

DEPARTMENT OF THE ARMY

U.S. ARMY CORPS OF ENGINEERS, GALVESTON DISTRICT 5151 FLYNN PARKWAY, SUITE 306 CORPUS CHRISTI, TEXAS 78411

February 26, 2024

Corpus Christi Regulatory Field Office

SUBJECT: Permit SWG-2022-00420; Letter of Permission

U.S. Fish and Wildlife Service Attn: Mr. Brandon Jones 22817 Ocelot Road Los Fresnos. Texas 78566-4759

Dear Mr. Jones:

This is in reference to your request, dated June 15, 2022, submitted on your behalf by Freese and Nichols, Inc., to conduct work associated with excavation of an approximate 1.6-mile earthen channel and construction of a water control structure. Your request is approved by this Letter of Permission (LOP) pursuant to Section 404 of the Clean Water Act. The work and/or structure will consist of excavation of 10.75 acres of waters of the United States (WOUS), that would include 9.34 acres of wetland habitat and 1.41 acres of upland vegetation. The channel will be designed as a swale-like feature (wide and shallow) with a 30-foot-wide bottom and 5:1 sloped sides. A water control structure consisting of an articulated concrete block mat weir will be constructed near the southern terminus of the channel to impound water during low rainfall events and further divert flows into the Laguna Larga during high rainfall events. This will result in a fill activity that permanently impacts 0.25 acre of jurisdictional waters of the U.S. This project action area also includes 50-foot work areas along both the east and west sides of the proposed earthen channel and a portion of the access routes that are primarily located along the upland ridges within the basin to allow for equipment and temporary material storage prior to placement in upland deposition areas. Temporary fills will only persist during construction until the material is placed on the upland ridge formed by the decommissioned railroad line within the Bahia Grande. Excavated material will be removed by dump trucks to an approved upland disposal area. The construction period for the wetland work component is expected to last 120 days unless unforeseen events cause delays (e.g., weather events). The project site is located in the Bahia Grande Unit in the Laguna Atascosa National Wildlife Refuge (LANWR), approximately 1.1. miles southwest of Laguna Vista, Cameron County, Texas.

All work is to be performed in accordance with the enclosed plans in 11 sheets, Attachment A in 24 sheets, and the permit conditions. The time limit for completing the work authorized ends on December 31, 2029. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.

If you object to the work authorized or the terms and conditions of this LOP, you may request that the LOP be modified (in accordance with 33 CFR 331.6). To object, you must submit a copy of the completed Request for Appeal (RFA) form to the District Engineer (DE) at the letterhead address, located at the top of this letter. Your objections must be received by the DE within **60 days** of the date of this notice, noting the NAP date is considered day 1, or you will forfeit your right to appeal the LOP in the future. It is not necessary to submit an RFA form to this office if you accept the LOP's terms and conditions.

If, after review by the DE, you are still unsatisfied with the LOP because of certain terms and conditions therein, you may appeal under the Corps of Engineers Administrative Appeal Process by completing Section II of the attached RFA form and sending it to the following address:

Mr. Jamie Hyslop Administrative Appeals Review Officer Southwestern Division USACE (CESWD-PD-O) U.S. Army Corps of Engineers 1100 Commerce Street, Suite 831 Dallas, Texas 75242-1317 Telephone: 469-216-8324

This LOP does not address nor include any consideration for geographic jurisdiction on aquatic resources and shall not be interpreted as such. If you have any questions, please contact Mark Pattillo by electronic mail (email) mark.e.pattillo@USACE.Army.Mil or by telephone at 361-814-5847 ext. 1004.

Email: Jamie.r.hyslop@usace.army.mil

Please notify the Galveston District Regulatory Division Corpus Christi Field Office in writing by email at CESWGRegulatoryInbox@USACE.Army.Mil, upon completion of the authorized project.

FOR THE DISTRICT COMMANDER:

