bird survey data;
- Response documents and data; and
- TCEQ and EPA remedial documents and studies

#### **B. Investigating the pathway**

The Trustees will:

- Identify the sources of hazardous substances and trace the fate and transport of the substances through the environment (e.g., through surface water, sediments, or food webs).
- Evaluate indicators of exposure and establish the connection between exposure and the mortality or injury of birds due to the Releases. The Trustees anticipate using a phased approach to accomplish this activity. The Trustees initiated the cooperative Phase 1 Necropsy and Pathology study (Natural Resource Trustees and ITC 2019) on October 28, 2019, after providing the plan for public comment.
- Conduct additional analyses as appropriate. Examples that may be considered include tissue analyses to assess chemical exposure or characterization of physiological markers of exposure, such as hemolytic anemia or immunological responses. The need for additional analyses will be decided upon after review of Phase 1 Necropsy and Pathology study data and other relevant information. Should the Trustees undertake further studies to define the exposure, injury, and mortality to birds due to Releases from the 2019 Fire, individual study plans will be developed and provided to the public for review.

#### **C. Quantifying bird injury**

Following data compilation and completion of tasks previously discussed, the Trustees will:

- Determine the geographical extent of injury;

- Number and type of birds that were potentially injured; and
- Duration of injury.

## 5.5 Human/Recreational Use Injury Assessment

The 2019 Fire had a number of impacts on the human use of public natural resources. The loss of services is the result of a person (1) declining to recreate (2) consuming a less preferred alternative or option (e.g., avoidance of sites or activities), (3) enjoying activities less as a result of the of limitations (i.e., fish consumption advisories), closures, or diminished quality of the resources (i.e., dead marsh) as a result of Releases. More generally, compensable losses include changes to “recreational quality, public access, or recreation demand” (43 CFR § 11.71(e); Elliot Bay Trustees 2019). The Trustees will evaluate impacts associated with the Releases on the human use of public natural resources by performing assessment activities:

### **A. Identifying impacts on the human use of public natural resources**

- Identify impacts to recreational opportunities caused by Releases from the Facility (e.g., health advisories, shelter in place orders, restricted transportation, and waterfront park closures); and
- Obtain data and/or information about the impact and the duration of these impacts caused by the Releases from the Facility and/or the response to the Releases.

### **B. Performing recreational use data collection activities**

In order to establish the baseline level of services, the Trustees will identify and acquire recreational use data in or near the Assessment Area prior to the Releases. The Trustees will also initiate data collection to supplement the pre-existing data as well as determine impacts from the Releases on visitor use. These data collection activities will inform the quantification of human use injuries.

- Request recreational-use data from natural resource management agencies with jurisdiction in or near the Assessment Area;
- Collect on-site primary recreational-use data (i.e., videography, on-site recreation-use counts, and automatic traffic counts) from parks and access points in the Houston, Texas region to support quantification of lost recreation at closed parks or access points; and
- Evaluate the use of pre-existing remote-sensing data (e.g., mobile device location data and satellite imagery) as a replacement for on-site primary data collection that was cancelled due to the COVID-19 pandemic.

### **C. Quantifying human use injuries**

The Trustees will use data from previously mentioned activities to quantify lost human use that occurred as result of Releases associated with the Facility. The Trustees may use a travel cost or other methods to determine the human/recreational use losses from the 2019 Fire.

## 6 APPROACH TO DAMAGES DETERMINATION

In the damages determination phase, the Trustees determine the monetary value (damages) of the compensation for injuries to natural resources and their services resulting from the Releases of hazardous substances (CERCLA §§ 107(a)(4)(C), 107(f)(1); 43 CFR § 11.15). The measure of damages is the cost of (i) restoration, or rehabilitation of the injured natural resources to a condition where they can provide the level of services available at baseline, (ii) the replacement and/or acquisition of equivalent natural resources capable of providing such services, and/or (iii) the compensable value<sup>3</sup> of all or a portion of the services lost to the public for the time period from the release pending restoration to baseline (43 CFR § 11.80(b)). The CERCLA NRDAR regulations provide a non-exhaustive description of various methodologies the Trustees may use in their damages determination, including Habitat Equivalency Analysis (HEA), Resource Equivalency Analysis (REA), and travel cost. 43 CFR § 11.83. REA is a resource-to-resource approach to injury quantification that assumes that services lost and restored are comparable, an approach similar to HEA (National Oceanic and Atmospheric Administration (NOAA) 2006). REA generally refers to a stepwise replacement model for killed or injured species. HEA is a service-to-service or resource-to-resource approach that can account for changes in baseline services while estimating interim losses of services. The fundamental concept in HEA is that compensation for lost ecological services can be provided by restoration projects that provide comparable services. During the assessment process, the Trustees will determine the most appropriate method(s) to determine damages.

