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Kansas City Southern Railway Company's (Permittee) Port Arthur Terminal (Project) will permanently impact (fill) 13.12 acres of forested wetlands. The wetland impacts were described in the HGMi Worksheets prepared by Headwaters Inc. (agent). The Permittee proposes permitee-responsible mitigation (PRM) to replace the functional capacities lost from these unavoidable permanent impacts to wetlands.

The Permittee will be responsible for implementation of the PRM Plan, monitoring, meeting performance standards, and long-term management of the property as described in 33 CFR §332.3 (l) (Federal Register 2008). RES will act as the Mitigation Agent for the Project and will prepare and submit a comprehensive PRM Plan. The PRM Plan will be prepared in general accordance with the Compensatory Mitigation for Losses of Aquatic Resources; Final Rule issued on April 10, 2008 as detailed in §332.4 (c) of the Federal Register (Volume 73 Number 70).

Implementation of this PRM Plan will re-establish forested wetlands in the same watershed (Sabine Lake; Hydrologic Unit Code [HUC] 12040201) and the same EPA Level III Ecoregion (Western Gulf Coastal Plain) as the Project. RES will apply the *Riverine Forested HGM Interim* model to estimate the mitigation functional capacity units (FCUs) that would be provided by forested wetland re-establishment (upland to wetland) within the PRM Site. The expected physical, biological, and chemical FCUs will be calculated for Year 10 following planting on the PRM Site. The expected Year 10 FCUs to be provided by a PRM Site would meet and/or exceed the physical, biological, and chemical FCUs that will be lost by the implementation of the Project.

Restoration will be accomplished through hydrological modifications and native species afforestation and seeding with a dominance of hydrophytic vegetation. The re-establishment of wetlands at the PRM Site will result in a desirable functional replacement for the wetlands at the Project site, since they will be equal or higher quality than the wetlands that will be impacted by the Project.

Construction to achieve restoration of hydrology on the PRM Site will be conducted the first summer following Project approval by the USACE. Planting and seeding to achieve restoration of plant community will occur in the following winter or spring as Year 1.

The work plan will restore wetland hydrology by one or more of the following: 1) filling/plugging incised drains that channel water off the PRM site, 2) establishing berms with low water crossings between the PRM Site and adjacent water body, 3) creating openings in existing berms that separate the PRM Site from up-slope properties, 4) restoring surface roughness, and 5) create low (~6") interior berms to slow the overland flow of water across the site.

Creating low water crossings in a berm maintains a controlled hydrologic connection between the re-established/rehabilitated wetlands and the adjacent water body. Replacing existing incised drains/channels with a low water crossing will result in surface water remaining on the PRM Site for longer periods of time. By making the low water crossings no more than 6 inches higher than grade, they will detain a thin layer of surface water during heavy flood events, which will increase hydroperiods but does not result in excess periods of ponding or open water due to evaporation, evapotranspiration, and absorption. The low water crossings will be armored with rock or other hard material to prevent erosion.

As necessary, RES will create breaks in the berms along the property boundary to allow sheet flow into the PRM Site from adjacent properties. The increased inflow of surface water from up-slope properties will create longer hydroperiods on the PRM site.

Prior to planting and seeding the PRM Site, a sub-soil treatment will be applied to alleviate soil compaction and establish roughness (microtopography). Restoration of surficial roughness will increase floral and habitat diversity by fostering the development of small humps and shallow depressions to mimic gilgai that are common to the area. Furthermore, the diversity of microtopography influences hydroperiods, soil permeability, and will help establish a more complex wetland vegetation community and a more diverse assemblage of wildlife species. Additionally, microtopography may improve nutrient cycling and removal. The goal of the hydrologic restoration would be for the PRM Site to be wet enough to achieve wetland hydrology, but not too wet that it would stunt growth of the planted trees.

The mitigation work plan will re-establish forested wetlands throughout the PRM Site. Vegetation restoration will occur through direct planting and seeding, natural recruitment and active invasive plant management. Bare root tree seedlings will be planted on 10-foot centers for a minimum of 435 stems per acre. The species composition consists of wetland tree species native to Jefferson County, Texas.

RES will source vegetation from nearby nursery facilities to provide greater control over the quantity and species composition of the seedling stock, greater assurance regarding the source of seeds, decreased seedling mortality from transportation and transplantation, and the ability to produce supplemental seedlings if needed. Seed, root stock, and cuttings will be gathered from within the ecoregion. For species that cannot be sufficiently gleaned from native sources, stock will be grown in RES's nurseries in Texas or Louisiana or on site, preferentially from stock derived from the Western Gulf Coastal Plain Ecoregion. To reduce shock to the plants, planting activities will be performed during the dormant season.