Kristie A. Wood Supervisor Corpus Christi Regulatory Field Office

cc w/Encl. Aaron Petty, Freese and Nichols, Inc. Texas General Land Office

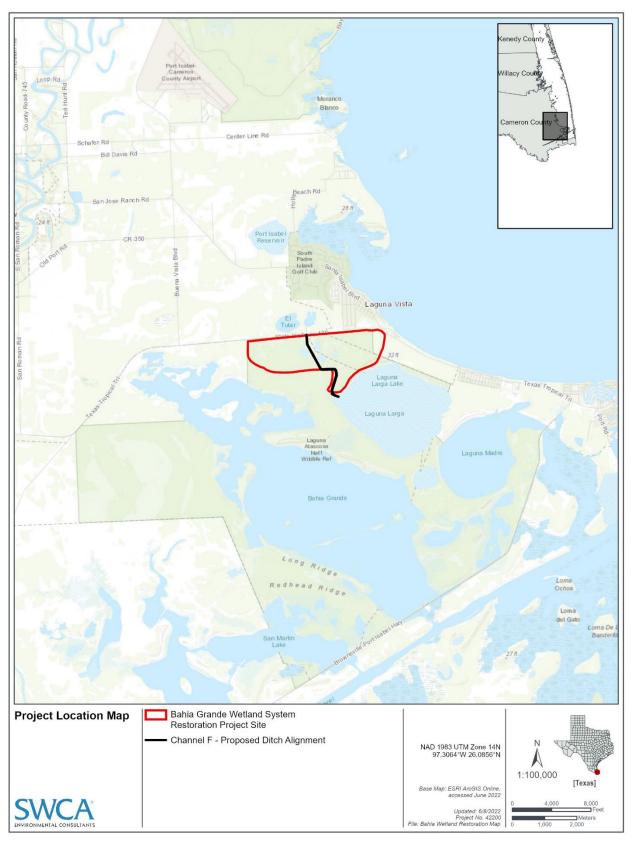
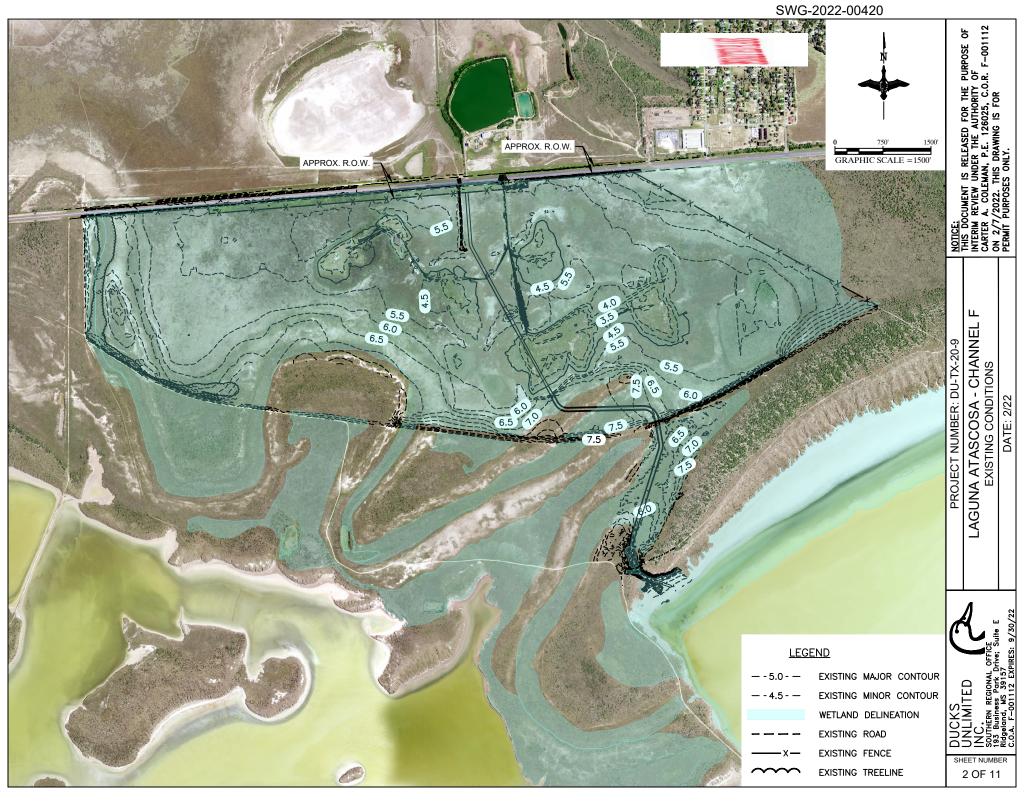
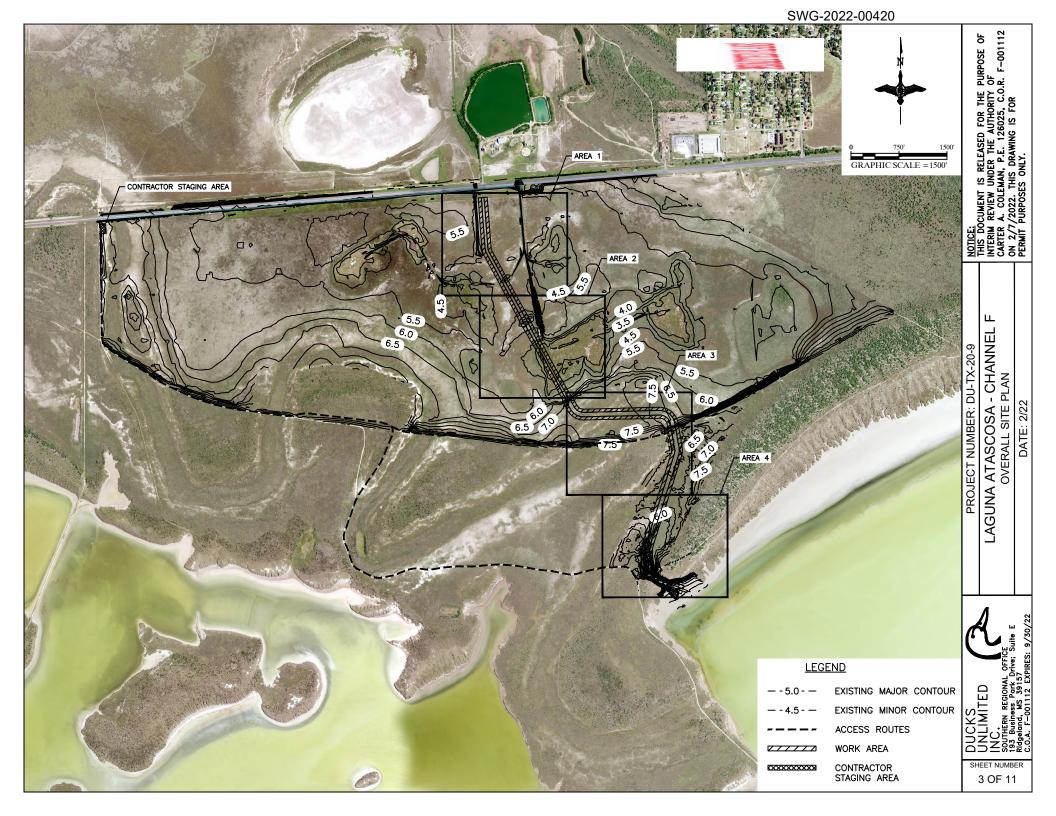
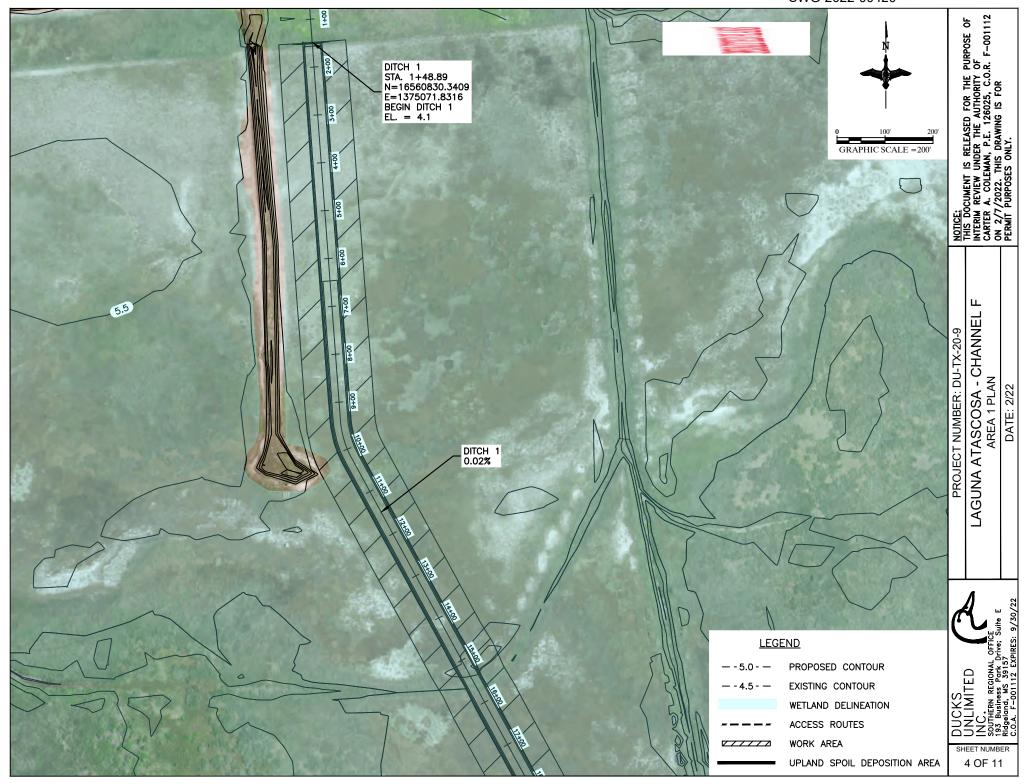
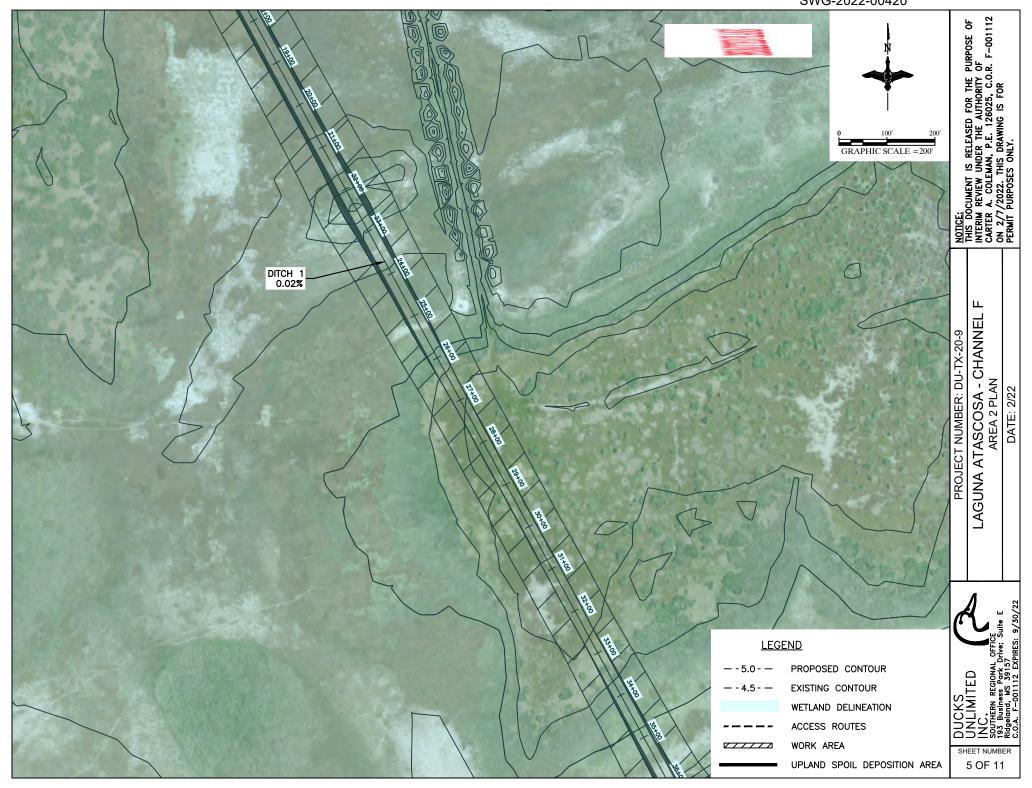