### 6.1 Baseline

In order to quantify injuries, the Trustees must quantify baseline conditions, which include the physical, chemical, and biological conditions and their associated services for natural resources. Baseline is “the condition or conditions that would have existed at the assessment area had the discharge of oil or release of the hazardous substance under investigation not occurred” (43 CFR § 11.14(e)). The baseline conditions for each resource and/or service will be taken into account when determining the level of injury and the amount of restoration required to offset the injury.

### 6.2 Aquatic, Shoreline, and Bird Damages Determination

The Trustees are assessing exposure of natural resources to the Facility-related hazardous substances, oil, and response actions and are determining whether natural resources or their services have been injured or lost. As part of the assessment, the Trustees determine the amount of restoration that is necessary to compensate the public for identified injuries to these resources and their associated services for the period between the onset of injury and the resource’s return

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<sup>3</sup> Compensable value is the amount of money required to compensate the public for the loss in services provided by the injured resources between the time of the release and the time the resources are fully returned to their baseline conditions, or until the resources are replaced and/or equivalent natural resources are acquired (43 CFR § 11.83(c)). This is also referred to as “interim loss.”

to baseline (“scaling”).

Trustees will likely use models, such as HEA or REA, to scale losses associated with aquatic, shoreline, and bird resources with restoration. The Trustees plan to use a restoration-based approach to determine damages for ecological injuries (43 CFR § 11.83(b)). This means that the damages sought would equal the costs associated with restoring the natural resource and associated services that were injured. For example, this could include costs associated with acquiring, preserving, and restoring habitat that supports the injured resource.

### 6.3 Human/Recreational Use Damages Determination

The Trustees are assessing the value of recreational use that was lost as a result of closures and the fish consumption advisory related to the Releases at and from the Facility. The Trustees will consider existing information and information collected as part of the NRDA

## 7 DATA MANAGEMENT

Assessments employing Type B methods are required to develop a Quality Assurance Plan (QAP) that adheres to the requirements of the NCP and guidance provided by USEPA (43 CFR § 11.31(c)(2)). The purpose of the QAP is to ensure that data are of sufficient quality to be used for injury assessment and damage determination. For any new Trustee-led data collections, there will be an associated QAP that will be made publicly available. The data management procedures described below are general and will pertain to existing data or data collection activities not led by the Trustees.

Data will be managed to ensure that it is accurate and accessible for this NRDAR. Documents for this case are housed on the DOI Damage Assessment and Restoration Tracking System [website](#) and are available to the public.

There are various data sources available to assess baseline conditions and inform the Trustees’ understanding of natural resource injuries that occurred as a result of Releases from the Facility. Data sources will be screened to verify that supporting documentation is sufficient to allow for an evaluation of the reliability and usability of the information. Required information will differ with data and information types, but may include:

- Sampling methodology, including information on sample locations, environmental media sampled, and measurement units;
- Chemical analysis, including information on detection limits and methodology accompanying quality assurance/quality control (QA/QC) data or separate QA/QC report;
- Raw data or data tabulations (e.g., rather than figures only); and
- Agreement from a governing body that the data collection methods/analysis were appropriate (e.g., published in a peer reviewed journal; approved for use in the remedial process or by the Trustees).



The Trustees may compile data from multiple sources to assess injury. Quality checks will be made on all data that is keyed into an electronic format.

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## 9 APPENDICES

### 9.1 APPENDIX A – Contaminants of Potential Concern Released as a Result of the ITC 2019 Fire

**Table 9.1 List of chemicals potentially released**

This is a non-exhaustive list of contaminants of concern potentially released as a result of the 2019 ITC Tank Fire. The Trustees may further revise the list during the NRDA.