Prior to planting, GPS-guided equipment will plow, prepare, and sub-soil the site to create rows ten feet apart that can be accurately planted and easily located in the future. The species to be planted will consist of native species adapted to the floodplain environments within the Western Gulf Coastal Plain (Table 1) and were chosen using references specific to the PRM Site. The reference site is located northeast of RES' pending mitigation bank, Sabine Lake Mitigation Bank. Dominant tree species in this reference site are listed below.

**Table 1.** Overstory tree species present at TRNWR reference site and selected for planting in the PRM Site.

| Species Name | Common Name | Wetland Status | Selected for Planting |
|---|---|---|---|
| *Carya aquatica* | water hickory | OBL | ✓ |
| *Quercus lyrata* | overcup oak | OBL | ✓ |
| *Taxodium distichum* | Bald cypress | OBL | ✓ |
| *Celtis laevigata* | sugarberry | FACW | ✓ |
| *Fraxinus pennsylvanica* | green ash | FACW | ✓ |
| *Platanus occidentalis* | sycamore | FACW | |
| *Quercus phellos* | willow oak | FACW | ✓ |

| | | | |
|---|---|---|---|
| *Quercus texana* | nuttall oak | FACW | ✓ |
| *Liquidambar styraciflua* | sweetgum | FAC | |
| *Quercus nigra* | water oak | FAC | ✓ |
| *Ulmus americana* | American elm | FAC | ✓ |
| *Ulmus crassifolia* | cedar elm | FAC | ✓ |
| *Carya illinoinensis* | pecan | FACU | ✓ |

For the initial forested wetland planting, the exact species composition will depend upon seedling availability but will be composed of at least 70% hard mast producing tree species (e.g., oak, and pecan) planted in mixed-species rows to maximize the within-stand heterogeneity. Overstory tree species composition will consist of at least five species with no single species accounting for more than 25% of the cumulative cover. Whenever possible, seedlings will be planted according to wetness tolerance to minimize mortality. Pioneer tree species such as sycamore (*Platanus occidentalis*) and black willow (*Salix nigra*) may be targeted for removal or left onsite during overstory tree establishment (through approximately year 5) if monitoring reveals these species are functioning as a beneficial nurse crop.

Species will be selected to match the expected hydrological regime and in general species classified as obligate wetland plants will be planted in semi-permanently flooded depressions, and FACW to FAC species planted in the seasonally wet areas. Common dominant species selected from the species list will be planted initially in order to establish cover of desirable species and minimize potential colonization by invasive species, then other species will be added in subsequent years in order to increase diversity of the wetland.

RES will implement management activities to monitor and control invasive, noxious or nuisance species such as Chinese tallow (*Triadica sebifera*), woodrush flatsedge (*Cyperus entrerianus*), alligator weed (*Alternanthera philoxeroides*), bahiagrass (*Paspalum notatum*), Vasey's grass (*Paspalum urvillei*), Johnsongrass (*Sorghum halepens*e), purpletop vervain (*Verbena incompta*), and Chinese bushclover (*Lespedeza cuneata*). Herbicide applications will be made in coordination with tree planting as a best management practice to control and suppress herbaceous weeds as well as Chinese tallow. Herbicide application will occur immediately preceding planting, as needed. Following planting, foliar herbicide will be applied between rows of trees for two years to suppress herbaceous competition for nutrients and light. These herbicides act synergistically and can control many herbaceous weed species. Following the construction phase of the PRM Plan, invasive vegetation management will continue on an as-needed basis. Spot treatments with approved herbicides or with manual removal are the preferred methods of management. Invasive species will be managed in both the restoration and preservation/protection areas of the PRM Site.

A perpetual conservation easement on the PRM Site will be secured in accordance with Texas Law, Natural Resources Code, Title 8, Chapter 183 Subchapter A. A third-party easement holder will be selected for the PRM site.

The Permittee and Mitigation Agent will be responsible for all maintenance activities required for the PRM Site through the 10-year minimum monitoring and achievement of performance standards, then in accordance with the long-term management phase requirements.

One or two continuous groundwater monitoring wells will be installed within the PRM Site to monitor hydrology at high and low points of the PRM Site. They will be evaluated to collect pertinent data at least daily throughout the growing season, including the collection of information to substantiate whether the site exhibits the appropriate hydrology for the wetland community types being restored. Monitoring reports will be submitted to the USACE by December 1 of each year for a period of at least 10 years and until all performance standards are achieved, whichever is later.

RES will provide a Performance Bond of sufficient size to ensure the success of the mitigation through the short-term monitoring period. In order to ensure that funds are available to provide for the perpetual management of the PRM site, RES will fund a long-term management investment account. The investment account will be designed to be a non-wasting endowment with earnings sufficient to fund the annual maintenance cost while accounting for inflation. The annual maintenance cost estimate will be based on the labor, materials, and equipment necessary for the long-term steward to implement long-term management of the PRM site.