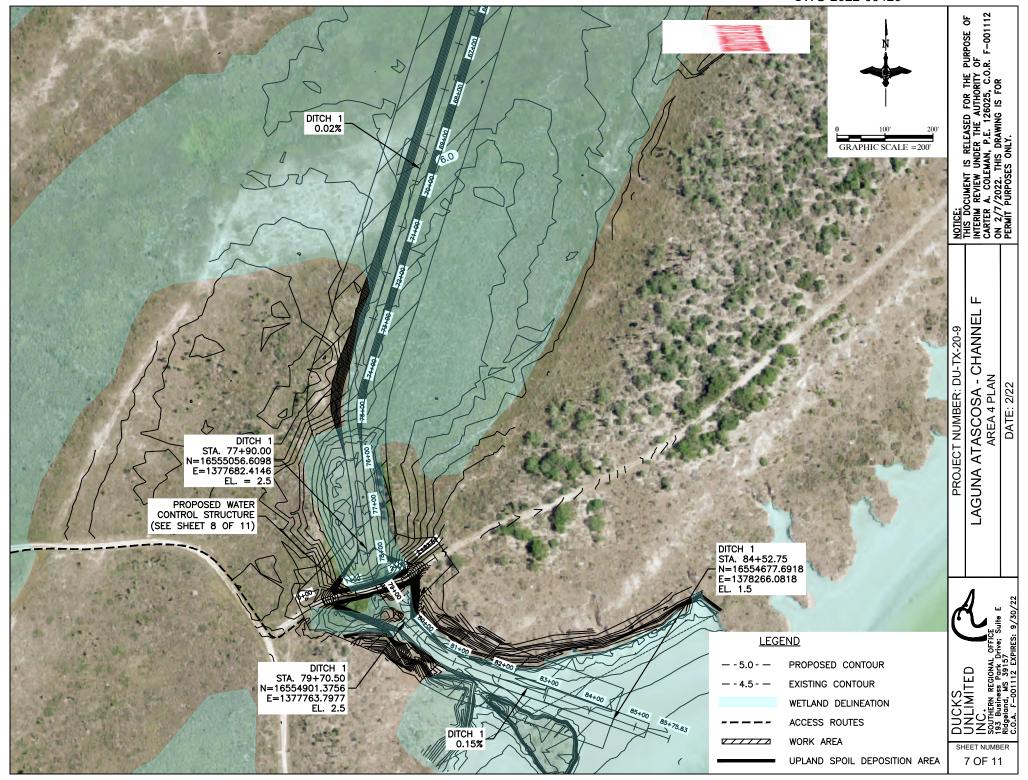
Figure 1. Project location.