Chemical Name	Chemical Abstracts Service Registry Numbers
1,2,4-Trimethylbenzene	95-63-6
Aliphatic alcohols	VARIES-ALCOHOLS C5-C12
Alkenes	68411-00-7
Alkyl polyglycoside	132778-08-6
Aromatic Hydrocarbons	68333-88-0
Benzene	71-43-2
.beta.-Alanine, N-(2-hydroxyethyl)-N-[2-[(1-oxooctyl)amino]ethyl]-	64265-45-8
Caprylcaprylyl glycoside	68515-73-1
Cocamidopropyl betaine	61789-40-0
Cocamidopropyl hydroxysultaine	68139-30-0
Cumene	98-82-8
Cyclohexane	110-82-7
Cyclopentadiene	542-92-7
Cyclopentane	287-92-3

Chemical Name	Chemical Abstracts Service Registry Numbers
Debutanizer bottoms pyrolysis gasoline	68606-10-0
Dicyclopentadiene	77-73-6
Diethylene glycol monobutyl ether	112-34-5
Dipropylene glycol monomethyl ether	34590-94-8
Distillates (petroleum) hydrotreated heavy paraffinic	64742-54-7
Distillates (petroleum), solvent-dewaxed heavy paraffinic	64742-65-0
Ethylbenzene	100-41-4
Ethylene glycol	107-21-1
Fluorosurfactants	
Fluroalkyl surfactants	
Fuller's earth	8031-18-3
Hexane	110-54-3
Hydrocarbon surfactant	
Indene	95-13-6
Isopentane	78-78-4
Isoprene	78-79-5
Lauramidopropyl betaine	4292-10-8
Lauryl Imino Propionate, Sodium Salt	14960-06-6
Methanol	67-56-1

Chemical Name	Chemical Abstracts Service Registry Numbers
Mixture of Fluorosurfactants	
Mixture of Fluorinated Polymers	
Naphthalene	91-20-3
N-Cocamidopropyl-N,N-dimethylglycine, hydroxide, inner salt	61789-40-0
Non-ionic Hydrocarbon Surfactant 6607730000	
Pentane	109-66-0
Petroleum	8002-05-9
Polyfluorinated alkyl betaine	
Polyfluorinated alkyl polyamide	
Polyfluorinated alkyl quaternary amine chloride	
Polyglycoside Surfactant	132778-08-6
Potassium Bicarbonate	298-14-6
Purple Pigment	68647-14-3
Sericite Potassium Aluminum Silicate (Mica group minerals)	12001-26-2
Silicone fluid - Silcone Oil Methyl Hydrogen Polysiloxane	63148-57-2
Sodium Bicarbonate	144-55-8
Sodium Decyl Sulfate	142-87-0
Sodium Octyl Sulfate	142-31-4
Surfactants, unspecified mixture	

Chemical Name	Chemical Abstracts Service Registry Numbers
Synthetic Detergent	
Toluene	108-88-3
Xanthan Gum	11138-66-2
Xylene - mixed isomers	1330-20-7



## 9.2 APPENDIX B – Public Comment Responsiveness Summary

This appendix summarizes the comment received on the Draft Assessment Plan and provides responses on behalf of the Trustees. One comment was received from a resident of Galveston Island. The Trustees appreciate the comment.

**Comment 1:** The commenter stated that the Assessment Phase should include a Type B procedure since natural resources were injured by released hazardous substances and products used in response to the incident. The commenter also stated that an assessment of current levels of PFAS in Houston-Galveston Bay's sediments is essential, and suggested actions to be taken in response to future spills, including collecting samples from various bait shops and collecting dead birds for PFAS analysis as well as other hazardous substances released during the spill.

*Response: The Trustees are proceeding with a Type B assessment (see Section 4.3). As part of the assessment, the Trustees are evaluating concentrations of PFAS in sediment and surface water within the affected area, including Tucker Bayou, Buffalo Bayou, Carpenters Bayou, the Houston Ship Channel, the Old River, and the San Jacinto River (see Figure 1.1). With regard to procedures on future spills, this Assessment Plan is limited in scope to releases from the 2019 ITC Deer Park Tank Fire.*