**Summary**

| **BLH (PFO) Wetland Permanent Impacts** | **Acres** | **FCUs** |
|---|---|---|
| Physical | 13.99 | 10.2567 |
| Biological | 13.99 | 9.4433 |
| Chemical | 13.99 | 9.7930 |
| | | |
| **PEM Wetland Permanent Impacts** | | |
| Physical | 0.07 | 0.0060 |
| Biological | 0.07 | 0.0467 |
| Chemical | 0.07 | 0.0362 |
| | | |
| **TOTALS:** | | |
| **Physical** | **13.99** | **10.2627** |
| **Biological** | **13.99** | **9.4900** |
| **Chemical** | **13.99** | **9.8292** |

**KCS - Port Arthur Loop Track**
**HGMi Functional Assessment and Mitigation Requirement Summary Sheet**
*Functional Values based on SWG HGM (Interim) Riverine Forested*
29-Aug-19

**KCS - Port Arthur Loop Track**
WAA (BLH Wetlands) (13.06 Acres Permanent Impacts)

| | | | Post | | |
|---|---|---|---|---|---|
| | *Variable* | *Pre* | *1 year* | *5 Year* | *10 Year* |
| Duration of Flooding | Vdur | 0.75 | | | |
| Frequency of Flooding | Vfreq | 0.75 | | | |
| Topography | Vtopo | 0.40 | | | |
| Coarse Woody Debris | Vcwd | 1.00 | | | |
| Woody Vegetation | Vwood | 0.75 | | | |
| Tree species | Vtree | 0.30 | | | |
| Tree richness/diversity | Vrich | 1.00 | | | |
| Tree basal area | Vbasal | 0.40 | | | |
| Tree density | Vdensity | 0.60 | | | |
| Midstory (shrubs/saplings/woody vines) | Vmid | 0.50 | | | |
| Herbaceous layer | Vherb | 0.50 | | | |
| Detritus | Vdetritus | 0.50 | | | |
| Redoximorphic process | Vredox | 0.10 | | | |
| Sorptive Soil Properties | Vsorpt | 1.00 | | | |
| Connectivity to other habitat types | Vconnect | 0.75 | | | |

| | | | | | | *WAA (BLH Wetlands)* | | |
|---|---|---|---|---|---|---|---|---|
| | *FCI* | *FCI* | *FCI* | *FCI* | | *Difference* | *Acres* | *FCUs* |
| Physical | 0.73 | 0.00 | 0.00 | 0.00 | | | **13.99** | 10.2567 |
| Biological | 0.68 | 0.00 | 0.00 | 0.00 | | | **13.99** | 9.4433 |
| Chemical | 0.70 | 0.00 | 0.00 | 0.00 | | | **13.99** | 9.7930 |

**KCS - Port Arthur Loop Track**
**HGMi Functional Assessment and Mitigation Requirement Summary Sheet**
*Functional Values based on SWG HGM (Interim) Riverine Herbaceous / Shrub*
29-Aug-19

**KCS - Port Arthur Loop Track**

WAA (Herbaceous Wetlands) (0.06 Acres Permanent Impacts)

| | | | Post | | |
|---|---|---|---|---|---|
| | *Variable* | *Pre* | *1 year* | *5 Year* | *10 Year* |
| Duration of Flooding | Vdur | 0.75 | | | |
| Frequency of Flooding | Vfreq | 0.75 | | | |
| Topography | Vtopo | 0.10 | | | |
| Woody Vegetation | Vwood | 0.10 | | | |
| Midstory (shrubs/saplings/woody vines) | Vmid | 0.25 | | | |
| Herbaceous layer | Vherb | 1.00 | | | |
| Connectivity to other habitat types | Vconnect | 0.75 | | | |
| Detritus | Vdetritus | 0.50 | | | |
| Redoximorphic process | Vredox | 0.10 | | | |
| Sorptive Soil Properties | Vsorpt | 1.00 | | | |

| | | | | | | *WAA (Herbaceous Wetlands)* | | |
|---|---|---|---|---|---|---|---|---|
| | *FCI* | *FCI* | *FCI* | *FCI* | | *Difference* | *Acres* | *FCUs* |
| Physical | 0.09 | 0.00 | 0.00 | 0.00 | | | **0.07** | 0.0060 |
| Biological | 0.67 | 0.00 | 0.00 | 0.00 | | | **0.07** | 0.0467 |
| Chemical | 0.52 | 0.00 | 0.00 | 0.00 | | | **0.07** | 0.0362 |