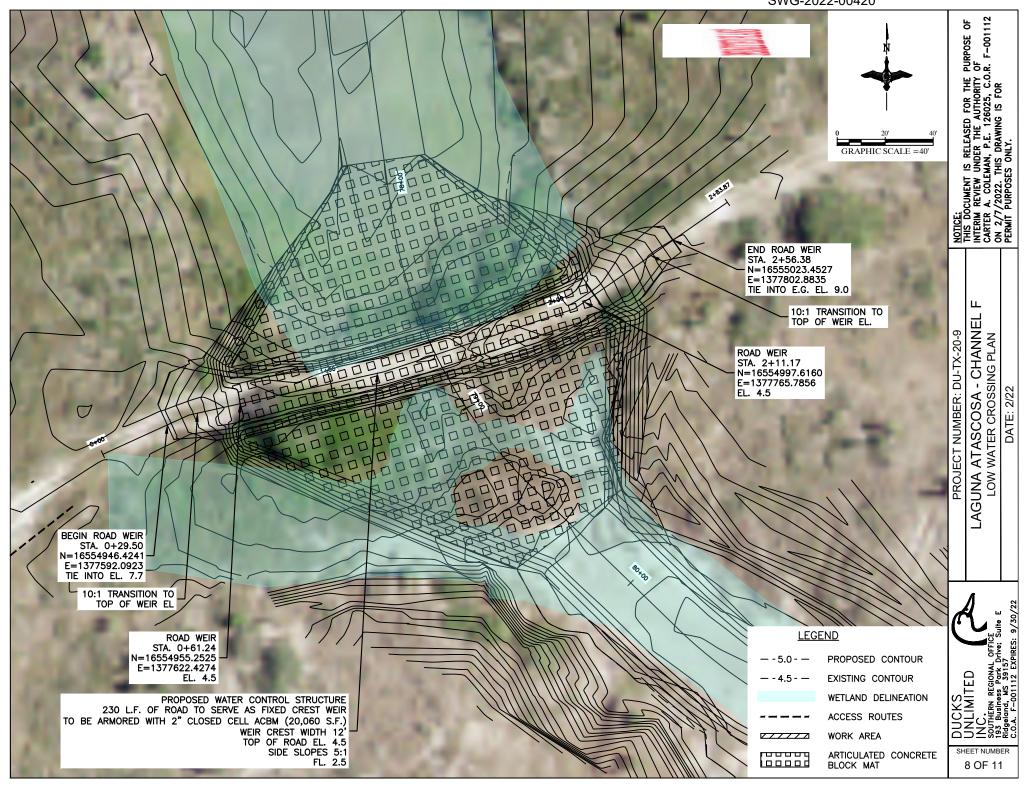


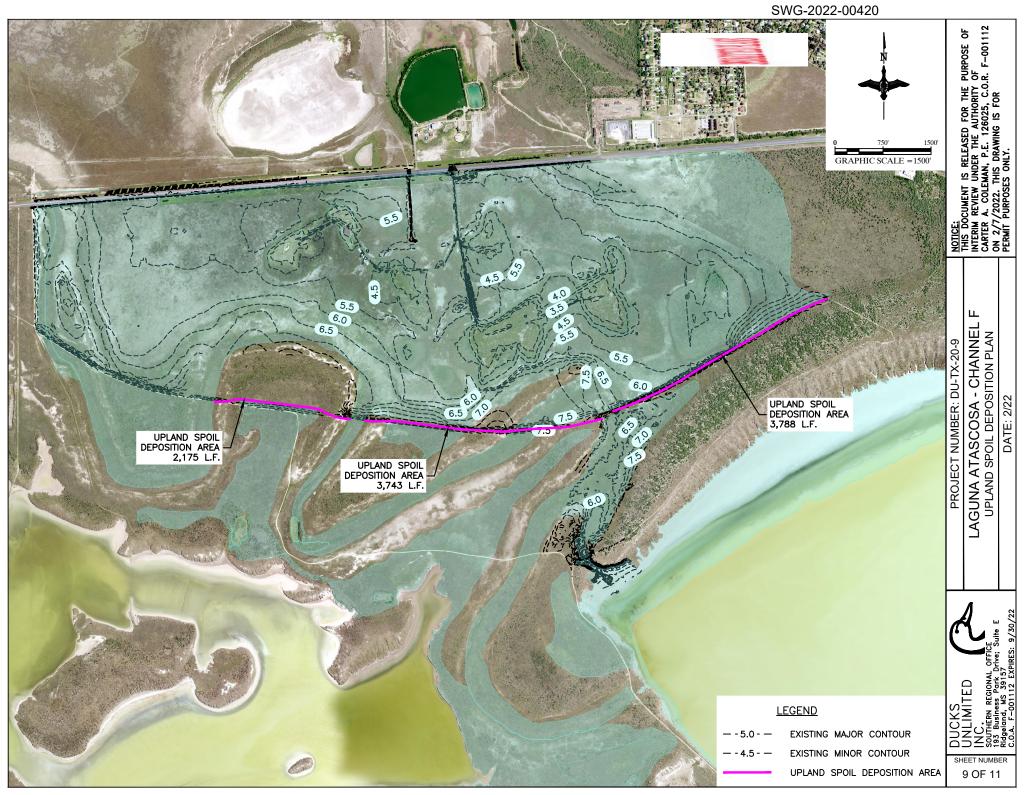


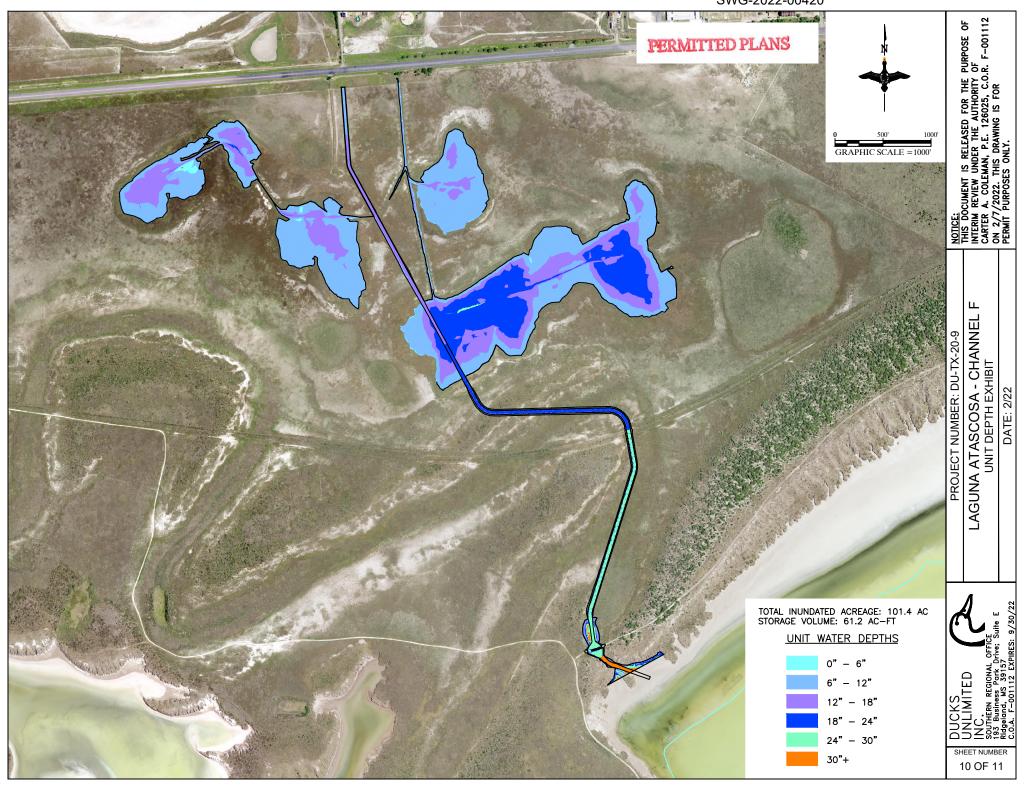


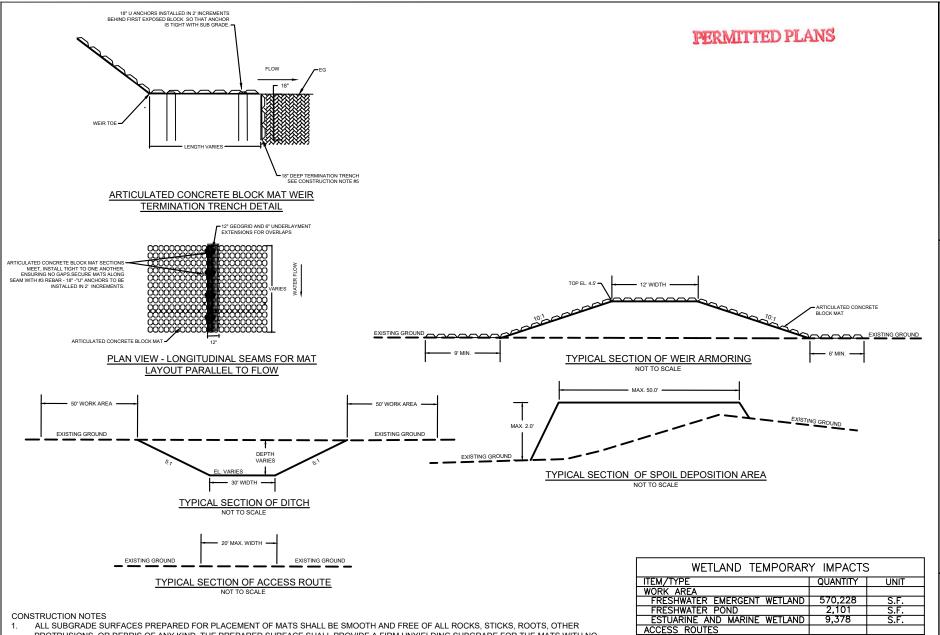












- PROTRUSIONS, OR DEBRIS OF ANY KIND. THE PREPARED SURFACE SHALL PROVIDE A FIRM UNYIELDING SUBGRADE FOR THE MATS WITH NO SHARP OR ABRUPT BREAKS IN THE GRADE.
- ENGINEER RECOMMENDS INSTALLING THE WIDEST MATS POSSIBLE FOR SPILLWAY APPLICATIONS.
- MAT SHALL EXTEND 4' PAST UPSTREAM AND DOWNSTREAM WEIR TOE.
- FOR WIDTHS WIDER THAN 16', INSTALL MATS WITH THE GEOGRID AND UNDERLAYMENT EXTENSION ADJACENT TO ONE ANOTHER.
- SECURE OVERLAP SEAM BY INSTALLING 18" U-ANCHORS IN 2' INCREMENTS THE LENGTH OF THE SEAM. U-ANCHORS CONSIST OF #3 REBAR, 3.2. SHAPED INTO A U WITH 18" LEGS.
- AT THE END OF THE ARMORED CHANNEL, EMBED THE MAT 18" IN A TERMINATION TRENCH. FILL AND COMPACT TERMINATION TRENCH WITH SUITABLE FILL.
- CRUSHED STONE BASE SHALL BE WELL GRADED STONE WITH A D50 OF 6" WITH NO ROCKS BEING LARGER THAN 8"
- GEOTEXTILE SEAMS SHALL OVERLAP A MINIMUM OF 18" 6.
- 7. GEOTEXTILE SHALL BE CLASS I NON-WOVEN GEOTEXTILE FABRIC WITH A MINIMUM WEIGHT OF 10 OZ/SQ. YD.
- GEOGRID AND UNDERLAYMENT FUSED INTO TIED CONCRETE BLOCK MAT

WETLAND TEMPORARY IMPACTS							
ITEM/TYPE	QUANTITY	UNIT					
WORK AREA							
FRESHWATER EMERGENT WETLAND	570,228	S.F.					
FRESHWATER POND	2,101	S.F.					
ESTUARINE AND MARINE WETLAND	9,378	S.F.					
ACCESS ROUTES							
FRESHWATER EMERGENT WETLAND	102,237	S.F.					

WEILAND PERMANENT IMPACTS								
ITEM/TYPE	QUANTITY	UNIT						
DITCH FOOTPRINT								
FRESHWATER EMERGENT WETLAND	364,394	S.F.						
FRESHWATER POND	15,757	S.F.						
ESTUARINE AND MARINE WETLAND	26,763	S.F.						
NON-WETLAND	61,401	S.F.						
DITCH VOLUME	35,266	C.Y.						
MODIFIED HYDROLOGY	3,962,892	S.F.						

BER: DU-TX-20-9	NOTICE:
OSA - CHANNEL F	INTERIM REVIEW UNDER THE AUTHORITY OF
	CARTER A. COLEMAN, P.E. 126025, C.O.R. F-001112
-: 2/22	PEPAIT PIPPOSES ONLY

PROJECT NUME LAGUNA ATASCC DETAILS & WET



SHEET NUMBER

11 OF 11

BAHIA GRANDE CHANNEL F WETLAND RESTORATION

July 2022

1.0 Introduction

This project monitoring and adaptive management (MAM) plan identifies the monitoring and data collection needed to evaluate progress toward meeting the project's objectives and to support adaptive management. This plan was developed in accordance with the MAM plan template provided in the MAM Manual Version 2.0 and was adapted to fit the needs of this project (DWH NRDA Trustees [DWH] 2021). This MAM plan is a living document and may be updated as needed to reflect changing conditions. Future revisions to this document will be made publicly available as part of project implementation through the Data Integration, Visualization, Exploration, and Reporting (DIVER) website (www.diver.orr.noaa.gov/web/guest/home) and accessible through the Trustee Council's website (www.habitat.noaa.gov/storymap/dwh/).

1.1 Project Overview

This project is being implemented as restoration for the DWH oil spill Natural Resource Damage Assessment (NRDA), consistent with the PDARP/PEIS (DWH Trustees, 2016). The Bahia Grande Channel F Wetland Restoration Project (project) is located within the Laguna Atascosa National Wildlife Refuge between Bahia Grande and Laguna Vista, Texas (Figure 1). The Bahia Grande System is a federally protected 10,000-acre estuary and wetland complex consisting of three shallow water basins (i.e., Bahia Grande, Little Laguna Madre, and Laguna Larga). This project will enhance 800 acres of wetlands and shallow open waters by restoring freshwater flow from north of Highway 100 to Laguna Larga in the upper Bahia Grande System. This project's primary activities include 1) final engineering design and solicitation for construction, 2) land grading and construction of a conveyance channel, and 3) monitoring.

This project is being implemented as restoration for the *Deepwater Horizon* oil spill (DWH oil spill) Natural Resource Damage Assessment (NRDA), consistent with the *Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement* (Final PDARP/PEIS) (DWH 2016). Per the Final PDARP/PEIS, the project falls into the following restoration categories:

- **Programmatic Goal:** Restore and conserve habitat
- **Restoration Type:** Wetlands, Coastal, and Nearshore Habitats
- Restoration Approach: Create, restore, and enhance coastal wetlands
- **Restoration Technique:** Restore hydrologic connections to enhance coastal habitats
- Trustee Implementation Group: Texas TIG
- **Restoration Plan:** Texas Trustee Implementation Group Final Restoration Plan and Environmental Assessment #2: Restoration of Wetlands, Coastal, and Nearshore Habitats; Nutrient Reduction; Oyster; Sea Turtles; and Birds.

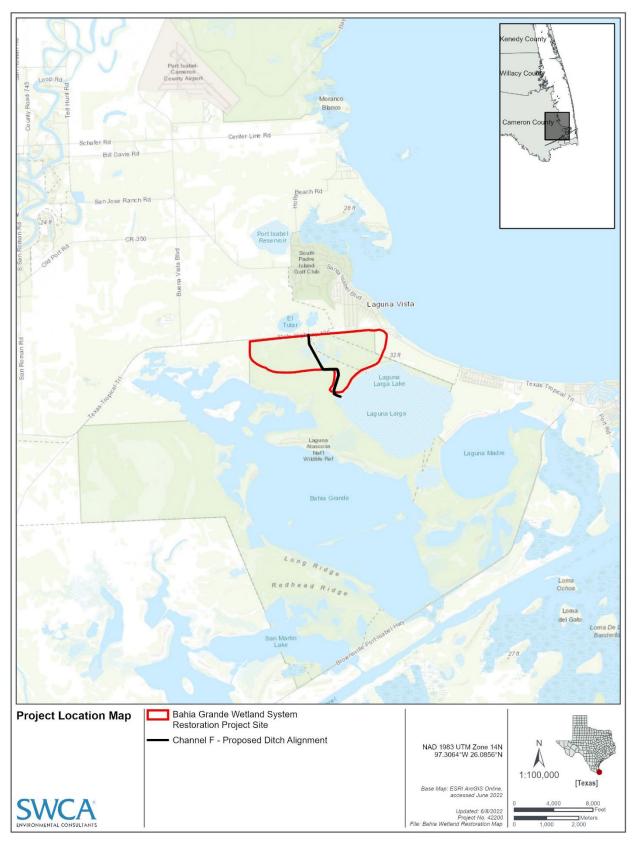


Figure 1. Project location.

1.2 Restoration Type Goals and Project Restoration Objectives

This project is designed to address the Wetlands, Coastal, and Nearshore Habitat restoration type. As summarized in Chapter 5 of the Final PDARP/PEIS, the restoration goals for injuries to coastal habitats are as follows:

- Restore a variety of interspersed and ecologically connected coastal habitats in each of the five Gulf states to maintain ecosystem diversity, with particular focus on maximizing ecological functions for the range of resources injured by the spill, such as oysters, estuarine-dependent fish species, birds, marine mammals, and nearshore benthic communities.
- Restore for injuries to habitats in the geographic areas where the injuries occurred, while considering approaches that provide resiliency and sustainability.
- While acknowledging the existing distribution of habitats throughout the Gulf of Mexico, restore
 habitats in appropriate combinations for any given geographic area. Consider design factors, such
 as connectivity, size, and distance between projects, to address injuries to the associated living
 coastal and marine resources and restore the ecological functions provided by those habitats.

The project-level restoration objectives for the project are 1) restore hydrologic connectivity, 2) restore targeted salinity regime, 3) promote regrowth of native submerged aquatic vegetation (SAV), and 4) provide habitat for fish and invertebrate species. These will be achieved by restoring the natural flow of fresh water to Laguna Larga in order to restore salinity gradients. Restoring salinity gradients will enhance the ecological value of existing coastal habitats, which would allow for colonization of SAV vegetation native to the natural salinity regime and creation of habitat conditions that enhance habitat utilization by benthic infaunal and epifaunal as well as nektonic faunal communities.

1.3 Conceptual Setting

The Bahia Grande System served as a natural nursery for fish, shellfish, wildlife, and waterfowl in the South Texas coastal region until the basin was modified by the placement of dredged sediments from the construction of the Brownsville Ship Channel in the mid-1930s and subsequently by the construction of State Highway 48 in the mid-1950s. This isolation left the Bahia Grande System a vast flat of dry sediment with little to no value as habitat for fish and wildlife. In the early 2000s, the U.S. Fish and Wildlife Service (USFWS) proposed to flood Bahia Grande by cutting in a channel from the Brownsville Ship Channel. The pilot channel was constructed in 2005 and flooded Bahia Grande; since then, additional hydrologic connection improvements have consisted of a bridge constructed on State Highway 48 and another DWH NRDA project (Bahia Grande Hydrologic Restoration [Portal ID #99; https://www.gulfspillrestoration.noaa.gov/project?id=99]) that widened and deepened the existing pilot channel between Bahia Grande and the Brownsville Ship Channel. These previous and ongoing efforts to restore the Bahia Grande System have resulted in improvements to the broader ecosystem. However, the ecological value of Laguna Larga is degraded in nature due to continued impacts of landscape and watershed alterations that prevent historical freshwater inflows from contributing to the Laguna Larga water budget. Given these conditions, DWH NRDA Texas TIG recognized the need re-establish natural freshwater inflows in order to benefit the habitat value of Laguna Larga, which contributes to the overall ecological functioning of the Bahia Grande ecosystem. Restoration of fresh water inflow to Laguna Larga would be accomplished by the modification of ditches, installation of box culverts under Highway 100, and the construction of a conveyance channel (Channel F) to route water flow into Laguna Larga. Land grading would be needed to ensure the desired water flow into Laguna Larga. Reestablishing freshwater inflow to Laguna Larga would complement the tidal flow restoration between the Brownsville Ship Channel and the Bahia Grande.

Key factors that could affect the success of this project include 1) delays or prevention of completion of construction activities due to ongoing or unforeseen market pressures, and 2) the ability to sufficiently grade the landscape between Highway 100 and Laguna Larga to make an effective elevation gradient. This restoration project will re-establish natural fresh water inflows, but the effectiveness of these hydrologic reconnections will also depend on external drivers with could affect achievement of project objectives. Examples of these external drivers include, but are not limited to 1) changes in precipitation patterns (e.g., amounts, durations, frequency of events, etc.) which limit the amount of fresh water available for Laguna Larga to receive and thus impact salinity regimes; 2) changes in sea level that affect the elevation gradient needed to divert fresh water; 3) floral and faunal colonization or recruitment patterns that prevent establishment of appropriate communities despite establishment of salinity regimes; and 4) the severity and/or frequency of major storm events that degrade and/or cause failure of the hydrologic restoration design features.

1.4 Potential Sources of Uncertainty

Although the likelihood of project success is evaluated under the Oil Pollution Act regulations (15 Code of Federal Regulations Section 990.54(a)(3)), uncertainties may exist regarding how to best implement projects to achieve the greatest benefits for the injured resources. These uncertainties may arise from an incomplete understanding of the current conceptual setting; from unknown conditions in the future; or from project elements that do not perform as anticipated. For this project, the uncertainties (summarized in Table 1) could affect project success and could therefore be key drivers of corrective actions or adaptive management decisions. Sections 2.0 and 3.0 summarize project monitoring protocols and describe how this information will be used to inform adaptive management to address these uncertainties.

Potential uncertainties are defined as those that may affect the ability to achieve project restoration objective(s). To aid in the identification of uncertainties, Trustees used a variety of sources, including but not limited to Final PDARP/PEIS restoration type MAM sections (DWH 2016), *Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.0* (DWH 2021), and other documents. Select monitoring activities can then be implemented to inform these uncertainties and to select appropriate corrective actions if the project does not meet its performance criteria (see Table 1).

Table 1. Key Uncertain	ties
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Reference Number	Key Uncertainty	Description on How the Uncertainty Could Impact Project Success and/or Decision Making
1	Extreme weather	Extreme weather may result in damage to the project prior to, during, or post construction. This could result in the need to postpone construction or reconstruct damaged portions of the project.
2	Recruitment and/or colonization patterns	Recruitment and/or colonization patterns of floral and/or faunal communities may be insufficient.
3	Precipitation patterns	The volume of fresh water necessary to effectively alter the Laguna Larga water budget (and salinity regime) will be affected by external drivers such as precipitation.
4	Sea level rise	Site-specific rates of sea level rise will impact the elevation gradient needed to divert fresh water to Laguna Larga.
5	Market instability	Unforeseen market instability may delay or prevent construction of the project.
6	Elevation gradient	The ability to sufficiently grade the landscape between Highway 100 and Laguna Larga will impact the level of success of the project.

This list is not exhaustive; additional uncertainties may be identified as the project is implemented and monitored. These uncertainties may affect the achievement of the restoration objectives of the project. For

example, environmental conditions that influence freshwater inflow patterns can vary at different spatial and temporal scales, and might not remain consistent throughout the life of the project. If any drivers or stressors are negatively impacting the project, adaptive management may be necessary to ensure that project objectives are being achieved. The adaptive management strategy for this project is outlined in Section 3.0 section below.

2.0 Project Monitoring

The proposed monitoring for this restoration project was developed to evaluate project performance and potential corrective actions and/or adaptive management, if needed. Parameters without performance criteria or potential corrective actions are being monitored for informational purposes to understand what changes to conditions are occurring; however, any corrective actions are either outside the scope of this project or are associated with another parameter that is being monitored. Information on each monitoring parameter is provided below, organized by objective (Table 2). Note that Table 2 does not include all possible options for corrective actions; rather, it includes a list of potential actions for each individual parameter to be considered if the project is not performing as expected once implemented. Other corrective actions may be identified post-implementation, as appropriate, and are further discussed in Section 5.0.

Project monitoring for "restore targeted salinity regime," "promote regrowth of native SAV," and "provide habitat for fish and invertebrate species" objectives will be coordinated so that relevant environmental information is paired with fish and invertebrate assemblage information for assessment of understanding what is occurring at the project site.

Table 2. Project Objectives, Parameters, Data Collection Activities, Performance Criteria, and Potential Corrective Actions

Project Objective	Parameter(s)	Method	Timing and Frequency of Data Collection	Sample Size/Sites	Performance Criteria	Potential Corrective Actions
Restore hydrologic connectivity	Elevation	Topographic profiles will be done to measure land elevation by using RTK GPS surveys.	Monitoring shall occur prior to construction, immediately after construction (as-built), and annually postconstruction for 5 years, for a total of 7 years, or longer to ensure that the elevation gradient is being maintained sufficiently to meet the performance criteria.	Topographic profiles should be collected along the entire project footprint. A reference and/or control site could be established, where appropriate and applicable.	Elevation gradient will be compared to construction drawings to determine if gradient was constructed and is functioning as designed.	Evaluate whether the design should be modified to prevent degradation of the desired gradient, then the elevation could be regraded as appropriate during As-built assessment. Continued monitoring during postconstruction, during Years1–5 will be informative for future project development and adaptive management.
	Channel Dimensions	Cross-sectional profiles will be measured using advanced survey instrumentation, such as RTK GPS.	Monitoring shall occur immediately following construction (as-built), and annually 5 years postconstruction to ensure channel dimensions are being maintained sufficiently to meet performance criteria. Additional sampling may be needed after large storm events.	Cross-sectional profiles should be measured in the constructed channel constructed. A reference and/or control site could be established, where appropriate and applicable.	Channel dimensions will be compared to construction drawings to determine if gradient is functioning as designed.	Should channel dimensions not be constructed or functioning as designed, the channel could be reconstructed or redesigned during As-built assessment. Continued monitoring during postconstruction, during Years 1–5 will be informative for future project development and adaptive management.

Project Objective	Parameter(s)	Method	Timing and Frequency of Data Collection	Sample Size/Sites	Performance Criteria	Potential Corrective Actions
Restore hydrologic connectivity	Discharge	Measure discharge by multiplying the water velocity (m/s) by the cross-sectional area (m²) of the channel.	Given the intermittent nature of these freshwater inflows, sampling events should capture both high-and low-flow water conditions during discrete flow events, but year-round data collection for 1 or more years is preferred to fully capture the seasonal variability in flow conditions, preferably early as well as later in the monitoring period for this project (i.e., up to 5 years post-implementation). For discrete measurements, the discharge could be assessed over a few weeks during both high- and low-flow conditions.	Discharge should be measured or calculated at the Channel F inlet to Laguna Larga. If discharge is calculated by multiplying the water velocity by the cross-sectional area, these two measurements should be taken in the same location. A reference and/or control site could be established, where appropriate and applicable.	Discharge will be evaluated against design criteria to ensure that the channel is not functioning outside of desired conditions (i.e., dewatered or frequently experiencing overbank flooding).	Should discharge be functioning outside of desired conditions, a hydrological analysis should be conducted to determine the cause of failure.
	Dissolved oxygen (DO)	Water DO will be measured continuously with an in-situ multiparameter sonde and data logger.	Quarterly. 30-minute sampling intervals over 2-day deployments. Sampling should occur preimplementation, immediately after implementation, and postimplementation for 5 years, resulting in up to 7 years of monitoring.	Measurements should occur in two locations: 1) the restored inlet of Channel F into Laguna Larga and 2) The middle of Laguna Larga.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.
Restore targeted salinity regime	Salinity, surface water	Water salinity will be measured continuously with an in-situ multiparameter sonde and data logger.	Quarterly. 30-minute sampling intervals over 2-day deployments. Sampling shall occur pre-implementation, immediately after implementation, and post-implementation for 5 years, resulting in up to 7 years of monitoring.	Measurements should occur in two locations: 1) the restored inlet of Channel F into Laguna Larga and 2) The middle of Laguna Larga.	Surface water salinity shall be evaluated against requisite conditions for desirable, native flora and fauna to colonize the restored area.	Should salinity be outside of the desired range, the Implementing Trustee shall determine if the freshwater inflows are sufficient for the water budget.

Project Objective	Parameter(s)	Method	Timing and Frequency of Data Collection	Sample Size/Sites	Performance Criteria	Potential Corrective Actions
Promote regrowth of native SAV	Percent Cover, Vegetation SAV)	Establish fixed sampling locations within the project area and record locations with a GPS and/or mark the plots with corner poles to allow for revisiting over time. Typical plot sizes are 0.25 to 1 m² for SAV.	Monitoring should occur pre-implementation, immediately after implementation, and annually post-implementation on a quarterly basis for 5 years resulting in up to 7 years of monitoring.	Vegetation percent cover monitoring sites should be distributed throughout the entire project footprint. For hydrologic restoration projects, transects typically go from areas of higher hydrologic influence to areas of lower hydrologic influence. A reference and/or control site should be established, where appropriate and applicable.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.
	Species Composition, Vegetation (SAV)	Calculate for species diversity metrics; community and diversity analyses derived from percent cover data.	Monitoring should occur pre-implementation, immediately after implementation, and annually post-implementation on a quarterly basis for 5 years resulting in up to 7 years of monitoring.	Vegetation species composition monitoring sites should be distributed throughout the entire project footprint. For hydrologic restoration projects, transects typically go from areas of higher hydrologic influence to areas of lower hydrologic influence. A reference and/or control site should be established, where appropriate and applicable.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.
	Density, Vegetation (SAV)	Establish fixed sampling locations within the project area and record locations with a GPS and/or mark the plots with corner poles to allow for revisiting over time. Typical plot sizes are 0.25 to 1 m² for SAV.	Monitoring should occur pre-implementation, immediately after implementation, and annually post-implementation on a quarterly basis for 5 years resulting in up to 7 years of monitoring.	Vegetation density cover monitoring sites should be distributed throughout the entire project footprint. For hydrologic restoration projects, transects typically go from areas of higher hydrologic influence to areas of lower hydrologic influence. A reference and/or control site should be established, where appropriate and applicable.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.

Project Objective	Parameter(s)	Method	Timing and Frequency of Data Collection	Sample Size/Sites	Performance Criteria	Potential Corrective Actions
Provide habitat for fish and invertebrate species	Temperature	Temperature will be measured continuously with an in-situ multiparameter sonde and data logger.	Quarterly. 30-minute sampling intervals over 2-day deployments. Sampling shall occur pre-implementation, immediately after implementation, and post implementation for 5 years, resulting in up to 7 years of monitoring.	Measurements should occur in two locations: 1) the restored inlet of Channel F into Laguna Larga and 2) the middle of Laguna Larga.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.
	Density, Epibenthic and/or Infaunal Organisms	Use cores (15-cm diameter, 15-cm depth) to sample infaunal invertebrates, washing samples over a 2 mm or smaller mesh (Baggett et al. 2014).	Sampling should occur quarterly for 7 years, for a total of 28 sampling events over the project life. Monitoring to occur for one year pre-implementation, and immediately following construction, and post-implementation for 5 years, resulting in up to 7 years of monitoring.	A minimum of 5 fixed sample sites located throughout the project footprint. Each sample will consist of 4 replicate cores. (Total of 560 samples within the project area across 7 years of sampling). A reference and/or control site should be established, where appropriate and applicable.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.

Project Objective	Parameter(s)	Method	Timing and Frequency of Data Collection	Sample Size/Sites	Performance Criteria	Potential Corrective Actions
Provide habitat for fish and invertebrate species	Species Composition, Epibenthic or Infaunal Organisms	Use cores (15-cm diameter, 15-cm depth) to sample infaunal invertebrates, washing samples over a 2 mm or smaller mesh (Baggett et al. 2014), diversity values are derived from density values.	Sampling should occur quarterly for 7 years, for a total of 28 sampling events over the project life. Monitoring to occur for one year pre-implementation, and immediately following construction, and post-implementation for 5 years resulting, in up to 7 years of monitoring.	A minimum of 5 fixed sample sites located throughout the project footprint. Each sample will consist of 4 replicate cores. (Total of 560 samples within the project area across 7 years of sampling). A reference and/or control site should be established, where appropriate and applicable.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.
	Community Composition, Epibenthic or Infaunal Organisms Use cores (15-cm diameter, 15-cm depth) to sample infaunal invertebrates, washing samples over a 2 mm or smaller mesh (Baggett et al. 2014), diversity values are derived from density values.		Sampling should occur quarterly for 7 years, for a total of 28 sampling events over the project life. Monitoring to occur for one year pre-implementation, and immediately following construction, and post-implementation for 5 years resulting, in up to 7 years of monitoring.	A minimum of 5 fixed sample sites located throughout the project footprint. Each sample will consist of 4 replicate cores. (Total of 560 samples within the project area across 7 years of sampling). A reference and/or control site should be established, where appropriate and applicable.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.
	Abundance, FWCI	Bag seines (18.3m L x 1.8m H with #5 multifilament mesh)	Sampling should occur quarterly for 7 years, for a total of 28 sampling events over the project life. Monitoring to occur for one year pre-implementation, and immediately following construction, and post-implementation for 5 years, resulting in up to 7 years of monitoring.	A minimum of 5 fixed sample sites located throughout the project footprint at each sampling event. Each sample will consist of 1 seine haul (Total of 140 samples across 7 years of sampling) within the project area. A reference and/or control site should be established, where appropriate and applicable.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.

Project Objective	Parameter(s)	Method	Timing and Frequency of Data Collection	Sample Size/Sites	Performance Criteria	Potential Corrective Actions
Provide habitat for fish and invertebrate species	Species composition, FWCI	Bag seines (18.3m L x 1.8m H with #5 multifilament mesh)	Sampling should occur quarterly for 7 years, for a total of 28 sampling events over the project life. Monitoring to occur for one year pre-implementation, and immediately following construction, and post-implementation for 5 years, resulting in up to 7 years of monitoring.	A minimum of 5 fixed sample sites located throughout the project footprint at each sampling event. Each sample will consist of 1 seine haul (Total of 140 samples across 7 years of sampling) within the project area. A reference and/or control site should be established, where appropriate and applicable.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.
	Community composition, FWCI	Bag seines (18.3m L x 1.8m H with #5 multifilament mesh)	Sampling should occur quarterly for 7 years, for a total of 28 sampling events over the project life. Monitoring to occur for one year pre-implementation, and immediately following construction, and post-implementation for 5 years, resulting in up to 7 years of monitoring.	A minimum of 5 fixed sample sites located throughout the project footprint at each sampling event. Each sample will consist of 1 seine haul (Total of 140 samples across 7 years of sampling) within the project area. A reference and/or control site should be established, where appropriate and applicable.	There are no performance criteria associated with this parameter. Data are being collected for informational purposes.	This parameter is not needed to assess performance of the project but is being monitored for informational purposes to understand what is occurring at the site.

3.0 Adaptive Management

Due to the nature of this project and the use of standard restoration techniques that have been successfully implemented in similar projects, the Texas TIG does not anticipate the need for rigorous adaptive management of the project. If assessment of project monitoring data, conducted annually at a minimum but could occur more often as needed or as triggered by project milestones, identifies that project objectives are not being met, the Texas TIG may implement corrective actions as identified in Table 2 and/or identify corrective actions as necessary.

4.0 Evaluation

Project MAM includes planned evaluations of the selected parameters (see Table 2) throughout the project's lifetime. By thoughtfully designing evaluation methods for the design and implementation of project restoration activities, the Implementing Trustee can assess if the project is meeting its restoration objectives and determine the need for adaptive management or corrective actions as well as identify lessons learned, previously unrecognized uncertainties, and/or unanticipated events unrelated to the restoration project that potentially affected the monitoring results (e.g., hurricanes). At a minimum and as part of annual reporting of monitoring data (Section 8.0), annual evaluations of monitoring data will be conducted to determine if corrective actions are needed. Evaluations of monitoring data can occur more often as needed or as triggered by project milestones, such as completion of the project implementation/construction.

5.0 Project-Level Decisions: Performance Criteria and Potential Corrective Actions

Evaluations of MAM data are used to 1) determine whether the project, once implemented, has met its objectives, and 2) inform the need for potential corrective actions (see Table 2).

6.0 Monitoring Schedule

The schedule for project monitoring is shown in Table 3 by monitoring parameter.

Table 3. Monitoring Schedule

Monitoring Parameters	Pre- Execution Monitoring	Execution Monitoring (initial) As-Built	Post- Execution Monitoring Year 1	Post- Execution Monitoring Year 2	Post- Execution Monitoring Year 3	Post- Execution Monitoring Year 4	Post- Execution Monitoring Year 5
Elevation	Х	Х	Х	Х	Х	Х	Х
Channel dimensions		Х	Х	Х	Х	Х	Х
Discharge		Х	Х	Х	Х	Х	Х
Dissolved oxygen (DO)*	Х	Х	Х	Х	Х	Х	Х
Salinity*	Х	Х	Х	Х	Х	Х	Х
Percent cover, SAV*	Х	Х	Х	Х	Х	Х	Х
Community composition, SAV*	Х	Х	Х	Х	Х	Х	Х

Monitoring Parameters	Pre- Execution Monitoring	Execution Monitoring (initial) As-Built	Post- Execution Monitoring Year 1	Post- Execution Monitoring Year 2	Post- Execution Monitoring Year 3	Post- Execution Monitoring Year 4	Post- Execution Monitoring Year 5
Density, SAV*	Х	Х	Х	Х	Х	Х	Х
Temperature*	Х	Х	Х	Х	Х	Х	Х
Density, epibenthic or infaunal organisms*	Х	Х	Х	Х	Х	Х	Х
Species composition, epibenthic or infaunal organisms*	Х	Х	Х	Х	Х	Х	Х
Community composition, epibenthic or infaunal organisms*	Х	Х	Х	Х	Х	Х	Х
Abundance, FWCI*	Х	Х	Х	Х	Х	Х	Х
Species composition, FWCI *	Х	Х	Х	Х	Х	Х	Х
Community composition, FWCI*	Х	Х	Х	Х	Х	Х	Х

^{*}Likely to be monitored/assessed quarterly.

7.0 Data Management

To the extent practicable, after consideration of ongoing federal and/or state-specific efforts (e.g., current protocols, existing databases), all environmental and biological data generated during monitoring activities will be documented using a standardized format (e.g., field datasheets), using the data parameters listed above. Data may be collected, tabulated, and/or reported using a variety of available tools, both electronic and non-electronic. Electronic data file names should include the date on which the file was created, a ReadMe file that describes when and by whom the file was created, and any explanatory notes about the file contents. If a data file is revised, a new copy will be made and the original preserved. The Implementing Trustee will verify and validate monitoring data and information and will ensure that all data are entered or converted into agreed upon/commonly used digital format labeled with metadata.

7.1 Data Review and Clearance

A standardized reporting format will be developed to the extent practicable (e.g., from standardized data sheet). Prior to publication, data will be reviewed and verified for completeness. A quality check is done by comparing the entered electronic data to the original hard copy data sheet. Data are validated and any necessary corrections are made. Upon validation, data are approved for analysis, reporting, and archiving.

After any and all errors are addressed, data are considered to have completed a quality assurance and quality control (QA/QC) review. Before submitting the monitoring data and information package, the Implementing Trustee shall confirm that the package is approved for submission. The Implementing Trustee will give the other TIG members time to review the data before publication in DIVER. No data release can occur if it is contrary to federal or state laws.

7.2 Data Storage and Accessibility

After data has been verified by QA/QC procedures, it will be stored on DIVER and, where applicable, on Implementing Trustee databases.

7.3 Data Sharing

Data will be made publicly available through DIVER and, where applicable, Implementing Trustee databases, in accordance with the applicable data sharing policies and regulations in operation at the time of data collection.

8.0 Reporting

Project monitoring information will be prepared and uploaded to DIVER annually. The Implementing Trustee will develop a final, high-level summary report prior to project closeout.

9.0 Roles and Responsibilities

The National Oceanic and Atmospheric Administration will be the Implementing Trustee for the project.

10.0 Monitoring and Adaptive Management Budget

The budget for this project includes support for the full range of monitoring and adaptive management activities described above, including field sampling, data management and analysis, report writing, and adaptive management.

11.0 References

- Baggett, L.P., S.P. Powers, R. Brumbaugh, L.D. Coen, B. DeAngelis, J. Greene, B. Hancock, and S. Morlock. 2014. *Oyster Habitat Restoration Monitoring and Assessment Handbook*. Arlington, Virginia: The Nature Conservancy.
- Deepwater Horizon Oil Spill NRDA Trustees (DWH). 2016. Deepwater Horizon Oil Spill: Final Programmatic Damage Assessment and Restoration Plan and Final Programmatic Environmental Impact Statement (Final PDARP/PEIS). Available at: http://www.gulfspillrestoration.noaa.gov/restoration-planning/gulf-plan. Accessed November 10, 2021.
- ———. 2021. Monitoring and Adaptive Management Procedures and Guidelines Manual Version 2.0. Appendix in Trustee Council Standard Operating Procedures for Implementation of the Natural Resource Restoration for the DWH Oil Spill. December. Available at: www.gulfspillrestoration.noaa.gov/. Accessed January 25, 2022.

Conditions for Letter of Permission:

General Conditions:

- The time limit for completing the activity authorized ends on 31 December 2029. If you find that you need more
 time to complete the authorized activity, submit your request for a time extension to this office for consideration
 at least one month before the above date is reached.
- 2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
- 3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.
- 4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
- 5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
- 6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.
 Special Conditions:

See Authorization Letter

Further Information:

1.	Congressional Authorities: You have been authorized to undertake the activity described above pursuant to: () Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
	(X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
	() Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).

2. Limits of this authorization:

- a. This permit does not obviate the need to obtain other Federal, state or local authorizations required by law.
- b. This permit does not grant property rights or exclusive privileges.
- c. This permit does not authorize any injury to the property or rights of others.
- d. This permit does not authorize interference with any existing or proposed Federal project.

- 3. Limits of Federal Liability. In issuing this permit, the Federal Government does not assume any liability for the following:
 - Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension or revocation of this permit.
- 4. Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.
- 5. Reevaluation of Permit Decision: This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:
 - a. You fail to comply with the terms and conditions of this permit.
 - b. The information provided by you in support of your permit application proves to have been false, incomplete or inaccurate (See 4 above).
 - Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it in appropriate to use the suspension, modification and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions: General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of time limit.

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below.

(TRANSFEREE – Typed/Printed Name)	(DATE)
(TRANSFEREE - Signature)	(Mailing Address)

NOTIFICATION OF ADMINISTRATIVE APPEAL OPTIONS AND PROCESS AND REQUEST FOR APPEAL

Applicant:	File Number:	Date:
Attached is:	See Section below	
INITIAL PROFFERED PERMIT (Standard Permit or Letter of permission)		А
PROFFERED PERMIT (Standard Permit or Letter of permission)		В
PERMIT DENIAL WITHOUT PREJUDICE		С
PERMIT DENIAL WITH PREJUDICE		D
APPROVED JURISDICTIONAL DETERMINATION		E
PRELIMINARY JURISDICTIONAL DETERMINATION		F

SECTION I

The following identifies your rights and options regarding an administrative appeal of the above decision. Additional information may be found at https://www.usace.army.mil/Missions/Civil-Works/Regulatory-Program-and-Permits/appeals/ or Corps regulations at 33 CFR Part 331.

A: INITIAL PROFFERED PERMIT: You may accept or object to the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to
 the district engineer for final authorization. If you received a Letter of Permission (LOP), you may
 accept the LOP and your work is authorized. Your signature on the Standard Permit or
 acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to
 appeal the permit, including its terms and conditions, and approved jurisdictional determinations
 associated with the permit.
- OBJECT: If you object to the permit (Standard or LOP) because of certain terms and conditions
 therein, you may request that the permit be modified accordingly. You must complete Section II of
 this form and return the form to the district engineer. Upon receipt of your letter, the district
 engineer will evaluate your objections and may: (a) modify the permit to address all of your
 concerns, (b) modify the permit to address some of your objections, or (c) not modify the permit
 having determined that the permit should be issued as previously written. After evaluating your
 objections, the district engineer will send you a proffered permit for your reconsideration, as
 indicated in Section B below.

B: PROFFERED PERMIT: You may accept or appeal the permit

- ACCEPT: If you received a Standard Permit, you may sign the permit document and return it to
 the district engineer for final authorization. If you received a Letter of Permission (LOP), you may
 accept the LOP and your work is authorized. Your signature on the Standard Permit or
 acceptance of the LOP means that you accept the permit in its entirety, and waive all rights to
 appeal the permit, including its terms and conditions, and approved jurisdictional determinations
 associated with the permit.
- APPEAL: If you choose to decline the proffered permit (Standard or LOP) because of certain terms and conditions therein, you may appeal the declined permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

C. PERMIT DENIAL WITHOUT PREJUDICE: Not appealable

You received a permit denial without prejudice because a required Federal, state, and/or local authorization and/or certification has been denied for activities which also require a Department of the Army permit before final action has been taken on the Army permit application. The permit denial without prejudice is not appealable. There is no prejudice to the right of the applicant to reinstate processing of the Army permit application if subsequent approval is received from the appropriate Federal, state, and/or local agency on a previously denied authorization and/or certification.

D: PERMIT DENIAL WITH PREJUDICE: You may appeal the permit denial You may appeal the denial of a permit under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.

E: APPROVED JURISDICTIONAL DETERMINATION: You may accept or appeal the approved JD or provide new information for reconsideration

- ACCEPT: You do not need to notify the Corps to accept an approved JD. Failure to notify the Corps within 60 days of the date of this notice means that you accept the approved JD in its entirety and waive all rights to appeal the approved JD.
- APPEAL: If you disagree with the approved JD, you may appeal the approved JD under the Corps of Engineers Administrative Appeal Process by completing Section II of this form and sending the form to the division engineer. This form must be received by the division engineer within 60 days of the date of this notice.
- RECONSIDERATION: You may request that the district engineer reconsider the approved JD by submitting new information or data to the district engineer within 60 days of the date of this notice. The district will determine whether the information submitted qualifies as new information or data that justifies reconsideration of the approved JD. A reconsideration request does not initiate the appeal process. You may submit a request for appeal to the division engineer to preserve your appeal rights while the district is determining whether the submitted information qualifies for a reconsideration.

F: PRELIMINARY JURISDICTIONAL DETERMINATION: Not appealable

You do not need to respond to the Corps regarding the preliminary JD. The Preliminary JD is not appealable. If you wish, you may request an approved JD (which may be appealed), by contacting the Corps district for further instruction. Also, you may provide new information for further consideration by the Corps to reevaluate the JD.

POINT OF CONTACT FOR QUESTIONS OR INFORMATION:

If you have questions regarding this decision you may contact:

If you have questions regarding the appeal process, or to submit your request for appeal, you may contact:

U.S. Army Corps of Engineers 5151 Flynn Parkway, Suite 306 Corpus Christi, Texas 78411-4318 361-814-5847 ext. Mr. Jamie Hyslop Administrative Appeals Review Officer

Southwestern Division (CESWD-PD-O)

U.S. Army Corps of Engineers 1100 Commerce Street, Suite 831

Dallas, Texas 75242-1317

Phone: 469-216-8324

Email: Jamie.r.hyslop@usace.army.mil

SECTION II – REQUEST FOR APPEAL or OBJE	CTIONS TO AN INITIAL PROFFERED PERMIT		
REASONS FOR APPEAL OR OBJECTIONS: (De your objections to an initial proffered permit in clean necessary. You may attach additional information objections are addressed in the administrative rec	ar concise statements. Use additional pages as to this form to clarify where your reasons or		
ADDITIONAL INFORMATION: The appeal is limited to a review of the administrative record, the Corps memorandum for the record of the appeal conference or meeting, and any supplemental information that the review officer has determined is needed to clarify the administrative record. Neither the appellant nor the Corps may add new information or analyses to the record. However, you may provide additional information to clarify the location of information that is already in the administrative record.			
	the right of entry to Corps of Engineers personnel, stigations of the project site during the course of the tice of any site investigation and will have the		
	Date:		
Signature of appellant or agent.			
Email address of appellant and/or agent:	Telephone number:		